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Abstract

Long-run trends in Africa's well-being are provided on the basis of a new index of human development, alternative to the UNDP's HDI. A sustained improvement in African human development is found that falls, nonetheless, short of those experienced in other developing regions. Within Africa, Sub-Saharan Africa has fallen steadily behind the North since mid-20th century. Human development improvement is positively associated to being coastal and resource-rich and negatively to political-economy distortions. Contrary to the world experience, in which life expectancy dominated, education has driven progress in African human development during the last half-a-century and, due to the impact of HIV/AIDS on life expectancy and the arresting effect of economic mismanagement and political turmoil on growth, advances in human development since 1990 have depended almost exclusively on education achievements. The large country variance of the recovery during the last decade suggests being cautious about the future's prospects.

JEL Codes: O15, O55, I30, N37

Keywords: Africa, Sub-Saharan Africa, Human Development, HDI, Life Expectancy, Education

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How has Africa performed in terms of well-being over the long-run? How has it behaved in comparison with other developing regions? On the basis of a new index of human development, constructed with an alternative approach to the United Nations Development Programme's index (UNDP 2010), an attempt is made to answer these questions.[1] The new "improved" Human Development Index (*IHDI*) provides systematically lower levels of human development, although roughly the same long-run trends, than both the conventional, pre-2010 UNDP Index (*HDI*) and the new 'hybrid' index (*Hybrid HDI*), and deepens the gap between Africa and the rest of the world.[2] A long-run improvement in African human development is observed which falls, nonetheless, short of those experienced in other developing regions such us Latin America or South-East Asia. Human development improvement in Africa since mid-20th century is positively associated to being a coastal and resource rich country and negatively to political-economy distortions. Education has been the driving force of human development since 1950. Stagnating life expectancy due to the spread of HIV/AIDS (and the resilience of malaria) together with arrested growth, largely resulting from economic mismanagement, political turmoil and civil wars, have made advances in human development dependent almost exclusively on education achievements since 1990 and help to explain Africa's falling behind in terms of well-being. Within Africa, the Sub-Saharan region has fallen behind the northern, Arab one, and a process of conditional convergence appears to have taken place over the last half a century. The recovery during recent years has varied widely across regions and countries suggesting a less optimistic prospect across the board than the one often expressed by international organizations and academics.

The paper opens with a critical discussion of the conventional UNDP human development index and its 2010-revised version, the 'hybrid' HDI, and presents the alternative index. The sources and procedures used to construct indices for each

[1] Fosu and Mwabu (2010) provide a recent overview of human development in Africa over 1970 and 2005 on the basis of the pre-2010 UNDP index.

[2] The alternative index proposed here revises and updates the 'improved' index of human development provided in Prados de la Escosura (2010) as it incorporates the new goalposts or upper and lower bounds fixed and the multiplicative combination of education indicators introduced in the UNDP revision of the HDI (HDR 2010)

dimension of human development are, then, discussed. Later, the new results for African human development are presented in comparative perspective, long-run trends across Africa's main regions are provided, and a closer look at the determinants of human development at country level from 1950 onwards is taken. Some remarks close the paper.

The UNDP Human Development Index: shortcomings and alternatives

Human development was originally defined as "a process of enlarging people's choices" that enables them "to lead a long and healthy life, to acquire knowledge and to have access to resources needed for a decent standard of living" (UNDP 1990: 10). As a synthetic measure of human development, the UNDP *HDI* attempts to capture a country's achievements in longevity, knowledge and standard of living through various indicators: the relative achievement in life expectancy at birth, in education, and in "all dimensions of human development not reflected in a long and healthy life and in knowledge" for which the discounted *per capita* income is taken as a surrogate (UNDP, 2001: 240).

The way in which progress in human development is measured matters. When the original values of a social, non-income dimension, say, life expectancy, which have biological asymptotic limits, are employed, identical changes in absolute terms result in lower increases as the starting level is higher.[3] Thus, following Amartya Sen (1981), a linear transformation was introduced for non-income dimensions in the human development index (expression 1) (UNDP 1990). This linear transformation represents an improvement over the use of the original values since it reduces the denominator and widens the index range.[4]

In the UNDP HDI, each dimension (I) is transformed into an index according to the following formula,

$$I = (x - Mo) / (M - Mo), \qquad [1]$$

[3] For example, 10 extra years of life expectancy represent a 33 percent increase if the initial value of life expectancy is 30 years, 25 percent if the starting level is 40 years … 14 percent if it is 70 years.

[4] However, as it will be shown below, it does not suffice to solve the comparability problems over time and space.

Where *x* is the observed value of a given dimension of welfare, and *Mo* and *M* represent the maximum and minimum values, or goalposts. Goalposts representing levels above and below those ever achieved were chosen for each indicator in order to facilitate comparisons over time. Each dimension ranges, thus, between 0 and 1. Then, the HDI was obtained, up to 2010, as the unweighted arithmetic average of the three dimensions' indices.

From 1995 to 2009 *Human Development Reports* kept the same goalposts. For life expectancy at birth the maximum and the minimum values were established at 85 and 25 years, respectively. For education, adult literacy and gross enrolment (primary, secondary, and tertiary) rates, with maximum and minimum values of 100 and 0, were combined using two-thirds and one-third weights, respectively. In the case of per capita GDP, the maximum and minimum values were 40,000 and 100 dollars, respectively, and, in 1999, a logarithmic transformation was introduced to allow for the assumed diminishing returns of income in terms of human development since this indicator is employed as a crude proxy for those dimensions of wellbeing other than education and health (UNDP 1999).[5]

In October 2010 the *Human Development Report* (UNDP 2010) introduced major changes in the indicators used to capture human development dimensions. Thus, for education the expected years of schooling for a school-age child and the mean years of schooling for population aged 25 and above were combined using an unweighted geometric average.[6] In the case of income, PPP-adjusted per capita Gross National Income (GNI) –that is, GDP plus net receipts of primary income from abroad-, replaced purchasing-power-adjusted GDP per head. The inclusion of GNI per capita represents an improvement as it captures the income accrued to residents of a

[5] Prior to 1999 per capita income was discounted above a certain threshold -the world average income- with Atkinson's formula for the utility of income. So, for example, the maximum level, $40,000 became just $5,448 in 1995 (UNDP 1995: 134). The logarithmic transformation implied, in turn, discounting all income, not just the income above a given level (UNDP 1999: 159).

[6] Mean years of schooling had been used previously in the Human Development Report 1994. The education attainment index was derived by weighting the mean years of schooling index by one-third and the adult literacy rate index by two-thirds (UNDP 1994).

country, not just the income produced in the country regardless the share retained at home.[7]

The new HDI also altered its goalposts, which now correspond to the maximum and minimum values for each dimension observed during the period 1980-2010. Upper and lower bounds for life expectancy have been fixed at 83.2 and 20 years, respectively. The expected years of schooling and the mean years of schooling were assigned maxima of 20.6 and 13.2 years, respectively, and minima of zero. In the case of per capita income, the 40,000 PPP US dollars maximum represented, at the time of its introduction in the early 1990s, an upper bound that no country had ever reached. As such an upper limit has been overcome in current price PPP dollars, it has been replaced by the maximum observed (108,211 PPP $ US 2008). The minimum has been established in 163 PPP $ US 2008.

A major change in the new HDI results from an attempt to mitigate the substitutability between its different dimensions, that is, to avoid that a high achievement in one dimension linearly compensates for a low achievement in another, so the indices for each dimension are combined using a geometric, rather than an arithmetic, average.

However, the new index is very data demanding, and when long-run trends are considered, a non negligible part of the information needed for its construction is not available across countries (for example, mean years of schooling or GNI). Thus, 'old' indicators (namely, literacy and school enrolment for education, and real GDP per head) had to be recovered in so called 'hybrid' human development index due to its wider availability over space and time. Nonetheless, the indices for each dimension were derived with the new goalposts and were combined with a geometric average in the 'hybrid' HDI (Gidwitz *et al*. 2010: 3).

Even if the multiplicative formula of the new human development index may be considered a substantial improvement over the previous additive one (Desai 1991,

[7] Thus, GNI (or GNP) includes international flows such as remittances and aid, and excludes income generated in the country but repatriated abroad.

Sagar and Najam 1998)[8], the linear transformation of the social, non-income dimensions –with asymptotic bounds- remains a serious obstacle for the comparison of human development levels across countries and over time. Thus, in the linear transformation, for a given absolute change in a social dimension, its corresponding increase would be larger the lower the initial level, favouring, hence, the country with the lower initial level of human development.[9] Such a bias is only justifiable from a normative point of view, when the stress is place on achieving a 'basic' or minimum level of human development. Otherwise, it narrows down differences across countries and introducing a spurious tendency for human development levels to converge.

An attempt to facilitate comparability of HDI levels across countries has been made in the Human Development Report 2010 by introducing the alternative concept of 'deviation from fit', which provides a country's deviation from its expected performance, given its initial HDI (UNDP 2010: 217). Unfortunately, the 'deviation from fit' only allows precise comparisons between countries starting from the same level evidencing, therefore, the limitations of the new index.[10]

Another option is provided by the 'shortfall' approach (Sen 1981: 292), which measures, for a given dimension, the relative fall in the distance between the country's initial level and some chosen upper bound. Contrary to the linear transformation, this

[8] There are a, nonetheless, discrepancies about the choice between an arithmetic and a geometric average to combine the dimensions' indices. See, for example, a harsh critique of the new index in Ravallion (2010).

[9] Thus, if the same absolute changes of the previous example (footnote 3) are considered with the linear transformation (expression 1) and the new goalposts (83.2 and 20 years, as maximum and minimum), 10 extra years of life expectancy would represent a 100 percent increase when the initial value of life expectancy is 30 years, a 50 percent increase if it is 40 years, and a 20 percent if it is 70 years. It can be observed that the bias towards low initial levels not only remains but it is magnified by the linear transformation.

[10] The Human Development Report 2010 defines the 'deviation from fit' as "a measure of progress that captures changes in a country's indicators relative to the average change for countries starting from the same point" (UNDP 2010: 26).

method tends to favour the country with the higher initial level (Gidwitz *et al*. 2010: 19).[11]

It appears, therefore, that a linear transformation of the original values of each dimension -currently used in the HDI- does not provide a solution to the comparability problem over space and time. Or, more precisely, in Amartya Sen's words (1981: 292), "as, say, longevity becomes high, it becomes more of an achievement to raise it further".[12] Nanak Kakwani (1993: 312) concurs: "as the standard of living reaches progressively higher limits, incremental improvement should require much greater resources than similar incremental improvements from a lower base".[13]

Perhaps, the problem derives from the fact that ethical and measurement aspects of wellbeing are at odds in the human development index. As Partha Dasgupta (1990: 23) pointed out:

> "Equal increments are possibly of less and less ethical worth as life expectancy rises to 65 or 70 years and more. But we are meaning performance here. So it would seem that it becomes more and more commendable if, with increasing life expectancy, the index were to rise at the margin. The idea here is that it becomes more and more difficult to increase life expectancy as life expectancy rises."[14]

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[11] If the same absolute changes of the example in footnotes 3 and 8 are considered once more, 10 extra years of life expectancy would represent a 19 percent 'shortfall' reduction when the initial value of life expectancy is 30 years, a 23 percent 'shortfall' reduction if it is 40 years, and a 76 percent 'shortfall' reduction if it is 70 years.

[12] Thus, the "intrinsic" value of a single "functioning", for example, the ability to live a healthy life, is not captured by its linear measure, since, as Srinivassan (1994: 240) argues, "a unit decrease in the deprivation in life expectancy at an initial life expectancy of, say, 40 years is not commensurate with the same unit decrease at 60 years".

[13] Kakwani's rationale can be challenged, for example, on the basis that an 'improvement in education attainment may not be more difficult as the level of education becomes higher and higher' (Tsui 1996: 302).

[14] An example of giving priority to the ethical aspect over the measurement of wellbeing is provided by Noorbakhsh (1998) who modified the human development index by extending the principle of diminishing returns to education (but not to longevity for which the linear transformation was kept) on

It should be bearded in mind that in the case of, say, longevity, the longer life expectancy, the longer the number of years during which good health is enjoyed[15]. A similar association can be suggested between the increase in the number of years of schooling and the quality of the education received at every level.

Since social indicators such as life expectancy, infant mortality, or literacy have -in opposition to GDP per head- asymptotic limits, which reflect physical and biological maxima, Kakwani (1993) explored the non-linearity of the relationship between the value of each social indicator and its achievement. Using an axiomatic approach, Kakwani (1993) constructed a normalised index from an achievement function in which an increase in the standard of living of a country at a higher level implies a greater achievement than would have been the case had it occurred at a lower level[16],

$$f(x, Mo, M) = ((M - Mo)^{1-\varepsilon} - (M - x)^{1-\varepsilon}) / ((M - Mo)^{1-\varepsilon}), \quad \text{for } 0 < \varepsilon < 1 \quad [2]$$

$$= f(x, Mo, M) = (\log(M - Mo) - \log(M - x)) / \log(M - Mo), \quad \text{for } \varepsilon = 1 \quad [3]$$

Where x is an indicator of a country's standard of living, M and Mo are the maximum and minimum values, respectively, and log stands for the natural logarithm. The achievement function proposed by Kakwani (1993: 314) is a convex function of x, and it is equal to 0, if $x = Mo$, and equal to 1, if $x = M$, ranging, thus, between 0 and 1.

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the basis that that 'under similar conditions the early "units" of educational attainments to a country should be of much higher value than the last ones' (Noorbakhsh 1998, p. 519).

[15] The ideal measure would be health-adjusted life expectancy (HALE), that is, the average number of years a person can expect to live in good health. Unfortunately this measure is only available for developed countries since 2003. In OECD countries the proportion of years a person enjoys good health tends to be about 90 percent. Cf. http://www.conferenceboard.ca/hcp/details/health/life-expectancy.aspx#quality. A measure of health expectancy, 'Healthy Life Years' (HLY) has been defined as disability-free life expectancy and estimated for European Union countries in recent years (Cf. Jagger et al. 2009). It shows that, for example, in 2005, the number of Healthy Life Years (HLY) in the European Union (EU) reached 60.8 years for men and 62.1 years for women which represented 80.1 and 75.8 percent of the total life expectancy at birth for men and women, respectively (EHEMU 2005).

[16] For example, in the case of longevity, "a further increase must be regarded as a greater achievement than an equal increase at lower levels of longevity, …the achievement must increase at a faster rate than the longevity" (Kakwani 1993: 313).

In this context, the UNDP HDI represents a particular case, for $\varepsilon = 0$, which yields expression [1] for each dimension of the index.

Following Kakwani's proposal, the original values of the social, non-income dimensions of the index have been transformed using a convex achievement function (expression 3).

Thus, in the alternative human development index, *IHDI*, as a social indicator reaches higher levels, its increases represent higher achievements than would have occurred had the same increase taken place at a lower level, while, in the UNDP 'old' and hybrid *HDI*, they reflect the same change regardless of its starting level.[17] The new "improved" human development index [*IHDI*] was derived, then, as a multiplicative combination of the transformed values of each dimension.

If we denote, as *L* and *E*, the non-linearly transformed values of life expectancy and education, and as *UNY* the adjusted *per capita* income, the "improved" human development index can be expressed as,

$$\text{IHDI} = L^{1/3}\, E^{1/3}\, UNY^{1/3} \qquad [4]$$

Human development dimensions: sources and procedures

A brief presentation of the sources and procedures used to construct indices for each dimension of human development is provided in this section. A more detailed explanation is offered in the Appendix A. Data availability precludes presenting estimates by country before 1950, but population-weighted averages for five regions: North, Central, East, West, and Southern, as well as for Sub-Saharan Africa (which includes the last four regions) and Africa as a whole, are provided at benchmark years back to 1870.[18]

Although the new goalposts have been accepted, due to the use of a convex achievement function, some minor modifications were introduced to improve the

[17] If the same absolute changes of the example in footnote 3 are considered with the convex transformation (expression 3) and the new goalposts once again, 10 extra years of life expectancy would represent a 121 percent increase when the initial value of life expectancy is 30 years, a 69 percent increase if it is 40 years, and a 90 percent increase if it is 70 years.

[18] These five regions are defined according the African Development Bank (See Appendix A).

presentation of the results. Thus, for life expectancy at birth, although UNDP (2010) maximum and minimum levels of 83.2 and 20 years have been adopted, the lowest historical level has been set at 25 years.[19]

Life expectancy data for most countries during the period 1980-2007 comes from the 2010 Human Development Report (UNDP 2010) while the United Nations' Demographic Yearbook Historical Supplement (United Nations 2000) provides the rest of the data from 1950 onwards. Pre-1950 estimates come mostly from James Riley (2005b). Dearth of data forced me to make some strong assumptions. Thus, lower bound estimates for the 1940s (and even occasionally 1950) were accepted for 1938. Furthermore, prior to 1929, life expectancy at birth was assumed to be 25 years (the assumed minimum historical value) for most Sub-Saharan African countries (See Appendix A). The reader may wonder to what extent the results are conditioned by these assumptions. The fact that the demographic transition was comparatively delayed in Africa, usually not until the 1920s, when life expectancy at birth had mean and median values of 26.4 and 25.4 years, respectively (Riley 2005b), suggests that the bias introduced by these assumptions is not significant**.**

In the case of education indicators (literacy and enrolment rates), UNDP values of M=100 and Mo=0 have been kept, but the highest and lowest historical values were set at 99 and 1 percent, respectively.[20]

Empirically, adult literacy is a far from uniform concept. Reading and writing do not necessarily go together in developing countries (Markussen 1990, Nilsson 1999)

[19] Truncating the lower part of the distribution by assuming a life expectancy 'floor' of 25 years -which is not far from the actual value in the poorest developing countries, both in the present and in the past- has the advantage of allowing the inclusion of countries for which no data are available. Moreover, given a minimum, M_o, of 20 years, the 25 years 'floor' of precludes a zero value for the transformed life expectancy and, consequently, for the *IHDI*.

[20] The assumption of 1 percent as the lowest historical value for literacy and enrolment seems historically more reasonable than accepting zero, as do the 'old' and hybrid *HDI*, while a historical maximum of 99 percent is also accepted for adult literacy in the *HDI*, but not in the hybrid HDI, in which the maximum observed level for the gross enrolment rate is 115.8 percent (Gidwitz et al. 2010). A consequence of assuming a historical lower bound of 1 percent is preventing zero values for the transformed variables.

and, thus, the estimated literacy rate varies depending on whether a wide (reading ability only) or a narrow (reading and writing skills) definition of literacy is used. The uncertainty about literacy rates even in recent times is evidenced by the wide discrepancies between the UNESCO and UNDP figures over the years 1980-95 and, thus, in order to keep consistency with those from the Human Development Reports, I have chosen the UNDP figures with a few exceptions.[21]

The 2009 Human Development Report (UNDP 2009) provides most of the data on literacy for 1980-2007. Most data from 1950 onwards come from UNESCO (1970, 2002) and the World Bank (2010), completed with data from Banks (2010), Hayami and Ruttan (1985), and Easterly (1999). UNESCO (1953, 1957) and Flora (1973) provide data for the pre-1950 era.

Enrolment rates basically capture the expansion of formal education and do not inform about the length of the academic year, the quality of education, or student completion (Benavot and Riddle 1988). Historical evidence only allows one to estimate the unadjusted rate of total enrolment, that is to say, the percentage of population aged 5-24 enrolled in primary, secondary, and tertiary education. Only for the recent past, international organisations (UNESCO, OECD, World Bank) provided gross enrolment rates, in which the denominator is adjusted to the age bracket for each type of schooling (primary, secondary, etc.). Thus, unadjusted rates will usually under-estimate gross enrolment rates, as, in the past, hardly any country's education extended to those aged 24 years. For the historical (pre-1980) estimates this downward bias has been corrected with the ratio between the gross and unadjusted enrolment rates in 1980.

The 2009 Human Development Report (UNDP 2009) provides most of the data enrolment for 1980-2007, completed with UNESCO (2010). For the pre-1970 period, enrolment figures come mostly from UNESCO (2010), Banks (2010) and Mitchell (2003a, 2003b, 2003c).[22] With regard to the relevant population, see the Appendix A.

[21] The exceptions are Algeria (1990-1995) and Botswana (1980-85). See the Appendix A.

[22] Data for Algeria and Tunisia come from Fargues (1986).

The UNHDI assumption that the marginal utility of *per capita* income declines as it reaches higher levels has been accepted. Were such an assumption relaxed, the range within which human development levels vary would increase substantially. The fact that this transformed measure was chosen by the UNDP to proxy any dimension of well-being (excluding health and education) explains why such an astringent assumption has been kept. Thus, the log of GDP per head is employed in expression [1].

In historical terms, there is practically no discrepancy in the available per capita GDP figures (expressed in Geary-Khamis [G-K] 1990 $) between the old UNDP 'cap' (G-K 1990 $ 40,000) and the new 'observed maximum' (G-K 1990 $ 42,916 for Qatar in 1973), although a significant difference appears between the previous lower bound of $100 and the observed minimum of $ 206 (D.R. Congo in 2001) (Maddison 2010).[23] Similarly to the cases of social indicators, I have assumed a lower bound for *per capita* GDP that has been set at G-K 1990 $ 300, which represents a basic level of physiological subsistence (Sagar and Najam 1998: 254, Milanovic *et al*. 2011), below the World Bank's extreme poverty threshold of G-K 1990 $ 1 a day per person and Maddison's (2006) G-K 1990 $ 400 per head.[24]

Post-1950 GDP per head (G-K 1990 $) data come from Maddison (2006, 2010) unless stated in the Appendix A. Pre-1950 era estimates are scant.[25] As Gareth Austin (2008a: 1011) put it, "there are no very serious estimates of aggregate output, because we do not know the size of domestic marketed activity, nor of non-marketed output".

[23] In the 2010 Human Development Report (UNDP 2010), expressed in 2008 international dollars, the lowest level observed since 1980 has been established in $163, which is equivalent to $108 in 1990 Geary-Khamis dollars. The highest per capita income level reached over the same time span, $ 108,211 international dollars of 2008, corresponds to $ 72,020 Geary-Khamis dollars of 1990. Such a figure has never been achieved in Geary-Khamis 1990 dollars (Maddison 2010) estimates, so I have chosen the observed maximum and minimum values over 1870-2007 in Maddison (2010) estimates.

[24] This lower bound for per capita income, which, no doubt, truncates the data set at the bottom, allows me to consider countries in earlier periods for which no data exist and that, otherwise, would reduce the country sample considered here.

[25] Ghana, along South Africa, is the only Sub-Saharan African country for which crude estimates exist (Maddison 2006). Maddison (2006, 2010) also provides estimates and conjectures for North Africa.

Austin suggests using the much better information on the income terms of trade although -he warns us- probably overestimate per capita income growth. In fact, attempts have been made at approximating GDP per head with the purchasing power of exports or income terms of trade (that is, the value of exports per head deflated by the price of imports) (Manning 1982). As "specialization for export production is at the heart of Africa's growth episodes" (Jerven 2010: 130), Szereszewski (1965) drew trends in output per head for late 19th-early 20th century Ghana by assuming that traditional consumption per head was stagnant and all the increase in output per head resulted from the modern sector of the economy linked to the international economy.

Thus, one possibility is to derive per capita GDP by assuming that no increase in output per head took place outside the part of the economy associated to international trade which would grow, in turn, as the purchasing power of per capita exports. In such a restrictive assumption an additional problem is setting the relative size, in terms of GDP of the traditional, non-tradable, and the modern, tradable, sectors, as well as the trade spillovers.

Since this is a too astringent and rather arbitrary procedure, I chose an alternative econometric approach to establish an association between per capita GDP and the income terms of trade per head (that is, the value of current exports deflated by the price of imports and, then, divided by each country's population) on the basis of the available evidence for the post-1950 period.[26] Using a panel data approach with nine benchmarks (for years ended in 0 and 5), the log of GDP per head (Maddison 2010) was regressed on the log of per capita income terms of trade -computed by deflating African countries' nominal export values with the industrial countries' export unit values (taken from IMF 2003) and, then, divided by the countries' population (from Maddison 2010)-, its quadratic term –in order to allow for non-linearities-, a time trend interacting with the log of income terms of trade –which would capture whether the association between per capita income and the income terms of trade changes over time, and dummy variables to capture whether a country was coastal (value 1) or landlocked (value 0), resource rich (1) or poor (0) (from Collier and

[26] Actually, only data for the period 1950-1990 was used since the impact of civil wars and, particularly, HIV-AIDS probably may have represented a major regime change.

O'Connell 2008), had a colonial background (1, if former French colony; 2, if former British colony; 0 otherwise) (Bertocchi and Canova 2002), and to which of the five regions distinguished by the African Development Bank (north, central, east, west, and southern) it belonged. The econometric results, provided in the Appendix B, Tables B1-B4, show a god fit that explains almost three-fourths of the variance. Using the parameters from the equation and the values of each independent variable, GDP per head levels were obtained for African countries over the period 1870-1938, under the arbitrary assumption that the econometric relationship derived for the period 1950-1990 is stable over time. Although this represents a 'heroic' assumption, it seems to be the best alternative given the lack of data on Africa's GDP, limited to Maddison's (2010) conjectures for the continent as a whole at 1870, 1900, 1913, and 1940 benchmarks.[27]

For those few countries for which GDP estimates were available, these were accepted and used together with those indirectly estimated. See Appendix A.

Later, per capita income levels were transformed into indices, using logs, with expression [1] and, then, combined with education and life expectancy indices in order to obtain human development indices for each country. Then, as pre-1950 individual country values would be highly conjectural, population-weighted aggregates were computed for the five regions, North, Central, West, East, and Southern, defined by the African Development Bank (See Appendix D for the original values of life expectancy, education, and GDP per head for Africa and its main regions).[28]

Trends in Human Development

A long-run improving trend in human development for Africa and Sub-Saharan Africa is offered by both the hybrid and the new indices in which three differentiated phases can be distinguished, two periods of slow growth, 1870-1913 and 1980-2007, and sustained improvement in between (Figures 1 and 2 and Table 1). Some major discrepancies exist, nonetheless, between the UNDP indices, both the 'old' and new 'hybrid' *HDI*, on the one hand, and the 'improved"' one (*IHDI*), on the other: a

[27] There are unpublished estimates for Sub-Saharan African GDP, 1910-1950, by Smits (2006).

[28] As Jerven put it (2009: 77), "with the exception of some resource-rich enclaves, a few island states, and South Africa, the income of one African economy is not meaningfully different from another".

significant difference in their initial levels -much lower in the case of the *IHDI*-, a widening gap in absolute (but not in relative) terms between them, with the *IHDI* lagging behind, and a faster growth for the *IHDI*. Another important discrepancy is that, in the *IHDI*, differences across countries deepen, and the gap between Africa and the rest of the world widens. Thus, although relative to the world as a whole, Africa (and Sub-Saharan Africa [SSA]) follow the same trends: falling behind until 1913; catching up until 1980; and, thereafter, stagnating (Africa) and falling behind (SSA) –at least, until 2000- their comparative levels are significantly lower in the *IHDI* (Figures 3 and 4). Thus, according to the hybrid *HDI*, Africa and SSA represented 70 and 64 percent of the world average by 2007, while they only reached 55 and 48 percent, respectively, with the *IHDI*.

A better perception of Africa's human development performance is obtained by comparison with that of other developing regions (Table 2 and Figure 5). Africa and Asia (excluding Japan) started from similar levels, with Africa's (and Sub-Saharan Africa's) *IHDI* representing about four-fifths (and three-fourths) of Asia's. Progress in Asia during the early twentieth century increased the differential, but Africa managed to reduce it during the 1930s and 1940s, and, again, in the 1970s, but fell behind since 1980. The comparison to the developed world (OECD countries) indicates that, while Asia and Latin America have been catching up since the early twentieth century - with Asia reducing its differential with Latin America - Africa and, in particular, Sub-Saharan Africa ceased to catch up from 1980 onwards, when their level of human development was less than one-third of OECD's (Figure 6).[29]

Gains in the IHDI are driven by the progress of its social dimensions. Life expectancy is the main contributor to improving long-run human development in the world, particularly between 1880 and 1990 (Prados de la Escosura 2010). This fact is associated with the diffusion of preventive methods of disease transmission -including low cost improvements in health and knowledge-dissemination through schooling

[29] OECD here refers to its pre-1995 members: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland – only since 1990-, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the UK and the US. No estimates have been obtained for Luxemburg. Turkey, although an OECD member, has been included in Asia in order to make the group more homogeneous in terms of development.

(Riley 2005a)-, with the introduction of new vaccines (since the 1890s) and drugs to cure infectious diseases (sulfa drugs since the late 1930s and antibiotics since the 1950s) (Easterlin 1999, Jayachandran *et al*. 2010), and with the public provision of health (McKeown *et al*., 1975, McKinley and McKinley 1977, Loudon 2000, Cutler and Miller 2005).

In Africa (and Sub-Saharan Africa), however, life expectancy was the main contributor to the improvement of human development only during the 1930s and 1940s and, then, education took the lead (Tables 3-4 and Figure 7). The collapse of life expectancy -largely as a result of HIV-AIDS-, together with the contraction in *per capita* income and the deceleration in the education expansion -associated to ethnic conflicts and unsound economic policies (Collier 2000)-, explain the weak advance in human development during the last two decades of the twentieth century. The reversal of this trend in the 2000s has been helped by the recovery in economic activity and, to less extent, in life expectancy, although education remains the main force behind the advance in African human development. This picture is stressed when the focus shifts to Sub-Saharan Africa, where life expectancy made a negative contribution during the 1990s (Figure 8). The comparison with other developing regions stresses the sluggish improvement of life expectancy in Africa and helps to explain the continent's widening lag in human development. Catching up with OECD countries slowed down in the developing regions from the 1970s onwards and came to a halt from 1990 onwards, when Africa fell behind (Figures 9-10). A mild catching up in education did not suffice to offset the life expectancy backlash (Figures 11-12)

Within Africa, a growing divergence between North and Sub-Saharan Africa emerged since mid-twentieth century and deepened from 1980 onwards (Figure 13). A closer look at Sub-Saharan Africa regions reveals persistent differences in levels of human development between Southern Africa and the rest, and highlights the change in the regional balance from 1990 with Central Africa falling behind and Southern Africa stagnating and being caught up by the western and eastern regions in the 2000s (Table 5 and Figure 14).

When the IHDI is decomposed into its dimensions, it emerges that life expectancy was a major force in North Africa between 1938 and 1950 and still a

substantial one during the 1950s. South of the Sahara its role, however, was less significant, dominating only in the 1930s (West Africa) and in the 1940s (Southern Africa), with the exception of the East in which longevity constituted the almost exclusive source of human development progress between 1929 and 1950 (Figures 15-19). The collapse of *per capita* income growth in Sub-Saharan regions since the mid-1970s -especially dramatic in Central Africa and to a lesser extent in Southern Africa- together with longevity's poor performance -which declined in the Central and Southern regions at the turn of the century-, meant that during the second half of the twentieth century most of the gains in human development came from education in Sub-Saharan Africa.

Data availability allows us to decompose regional behaviour at country level only from 1950 onwards (Tables 6-7). Following Paul Collier and Stephen O'Connell (2008), a typology of success in raising human development in Africa can be established as the interaction of opportunities (location and endowments) and choices. In such an interaction, these authors emphasise the negative role played by 'dysfunctional political-economy configurations' or 'syndromes', that is, "salient episodes of purposive failure attributable to human agency within the society" (Collier and O'Connell 2008: 89). Syndromes are defined by the choices made and may be classified into four categories: regulatory[30], distributive[31], inter-temporal[32], and state breakdown[33].

[30] This implies regulation of economic activity, the ownership of productive enterprises by the state, and state-led industrialization behind high trade barriers and financed through the taxation of exports (Collier and O'Connell 2008: 90). These authors all distinguish between 'hard' and 'soft' regulatory controls.

[31] This syndrome concerns "redistribution of income between ethno-regional groups" (Collier and O'Connell 2008: 89, 91-2). An extreme form is looting by which is meant "a situation in which assets, whether private or public, are stripped outside the context of the rule of law and due process".

[32] Two main ones are described: anticipated redistribution –which occurs when an elite group anticipates a loss of power-, and unsustainable spending –which syndrome occurs when a country fails to transform temporary income into permanent income (Collier and O'Connell 2008: 94-95).

[33] In which the state is unable to maintain internal security (Collier and O'Connell 2008: 96).

In North Africa, coastal, resource-rich countries appear at the top. Libya exhibits the highest level of human development followed by Tunisia and Algeria, with the former catching up to Libya from 2000 onwards. Mauritania, coastal, resource-rich, and largely a syndrome-free country remained, though, at the bottom even though she experienced an intense improvement over 1950-70.

If we take a closer look at Sub-Saharan regions we find that, in Central Africa, a clear divide appears to exist between coastal, resource-rich countries (Gabon, Congo -until the mid 1980s-, and Equatorial Guinea -since the mid-1990s) and landlocked, resource-poor countries (CAR, Chad, and Democratic Republic of Congo). State breakdown, including civil conflict, and looting, are features of these three countries, and especially dramatic in D.R. Congo. The overall negative human development performance of the region during the 1990s, largely associated with the decline in life expectancy as a result of HIV/AIDS, is attributable to the behaviour of the two Congo states.

In West Africa, coastal and increasingly syndrome-free countries: Cape Verde, especially, Ghana, Côte d'Ivoire –until 1990-, with Benin and Nigeria joining them in the early 21st century, are above the regional average, while landlocked, and resource-poor countries and syndrome victims (Burkina Faso, Mali –which suffered from looting between the late 1960s and the early 1990s-, and Niger –a failed state during the 1990s) are way below the average level. An exceptional addition is Sierra Leone, a coastal resource-rich country, but a breakdown state in the 1990s.

In East Africa, landlocked, resource-poor countries: Ethiopia –suffering hard regulatory controls-, Burundi –a breakdown state in the 1960s and from the late 1980s onwards, and under regulatory and redistributive syndromes-, and, to less extent, Rwanda -which experienced a redistributive syndrome between the early 1970s and 1990s- are at the bottom of human development. Seychelles, in particular, and Kenya -until 2000- are way ahead the rest. Interestingly, Uganda and Sudan-landlocked, resource-poor nations, suffering looting and state failure during different periods-, and Tanzania -coastal but poorly endowed-, have been catching up to Kenya since the late 1990s.

In Southern Africa, Angola and Mozambique, coastal countries severely hit by civil war, state failure, and regulatory and redistributive syndromes, and to a lesser extent, Malawi, a landlocked but syndrome-free country, have been at the bottom, with the post-1990 addition of Zimbabwe and Zambia. The latter's misfortunes can hardly be attributed to being landlocked, but to their economic and political mismanagement (Mwanawina and Mulungushi 2008). Zambia, a resource rich country, experienced 'unsustainable spending' from the early 1970s to the late 1980s (Jerven 2010b). In Zimbabwe, hard regulatory controls (including state ownership of enterprises and protectionism) since 1980 have gone hand-in-hand with looting at the turn of the 21st century. Meanwhile, at the top, we find coastal and largely syndrome-free countries: Mauritius, clearly ahead of the rest, Namibia, and, despite having been hit by HIV/AIDS since 1990, South Africa and Botswana (Maitpose and Matsheka 2010; Jerven 2010b).

If we look, now, at the country ranking, we find that northern and southern countries compose the first quartile throughout the six decades considered. Resource-rich countries and small islands have gradually gained weight over time and, since 2000, comprised the top decile. North African countries have improved their relative position, and, by 2007, all, but Mauritania, were in the first quartile (and three in the top decile), while, in 1950, only three of them (Egypt, Algeria, and Tunisia) belonged there (Table 8). As regards Sub-Saharan countries, only Mauritius, Namibia, and South Africa, from the southern region, have been part of the first quartile over the entire period 1950-2007. Other countries in the southern region belonged temporarily to the first quartile –Madagascar, until 1960; Lesotho, up to 1965; Zambia, until 1970; and Zimbabwe, up to 1990-. In addition, Swaziland and Botswana joined it in 1965 and 1975, and remained there until 1995 and 2000, respectively. Remarkable are the cases of Zimbabwe, which moved from the first to the third quartile between 1990 and 2007, and Zambia, which fell steadily from the top quartile in 1970 to the fourth quartile in 2007. In other regions south of the Sahara only few countries were temporarily part of the first quartile.[34]

[34] That is, Congo (1975-1990), Equatorial Guinea (2000-2007), and Gabon (1965-2007) in Central Africa; Ghana (1950-1965), and Cape Verde (1995-2007) in West Africa; and Uganda (1950), Kenya (1975-1980)

The lowest quartile has had a very stable composition: most countries at the bottom have remained there throughout the nearly sixty years considered. These include landlocked and resource-poor countries (Burkina Faso, Mali, Niger, in West Africa; Burundi, in East Africa; and Chad, in Central Africa) and coastal countries, both resource-rich (Guinea, and Sierra Leone) and resource-poor (Guinea-Bissau, and Ethiopia, until 1993), all of them having gone through episodes of severe economic regulation and redistribution, including looting, and/or state breakdown. These bottom countries were joined at the turn of the twentieth century by landlocked and resource poor countries -CAR (1980-2007), Rwanda (1990-1995), and D.R. Congo (1995-2007)-, which had in common failed states and civil conflict, plus Zambia (2000-2007) -a resource-rich one which suffered the unsustainable spending syndrome associated to the depletion of its copper deposits-, and Mozambique (1985-1995) and Angola (at the bottom over 1950-1975, and, again, 1990-2000), which experienced regulatory syndrome, including looting, and state breakdown, associated to civil war.

A glance at the country ranking in terms of human development progress is also illuminating (Table 9). Fast improving countries exhibit a negative correlation with their initial levels over 1950-2007 (-0.65) (Table 8). This suggests a mild tendency to convergence. In fact, nine of the twelve countries in the upper quartile, in terms of human development gains over 1950-2007, belonged to the lower quartile of the level of human development in 1950. The opposite is found for the slowest improving countries, with seven out of twelve countries belonging to the upper quartile in 1950. When a shorter time-span is considered, 1950-1980, the negative correlation is slightly weaker (-0.6), and this translates in that only five out of twelve countries in the top quartile of growth belong to the lowest quartile in terms of levels in 1950, and seven of the twelve slowest improvers pertain to the top quartile in terms of levels in 1950. The correlation weakens further over 1980-2007 (-0.4) and only four out of twelve of the top performers in terms of human development improvement were at the bottom of 1980 levels, while six of the twelve slowest improvers pertain to the top quartile in terms of levels in 1980.

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and Seychelles (1990-2007) in East Africa. Since no human development estimates are available for Seychelles before 1990 there is possibility that it already belonged to the first quartile.

Which dimensions of human development determine the improvement in the IHDI across African countries? Education emerges as the main force throughout the last six decades (about two thirds of it in Sub-Saharan Africa and 60 percent in Africa), with its contribution enhanced during the last three decades due to the slowing down in longevity gains (up to three-fourths and two-thirds in SSA and Africa, respectively) (Figures 20-22). In fact, a significant distinction can be made between the pre- and post-1980 periods. Over the period 1950-1980, life expectancy was the second main contributor to human development progress, with a stable share of around one-third. However, since 1980, the share of life expectancy has fallen to about 20 percent in Sub-Saharan Africa (although increased in North Africa) and, more importantly, its variance increased across countries, with a negative contribution, on average, in Southern Africa (-10 percent) and a very low contribution in Central Africa (15 percent, on average). Meanwhile, the always residual contribution of income, below 10 percent over 1950-1980, collapsed into insignificance during the period 1980-2007. It is worth noting that regions whose life expectancy was higher in 1980 were those more heavily hit by HIV/AIDS, so the mild convergence observed is, to a large extent, its result.

So far, a descriptive typology of African countries through out the post-1950 era has been carried out from which it can be suggested that being a coastal and a resource rich country appears to be correlated with a higher level of human development. Moreover, free-syndromes countries behave, on average, better in terms of human development than more regulated societies, particularly, those suffering severe syndromes of regulation and redistribution, looting, especially. Furthermore, low human development and civil and conflict seem to be correlated, as suggested by the experiences of war-torn countries.[35] A more precise association can be derived, however, through a pool regression on the basis of six periods (1950-60, 1960-70, 1970-80, 1980-90, 1990-2000, 2000-2007) are offered. Thus, the log growth rate of human development over each decade has been regressed on the (log of the) level of human development at the initial year, and a set of dummies capturing whether, at the initial year of each decade, countries suffered from syndromes, were

[35] Angola and Mozambique (1970s-1990s), Burundi (1990s), Chad (1970s), D.R. Congo (since the 1970s and, especially, in the 1990s), and CAR (1970s and 1980s)

coastal, resource rich,located in the north of Africa, and with a colonial past (had the country been a British colony, value 2; French colony, value 1; 0, otherwise)..[36] The econometric results –derived with fixed period effects- confirm some of the descriptive results presented in a less systematic way above (Table 10). There is convergence, which increases when it is conditioned. That is, a negative and statistically significant association is observed between the rate of variation of human development and its initial level. The colonial legacy had a negative, but not statistically significant, impact on the growth rate. Countries suffering from syndromes achieve a lower improvement of its human development for identical initial levels of human development. Moreover, being a coastal, rather than landlocked country, and to a lesser extent, resource-rich, brings with it, other things being equal, higher gains in human development. Furthermore, being part of the northern region goes together with higher growth in human development for any given initial level.

After looking at beta-convergence, it is worth considering how the inter-country dispersion (sigma-convergence) of human development evolved in post-1950 Africa. Three differentiated phases can be established, one of declining inequality up to 1980, though more intense until 1970, that appears deeper in Sub-Saharan Africa than in the continent as a whole (Figure 23). Moreover, when population-weighted, the decline in dispersion is less intense. Then, the dispersion increased between 1980 and 1995, especially for Sub-Saharan Africa (population-weighted measure). Lastly, a sustained reduction in inequality, stronger in Sub-Saharan Africa, is observed since 1995. If, in turn, the dispersion of each of the human development dimensions is considered, it becomes clear that the main force behind the inter-country inequality decline in human is education, which exhibits a steady fall since 1950, but for the years 1980-1995 (Figure 25). Inter-national inequality in life expectancy follows the three phases previously described for human development in the case of Sub-Saharan Africa (Figure 24); but when Africa as a whole is considered, inequality increases steadily between 1980 and 2005, highlighting the growing divergence between the north and the south of the Sahara. Income's dispersion, in turn, goes up in both Africa and Sub-

[36] I have extended the coverage of the syndrome dummy to 1950 and to North Africa following Collier and O'Connell (2008) criteria.

Saharan Africa between 1980 and 2005 to reverse the inter-country inequality contraction of the 1950s and 1960s (Figure 26).

Concluding Remarks

Africa's human development in the long-run and from a comparative perspective has been the focus of this paper. New historical indices of human development, built in an attempt to mitigate the shortcomings of the UNDP index, are presented. The new *IHDI* provides systematically lower levels but faster improvement of African human development, and, at the same time, widens the absolute gap between Africa and the developed countries.

A long-run improvement in human development is observed for Africa that, nonetheless, falls short of the achievements in Asia or Latin America. Compared to the developed world, Africa stopped catching up in 1980 to fall behind. Within Africa, a growing divergence between North and Sub-Saharan Africa emerged from the mid-twentieth century and has deepened since 1980.

Life expectancy has been the main contributor to human development improvement in the world. In Africa, however, life expectancy was only leading its advance during the 1930s and 1940s and education became the driving force since mid-twentieth century. In fact, stagnation of life expectancy and arrested growth explain Africa's comparative decline in human development despite the advance in education during the late twentieth century.

Location and resource endowment, as well as former colonial status, influence the level of human development and condition its rate of growth. However, a major and negative influence derives from the political-economic distortions or syndromes that have afflicted the continent, and especially Sub-Saharan Africa, since independence.

A reversal in the longevity decline, as a result of the fight against HIV/AIDS, and, especially, an improvement in economic activity, have contributed to a mild recovery of human development in the 2000s, in which education continues to play the main role. The large variance in countries' behaviour suggests being cautious about the extent this improvement will provide the foundations for a change in trend that would allow Africa and, especially, Sub-Saharan Africa, to catching up with the West.

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Table 1 ***Human Development in Africa, 1870-2007: IHDI and Hybrid HDI***

Panel A ***Levels***

	Africa		Sub-Saharan Africa	
	IHDI	**Hybrid HDI**	**IHDI**	**Hybrid HDI**
1870	0.028	0.070	0.025	0.062
1880	0.029	0.074	0.027	0.066
1890	0.032	0.080	0.029	0.071
1900	0.034	0.085	0.031	0.076
1913	0.038	0.095	0.034	0.085
1929	0.051	0.129	0.047	0.118
1938	0.064	0.160	0.060	0.149
1950	0.087	0.210	0.081	0.196
1960	0.117	0.272	0.108	0.254
1970	0.148	0.333	0.139	0.314
1980	0.185	0.399	0.173	0.376
1990	0.206	0.425	0.185	0.391
2000	0.225	0.446	0.194	0.403
2007	0.252	0.490	0.220	0.449

Panel B ***Average Growth Rates (%)***

	Africa		Sub-Saharan Africa	
	IHDI	**Hybrid HDI**	**IHDI**	**Hybrid HDI**
1870-1880	0.5	0.5	0.7	0.7
1880-1890	0.8	0.8	0.8	0.8
1890-1900	0.8	0.7	0.8	0.7
1900-1913	0.8	0.9	0.7	0.9
1913-1929	1.9	1.9	1.9	2.0
1929-1938	2.5	2.4	2.8	2.6
1938-1950	2.5	2.3	2.5	2.3
1950-1960	3.0	2.6	2.9	2.6
1960-1970	2.3	2.0	2.5	2.1
1970-1980	2.3	1.8	2.2	1.8
1980-1990	1.1	0.6	0.7	0.4
1990-2000	0.9	0.5	0.5	0.3
2000-2007	1.6	1.3	1.8	1.5
1870-1913	0.7	0.7	0.7	0.8
1913-1980	2.4	2.1	2.4	2.2
1980-2007	1.1	0.8	0.9	0.7
1913-1950	2.2	2.1	2.3	2.2
1950-1980	2.5	2.1	2.5	2.2
1950-2007	1.9	1.5	1.8	1.5
1870-2007	1.6	1.4	1.6	1.4

Sources: See the text.

Table 2 ***Human Development [IHDI] across World Developing Regions 1870-2007***

Panel A ***Levels***

	Latin America	Asia (excluding Japan)	Africa	Sub-Saharan Africa
1870	0.055	0.032	0.028	0.025
1880	0.060	0.033	0.029	0.027
1890	0.072	0.039	0.032	0.029
1900	0.084	0.039	0.034	0.031
1913	0.107	0.044	0.038	0.034
1929	0.138	0.067	0.051	0.047
1938	0.157	0.083	0.064	0.060
1950	0.215	0.107	0.087	0.081
1960	0.263	0.161	0.117	0.108
1970	0.313	0.209	0.148	0.139
1980	0.374	0.241	0.185	0.173
1990	0.403	0.289	0.206	0.185
2000	0.481	0.354	0.225	0.194
2007	0.520	0.406	0.252	0.220

Panel B ***Average Growth Rates (%)***

	Latin America	Asia (excluding Japan)	Africa	Sub-Saharan Africa
1870-1880	0.9	0.3	0.5	0.7
1880-1890	1.8	1.7	0.8	0.8
1890-1900	1.5	0.0	0.8	0.8
1900-1913	1.9	0.8	0.8	0.7
1913-1929	1.6	2.7	1.9	1.9
1929-1938	1.5	2.4	2.5	2.8
1938-1950	2.6	2.1	2.5	2.5
1950-1960	2.0	4.1	3.0	2.9
1960-1970	1.7	2.6	2.3	2.5
1970-1980	1.8	1.4	2.3	2.2
1980-1990	0.7	1.8	1.1	0.7
1990-2000	1.8	2.0	0.9	0.5
2000-2007	1.1	2.0	1.6	1.8
1870-1913	1.6	0.7	0.7	0.7
1913-1980	1.9	2.6	2.4	2.4
1980-2007	1.2	1.9	1.1	0.9
1913-1950	1.9	2.4	2.2	2.3
1950-1980	1.8	2.7	2.5	2.5
1950-2007	1.5	2.3	1.9	1.8
1870-2007	1.6	1.9	1.6	1.6

Sources: Table 1 and Prados de la Escosura (2011).

Table 3 ***Human Development and Its Dimensions: Africa, 1870-2007***

Panel A

	IHDI	Life Expectancy	Education	Income
1870	0.028	0.021	0.007	0.153
1880	0.029	0.022	0.007	0.155
1890	0.032	0.022	0.009	0.162
1900	0.034	0.024	0.010	0.169
1913	0.038	0.026	0.011	0.190
1929	0.051	0.033	0.019	0.207
1938	0.064	0.049	0.024	0.224
1950	0.087	0.082	0.032	0.247
1960	0.117	0.110	0.052	0.278
1970	0.148	0.134	0.076	0.317
1980	0.185	0.161	0.118	0.335
1990	0.206	0.187	0.145	0.321
2000	0.225	0.197	0.182	0.317
2007	0.252	0.212	0.213	0.355

Panel B ***Annual IHDI Growth and its Decomposition***

	IHDI	Life Expectancy	Education	Income
1870-1880	0.5	0.1	0.4	0.0
1880-1890	0.8	0.1	0.6	0.1
1890-1900	0.8	0.3	0.3	0.2
1900-1913	0.8	0.1	0.4	0.3
1913-1929	1.9	0.6	1.1	0.2
1929-1938	2.5	1.4	0.8	0.3
1938-1950	2.5	1.4	0.8	0.3
1950-1960	3.0	1.0	1.6	0.4
1960-1970	2.3	0.6	1.2	0.4
1970-1980	2.3	0.6	1.5	0.2
1980-1990	1.1	0.5	0.7	-0.1
1990-2000	0.9	0.2	0.8	0.0
2000-2007	1.6	0.4	0.7	0.5
1870-1913	0.7	0.2	0.4	0.2
1913-1980	2.4	0.9	1.2	0.3
1980-2007	1.1	0.3	0.7	0.1
1913-1950	2.2	1.1	1.0	0.2
1950-1980	2.5	0.7	1.4	0.3
1950-2007	1.9	0.6	1.1	0.2
1870-2007	1.6	0.6	0.8	0.2

Sources: See the text.

Table 4 ***Human Development and Its Dimensions: Sub-Saharan Africa, 1870-2007***

Panel A

	IHDI	Life Expectancy	Education	Income
1870	0.025	0.021	0.005	0.131
1880	0.027	0.022	0.006	0.131
1890	0.029	0.023	0.007	0.136
1900	0.031	0.024	0.008	0.145
1913	0.034	0.025	0.010	0.164
1929	0.047	0.032	0.017	0.186
1938	0.060	0.049	0.022	0.204
1950	0.081	0.076	0.030	0.231
1960	0.108	0.098	0.049	0.263
1970	0.139	0.123	0.072	0.301
1980	0.173	0.146	0.117	0.304
1990	0.185	0.161	0.139	0.283
2000	0.194	0.159	0.165	0.276
2007	0.220	0.171	0.198	0.315

Panel B ***Annual IHDI Growth and its Decomposition***

	IHDI	Life Expectancy	Education	Income
1870-1880	0.7	0.1	0.5	0.0
1880-1890	0.8	0.2	0.5	0.1
1890-1900	0.8	0.1	0.5	0.2
1900-1913	0.7	0.0	0.4	0.3
1913-1929	1.9	0.5	1.1	0.3
1929-1938	2.8	1.6	0.9	0.3
1938-1950	2.5	1.2	0.9	0.3
1950-1960	2.9	0.9	1.6	0.4
1960-1970	2.5	0.7	1.3	0.4
1970-1980	2.2	0.6	1.6	0.0
1980-1990	0.7	0.3	0.6	-0.2
1990-2000	0.5	-0.1	0.6	-0.1
2000-2007	1.8	0.4	0.9	0.6
1870-1913	0.7	0.1	0.5	0.2
1913-1980	2.4	0.9	1.2	0.3
1980-2007	0.9	0.2	0.7	0.0
1913-1950	2.3	1.0	1.0	0.3
1950-1980	2.5	0.7	1.5	0.3
1950-2007	1.8	0.5	1.1	0.2
1870-2007	1.6	0.5	0.9	0.2

Note: There small discrepancies between IHDI growth and its components' contributions to growth due to rounding.
Sources: See the text.

Table 5 ***Human Development across African Regions, 1870-2007*****:** ***IHDI Estimates***

Panel A ***Levels***

	North	Central	West	East	Southern
1870	0.034	0.017	0.020	0.019	0.035
1880	0.035	0.017	0.020	0.020	0.041
1890	0.038	0.018	0.020	0.021	0.049
1900	0.042	0.017	0.020	0.023	0.058
1913	0.049	0.019	0.022	0.027	0.064
1929	0.067	0.028	0.034	0.041	0.078
1938	0.078	0.047	0.045	0.049	0.092
1950	0.111	0.069	0.068	0.061	0.124
1960	0.150	0.102	0.090	0.084	0.164
1970	0.181	0.134	0.115	0.113	0.203
1980	0.231	0.155	0.158	0.150	0.232
1990	0.284	0.162	0.172	0.160	0.255
2000	0.347	0.144	0.188	0.177	0.253
2007	0.386	0.162	0.218	0.212	0.267

Panel B ***Average Growth Rates (%)***

	North	Central	West	East	Southern
1870-1880	0.4	0.2	-0.1	0.4	1.6
1880-1890	0.9	0.4	0.0	0.8	1.7
1890-1900	1.0	-0.2	0.2	0.9	1.6
1900-1913	1.1	0.6	0.7	1.0	0.7
1913-1929	2.0	2.5	2.7	2.6	1.3
1929-1938	1.7	5.6	3.1	2.1	1.8
1938-1950	2.9	3.3	3.4	1.8	2.4
1950-1960	3.0	3.9	2.8	3.1	2.8
1960-1970	1.9	2.7	2.4	3.0	2.1
1970-1980	2.5	1.5	3.2	2.8	1.3
1980-1990	2.0	0.4	0.8	0.6	1.0
1990-2000	2.0	-1.2	0.9	1.0	-0.1
2000-2007	1.5	1.7	2.1	2.6	0.8
1870-1913	0.9	0.3	0.2	0.8	1.4
1913-1980	2.3	3.1	2.9	2.6	1.9
1980-2007	1.9	0.2	1.2	1.3	0.5
1913-1950	2.2	3.5	3.1	2.2	1.8
1950-1980	2.5	2.7	2.8	3.0	2.1
1950-2007	2.2	1.5	2.0	2.2	1.4
1870-2007	1.8	1.7	1.7	1.8	1.5

Sources: See the text.

Table 6 ***Human Development in African Countries, 1950-2007*****: IHDI Estimates**

	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2007
North Africa	***0.111***	***0.125***	***0.150***	***0.165***	***0.181***	***0.203***	***0.231***	***0.265***	***0.284***	***0.315***	***0.347***	***0.376***	***0.386***
Algeria	0.109	0.120	0.146	0.167	0.192	0.222	0.248	0.292	0.314	0.332	0.362	0.397	0.405
Egypt	0.117	0.130	0.160	0.168	0.178	0.196	0.223	0.261	0.280	0.315	0.352	0.372	0.382
Libya	0.099	0.123	0.157	0.201	0.252	0.283	0.319	0.348	0.372	0.419	0.462	0.488	0.502
Mauritania	0.034	0.040	0.056	0.084	0.105	0.113	0.145	0.158	0.166	0.183	0.208	0.222	0.228
Morocco	0.096	0.115	0.130	0.144	0.156	0.178	0.210	0.225	0.235	0.267	0.283	0.327	0.341
Tunisia	0.111	0.125	0.151	0.183	0.209	0.233	0.263	0.297	0.317	0.345	0.369	0.440	0.451
Central Africa	***0.069***	***0.087***	***0.102***	***0.114***	***0.134***	***0.149***	***0.155***	***0.166***	***0.162***	***0.140***	***0.144***	***0.155***	***0.162***
Cameroon	0.069	0.075	0.093	0.107	0.147	0.164	0.190	0.214	0.203	0.184	0.210	0.218	0.219
CAR	0.049	0.069	0.094	0.108	0.113	0.118	0.129	0.131	0.139	0.129	0.141	0.131	0.134
Chad	0.029	0.040	0.058	0.067	0.071	0.081	0.080	0.106	0.116	0.099	0.116	0.147	0.146
Congo	0.078	0.104	0.126	0.142	0.177	0.211	0.280	0.308	0.285	0.270	0.233	0.274	0.275
Congo D.R.	0.072	0.095	0.109	0.119	0.135	0.149	0.144	0.146	0.142	0.106	0.105	0.112	0.122
Equatorial Guinea	0.088	0.103	0.120	0.152	0.175	0.171	0.201	0.219	0.238	0.255	0.311	0.337	0.344
Gabon	0.091	0.115	0.128	0.184	0.218	0.251	0.295	0.346	0.349	0.381	0.354	0.365	0.373
West Africa	***0.068***	***0.080***	***0.090***	***0.100***	***0.115***	***0.132***	***0.158***	***0.162***	***0.172***	***0.179***	***0.188***	***0.205***	***0.218***
Benin	0.052	0.066	0.079	0.090	0.104	0.121	0.143	0.151	0.159	0.178	0.198	0.222	0.229
Burkina Faso	0.034	0.042	0.055	0.064	0.070	0.072	0.082	0.092	0.107	0.112	0.120	0.149	0.165
Cape Verde	0.091	0.099	0.123	0.148	0.172	0.187	0.216	0.243	0.273	0.315	0.350	0.371	0.390
Côte d'Ivoire	0.054	0.068	0.096	0.116	0.142	0.155	0.198	0.200	0.193	0.189	0.201	0.198	0.204
Gambia	0.050	0.055	0.060	0.073	0.081	0.095	0.123	0.134	0.145	0.163	0.178	0.193	0.197
Ghana	0.116	0.135	0.143	0.169	0.172	0.177	0.197	0.198	0.216	0.231	0.228	0.240	0.253
Guinea	0.027	0.037	0.054	0.067	0.076	0.088	0.106	0.108	0.116	0.128	0.146	0.162	0.167
Guinea-Bissau	0.031	0.047	0.061	0.079	0.090	0.105	0.112	0.120	0.133	0.147	0.153	0.157	0.161
Liberia	0.071	0.085	0.096	0.116	0.132	0.140	0.138	0.139	0.143	0.158	0.208	0.207	0.215
Mali	0.035	0.042	0.052	0.065	0.074	0.080	0.084	0.083	0.091	0.099	0.129	0.156	0.160
Niger	0.029	0.032	0.040	0.059	0.067	0.069	0.080	0.077	0.082	0.084	0.083	0.118	0.126
Nigeria	0.076	0.087	0.096	0.096	0.117	0.141	0.170	0.171	0.181	0.188	0.195	0.214	0.231
Senegal	0.060	0.071	0.081	0.099	0.111	0.119	0.137	0.151	0.160	0.164	0.185	0.201	0.204
Sierra Leone	0.050	0.058	0.069	0.077	0.086	0.093	0.120	0.134	0.127	0.118	0.114	0.144	0.151
Togo	0.064	0.076	0.087	0.112	0.135	0.157	0.174	0.158	0.159	0.166	0.213	0.206	0.208
East Africa	***0.061***	***0.072***	***0.084***	***0.096***	***0.113***	***0.129***	***0.150***	***0.153***	***0.159***	***0.160***	***0.177***	***0.200***	***0.212***
Burundi	0.049	0.062	0.074	0.064	0.095	0.093	0.100	0.119	0.139	0.121	0.139	0.148	0.160
Djibouti	0.077	0.088	0.099	0.108	0.118	0.126	0.158	0.169	0.170	0.177	0.178	0.198	0.203
Ethiopia	0.032	0.037	0.044	0.058	0.078	0.088	0.105	0.105	0.112	0.117	0.132	0.165	0.178
Kenya	0.101	0.113	0.126	0.140	0.164	0.197	0.235	0.243	0.257	0.245	0.225	0.232	0.241
Rwanda	0.073	0.087	0.100	0.109	0.125	0.130	0.152	0.157	0.127	0.113	0.166	0.194	0.203
Sudan	0.065	0.073	0.088	0.101	0.119	0.134	0.150	0.154	0.161	0.178	0.198	0.217	0.221
Tanzania	0.054	0.076	0.092	0.104	0.117	0.141	0.163	0.155	0.158	0.150	0.162	0.201	0.221
Uganda	0.101	0.110	0.115	0.126	0.134	0.138	0.140	0.153	0.154	0.155	0.198	0.216	0.234
Southern Africa	***0.124***	***0.143***	***0.164***	***0.182***	***0.203***	***0.218***	***0.232***	***0.244***	***0.255***	***0.261***	***0.253***	***0.259***	***0.267***
Angola	0.036	0.052	0.062	0.079	0.097	0.101	0.140	0.140	0.138	0.132	0.155	0.211	0.227
Botswana	0.078	0.089	0.102	0.130	0.159	0.212	0.255	0.293	0.333	0.318	0.285	0.308	0.324
Lesotho	0.104	0.119	0.135	0.168	0.176	0.197	0.227	0.243	0.270	0.279	0.253	0.236	0.241
Madagascar	0.109	0.119	0.136	0.149	0.168	0.179	0.192	0.181	0.181	0.183	0.203	0.226	0.235
Malawi	0.057	0.074	0.090	0.094	0.104	0.127	0.140	0.145	0.150	0.193	0.203	0.199	0.212
Mauritius	0.206	0.240	0.276	0.301	0.310	0.339	0.338	0.364	0.399	0.414	0.453	0.491	0.500
Mozambique	0.059	0.081	0.097	0.102	0.117	0.133	0.139	0.129	0.134	0.146	0.173	0.200	0.210
Namibia	0.116	0.126	0.137	0.195	0.222	0.253	0.306	0.327	0.343	0.367	0.343	0.347	0.362
South Africa	0.183	0.208	0.234	0.257	0.280	0.300	0.304	0.326	0.346	0.366	0.341	0.331	0.335
Swaziland	0.087	0.107	0.129	0.163	0.197	0.225	0.255	0.285	0.291	0.304	0.272	0.250	0.254
Zambia	0.103	0.118	0.139	0.160	0.184	0.193	0.200	0.205	0.203	0.173	0.158	0.184	0.193
Zimbabwe	0.116	0.139	0.162	0.176	0.197	0.214	0.251	0.306	0.299	0.268	0.223	0.205	0.208
SSA	***0.081***	***0.095***	***0.108***	***0.121***	***0.139***	***0.154***	***0.173***	***0.179***	***0.185***	***0.187***	***0.194***	***0.209***	***0.220***
Africa	***0.087***	***0.101***	***0.117***	***0.130***	***0.148***	***0.164***	***0.185***	***0.197***	***0.206***	***0.213***	***0.225***	***0.242***	***0.252***

Table 7 ***Human Development in African Countries, 1950-2007*****:** ***IHDI Growth Rates (%)***

	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2007	1950-1980	1980-2007	1950-2007
North Africa	***3.0***	***1.9***	***2.5***	***2.0***	***2.0***	***1.5***	***2.5***	***1.9***	***2.2***
Algeria	2.9	2.7	2.6	2.3	1.4	1.6	2.7	1.8	2.3
Egypt	3.2	1.1	2.2	2.3	2.3	1.2	2.2	2.0	2.1
Libya	4.6	4.7	2.4	1.5	2.2	1.2	3.9	1.7	2.9
Mauritania	5.1	6.3	3.3	1.3	2.3	1.3	4.9	1.7	3.4
Morocco	3.0	1.8	2.9	1.1	1.9	2.6	2.6	1.8	2.2
Tunisia	3.1	3.2	2.3	1.8	1.5	2.9	2.9	2.0	2.5
Central Africa	***3.9***	***2.7***	***1.5***	***0.4***	***-1.2***	***1.7***	***2.7***	***0.2***	***1.5***
Cameroon	3.0	4.6	2.5	0.7	0.3	0.6	3.4	0.5	2.0
CAR	6.5	1.9	1.3	0.8	0.2	-0.8	3.2	0.2	1.8
Chad	6.9	2.0	1.2	3.7	0.0	3.2	3.4	2.2	2.8
Congo	4.7	3.4	4.6	0.2	-2.0	2.3	4.2	-0.1	2.2
Congo D.R.	4.2	2.2	0.6	-0.1	-3.0	2.1	2.3	-0.6	0.9
Equatorial Guinea	3.1	3.8	1.4	1.7	2.7	1.4	2.8	2.0	2.4
Gabon	3.4	5.3	3.0	1.7	0.1	0.7	3.9	0.9	2.5
West Africa	***2.8***	***2.4***	***3.2***	***0.8***	***0.9***	***2.1***	***2.8***	***1.2***	***2.0***
Benin	4.1	2.7	3.2	1.1	2.2	2.1	3.4	1.8	2.6
Burkina Faso	4.9	2.4	1.6	2.6	1.2	4.5	3.0	2.6	2.8
Cape Verde	3.0	3.3	2.3	2.3	2.5	1.6	2.9	2.2	2.6
Côte d'Ivoire	5.7	4.0	3.3	-0.3	0.4	0.2	4.3	0.1	2.3
Gambia	1.9	3.0	4.2	1.7	2.0	1.5	3.0	1.7	2.4
Ghana	2.0	1.9	1.3	0.9	0.6	1.5	1.8	0.9	1.4
Guinea	7.1	3.4	3.3	0.9	2.3	1.9	4.6	1.7	3.2
Guinea-Bissau	6.8	3.8	2.2	1.7	1.4	0.8	4.3	1.3	2.9
Liberia	3.1	3.1	0.5	0.3	3.8	0.5	2.2	1.6	1.9
Mali	4.1	3.5	1.2	0.8	3.6	3.1	2.9	2.4	2.7
Niger	3.3	5.0	1.8	0.3	0.2	5.9	3.4	1.7	2.6
Nigeria	2.4	2.0	3.7	0.7	0.8	2.4	2.7	1.1	2.0
Senegal	3.1	3.1	2.1	1.6	1.5	1.4	2.8	1.5	2.2
Sierra Leone	3.3	2.2	3.3	0.6	-1.1	4.1	2.9	0.9	1.9
Togo	3.0	4.4	2.6	-0.9	3.0	-0.4	3.3	0.7	2.1
East Africa	***3.1***	***3.0***	***2.8***	***0.6***	***1.0***	***2.6***	***3.0***	***1.3***	***2.2***
Burundi	4.1	2.6	0.5	3.3	0.0	2.0	2.4	1.7	2.1
Djibouti	2.5	1.7	2.9	0.7	0.5	1.9	2.4	0.9	1.7
Ethiopia	3.3	5.8	3.0	0.7	1.6	4.3	4.0	2.0	3.0
Kenya	2.2	2.6	3.6	0.9	-1.3	1.0	2.8	0.1	1.5
Rwanda	3.1	2.3	1.9	-1.8	2.7	2.8	2.5	1.1	1.8
Sudan	3.0	3.1	2.3	0.7	2.0	1.6	2.8	1.4	2.2
Tanzania	5.3	2.4	3.3	-0.3	0.2	4.4	3.7	1.1	2.5
Uganda	1.3	1.5	0.4	1.0	2.5	2.4	1.1	1.9	1.5
Southern Africa	***2.8***	***2.1***	***1.3***	***1.0***	***-0.1***	***0.8***	***2.1***	***0.5***	***1.4***
Angola	5.3	4.4	3.7	-0.2	1.2	5.5	4.5	1.8	3.2
Botswana	2.7	4.4	4.7	2.7	-1.6	1.8	3.9	0.9	2.5
Lesotho	2.6	2.7	2.5	1.7	-0.7	-0.7	2.6	0.2	1.5
Madagascar	2.2	2.1	1.4	-0.6	1.2	2.1	1.9	0.7	1.4
Malawi	4.6	1.5	2.9	0.7	3.0	0.7	3.0	1.6	2.3
Mauritius	2.9	1.1	0.9	1.6	1.3	1.4	1.7	1.4	1.6
Mozambique	4.9	1.9	1.7	-0.4	2.5	2.8	2.9	1.5	2.2
Namibia	1.7	4.8	3.2	1.1	0.0	0.8	3.2	0.6	2.0
South Africa	2.4	1.8	0.8	1.3	-0.2	-0.2	1.7	0.4	1.1
Swaziland	3.9	4.3	2.6	1.3	-0.7	-1.0	3.6	0.0	1.9
Zambia	3.0	2.8	0.9	0.2	-2.5	2.8	2.2	-0.1	1.1
Zimbabwe	3.4	2.0	2.4	1.8	-2.9	-1.0	2.6	-0.7	1.0

Table 8 *African Country Ranking in Human Development, 1950-2007*: *IHDI Estimates*

1950		1960		1970		1980		1990		2000		2007	
Mauritius	0.206	Mauritius	0.276	Mauritius	0.310	Mauritius	0.338	Mauritius	0.399	Libya	0.462	Libya	0.502
South Africa	0.183	South Africa	0.234	South Africa	0.280	Libya	0.319	Libya	0.372	Mauritius	0.453	Mauritius	0.500
Egypt	0.117	Zimbabwe	0.162	Libya	0.252	Namibia	0.306	Gabon	0.349	Tunisia	0.369	Tunisia	0.451
Ghana	0.116	Egypt	0.160	Namibia	0.222	South Africa	0.304	South Africa	0.346	Algeria	0.362	Algeria	0.405
Namibia	0.116	Libya	0.157	Gabon	0.218	Gabon	0.295	Namibia	0.343	Gabon	0.354	Cape Verde	0.390
Zimbabwe	0.116	Tunisia	0.151	Tunisia	0.209	Congo	0.280	Botswana	0.333	Egypt	0.352	Egypt	0.382
Tunisia	0.111	Algeria	0.146	Zimbabwe	0.197	Tunisia	0.263	Tunisia	0.317	Cape Verde	0.350	Gabon	0.373
Algeria	0.109	Ghana	0.143	Swaziland	0.197	Swaziland	0.255	Algeria	0.314	Namibia	0.343	Namibia	0.362
Madagascar	0.109	Zambia	0.139	Algeria	0.192	Botswana	0.255	Zimbabwe	0.299	South Africa	0.341	Equat. Guinea	0.344
Lesotho	0.104	Namibia	0.137	Zambia	0.184	Zimbabwe	0.251	Swaziland	0.291	Equat. Guinea	0.311	Morocco	0.341
Zambia	0.103	Madagascar	0.136	Egypt	0.178	Algeria	0.248	Congo	0.285	Botswana	0.285	South Africa	0.335
Uganda	0.101	Lesotho	0.135	Congo	0.177	Kenya	0.235	Egypt	0.280	Morocco	0.283	Botswana	0.324
Kenya	0.101	Morocco	0.130	Lesotho	0.176	Lesotho	0.227	Cape Verde	0.273	Swaziland	0.272	Congo	0.275
Libya	0.099	Swaziland	0.129	Equat. Guinea	0.175	Egypt	0.223	Lesotho	0.270	Lesotho	0.253	Swaziland	0.254
Morocco	0.096	Gabon	0.128	Ghana	0.172	Cape Verde	0.216	Kenya	0.257	Congo	0.233	Ghana	0.253
Gabon	0.091	Congo	0.126	Cape Verde	0.172	Morocco	0.210	Equat. Guinea	0.238	Ghana	0.228	Kenya	0.241
Cape Verde	0.091	Kenya	0.126	Madagascar	0.168	Equat. Guinea	0.201	Morocco	0.235	Kenya	0.225	Lesotho	0.241
Equat. Guinea	0.088	Cape Verde	0.123	Kenya	0.164	Zambia	0.200	Ghana	0.216	Zimbabwe	0.223	Madagascar	0.235
Swaziland	0.087	Equat. Guinea	0.120	Botswana	0.159	Côte d'Ivoire	0.198	Cameroon	0.203	Togo	0.213	Uganda	0.234
Congo	0.078	Uganda	0.115	Morocco	0.156	Ghana	0.197	Zambia	0.203	Cameroon	0.210	Nigeria	0.231
Botswana	0.078	Congo D.R.	0.109	Cameroon	0.147	Madagascar	0.192	Côte d'Ivoire	0.193	Mauritania	0.208	Benin	0.229
Djibouti	0.077	Botswana	0.102	Côte d'Ivoire	0.142	Cameroon	0.190	Madagascar	0.181	Liberia	0.208	Mauritania	0.228
Nigeria	0.076	Rwanda	0.100	Congo D.R.	0.135	Togo	0.174	Nigeria	0.181	Madagascar	0.203	Angola	0.227
Rwanda	0.073	Djibouti	0.099	Togo	0.135	Nigeria	0.170	Djibouti	0.170	Malawi	0.203	Tanzania	0.221
Congo D.R.	0.072	Mozambique	0.097	Uganda	0.134	Tanzania	0.163	Mauritania	0.166	Côte d'Ivoire	0.201	Sudan	0.221
Liberia	0.071	Liberia	0.096	Liberia	0.132	Djibouti	0.158	Sudan	0.161	Benin	0.198	Cameroon	0.219
Cameroon	0.069	Nigeria	0.096	Rwanda	0.125	Rwanda	0.152	Senegal	0.160	Uganda	0.198	Liberia	0.215
Sudan	0.065	Côte d'Ivoire	0.096	Sudan	0.119	Sudan	0.150	Benin	0.159	Sudan	0.198	Malawi	0.212
Togo	0.064	CAR	0.094	Djibouti	0.118	Mauritania	0.145	Togo	0.159	Nigeria	0.195	Mozambique	0.210
Senegal	0.060	Cameroon	0.093	Nigeria	0.117	Congo D.R.	0.144	Tanzania	0.158	Senegal	0.185	Togo	0.208
Mozambique	0.059	Tanzania	0.092	Mozambique	0.117	Benin	0.143	Uganda	0.154	Djibouti	0.178	Zimbabwe	0.208
Malawi	0.057	Malawi	0.090	Tanzania	0.117	Angola	0.140	Malawi	0.150	Gambia	0.178	Côte d'Ivoire	0.204
Tanzania	0.054	Sudan	0.088	CAR	0.113	Uganda	0.140	Gambia	0.145	Mozambique	0.173	Senegal	0.204
Côte d'Ivoire	0.054	Togo	0.087	Senegal	0.111	Malawi	0.140	Liberia	0.143	Rwanda	0.166	Djibouti	0.203
Benin	0.052	Senegal	0.081	Mauritania	0.105	Mozambique	0.139	Congo D.R.	0.142	Tanzania	0.162	Rwanda	0.203
Gambia	0.050	Benin	0.079	Malawi	0.104	Liberia	0.138	Burundi	0.139	Zambia	0.158	Gambia	0.197
Sierra Leone	0.050	Burundi	0.074	Benin	0.104	Senegal	0.137	CAR	0.139	Angola	0.155	Zambia	0.193
Burundi	0.049	Sierra Leone	0.069	Angola	0.097	CAR	0.129	Angola	0.138	Guinea-Bissau	0.153	Ethiopia	0.178
CAR	0.049	Angola	0.062	Burundi	0.095	Gambia	0.123	Mozambique	0.134	Guinea	0.146	Guinea	0.167
Angola	0.036	Guinea-Bissau	0.061	Guinea-Bissau	0.090	Sierra Leone	0.120	Guinea-Bissau	0.133	CAR	0.141	Burkina Faso	0.165
Mali	0.035	Gambia	0.060	Sierra Leone	0.086	Guinea-Bissau	0.112	Rwanda	0.127	Burundi	0.139	Guinea-Bissau	0.161
Burkina Faso	0.034	Chad	0.058	Gambia	0.081	Guinea	0.106	Sierra Leone	0.127	Ethiopia	0.132	Mali	0.160
Mauritania	0.034	Mauritania	0.056	Ethiopia	0.078	Ethiopia	0.105	Chad	0.116	Mali	0.129	Burundi	0.160
Ethiopia	0.032	Burkina Faso	0.055	Guinea	0.076	Burundi	0.100	Guinea	0.116	Burkina Faso	0.120	Sierra Leone	0.151
Guinea-Bissau	0.031	Guinea	0.054	Mali	0.074	Mali	0.084	Ethiopia	0.112	Chad	0.116	Chad	0.146
Niger	0.029	Mali	0.052	Chad	0.071	Burkina Faso	0.082	Burkina Faso	0.107	Sierra Leone	0.114	CAR	0.134
Chad	0.029	Ethiopia	0.044	Burkina Faso	0.070	Chad	0.080	Mali	0.091	Congo D.R.	0.105	Niger	0.126
Guinea	0.027	Niger	0.040	Niger	0.067	Niger	0.080	Niger	0.082	Niger	0.083	Congo D.R.	0.122

Table 9a *Human Development Growth Decomposition: Country Ranking, 1950-2007*

IHDI Growth and Its Composition, 1950-1980 (%)					IHDI Growth and Its Composition, 1980-2007 (%)				
		Growth Decomposition					*Growth Decomposition*		
	IHDI	Life Expectancy	Education	Income		*IHDI*	Life Expectancy	Education	Income
Mauritania	4.9	1.1	3.1	0.7	Burkina Faso	2.6	0.5	1.7	0.4
Guinea	4.6	1.0	2.6	1.1	Mali	2.4	0.5	1.6	0.3
Angola	4.5	0.9	3.6	-0.1	Chad	2.2	0.0	1.0	1.1
Côte d'Ivoire	4.3	1.2	2.8	0.4	Cape Verde	2.2	0.5	0.9	0.7
Guinea-Bissau	4.3	0.6	2.3	1.4	Tunisia	2.0	0.7	1.0	0.3
Congo	4.2	1.1	2.7	0.4	Equatorial Guinea	2.0	0.4	0.5	1.0
Ethiopia	4.0	0.8	2.5	0.7	Egypt	2.0	0.7	1.0	0.3
Botswana	3.9	0.9	1.4	1.6	Ethiopia	2.0	0.6	1.1	0.2
Gabon	3.9	0.9	2.7	0.3	Uganda	1.9	0.1	1.2	0.6
Libya	3.9	0.9	2.0	1.0	Algeria	1.8	0.7	1.1	0.0
Tanzania	3.7	0.8	2.4	0.4	Morocco	1.8	0.7	0.9	0.2
Swaziland	3.6	1.1	1.7	0.7	Angola	1.8	0.4	1.1	0.3
Chad	3.4	1.1	2.9	-0.6	Benin	1.8	0.6	1.1	0.1
Cameroon	3.4	0.9	2.0	0.4	Gambia	1.7	0.5	1.2	0.0
Benin	3.4	1.1	2.3	0.0	Burundi	1.7	0.2	1.8	-0.3
Niger	3.4	0.5	2.6	0.2	Niger	1.7	0.7	1.4	-0.5
Togo	3.3	1.1	1.6	0.5	Libya	1.7	0.8	1.2	-0.4
CAR	3.2	0.8	2.4	0.0	Guinea	1.7	0.8	0.8	0.1
Namibia	3.2	1.1	1.9	0.2	Mauritania	1.7	0.2	1.3	0.2
Gambia	3.0	1.3	1.3	0.4	Liberia	1.6	0.6	1.4	-0.3
Malawi	3.0	0.6	1.4	1.0	Malawi	1.6	0.4	1.0	0.1
Burkina Faso	3.0	0.8	1.7	0.5	Mozambique	1.5	0.3	0.8	0.4
Sierra Leone	2.9	1.0	1.5	0.4	Senegal	1.5	0.5	0.9	0.1
Mali	2.9	0.6	1.8	0.5	Mauritius	1.4	0.4	0.7	0.4
Tunisia	2.9	0.9	1.5	0.5	Sudan	1.4	0.5	0.8	0.2
Cape Verde	2.9	0.6	1.6	0.7	Guinea-Bissau	1.3	0.5	1.1	-0.2
Mozambique	2.9	0.7	2.1	0.0	Nigeria	1.1	0.2	0.7	0.2
Kenya	2.8	0.9	1.5	0.4	Tanzania	1.1	0.3	0.6	0.2
Sudan	2.8	0.7	2.0	0.1	Rwanda	1.1	0.2	0.8	0.0
Equatorial Guinea	2.8	0.6	1.3	0.8	Djibouti	0.9	0.4	0.7	-0.2
Senegal	2.8	0.7	2.1	0.0	Ghana	0.9	0.2	0.5	0.2
Algeria	2.7	0.9	1.5	0.4	Botswana	0.9	-0.4	0.8	0.5
Nigeria	2.7	0.6	1.7	0.4	Gabon	0.9	0.3	0.8	-0.2
Lesotho	2.6	0.9	0.5	1.2	Sierra Leone	0.9	0.4	0.9	-0.5
Morocco	2.6	0.8	1.6	0.2	Madagascar	0.7	0.7	0.4	-0.3
Zimbabwe	2.6	0.9	1.2	0.5	Togo	0.7	0.4	0.8	-0.5
Rwanda	2.5	0.4	1.6	0.5	Namibia	0.6	0.1	0.4	0.1
Burundi	2.4	0.5	1.2	0.7	Cameroon	0.5	0.0	0.6	0.0
Djibouti	2.4	1.0	1.3	0.1	South Africa	0.4	-0.3	0.6	0.0
Congo D.R.	2.3	0.5	1.8	0.1	Lesotho	0.2	-0.5	0.3	0.4
Zambia	2.2	0.8	1.1	0.3	CAR	0.2	-0.1	0.6	-0.4
Liberia	2.2	0.6	1.5	0.1	Côte d'Ivoire	0.1	0.1	0.4	-0.3
Egypt	2.2	0.8	0.9	0.5	Kenya	0.1	-0.2	0.3	0.1
Madagascar	1.9	0.6	1.2	0.1	Swaziland	0.0	-0.5	0.4	0.1
Ghana	1.8	0.6	1.1	0.0	Congo	-0.1	-0.3	0.3	-0.1
South Africa	1.7	0.6	0.9	0.2	Zambia	-0.1	-0.4	0.4	-0.1
Mauritius	1.7	0.7	0.7	0.2	Congo D.R.	-0.6	0.1	0.6	-1.3
Uganda	1.1	0.6	0.7	-0.2	Zimbabwe	-0.7	-0.9	0.5	-0.3

Table 9b *Human Development Growth Decomposition: Country Ranking, 1950-2007*

IHDI Growth and Its Composition, 1950-2007 (%)

		Growth Decomposition		
	IHDI	**Life Expectancy**	**Education**	**Income**
Mauritania	3.4	0.7	2.2	0.5
Guinea	3.2	0.9	1.7	0.6
Angola	3.2	0.7	2.4	0.1
Ethiopia	3.0	0.7	1.9	0.4
Guinea-Bissau	2.9	0.6	1.7	0.6
Libya	2.9	0.8	1.6	0.4
Chad	2.8	0.6	2.0	0.2
Burkina Faso	2.8	0.7	1.7	0.4
Mali	2.7	0.6	1.7	0.4
Benin	2.6	0.8	1.7	0.1
Niger	2.6	0.6	2.0	-0.1
Cape Verde	2.6	0.6	1.3	0.7
Botswana	2.5	0.3	1.1	1.0
Gabon	2.5	0.6	1.8	0.0
Tunisia	2.5	0.8	1.3	0.4
Tanzania	2.5	0.6	1.6	0.3
Gambia	2.4	0.9	1.3	0.2
Equatorial Guinea	2.4	0.5	0.9	0.9
Côte d'Ivoire	2.3	0.6	1.6	0.0
Malawi	2.3	0.5	1.2	0.6
Algeria	2.3	0.8	1.3	0.2
Mozambique	2.2	0.5	1.5	0.2
Morocco	2.2	0.8	1.2	0.2
Congo	2.2	0.4	1.6	0.2
Senegal	2.2	0.6	1.5	0.0
Sudan	2.2	0.6	1.4	0.1
Burundi	2.1	0.3	1.5	0.2
Egypt	2.1	0.7	0.9	0.4
Togo	2.1	0.8	1.2	0.0
Cameroon	2.0	0.5	1.3	0.2
Namibia	2.0	0.6	1.2	0.2
Nigeria	2.0	0.4	1.3	0.3
Sierra Leone	1.9	0.7	1.3	0.0
Liberia	1.9	0.6	1.5	-0.1
Swaziland	1.9	0.3	1.1	0.4
Rwanda	1.8	0.3	1.2	0.3
CAR	1.8	0.4	1.6	-0.2
Djibouti	1.7	0.7	1.0	-0.1
Mauritius	1.6	0.6	0.7	0.3
Kenya	1.5	0.4	0.9	0.2
Lesotho	1.5	0.2	0.4	0.8
Uganda	1.5	0.4	0.9	0.2
Ghana	1.4	0.4	0.8	0.1
Madagascar	1.4	0.6	0.8	-0.1
Zambia	1.1	0.2	0.8	0.1
South Africa	1.1	0.2	0.7	0.1
Zimbabwe	1.0	0.1	0.9	0.1
Congo D.R.	0.9	0.3	1.2	-0.6

Table 10 ***Determinants of Human Development Growth, 1950-2007***

Dependent Variable lHDI_GR						
	[1]		**[2]**		**[3]**	
Constant	-6.398	(-5.858)	-6.105	(-5.770)	-0.938	(-1.841)
IHDI (log)	-4.256	(-7.828)	-4.306	(-8.189)	-1.529	(-7.793)
SYNDROME			-0.843	(-4.164)	-0.731	(-4.237)
RR					0.342	(2.215)
COAST					0.399	(2.461)
NORTH					0.539	(2.317)
COLONIAL					-0.102	(-1.015)
Adjusted-R squared	0.501		0.533		0.503	
S.E. of regression	1.188		1.148		1.185	
Durbin-Watson stat	1.889		1.977		1.986	
F-statistic	6.426		7.069		27.419	
Number of observations	288		288		288	

Notes: Pooled Least Squares have been used.
White Heteroskedasticity-Consistent Standard Errors & Covariance
t-ratios in brackets
Equations (1) and (2) cross-section and period fixed effects (dummy variables)
Equation (3) period fixed effects (dummy variables)

IHDI_GR: IHDI logarithmic growth rate (see text)
IHDI: Improved Human Development Index (logs) (see text)
SYNDROME: takes value 1 when a syndrome exists and 0 otherwise (Collier and O'Connell 2008)
RR: value 1 when a country is resource-rich and 0 otherwise (Collier and O'Connell (2008)
COAST: value 1 when a country is coastal and 0 otherwise (Collier and O'Connell (2008)
NORTH: value 1 when a country is located in North Africa and 0 otherwise
(African Bank of Development)
COLONIAL: takes value 2 when a country was a British colony, 1 if it was French colony,
and 0 otherwise (Bertocchi and Canova 2002)

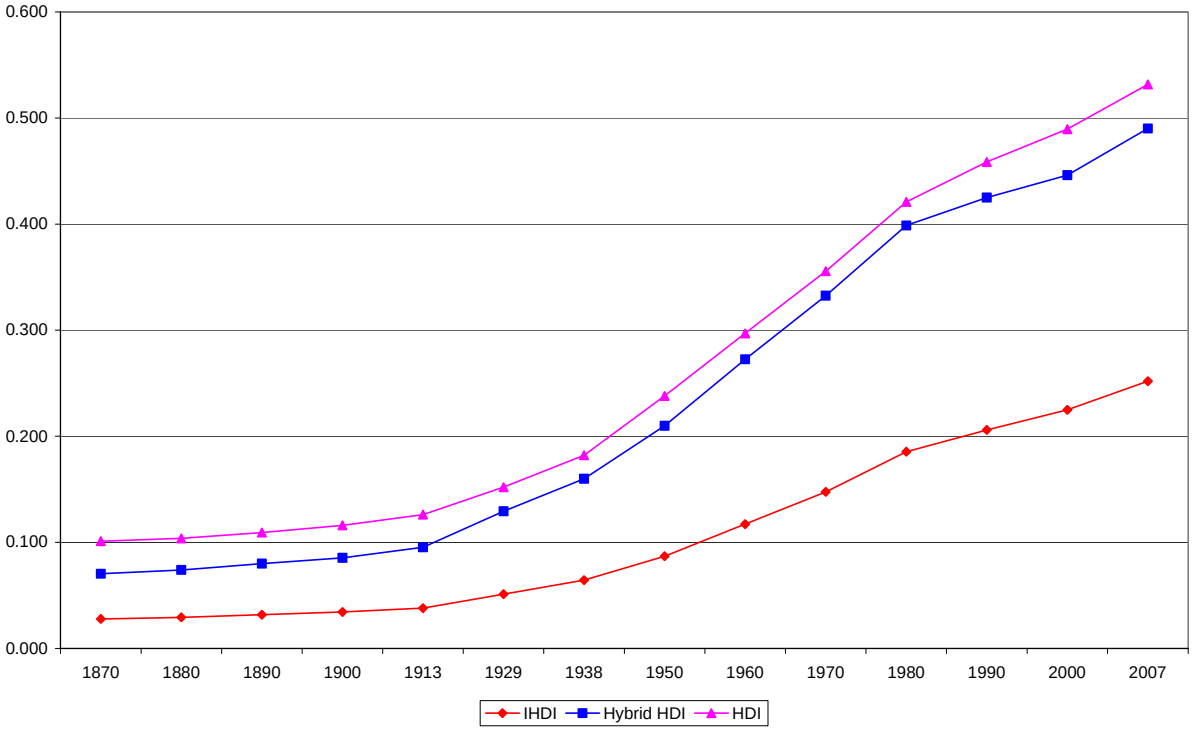

Figure 1 ***Human Development in Africa: IHDI and Hybrid and 'old' HDI, 1870-2007***
Sources: Table 1

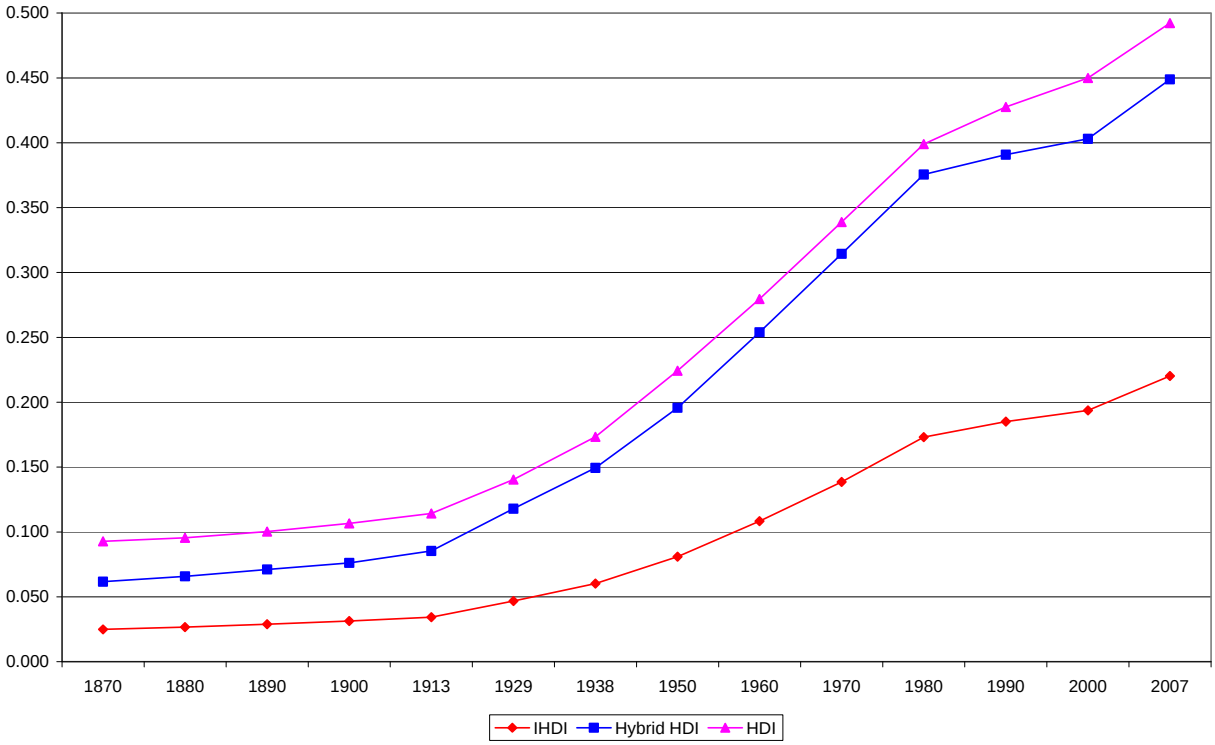

Figure 2 ***Human Development in SSA: IHDI and Hybrid and 'old' HDI, 1870-2007***
Sources: Table 1

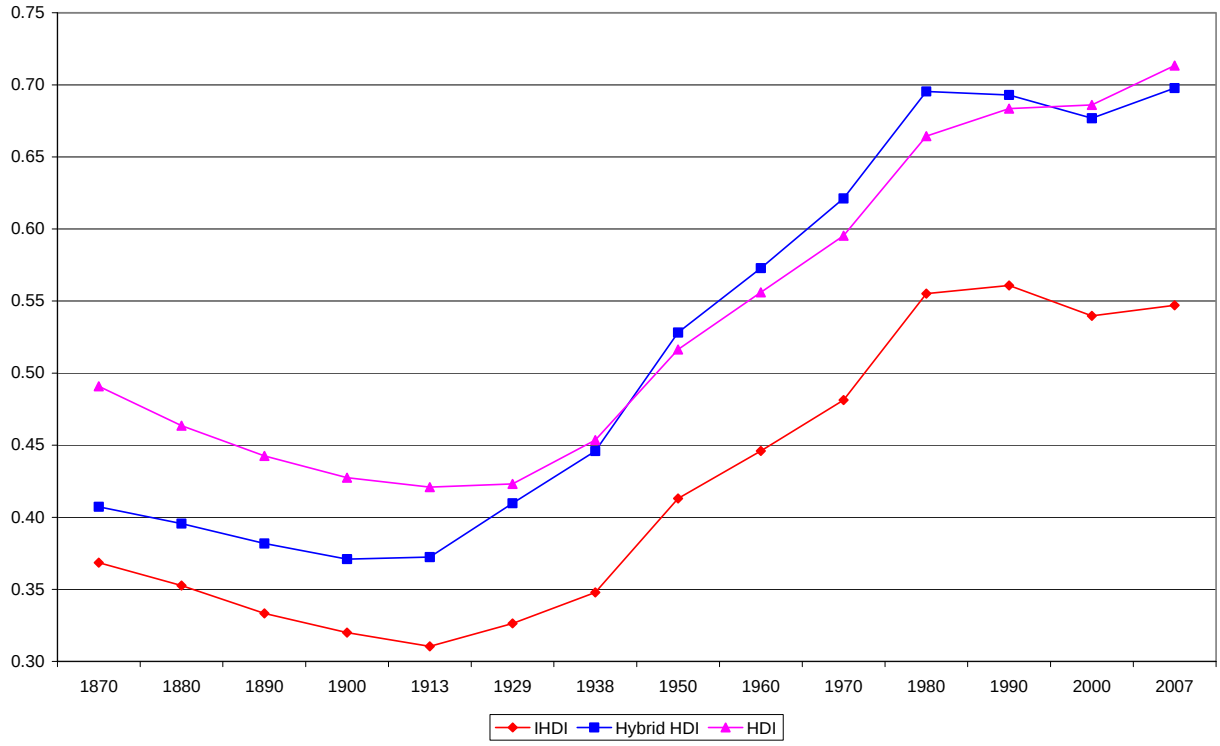

Figure 3 ***Relative Human Development in Africa: IHDI and hybrid and 'old' HDI, 1870-2007 (World = 1)***

Sources: Table 1 and Prados de la Escosura (2011).

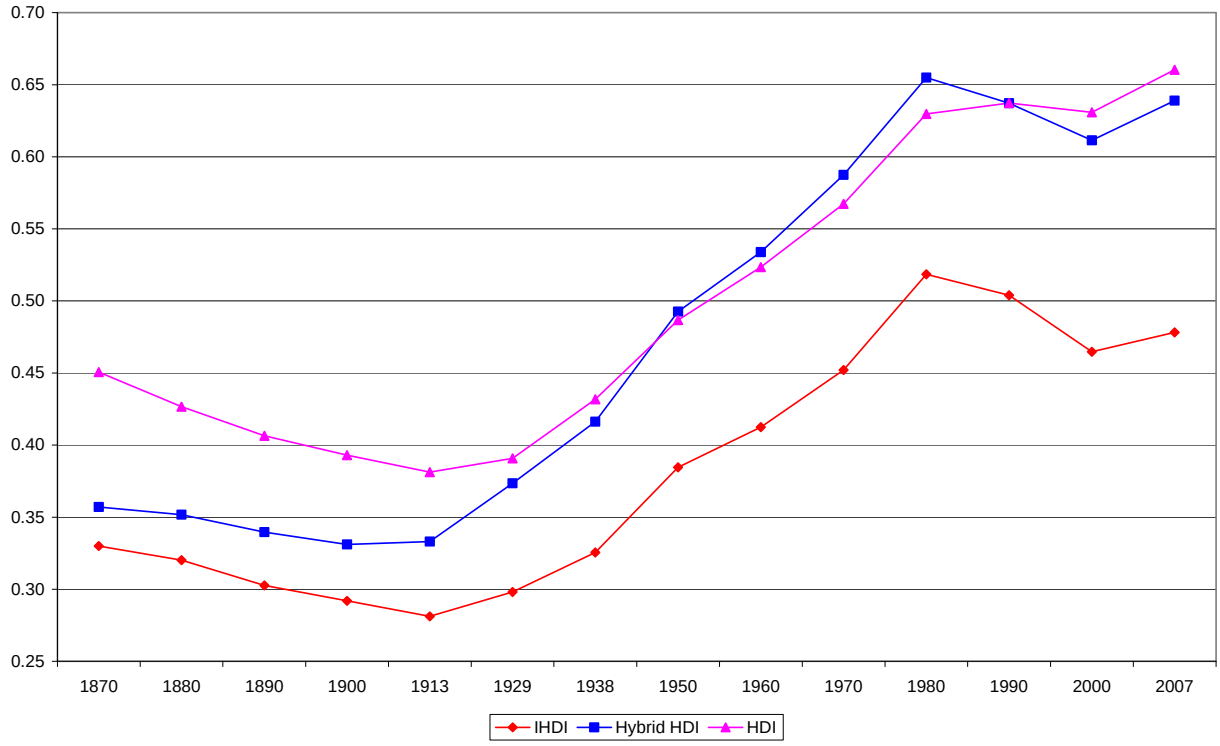

Figure 4 ***Relative Human Development in Sub-Saharan Africa: IHDI and hybrid and 'old' HDI, 1870-2007 (World = 1)***

Sources: Table 1 and Prados de la Escosura (2011).

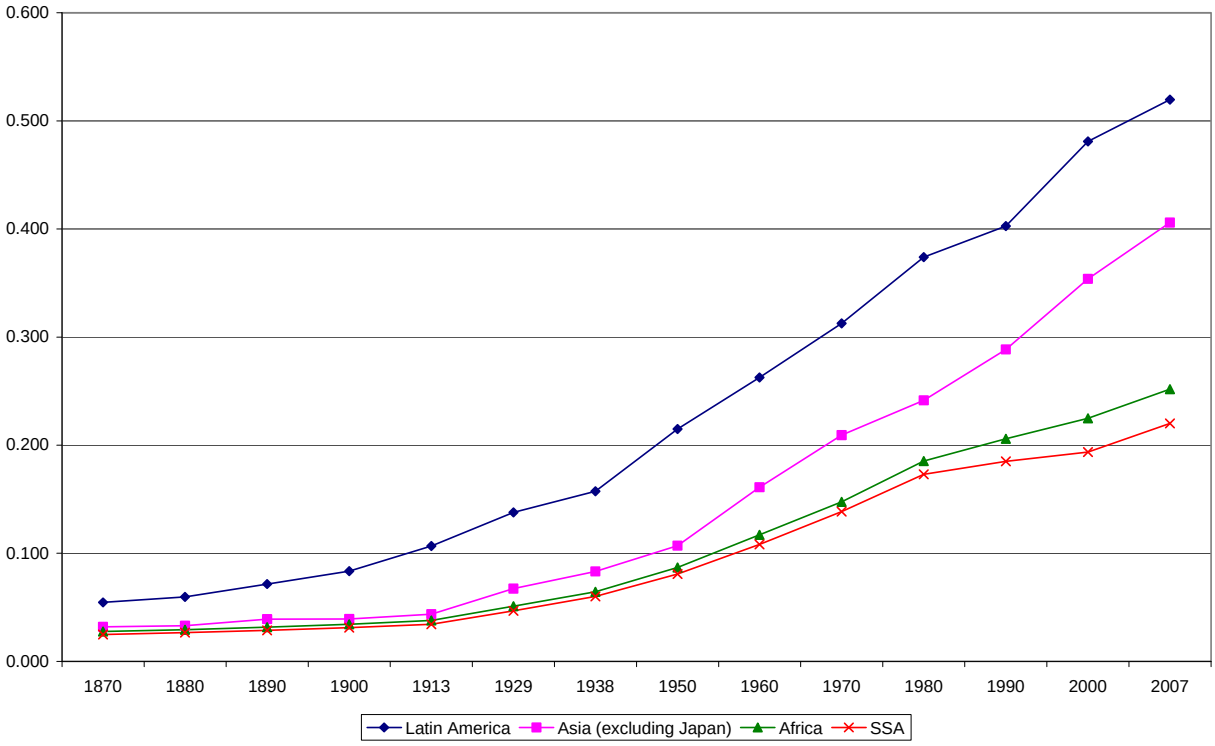

Figure 5 ***IHDI across Developing Regions, 1870-2007***
Sources: Table 3

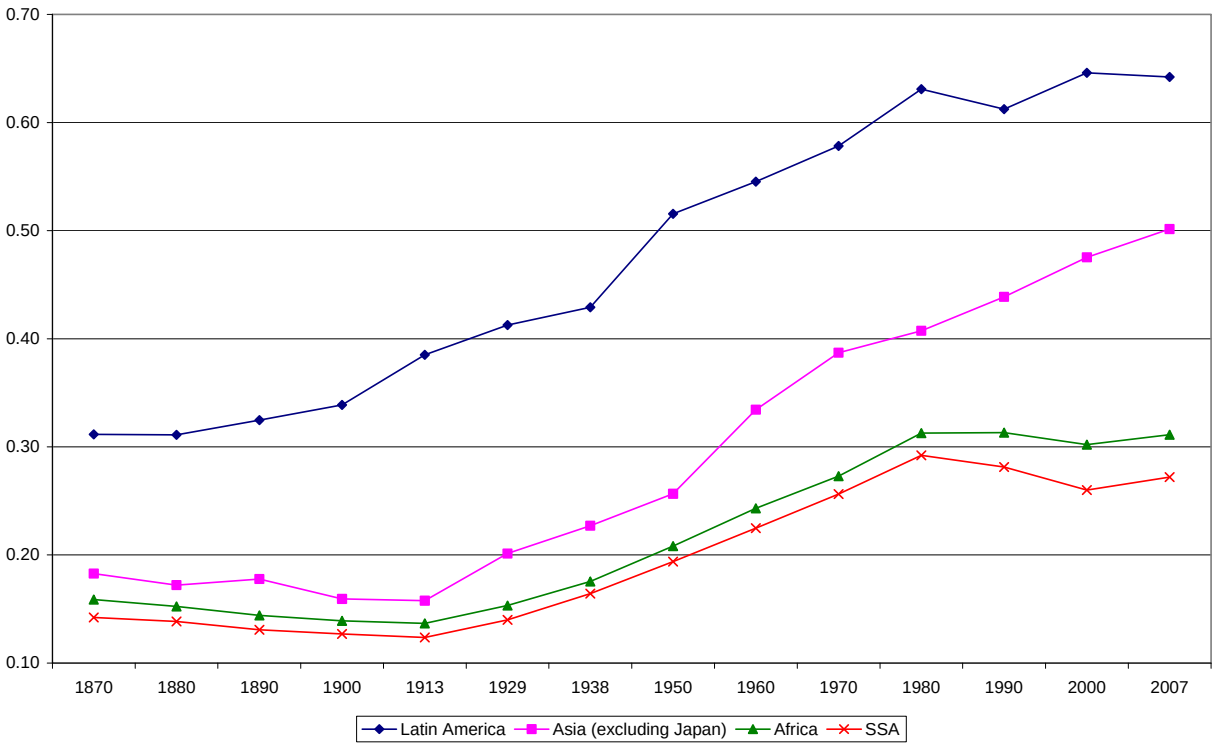

Figure 6 ***Relative IHDI across Developing Regions, 1870-2007 (OECD = 1)***
Sources: Table 3 and Prados de la Escosura (2011).

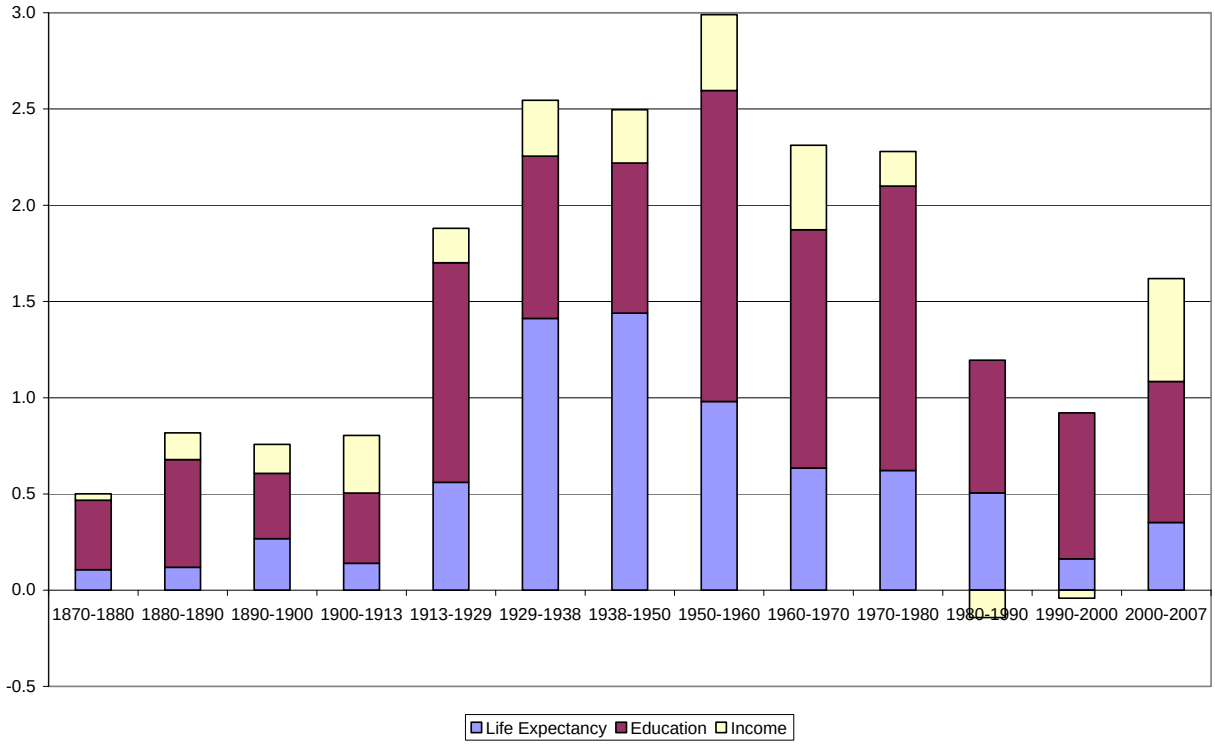

Figure 7 ***IHDI Growth and its Decomposition in Africa, 1870-2007 (%)***
Sources: Table 3

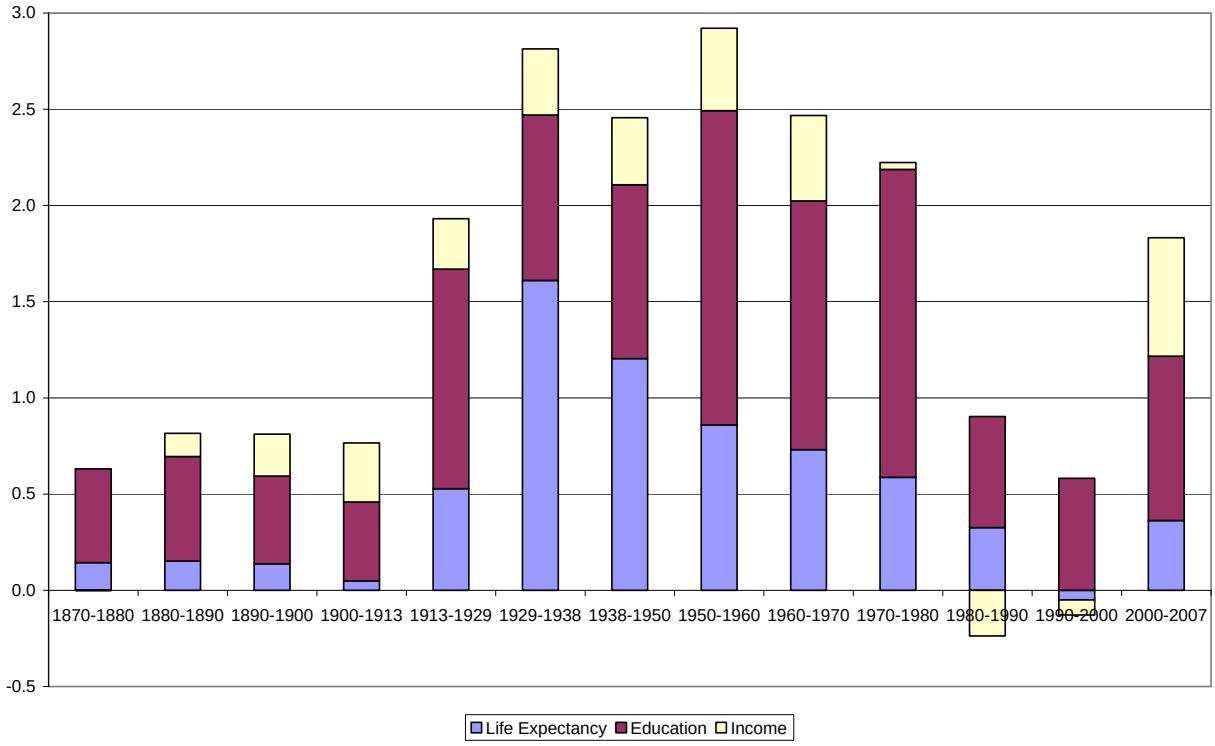

Figure 8 ***IHDI Growth and its Decomposition in Sub-Saharan Africa, 1870-2007 (%)***
Sources: Table 4

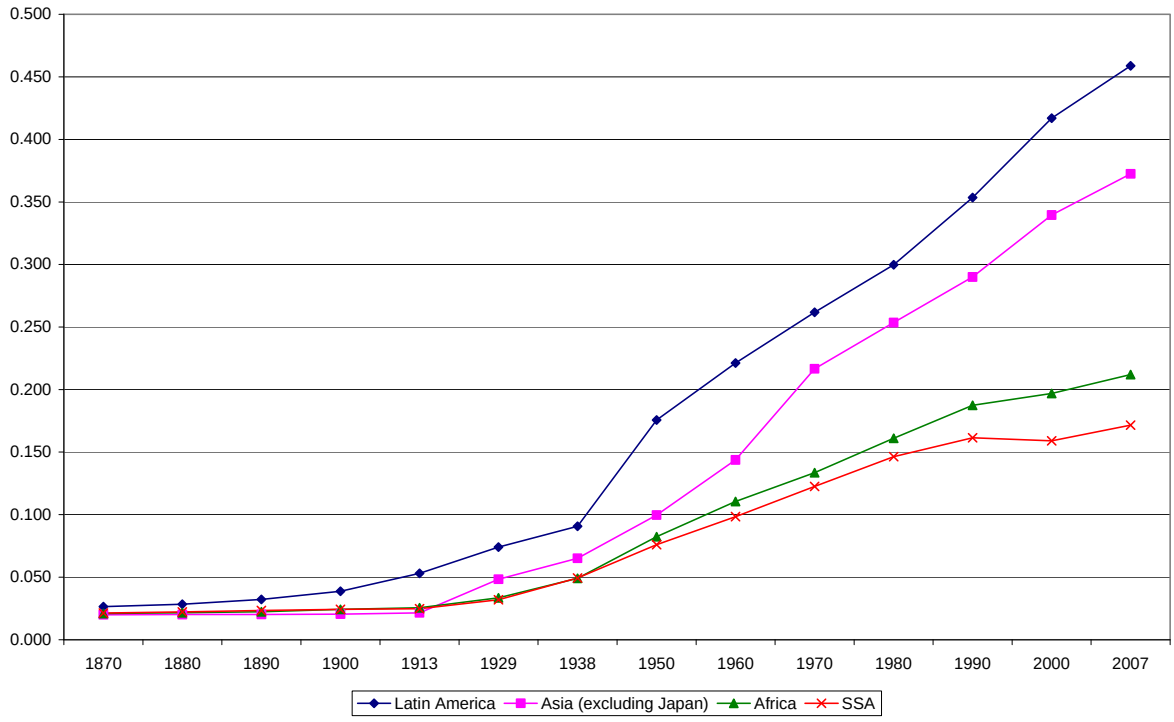

Figure 9 ***Life Expectancy Index across Developing Regions, 1870-2007***
Sources: See the text for Africa and Prados de la Escosura (2011) for the rest.

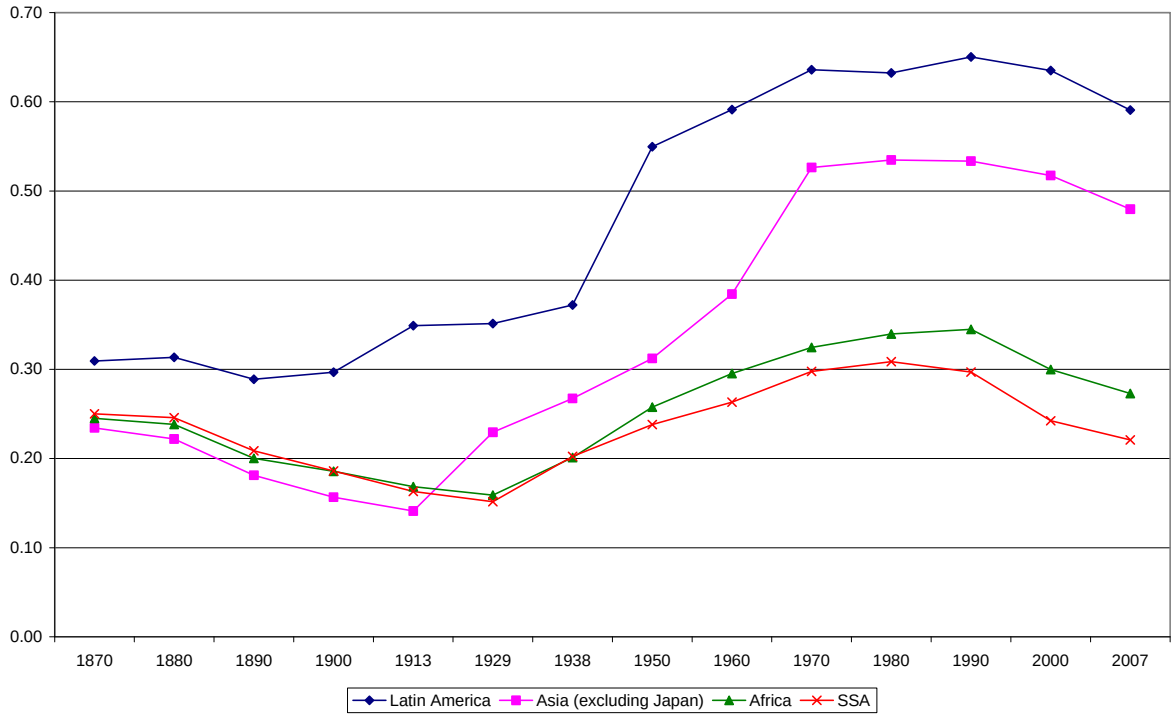

Figure 10 ***Relative Life Expectancy Index across Developing Regions, 1870-2007 (OECD = 1)***
Sources: See the text for Africa and Prados de la Escosura (2011) for the rest.

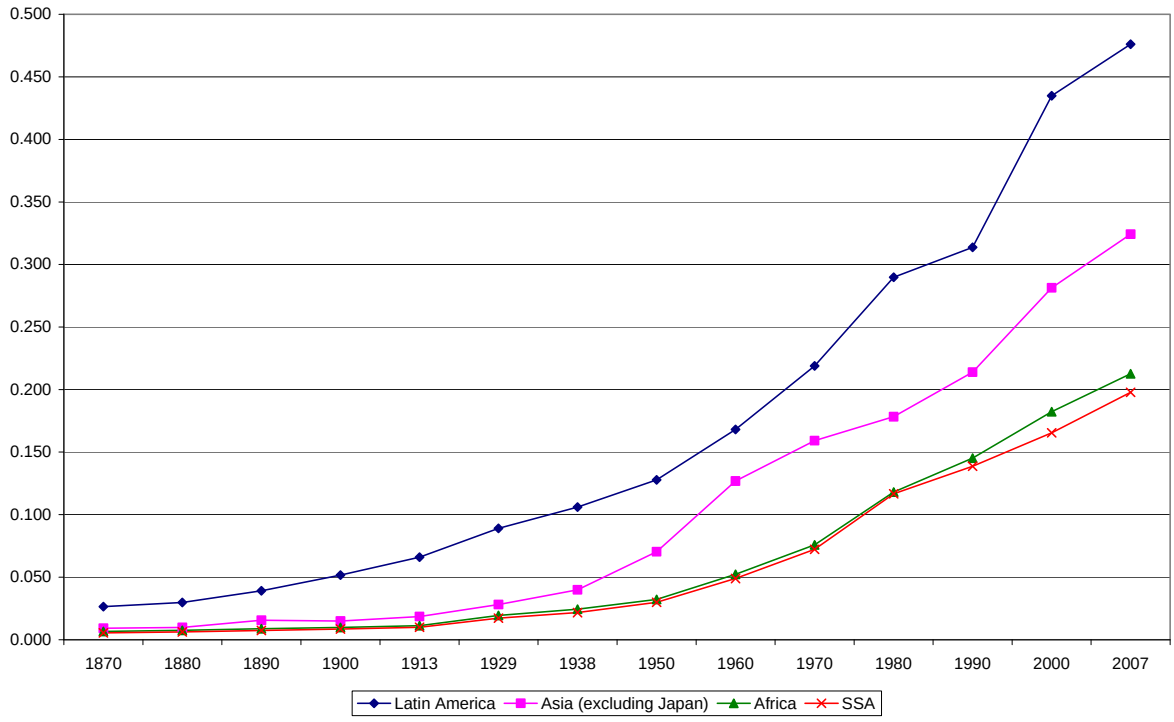

Figure 11 ***Education Index across Developing Regions, 1870-2007***
Sources: See the text for Africa and Prados de la Escosura (2011) for the rest.

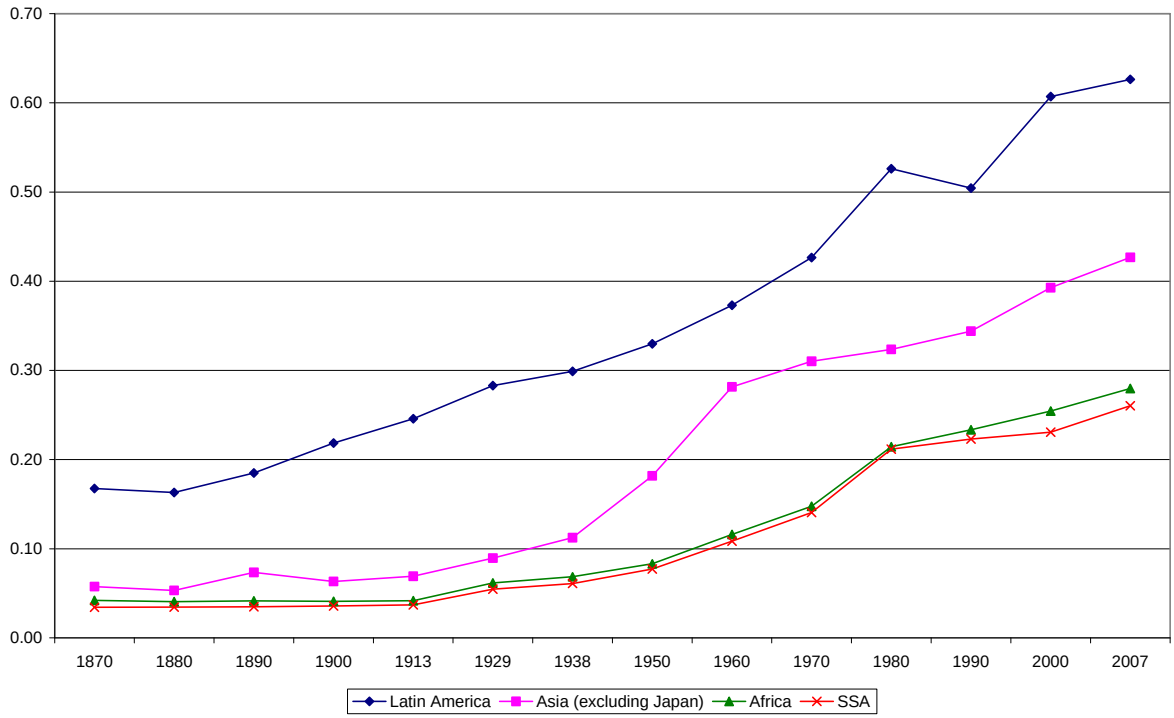

Figure 12 ***Relative Education Index across Developing Regions, 1870-2007 (OECD = 1)***
Sources: See the text for Africa and Prados de la Escosura (2011) for the rest.

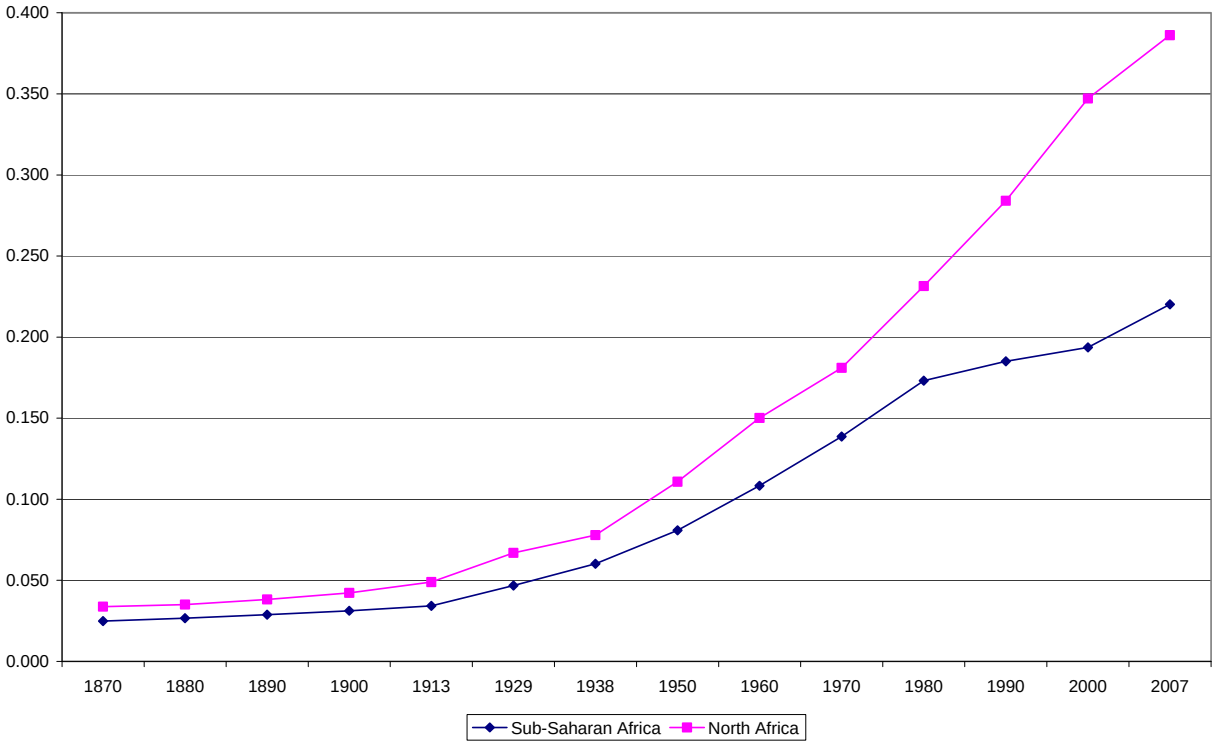

Figure 13 ***Human Development in Sub-Saharan and North Africa: IHDI, 1870-2007***
Sources: Table 5

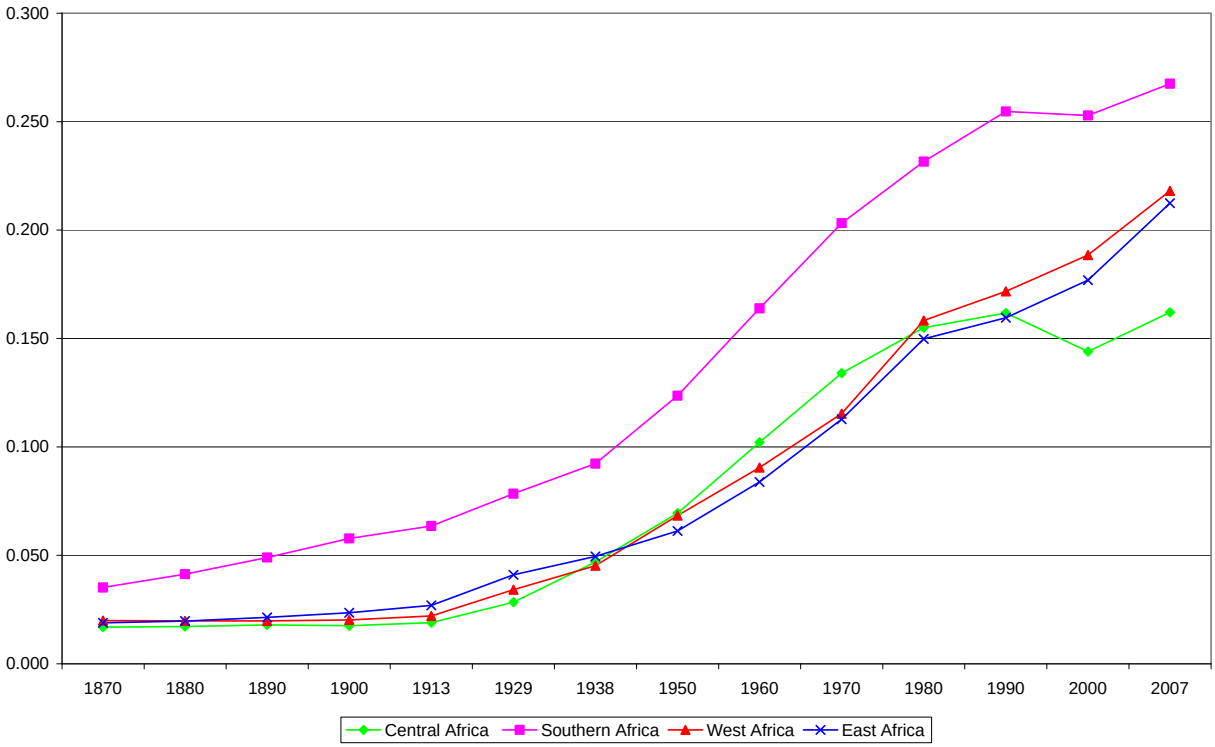

Figure 14 ***Human Development in Sub-Saharan African Regions: IHDI, 1870-2007***
Sources: Table 5

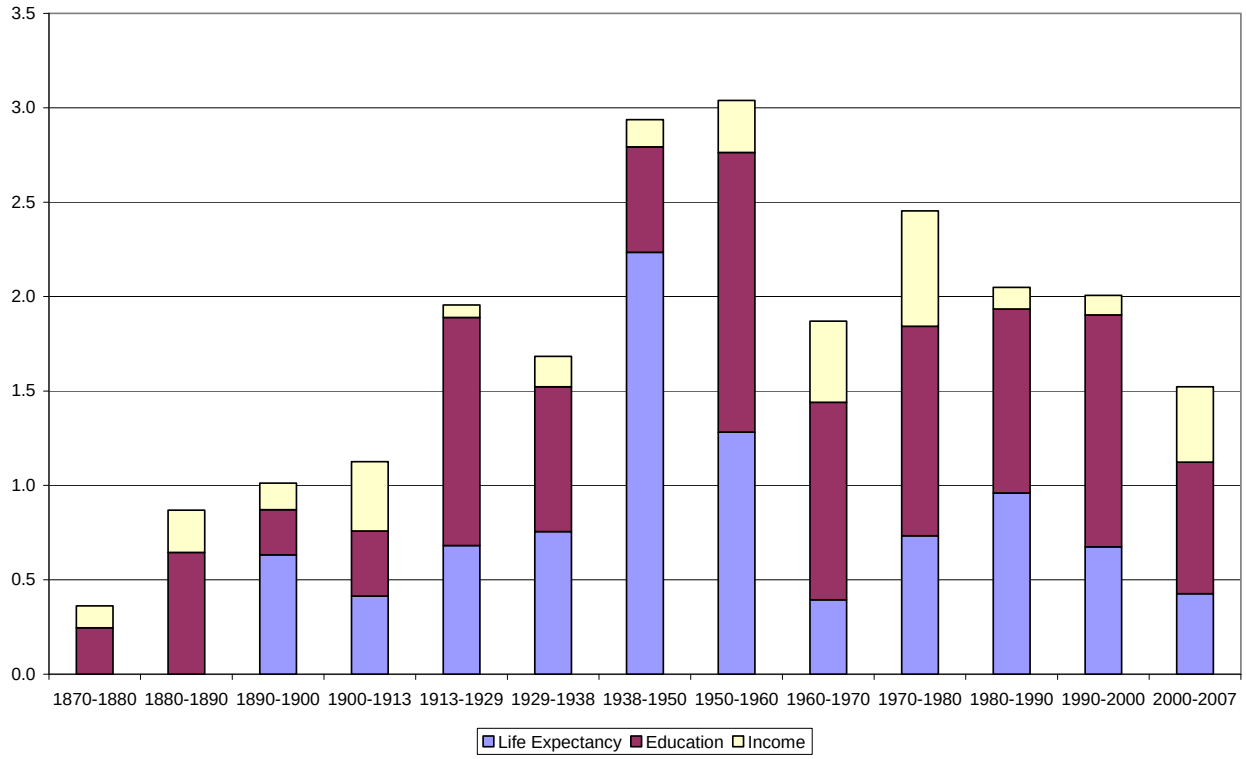

Figure 15 ***IHDI Growth and its Decomposition in North Africa, 1870-2007***
Sources: See the text.

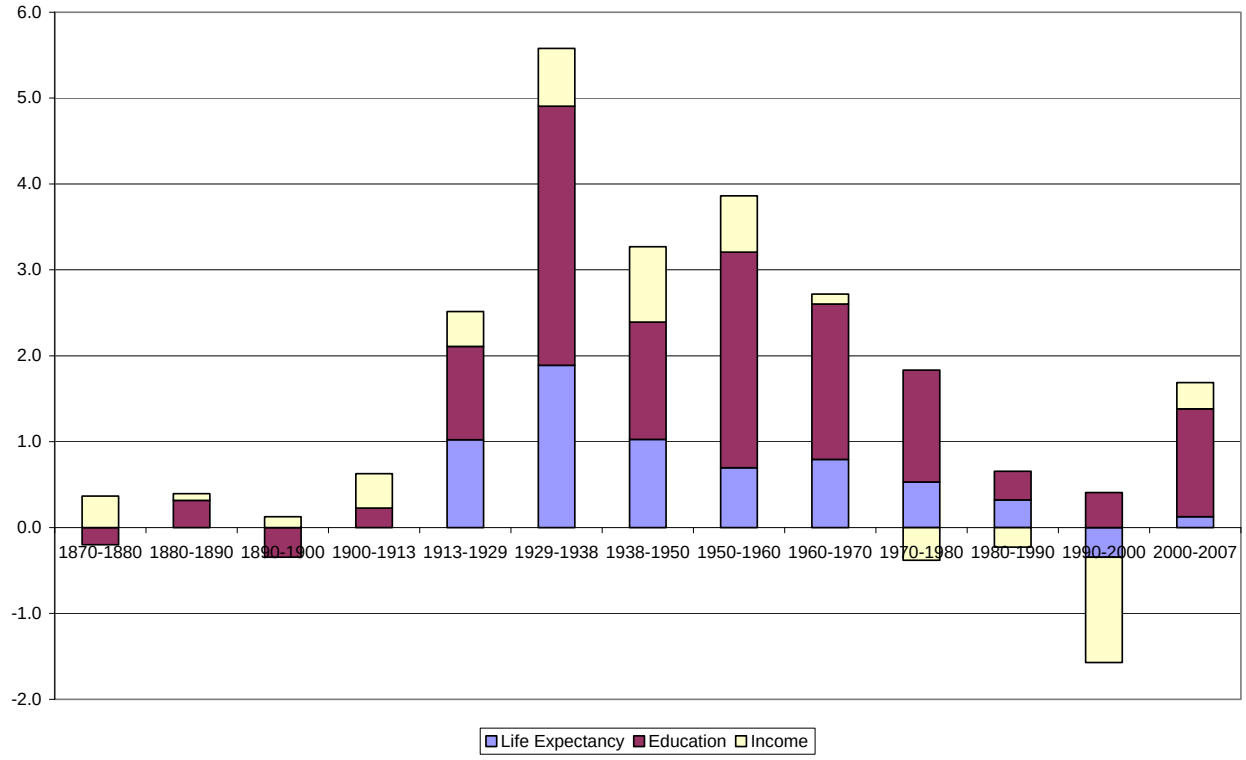

Figure 16 ***IHDI Growth and its Decomposition in Central Africa, 1870-2007***
Sources: See the text.

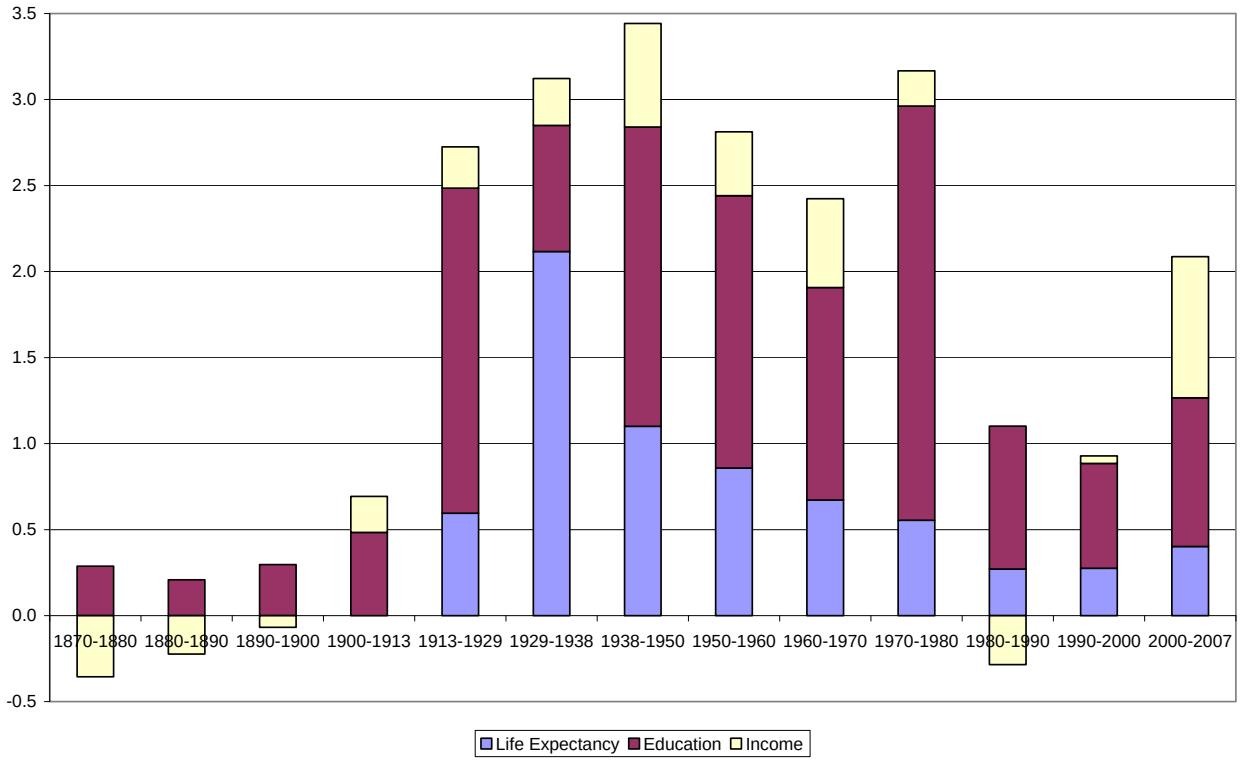

Figure 17 ***IHDI Growth and its Decomposition in West Africa, 1870-2007***
Sources: See the text.

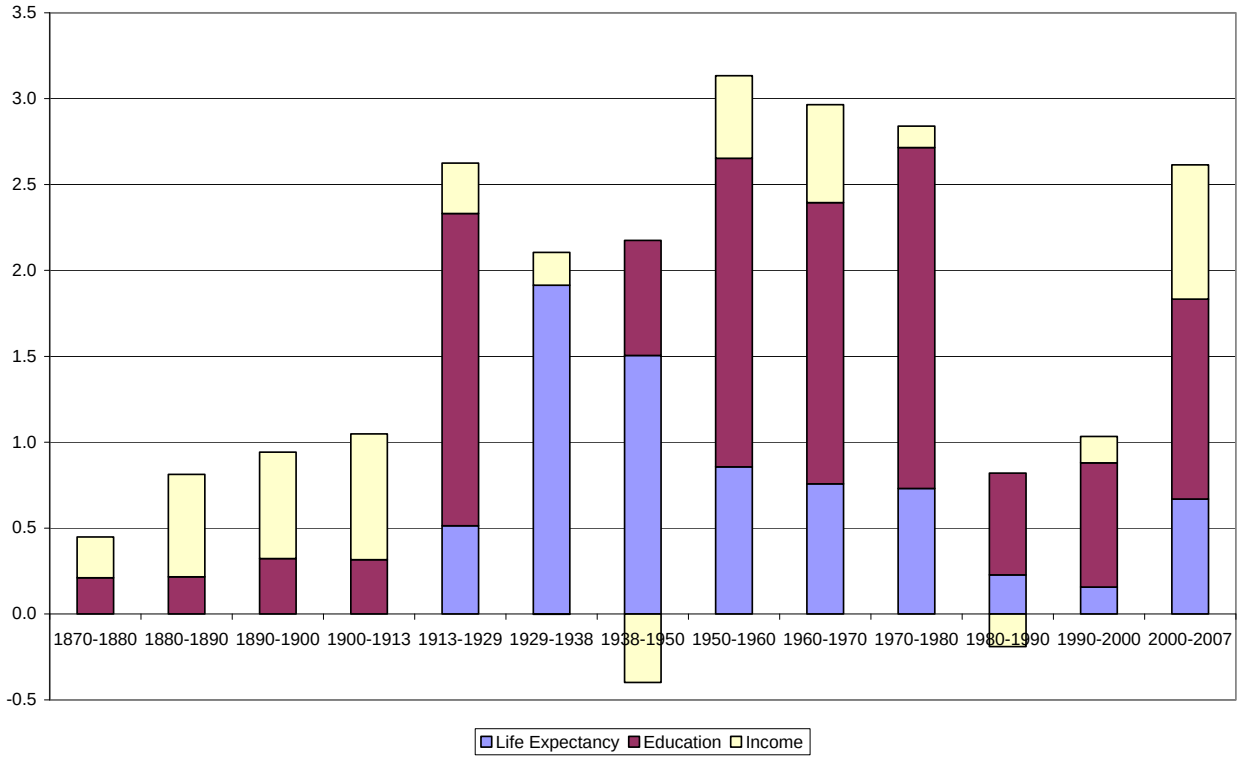

Figure 18 ***IHDI Growth and its Decomposition in East Africa, 1870-2007***
Sources: See the text.

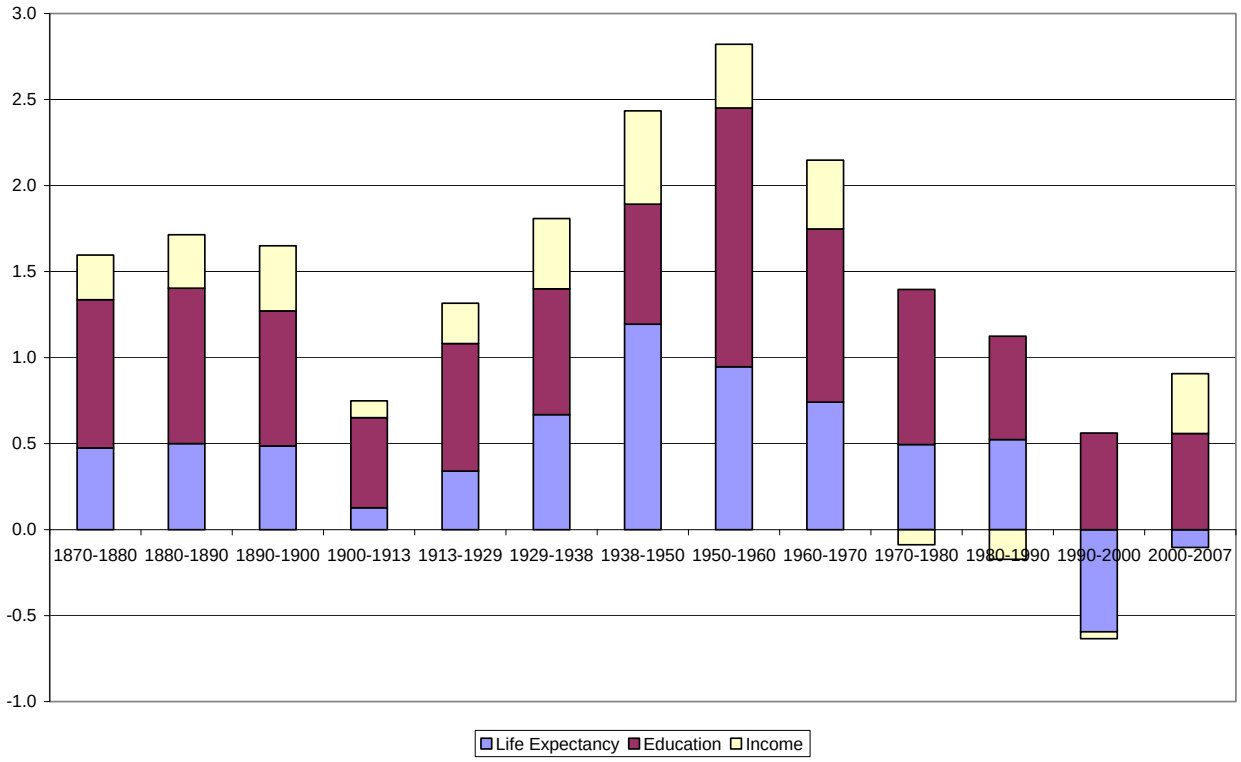

Figure 19 ***IHDI Growth and its Decomposition in Southern Africa, 1870-2007***
Sources: See the text.

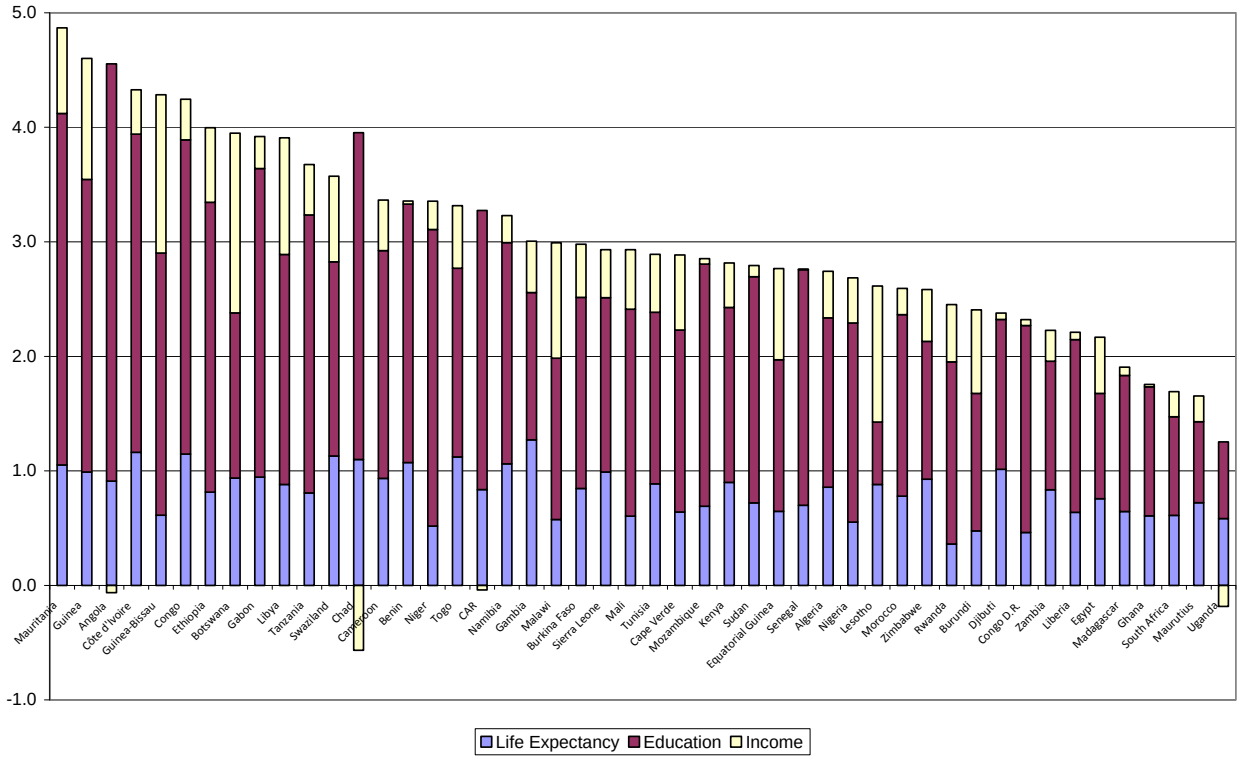

Figure 20 ***IHDI Growth Decomposition, 1950-1980: Country Ranking (%)***
Sources: Table 9a.

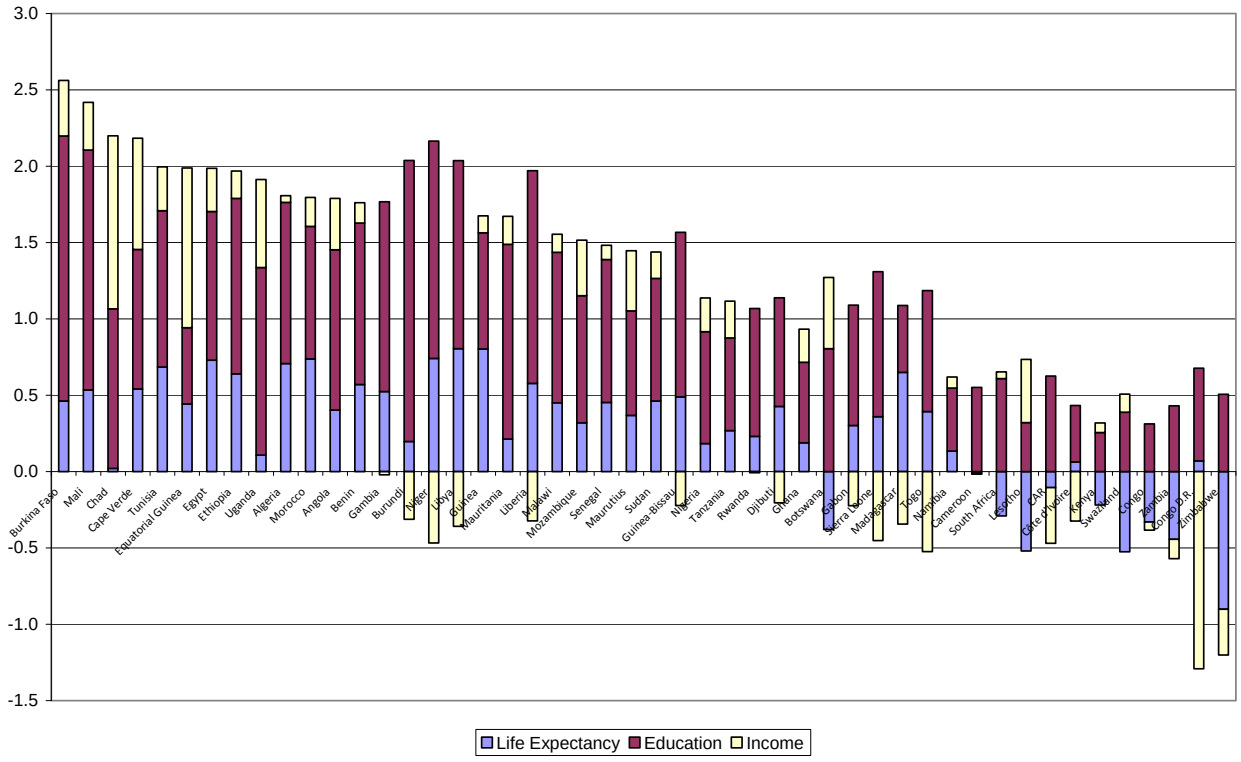

Figure 21 ***IHDI Growth Decomposition, 1980-2007: Country Ranking (%)***
Sources: Table 9a.

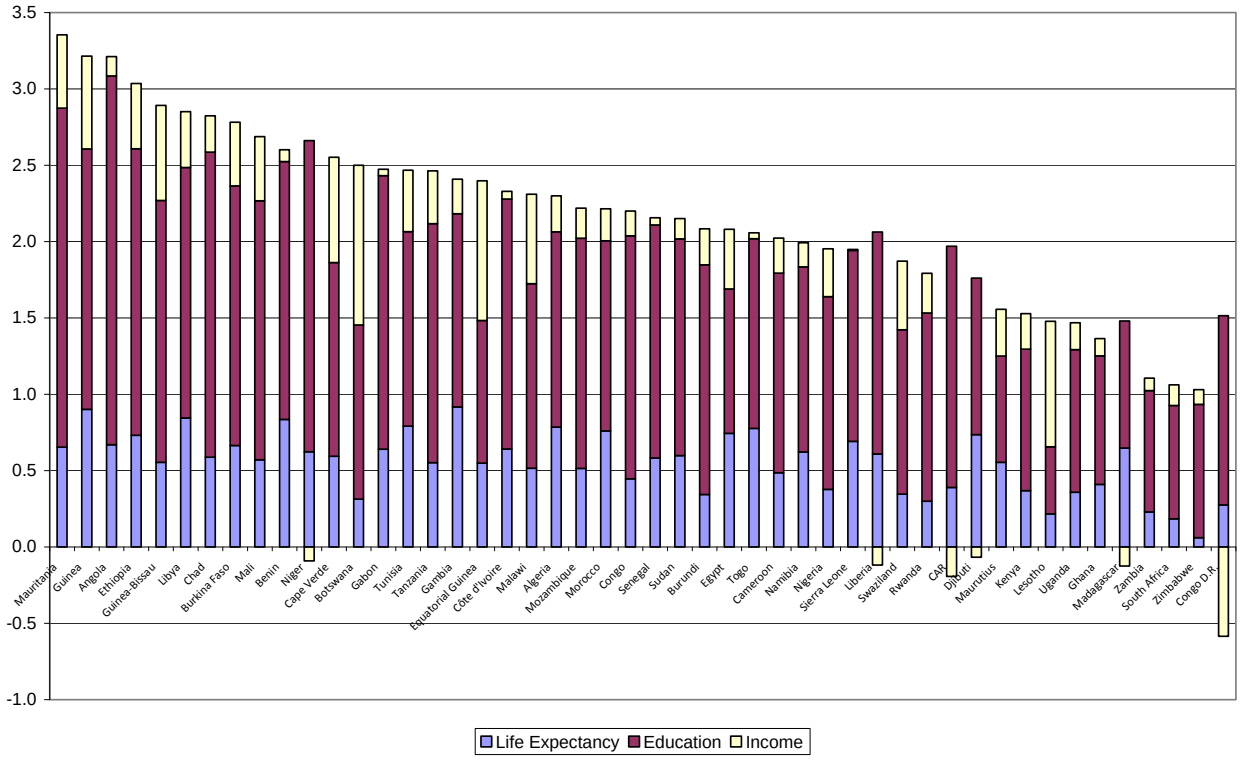

Figure 22 ***IHDI Growth Decomposition, 1950-2007: Country Ranking (%)***
Sources: Table 9b.

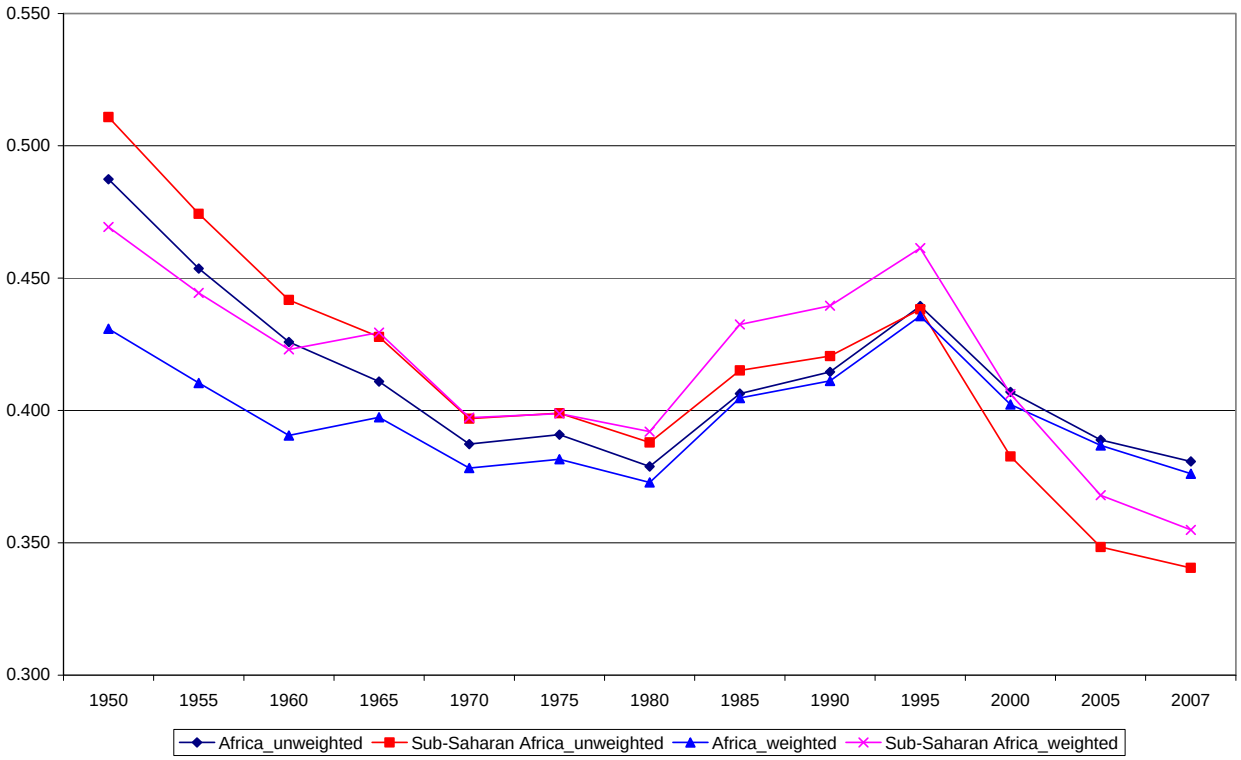

Figure 23 ***IHDI Dispersion in Africa and Sub-Saharan Africa, 1950-2007: unweighted and population-weighted coefficient of variation***
Sources: See the text.

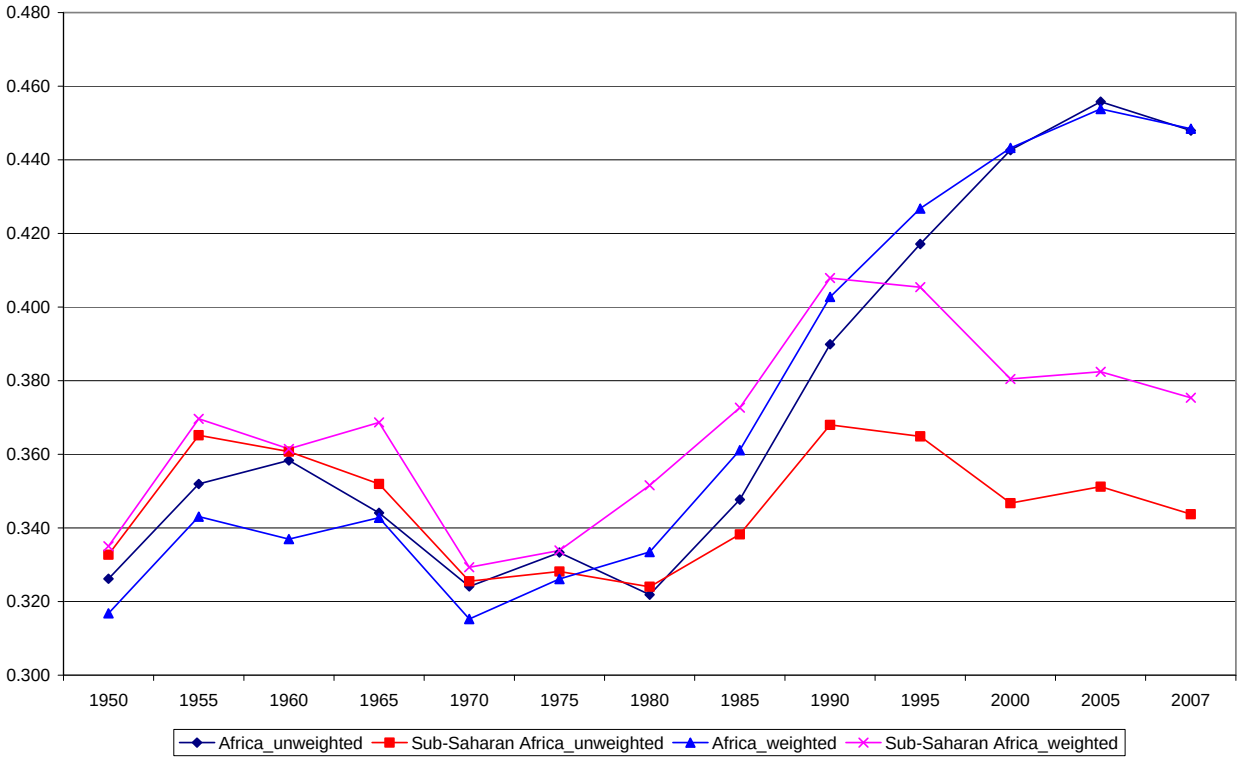

Figure 24 Life Expectancy Index: ***Dispersion in Africa and Sub-Saharan Africa, 1950-2007 (unweighted and population-weighted coefficient of variation)***
Sources: See the text.

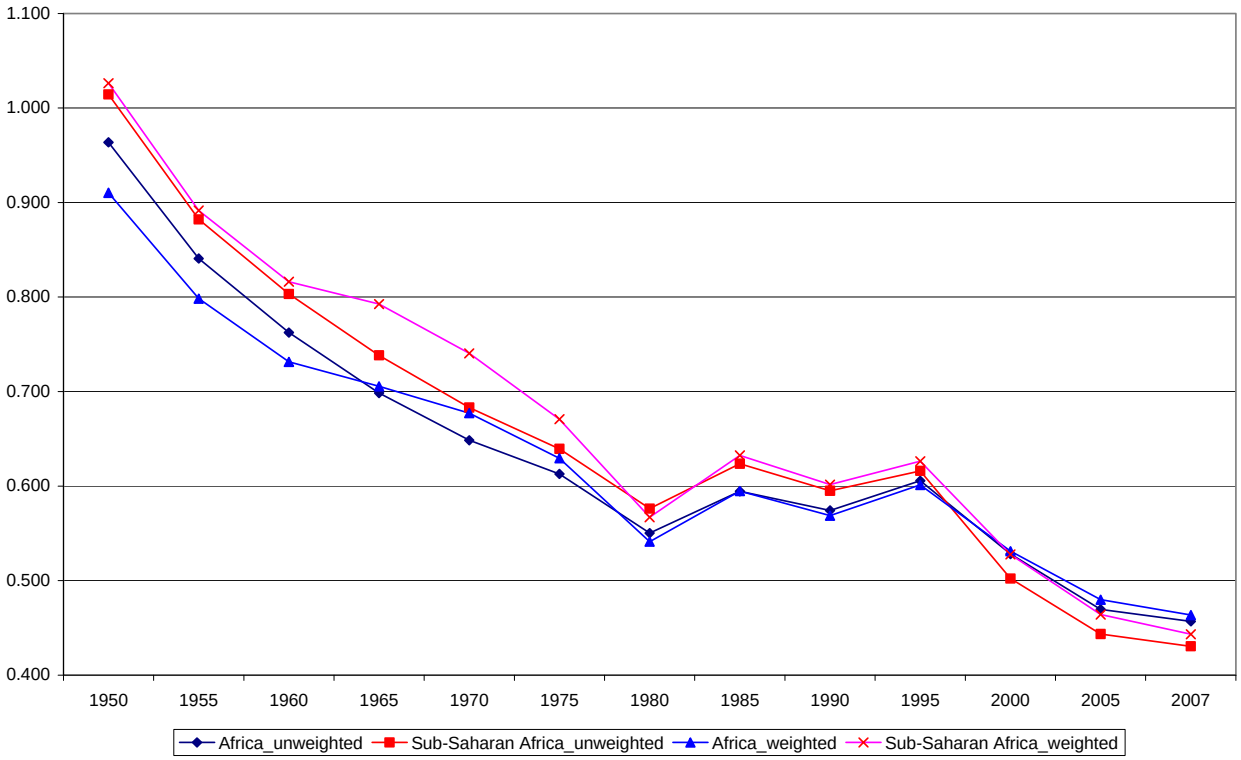

Figure 25 Education Index: ***Dispersion in Africa and Sub-Saharan Africa, 1950-2007 (unweighted and population-weighted coefficient of variation)***
Sources: See the text.

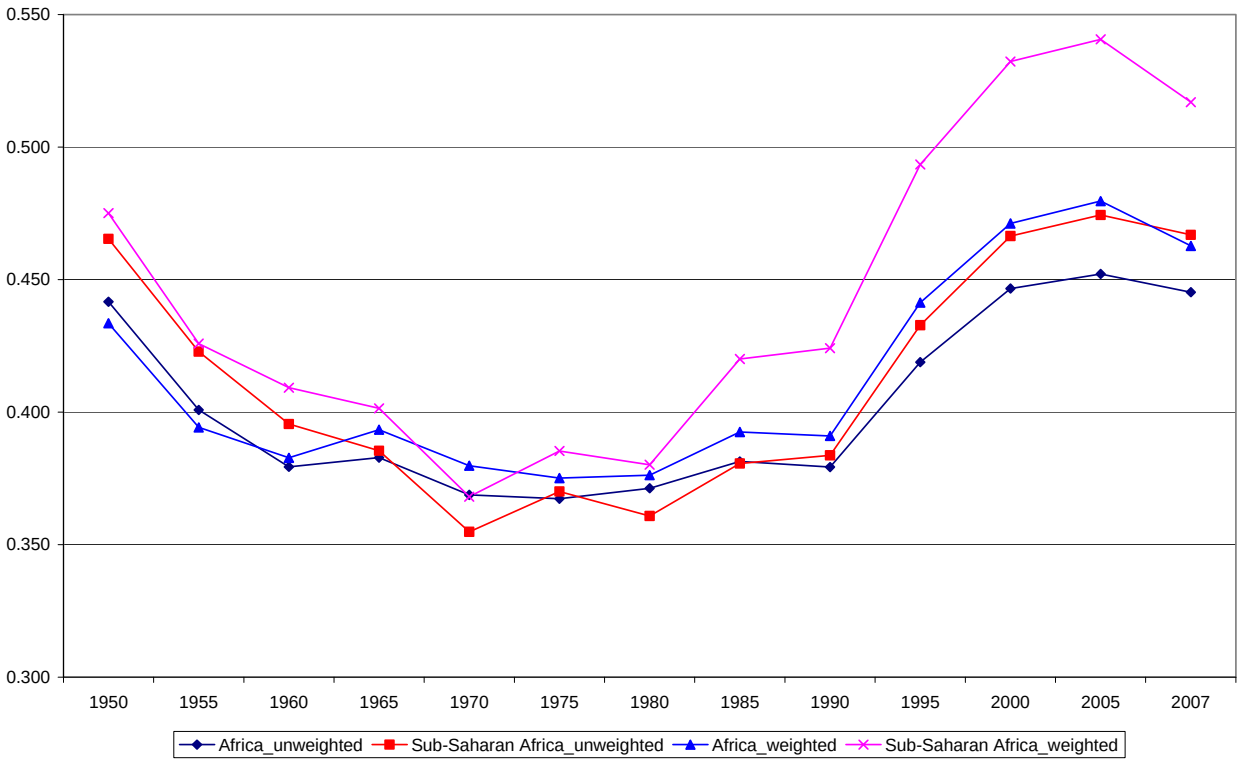

Figure 26 Income Index: ***Dispersion in Africa and Sub-Saharan Africa, 1950-2007 (unweighted and population-weighted coefficient of variation)***
Sources: See the text.

Appendix A. The Data

Life Expectancy at birth

Life expectancy is defined in the "Technical Notes" to the United Nations (2000), Demographic Yearbook Historical Supplement 1948-1997 as "the average number of years of life which would remain for males and females reaching the ages specified if they continued to be subjected to the same mortality experienced in the year(s) to which these life expectancies refer". In the Life Tables, estimates are based upon the assumption that "the theoretical cohort is subject, throughout its existence, to the age-specific mortality rates observed at a particular time. Thus, the levels of mortality prevailing at the time a life table is constructed are assumed to remain unchanged in the future until all members of the cohort have died". Lack of data implied that some strong explicit assumptions had to be introduced.

The United Nations' Demographic Yearbook Historical Supplement (United Nations 2000), from 1950 onwards, and the 2010 Human Development Report (UNDP 2010), from 1980, provide the database that, for the pre-1950 period comes from Riley (2005b), unless a reference is made below to a specific country's sources.

Algeria, 1930s, Riley (2005b); 1920s, assumed to be the same as Tunisia's.

Angola, 1938, Riley (2005b).

Benin, 1938, Riley (2005b).

Botswana (1870-1938) assumed to be identical to Namibia.

Djibouti (1938) assumed to be equal to Sudan's.

Libya (1929-1938), assumed to be identical to Egypt's.

Cameroon, 1929 and 1933, and 1938 (assumed to be equal to the lower bound estimate for 1950), Riley (2005b).

Angola, Benin, Chad, Eritrea, Ethiopia, Gabon, The Gambia, Niger, Sudan, Togo, 1929-1933, assumed to be as Nigeria's.

Burkina Faso, Burundi, CAR, Congo, D.R. Congo, Côte d'Ivoire, Liberia, Mali, Mauritania, Rwanda, Tanzania, 1929-1933, assumed to be as in Ghana.

Côte d'Ivoire, 1938, Riley (2005b).

Egypt, 1929-1938, Fargues (1986); 1925, assumed to be similar to Tunisia's.

Ethiopia, 1938, Riley (2005b).

Ghana, 1920, Riley (2005b), 1933, Bourguignon and Morrison (2002).
Kenya, Riley (2005b) provides an estimate of 23.5 years for the 1930s. Thus, the 25 years historical minimum value was assigned to the pre-1938 period.
Lesotho, Madagascar, and Malawi, 1925-1933, assumed to be as in Mauritius.
Mauritius, 1920s, Riley (2205b); 1930s, assumed to be the same as in 1942-6, UN (1993).
Morocco, 1925-1938, assumed to be as Tunisia's.
Mozambique, 1929-1938, assumed to be as in Angola's.
Namibia, 1870-1900, assumed to evolve as South Africa; 1900, assumed to be the same as for blacks in Cape Colony from Simkins *et al*. (1989); 1938, Notkola *et al*. (2000) 161, Northern Namibia figure adjusted with the ratio all Namibia to Northern Namibia c. 1960. It does not change over 1900-38.
Nigeria, 1929-1933, average of Ayeni (1976) for 1931, cited in Riley (2005b).
Senegal, 1938, average of Riley (2005b).
South Africa, 1880-1925, Simkins *et al*. (1989); 1929-1938, van Tonder and van Eeden (1975), cited in Riley (2005b).
Tunisia, 1920s, Riley (2005b); 1930s, is assumed to be the same as Algeria's.
Uganda, 1930s (c 1935), 23.9 (Riley 2005b), so I have assigned the minimum historical value of 25 years over 1850-1938.
Zambia, 1929-1938, assumed to be the same as Zimbabwe's.
Zimbabwe, 1930s, 26.4 Riley (2005b). I have assigned the minimum goalpost over 1850-1929.

Literacy

The rate of adult literacy is defined as the percentage of the population aged 15 years or over who is able to read and write. While, from a conceptual point of view, there are no objections to the UNESCO definition of a literate person, namely, those "who can, with understanding, both read and write a short simple statement on his everyday life" (quoted in Nilsson 1999: 278), assessing a person's literacy is quite a different issue.

Most data from 1950 onwards come from UNESCO (1970, 2002) and the World Bank (2010), and since 1980 from the Human Development Report (UNDP 2009), completed with data from Banks (2010), Hayami and Ruttan (1985), and Easterly

(1999). Data for Guinea, Madagascar, Mali, Mauritius, Niger, Senegal, and Togo, 1970-80, come from Ouane and Amon-Tanoh (1990). Pre-1950 figures are mainly taken from UNESCO (1953, 1957) and Flora (1973)

In the absence of estimates, literacy rates have been projected backwards with the rate of primary enrolment or with years of primary education (from Morrisson and Murtin 2009). Also, for the post-1960, when data were lacking, the literacy rate has been derived by assuming the illiteracy rate to be identical to the share of population without schooling, from Barro and Lee (2002, 2010) and Cohen and Soto (2007).

Literacy rates have been projected backwards with the rate of primary enrolment for Algeria (1870-80, 1930s), Burkina Faso (1929-19308), Burundi (1929-1938), Cape Verde (1929-1938), Chad (1925-1938), Congo (1929-1938), Congo D. R. (1929-1938), Djibouti (1938), Equatorial Guinea (1929-1938) Ethiopia and Eritrea (1938), The Gambia (1929-1933), Ghana (1870-1938), Guinea-Bissau (1938), Guinea (1913-1938), Kenya (1920-1938), Lesotho (1890-1938), Liberia (1890-1938), Mauritius (1870-1933), Namibia (1913-1938), Nigeria (1900-1938), Réunion (1900-1938), Rwanda (1929-1938), Seychelles (1900-1938), Sierra Leone (1870-1938), South Africa (1925-1933), Sudan (1913-1938), Swaziland (1938), Tanzania (1920-1938), Togo (1929-1938), Tunisia (1900-1925), Uganda (1900-1938), Zambia (1900-1938), and Zimbabwe (1900-1938).

Literacy rates have been projected backwards with years of primary education for the population above 15 years (Morrisson and Murtin 2009) for Angola (1870-1938), Benin (1870-1938), Botswana (1900-1938), Cameroon (1870-1938), Côte d'Ivoire (1870-1938), Eritrea and Ethiopia (1870-1933), Kenya (1870-1913), Lesotho (1870-1880), Madagascar (1870-1938), Malawi (1870-1938), Mali (1870-1938), Mozambique (1870-1880), Morocco (1870-1900), Senegal (1870-1880), and Tunisia (1870-1890).

Botswana (1870-1900) and Namibia (1870-1900) have been assumed to evolve along South Africa, Swaziland (1870-1933), as Lesotho's. Libya (1870-1900) is assumed to be as Egypt's. Djibouti (1870-1933), was assumed to evolve along Sudan.

Enrolment

Figures on enrolment rates, apparently straightforward, present difficulties of interpretation. The usual measurement procedure is to divide the number of students by the relevant school-age population cohort, for example, primary enrolment rate as the share of children receiving primary education over population aged 5 to 14 years, keeping this yardstick fixed over time. This ways the unadjusted (primary) enrolment rate is obtained. Such age span is, however, longer than primary schooling, leading to an under-estimate. Even worse, comparability is fraught with difficulties as the length of primary or secondary schooling changes across countries and over time, and, therefore, biases of an unknown sign are introduced (Benavot and Riddle 1988: 195; Nilsson 1999: 282). Alas, up to the mid-twentieth century, the only kind of enrolment rate that can be easily computed for a large number of countries and over a long time-span is the unadjusted one. Gross enrolment rates, in which the denominator is adjusted to the age bracket for each type of schooling (primary, secondary …) are provided for the present by UNESCO, OECD, and the World Bank. The difficulty here is that enrolment rates above 100 percent can appear, as under-age and/or over-age students are included in the numerator. Eliminating them is, thus, required to obtain the net enrolment rate.

In our case, since the rate of unadjusted total enrolment includes primary, secondary, and tertiary enrolment numbers in the numerator and the population aged 5-24 in the denominator, differences between gross and net rates are negligible. The resulting unadjusted rates tend to under-estimate gross enrolment rates, as historically education was not extended to population aged 24 years. Using the ratio between gross all enrolment rates and the unadjusted rates for 1980, I corrected the bias in my historical, pre-1980 estimates.

The relevant population was derived as follows. Firstly, I computed the share of population aged 5-24 (and 5-14) over total population at census years from Mitchell (2003) that was, then, interpolated log-linearly to derive yearly series and, finally, its result multiplied by total population figures (see below). The population share of those aged 5-24 years of age for missing countries has been replaced with that of a neighbour country with a similar demographic transition. Thus, Nigeria's shares have also been accepted for Benin, Cameroon, Equatorial Guinea, and Togo. South Africa's

have been adopted for Botswana, Lesotho, Namibia, and Swaziland. Mali's shares have been adopted for Burkina Faso, CAR, Chad, Congo, The Gambia, Guinea, Guinea-Bissau, Mauritania, Niger, and Senegal. Uganda's, in turn, are used for Burundi, Congo D.R., and Rwanda. Then, Ghana's are employed for Cape Verde, Côte d'Ivoire, Gabon, Liberia, and Sierra Leone. Kenya's for Somalia. Lastly, Mozambique's were accepted for Comoros and Madagascar, Egypt's for Djibouti, Ethiopia, and Sudan, Algeria's for Libya, and Tanzania's for Malawi.

For the pre-World War II era, Benavot and Riddle (1998) and Frankema (2011), and Lindert (2004), estimates of primary enrolment rates, and primary plus secondary education enrolment rates, respectively, have been used in the absence of direct estimates.

Occasionally, the total (that is, primary, secondary, and tertiary) enrolment rate for nineteenth and early twentieth century countries has been obtained by adjusting the primary or primary and secondary enrolment ratio with the ratio resulting from dividing the share of population aged 5-14 years of age by the share of population aged 5-24. This crude procedure implies the assumption that secondary and tertiary enrolment numbers represent a negligible proportion of the relevant population cohort. In such cases, all enrolment rates have been derived with primary enrolment rates provided by UNESCO (1953, 1957) [U], Benavot and Riddle (1988) []B&R] and Frankema (2011) [F], adjusted with the ratio of those aged 5-14 years to those aged 5-24 years, for the following countries and years: for Angola (F), 1890-1929; Benin (B&R,F), 1890-1938; Botswana (F,U), 1890-1938, 1955-1960; Burkina Faso (B&R,F), 1913-1950; Burundi (F,U) 1929-50; Cameroon (B&R), 1890-1933; CAR (B&R,F), 1900-1950; Chad(B&R), 1900-1938; Congo (B&R,F), 1900-1950; Congo, D.R. (U), 1929-1955; Côte d'Ivoire, (B&R,F),1900-1950, 1960; Djibouti (F), 1938-1960; Egypt (B&R), 1890-1900; Equatorial Guinea (F), 1938, 1955-1965; Ethiopia (F), 1938; Gabon (B&R,F), 1900-1950; The Gambia (B&R,F), 1900-1938, 1955-1960; Ghana (F), 1870, 1890; Guinea (B&R,F), 1913-1950, 1960; Guinea-Bissau (F), 1938-1960; Kenya (B&R), 1920, 1938; Lesotho (B&R,F) 1890-1939, 1955-1960; Madagascar (B&R,U), 1920-1938; Malawi (F), 1900-1938; Mali (B&R), 1913-1933; Mauritania (B&R), 1913-1938; Mauritius (B&R), 1870-1900, 1929, 1938; Mozambique (B&R), 1938; Namibia (B&R,F),

1913-1960; Niger (B&R,F), 1913-1938; Nigeria (B&R,F), 1920-1950, 1960; Réunion (B&R,U), 1900-1950; Rwanda (U,F), 1929-1950; Senegal (B&R,F), 1913-1960; Seychelles (B&R,U), 1900-1950; Sierra Leone (F), 1870-1890, 1950; Somalia (F,U), 1938-1950; Sudan (B&R), 1913-1933; Swaziland (F,U), 1938-1955; Tanzania (B&R,F) 1920, 1938, 1960; Togo (B&R,U) 1913-1955; Uganda (F,B&R,U), 1900-1955; Zambia (F), 1900-1955; Zimbabwe (F), 1900, 1938-1960.

For those countries for which no evidence on enrolment was available at given dates the closer enrolment rates have been projected backwards with the average years of schooling among the population above 15 (Morrisson and Murtin 2009). This procedure has been applied to Egypt (1870-1880), Kenya (1870-1913), Madagascar (1870-1900), Malawi (1870-1890), Mozambique (1870-1920), and Tunisia (1870-1890).

In the absence of enrolment data for particular countries, I have assumed they evolved as a neighbouring country or one with similar features. Thus, Djibouti (1913-1933) was assumed to move along Sudan, and Libya (1870-1938) as Egypt. Enrolment rates for Botswana (1870-1890), Lesotho (1870-1880) and Namibia (1870-1900) have been derived with the rate of variation of South Africa over the relevant period, and Swaziland (1870-1933) with Lesotho's. Also, it was assumed that Guinea-Bissau (1965-1970) moved along Senegal, The Gambia (1870-1890) as Ghana, and Tanzania (1890-1913) as Uganda.

Per Capita GDP

For North Africa, Algeria, 1870-1950, estimates come from Maddison (2006: 577-580). I interpolated levels for 1890, 1900, 1925, and 1938. For Egypt, 1870-1950, Maddison (2006: 577) estimates were used. Pamuk (2006) and Yousef (2002) also provide estimates. The former figures match closely Maddison's estimates. The latter suggest too low levels for 1870-1913. In Sub-Saharan Africa, the only countries for which estimates were available are Ghana (Maddison 2006) and South Africa, for which I deflated nominal GDP estimates for 1913-1950 (Stadler 1963) with Alvaredo and Atkinson (2010) price index, and used population figures from Feinstein (2005: 257-8) to derive per capita GDP. Then, the estimates were projected backwards to 1880 with Bourguignon and Morrisson (2002) conjectures while Maddison (2010) guessestimates for 1870 was accepted. As for the rest of the countries, I used the

panel regression approach exposed above. The econometric tests and results are provided in Appendix B.

Population

All figures are adjusted to refer to mid-year and to take into account the territorial changes and are derived from Maddison (2010), from 1950 onwards. Pre-1950 data come from Smits (private communication) for Sub-Saharan Africa, completed with Banks (2010), for Ethiopia, Liberia, Malawi, and Sierra Leone; Fargues (1986), for Algeria and Tunisia, and Feinstein (2005) for South Africa. Missing observations for Sub-Saharan African countries in the late 19th century derived by assuming the average growth rate for countries in the region.

Main regions

These five regions are defined according the African Development Bank. North Africa includes Algeria, Egypt, Libya, Mauritania, Morocco, and Tunisia. Central Africa contains Cameroon, Central African Republic, Chad, Congo, Democratic Republic of Congo, Equatorial Guinea, and Gabon. East Africa comprises Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Seychelles, Somalia, Sudan, Tanzania, and Uganda. Lack of data at each benchmark excluded Comoros, Seychelles, and Somalia form the region population-weighted averages. Ethiopia includes Eritrea. West Africa comprises Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea‑Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. Lack of data prevents the inclusion of São Tomé and Principe. Southern Africa consists of Angola, Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe.

Appendix B
Estimating GDP Indirectly

I have investigated the order of integration of the variables used (excluding the dummies) in the estimate with the Augmented Dickey-Fuller test (ADF) (Table B-1). All variables are integrated of order zero, I (0), that is, its level does not contain a unit root. The hypothesis of a unitary root is rejected at the 1 per cent confidence level.

Table B-1 Variables in the Model: Order of Integration

Variables (logs)	ADF test level	Critical value 1% level	Order of integration
Y *	-5.601	-3.447	I(0)
ITT *	-6.213	-3.447	I(0)

Notes: * The ADF level tests have been considered with constant

Y: Per Capita GDP (1990 Geary-Khamis $) from Maddison (2010)
ITT: Income Terms of Trade per Head. Income Terms of trade were computed by deflating African countries' nominal export values with the industrial countries' export unit values (IMF 2003) and, then, divided by the countries' population (Maddison 2010)

Table B-2 Summary Statistics

	Mean	Std. Dev.
Y	1370.69	1280.86
ITT	266.48	700.06
RR	0.28	0.45
COAST	0.65	0.48
NORTH	0.12	0.32
COLONIAL	1.23	0.74

Y: Per Capita GDP ((1990 Geary-Khamis $) (in logs) (Maddison 2010)
ITT: Income Terms of Trade per Head (in logs) (IMF 2003 and Maddison 2010)
RR: takes value 1 when a country is resource-rich and 0 otherwise (Collier and O'Connell (2008)
COAST: value 1 when a country is coastal and 0 otherwise (Collier and O'Connell (2008)
NORTH: value 1 when a country is located in North Africa and 0 otherwise
(African Development Bank)
COLONIAL: takes value 2 when a country was a British colony, 1 if it was French colony, and 0 otherwise (Bertocchi and Canova 2002)

Table B-3 Econometric Estimate

Dependent Variable log(Y)		
Constant	6.283	(48.696)
log (ITT)	-0.576	(-6.758)
log(ITT)^2	0.051	(6.718)
RR	-0.104	(-2.217)
COAST	0.336	(9.833)
NORTH	0.317	(5.806)
COLONIAL	0.082	(2.987)
log(ITT)*TREND	0.002	(7.323)
AR(1)	-0.109	(-2.296)
Adjusted-R squared	0.732	
S.E. of regression	0.345	
Durbin-Watson stat	1.993	
F-statistic	132.568	
No. of observations	386	

Notes: Ordinary Least Squares have been used.
White Heteroskedasticity-Consistent Standard Errors and Covariance
t-ratios in brackets

Y: Per Capita GDP ((1990 Geary-Khamis $) (in logs) (Maddison 2010)
ITT: Income Terms of Trade per Head (in logs) (IMF 2003 and Maddison 2010)
RR: takes value 1 when a country is resource-rich and 0 otherwise (Collier and O'Connell (2008)
COAST: takes value 1 when a country is coastal and 0 otherwise (Collier and O'Connell (2008)
NORTH: takes value 1 when a country is located in North Africa and 0 otherwise
(African Bank of Development)
COLONIAL: takes value 2 when a country was a British colony, 1 if it was French colony,
and 0 otherwise (Bertocchi and Canova 2002)

Appendix C
IHDI Determinants: Econometric Estimates

I have analysed the order of integration of the variables used (excluding dummies), with the Augmented Dickey-Fuller test (ADF) (Table C-1). All variables are integrated of order zero, I (0. The hypothesis of a unitary root is rejected at the 1 per cent confidence level.

Table C-1 Variables in the Model: Order of Integration

Variables	ADF test level	Critical value 1% level	Order of integration
IHDI_GR **	-14.113	-3.990	I(0)
IHDI (in logs) **	-18.682	-3.990	I(0)

Notes: ADF level tests have been considered with constant (*) and with constant and linear trend (**).

IHDI_GR: IHDI logarithmic growth rate
IHDI: Improved Human Development Index
Sources: See the text.

Table C-2 Summary Statistics

	Mean	Std. Dev.
IHDI_GR	2.134	1.681
IHDI (in logs)	-2.005	0.565
SYNDROME	0.465	0.500
RR	0.354	0.479
COAST	0.688	0.464
NORTH	0.125	0.331
COLONIAL	1.146	0.765

IHDI_GR: IHDI logarithmic growth rate (see the text)
IHDI: Improved Human Development Index (see the text)
SYNDROME: takes value 1 when a syndrome exists and 0 otherwise (Collier and O'Connell 2008)
RR: takes value 1 when a country is resource-rich and 0 otherwise (Collier and O'Connell (2008)
COAST: takes value 1 when a country is coastal and 0 otherwise (Collier and O'Connell (2008)
NORTH: takes value 1 when a country is located in North Africa and 0 otherwise (African Bank of Development)
COLONIAL: takes value 2 when a country was a British colony, 1 if it was French colony, and 0 otherwise (Bertocchi and Canova 2002)

Appendix D
Original Values of Social Indicators and GDP per Head in Africa and its Main Regions

Table D-1 Life Expectancy at Birth in Africa and its Main Regions (years)

	Africa	North	Central	Southern	West	East	SSA
1870	25.2	25.0	25.0	26.1	25.0	25.0	25.3
1880	25.3	25.0	25.0	26.9	25.0	25.0	25.5
1890	25.5	25.0	25.0	27.7	25.0	25.0	25.7
1900	25.9	26.0	25.0	28.8	25.0	25.0	25.9
1913	26.3	27.0	25.0	29.7	25.0	25.0	26.1
1929	28.1	29.5	28.0	31.2	26.6	26.3	27.7
1938	31.5	31.4	32.7	33.2	31.1	30.2	31.6
1950	38.1	42.7	37.4	39.2	35.8	36.5	36.9
1960	42.8	50.2	40.8	44.0	39.6	40.4	41.0
1970	46.5	52.9	45.1	48.5	43.0	44.5	44.9
1980	50.2	57.9	48.2	51.4	46.1	48.7	48.3
1990	52.9	64.4	50.1	54.7	47.5	50.0	50.1
2000	53.7	68.9	48.1	51.1	49.3	51.3	50.1
2007	55.3	70.7	48.6	50.7	51.2	54.5	51.8

Sources: See the text and Appendix A

Table D-2 Adult Literacy Rates in Africa and its Main Regions
(% Population 15 years and above)

	Africa	North	Central	Southern	West	East	SSA
1870	3.7	5.9	2.2	6.4	1.1	1.7	2.8
1880	4.1	5.8	2.0	8.5	1.2	1.8	3.4
1890	4.8	6.8	1.8	11.1	1.3	2.0	4.0
1900	5.5	7.6	1.6	14.8	1.5	2.4	4.8
1913	5.7	8.6	1.5	13.6	1.8	3.0	4.8
1929	8.8	11.9	1.6	18.2	4.3	7.8	8.0
1938	10.0	12.4	2.8	21.6	5.1	7.5	9.3
1950	13.3	18.3	4.4	25.3	9.1	9.4	12.1
1960	19.9	21.5	13.4	38.3	12.9	16.2	19.5
1970	27.4	27.4	23.0	47.2	18.1	25.5	27.3
1980	37.2	36.2	33.8	57.3	27.7	35.9	37.4
1990	47.9	44.3	44.6	62.8	43.0	47.5	48.8
2000	57.4	56.0	62.4	72.6	51.2	53.7	57.7
2007	62.8	67.2	63.9	74.7	57.7	57.9	61.8

Sources: See the text and Appendix A

Table D-3 Gross Enrolment Rates in Africa and its Main Regions (%)
(primary, secondary and tertiary enrolment over population ages 5 to 24)

	Africa	North	Central	Southern	West	East	SSA
1870	2.0	3.0	1.0	2.8	1.0	1.2	1.6
1880	2.3	3.5	1.0	3.6	1.0	1.4	1.8
1890	2.8	4.4	1.3	4.7	1.1	1.5	2.1
1900	2.8	4.5	1.0	5.4	1.1	1.7	2.2
1913	3.7	5.2	1.1	8.8	1.3	2.0	3.2
1929	7.5	11.3	4.1	14.8	3.4	5.1	6.5
1938	10.1	15.7	11.1	17.6	4.3	5.2	8.6
1950	12.8	15.6	17.7	22.8	7.8	6.8	12.1
1960	20.3	29.3	24.4	31.4	13.7	10.8	18.0
1970	27.9	38.5	36.3	39.5	19.2	17.3	25.2
1980	42.2	49.0	45.7	49.1	41.0	31.8	40.5
1990	43.9	59.5	40.7	54.8	38.8	31.6	40.1
2000	48.1	71.5	32.5	57.5	42.6	37.7	42.7
2007	56.4	72.9	47.8	65.5	48.7	51.9	52.8

Sources: See the text and Appendix A

Table D-4 GDP per Head in Africa and its Main Regions (1990 Geary-Khamis $)

	Africa	North	Central	Southern	West	East	SSA
1870	498	624	307	523	541	313	446
1880	506	650	322	583	485	324	447
1890	531	706	326	659	457	354	463
1900	557	747	333	758	448	395	492
1913	628	906	361	808	482	484	542
1929	682	955	406	914	533	551	607
1938	755	1023	462	1086	574	584	682
1950	887	1118	657	1472	757	526	830
1960	1054	1314	832	1794	872	609	988
1970	1340	1783	897	2357	1096	714	1229
1980	1524	2550	849	2353	1210	751	1270
1990	1433	2673	775	2135	1037	706	1131
2000	1460	2913	624	2137	1073	748	1123
2007	1821	3673	728	2581	1501	924	1410

Sources: See the text and Appendices A and B

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