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Abstract

How has Latin America's wellbeing evolved over time? How does Latin America compare to today's developed countries (*OECD*, for short)? What explains their differences? These questions are addressed using an historical index of human development. A sustained improvement in wellbeing can be observed since 1870. The absolute gap between *OECD* and Latin America widened over time, but an incomplete catching up –largely explained by education- occurred since 1900, but faded away after 1980, as Latin America fell behind the *OECD* in terms of longevity. Once the first health transition was exhausted, the contribution of life expectancy to human development declined.

JEL classification: O15, O54, I00, N36.

Keywords: Latin America, Human Development, Positive Freedom, Life Expectancy, Education

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How much has well-being improved in Latin America during the last one-and-a-half centuries? How does Latin America compare to the advanced nations? Have their differences widened? Why? There are no easy answers to these questions, but the policy implications are far-reaching.

Trends in well-being have been drawn on the basis of GDP per head (Bulmer-Thomas, 2003; Coatsworth, 2005; Prados de la Escosura, 2007). However, as development is a multidimensional process, a more comprehensive approach to living standards has been put forward in recent years (Astorga et al., 2005; Salvatore et al. 2010; Bértola and Ocampo, 2012).

This paper favours the capabilities approach, in which development is seen as a process of expanding freedom and in which objective measures are used. Human development, a concept deep-rooted in the capabilities approach, was originally defined as 'a process of enlarging people's choices' (UNDP, 1990): enjoying a healthy life, acquiring knowledge and achieving a decent standard of living. These achievements provide individuals with freedom to choose and the opportunity 'to lead lives they have reasons to value' (Sen, 1997). Human development can thus be depicted as positive freedom (Desai, 1991).

In this paper, answers to the questions raised here are based on a new historical index of human development that covers nearly one and a half centuries, between 1870, when large-scale improvements in health, helped by the diffusion of the germ theory of disease (Preston, 1975; Riley 2001) and in primary education (Benavot and Riddle, 1988; Lindert, 2004) were initiated, and 2007, which marks the eve of the Great Recession.[2] I start by proposing an alternative historical index of human development (*HIHD*) as an alternative to the index proposed by the United Nations Development Programme (UNDP), *HDI* and briefly examining the sources and computation procedures used to derive it.[3] Next, the main results for Latin America, both a continental and country level, are discussed and Latin America's evolution placed into a world perspective. I address, then, how its dimensions contributed to the

[2] This paper is part of a broad research project on negative and positive freedom in a historical perspective. See Prados de la Escosura (2013, 2015, forthcoming).

[3] I will not examine the UNDP *HDI* as a measure of wellbeing here, since it has recently been discussed elsewhere (Klugman et al. 2011, Prados de la Escosura 2010).

aggregate performance of the *HIHD* over time and to what extent explain the observed differences between Latin America and the developed countries, defined as the countries that composed the OECD prior to 1994 (*OECD*, hereafter).[4] Last section concludes.

The new *HIHD* shows substantial gains in Latin American human development since 1870 –and especially over 1900-1980. A major advance in human development, which resulted from substantial gains in longevity and education, took place between 1938 and 1950, at the time of an economic globalization backlash. Although the gap between *OECD* and Latin America widened in absolute terms, an incomplete catching up took place in Latin America between 1900 and 1980, as part of a wider but shorter process that embraced all developing regions. Education and, to less extent, life expectancy at birth drive Latin America's limited catching-up. In Latin America, the epidemiological or *first* health transition –that is, the phase in which persistent gains in lower mortality and higher survival are achieved as infectious disease gives way to chronic disease (Riley 2005a)- is the only period in which substantial gains in longevity were achieved. Afterwards, the region fell behind the *OECD* in terms of the longevity index, which largely explains Latin America's failure to catch up despite the educational expansion.

Assessing Human Development

The UNDP Human Development Index (*HDI*) includes three dimensions: a healthy life, access to knowledge, and other aspects of well-being. Reduced forms of these dimensions are used as a short-cut, namely, life expectancy at birth as a proxy for a healthy life, education measures for access to knowledge, and discounted per capita income (its log) as a surrogate for all other aspects of well-being (Anand and

[4] Pre-1994 OECD members were: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxemburg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the U.K., and the U.S.A. No human development estimates have been computed for Iceland and Luxemburg so these two countries were excluded from my own version of *OECD*. Turkey, although an OECD member, has been excluded from the *OECD* group in order to make the group more homogeneous.

Sen, 2000; UNDP, 2001).[5] These are combined into a synthetic measure using a geometric average (UNDP, 2010).[6] Since all dimensions are considered indispensable they are assigned equal weights.

A linear transformation was introduced for the dimensions in the human development index (UNDP 1990), which, by reducing the denominator, widens the index's range. Thus, the original values of each dimension (*I*) are transformed into index form according to the following formula,

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

Where *x* is the observed value of a given dimension of welfare, and *Mo* and *M* are the maximum and minimum values, or goalposts -which facilitate comparisons over time-.[7] Each dimension ranges, thus, between 0 and 1.

[5] In 2010 the Human Development Report (UNDP 2010) introduced major changes in the indicators used to represent 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 substituted for adult literacy and gross enrolment (primary, secondary, and tertiary) rates. Also, PPP-adjusted per capita Gross National Income (GNI) replaced purchasing-power-adjusted GDP per head. Data requirements are highly demanding so, when long-run trends are needed, old' indicators (namely, literacy and school enrolment for education, and real GDP per head) have been recovered in the so-called 'hybrid' human development index. Nonetheless, indices for each dimension are derived with the new goalposts and combined through a geometric average to derive the 'hybrid' HDI (Gidwitz et al. 2010: 3).

[6] Since 2010, in an attempt to mitigate the substitutability between its different dimensions, the indices for each dimension are combined using a geometric average, no longer using an arithmetic average. The geometric average had been previously proposed by Desai (1991) and Sagar and Najam (1998) and used in historical estimates by Prados de la Escosura (2010). There are serious discrepancies about the choice between arithmetic and geometric averages to combine the dimensions' indices. See, for example, the harsh critique of the new index in Ravallion (2012) and the response in Zambrano (2011).

[7] The 2010 new human development index also altered its goalposts for each dimension with upper and lower bounds corresponding to the maximum values observed during the period 1980-2010 and to discretionally fixed minimum values, respectively. Goalposts for life expectancy are 83.2 and 20 years. 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, while previously literacy and enrolment ranged between 0 and 100. In the case of per capita income, the upper bound is the maximum observed (108,211 PPP $ 2008). The minimum was set at 163 PPP $ US 2008.

It matters how progress in the dimensions of human development is measured. Often social variables (life expectancy, height or literacy) are used, either raw (Acemoglu and Johnson, 2007; Hatton and Bray, 2010; Lindert, 2004) or linearly transformed (UNDP, 2010). This causes measurement problems when a social variable has asymptotic limits. An example would be life expectancy. Consider two improvements, one from 30 to 40 years and another from 70 to 80 years. These increases are identical in absolute terms, but the second is smaller in proportion to the initial starting level. When original (or linearly transformed, as happens in the case of the UNDP's *HDI*) values are employed, identical changes in absolute terms result in a smaller measured improvement for the country with the higher starting point, favouring the country with the lower initial level (Sen, 1981; Kakwani, 1993).

The limitations of linear measures become more evident when quality is taken into account. Life expectancy at birth and education measures are just crude proxies for the actual goals of human development: a long and healthy life and access to knowledge. Research over the last two decades concludes that healthy life expectancy increases in line with total life expectancy, and as life expectancy rises, disability for the same age-cohort falls (Salomon et al. 2012). Similarly, the quality of education, measured in terms of cognitive skills, grows as the quantity of education increases (Hanushek and Kimko, 2000; Altinok et al., 2014). The bottom line is that more years of life and education imply higher quality of health and education during childhood and adolescence in both the time series and the cross-section.

In this paper, as an alternative to the UNDP's conventional *HDI*, a historical index of human development (*HIHD*) is used in which non-income variables are transformed non-linearly, rather than linearly as in the *HDI*, in order to allow for two main facts: increases of the same absolute size represent greater achievements the higher the level at which they take place; and quality improvements are associated to increases in quantity (see Prados de la Escosura, 2015, for further details).

In the alternative historical index of human development, *HIHD*, as a social indicator reaches higher levels, its increases represent higher achievements than had the same increase taken place at a lower level, while, in both the UNDP 'old' and 'hybrid' *HDI*, they reflect the same change regardless of its starting level.

Following Kakwani's (1993) proposal, the original values of the social, non-income dimensions of the index have been transformed using a convex achievement function,

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

Where x is an indicator of a country's standard of living, M and Mo are the maximum and minimum values, or goalposts, and log stands for the natural logarithm.

In the case of the income dimension I have accepted the linear transformation (expression [1]) using log values, that is, diminishing returns are introduce to successive additions of income per head.

In the historical index of human development for Latin America, the variables and goalposts of the UNDP 'hybrid' index are adopted. Also following the UNDP new approach, the historical index has been derived as a multiplicative combination of the transformed values of each dimension. If we denote the non-linearly transformed values of life expectancy and education as *LEB* and *E*DU, and the adjusted *per capita* income as, the historical index of human development can be expressed as,

$$HIHD = LEB^{1/3}\ EDU^{1/3}\ UNY^{1/3} \quad [3]$$

An important objection to any index of human development derives from the fact that, in the capabilities approach, functionings are directly related to whatever life people actually lead (that is, achievements), while capabilities (or ability to achieve) are connected with the freedom people have in the choice of life or functionings (Sen 1999). This means that while the HDI includes achievements (in health, access to knowledge, etc.), it does not comprise the freedom to choose functionings. However, without agency – that is, the ability to pursue and realize goals a person has reasons to value – and freedom, any index captures only 'basic needs' and falls short of even a reduced form of the concept of human development (Ivanov and Peleah, 2010).

The Data

The sources and procedures used to construct indices for each dimension of human development are briefly described in this section (See the Appendix for details).

Life expectancy data for most countries during the period 1980-2007 comes from the 2010 Human Development Report (UNDP 2010) while the MOxLAD database (Astorga *et al*. 2003) and Arriaga (1968), provide the rest of the data, which were completed with national sources.[8] Dearth of data forced me occasionally to introduce some assumptions for the period before the epidemiological or health transition (Riley 2005b, 2005c).[9] Thus, in those (mostly pre-1913) cases, for which data on life expectancy or, in its absence, on infant mortality and heights do not exist, a 'floor' of 25 years has been accepted as the minimum historical value for life expectancy at birth.[10] Furthermore, given the UNDP minimum goalpost (M_o) of 20 years, the 25 years 'floor' precludes a zero value for the transformed life expectancy index and, consequently, for the *HIHD*.[11]

Adult literacy is a far from uniform concept.[12] Reading and writing do not necessarily coincide in developing countries (Markussen 1990, Nilsson 1999) so the estimated literacy rate varies depending on whether a wide or a narrow definition (just reading or reading and writing skills) is used. The 2009 Human Development Report (UNDP 2009) provides most of the data on literacy for 1980-2007 MOxLAD database and Newland (1991), plus national sources, provide data for the pre-1980 era.

Enrolment rates capture the expansion of formal education without informing completion or quality of education (Benavot and Riddle 1988). Historical evidence allows one to estimate the percentage of population aged 5-24 enrolled in primary, secondary, and tertiary education, that is, the unadjusted rate of total enrolment. As

[8] Life expectancy has been defined 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' (United Nations 2000).

[9] Omran (1971: 736) defines the epidemiological transition as a long-term shift in mortality "whereby pandemics of infection are gradually displaced by degenerative and man-made diseases as the chief form of morbidity and primary cause of death".

[10] Nonetheless, Arriaga (1968) reports lower values for Central, America (Nicaragua and Guatemala), Mexico, and Paraguay in the late nineteenth and early twentieth century.

[11] Truncating the lower part of the distribution by assuming a life expectancy 'floor' of 25 years has the advantage of allowing the inclusion of countries for which no data are available.

[12] Defined as the percentage of the population aged 15 years or over who is able to read and write.

practically no country's education was extended to those aged 24 years in Latin America's past, in order to avoid underestimation, the denominator needs to be adjusted to the age bracket for each type of schooling (primary, secondary, etc.). Gross enrolment rates, that is, adjusted rates, are only available for the recent past. Thus, for the historical (pre-1980) estimates using the ratio between gross enrolment rates (GER) and unadjusted rates (UER) for each country ($_i$) in 1980, and assuming the relationship between GER and UER was stable over time, I corrected the downward bias in previous benchmark years ($_j$). That is,

$$GER_{ij} = (GER_{i1980} / UER_{i1980}) * UER_{ij} \qquad [4]$$

Enrolment data for 1980-2007 comes from the 2009 Human Development Report (UNDP 2009), completed with UNESCO (2010). For the pre-1980 period, enrolment figures come mostly from MOxLAD database and Newland (1991), supplemented with national sources. With regard to the relevant population, see the Appendix.

In the case of education indicators (literacy and enrolment rates), UNDP goalposts [M=100, Mo=0] have been kept, but the highest and lowest historical values were set at 99 and 1 per cent, respectively.[13]

In the case of the per capita income dimension, I have accepted the UNHDI assumption that its marginal utility declines as it reaches higher levels. The UNDP assumption is justified on the basis that this transformed measure proxies any dimension of wellbeing not directly related to health and education. It is worth noting that were the assumption of diminishing returns to income relaxed, per capita GDP - as it does not have an asymptotic upper bound- would drive the human development index, rendering it redundant.[14] Thus, in order to get the income index I have used expression [1] with GDP per head in logs.

[13] The assumption of 1 per cent as the lowest historical value for literacy and enrolment seems historically more reasonable than accepting zero. A consequence of assuming a historical lower bound of 1 per cent is preventing zero values for the transformed variables.

[14] Zambrano (2011) provides a theoretical justification for the introduction of diminishing returns to income per head within the conceptual framework of the human development index.

I have set a lower bound for *per capita* GDP at G-K 1990 $ 300, which represents a basic level of physiological subsistence (Sagar and Najam 1998: 254, Milanovic *et al*. 2011), and remains 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.[15] GDP per head is expressed in Geary-Khamis 1990 dollars and data come from CEPAL and MOxLAD supplemented with historical national accounts (see Appendix).[16]

Later, the indices for each dimension of human development were combined with a geometric average (see expression [3]) in order to derive the historical index (*HIHD*). World human development has been computed on the basis of four different country samples for which time and spatial coverage are inversely related. Thus, over the entire time span, 1870-2007, 12 countries are considered, and its number rises up to 17, 27, and 29 countries for the samples starting in 1913, 1950, and 1990, respectively.[17] These samples represent around 85 per cent of Latin American population prior to 1913, above 90 per cent in the Interwar years, and practically all after 1950. As it can be observed in Figure 1, their population-weighted averages for Latin America are highly coincidental. Therefore, I have not spliced them.

INSERT FIGURE 1 OVER HERE

Trends in Human Development

A long-run upward trend in world human development is observed, with *HIHD* in 2007 nine-fold the level in 1870. Lower but still significant gains are also found for UNDP indices, 'hybrid' and pre-2010 HDI ('old'), whose levels in 2007 were a four- and

[15] This lower bound for per capita income, which, no doubt, truncates the data set at the bottom, allows one to consider countries in earlier periods for which no data exist.

[16] In the 2010 Human Development Report (UNDP 2010), the lowest level observed since 1980 has been established in 2008 international $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.

[17] Previously, Astorga et al. (2005) studied human development for 6 countries since 1900 and 20 from 1950 to 2000, and Bértola and Ocampo (2012) investigated 7 countries from 1900 and 19 from 1960 to 2010.

a five-fold of that in 1870, respectively (Figure 2). The *HIHD* exhibits a systematically lower level than UNDP indices.[18] A widening absolute gap opens up between them over time, but not in relative terms, as the *HIHD* grows at a faster pace: 1.6 per cent annually against 1.1 and 1.3 per cent for 'old' and the 'hybrid' HDI, respectively (Table 1).

INSERT FIGURE 2 OVER HERE

Since the income index is the same for all indices (the *HIHD* and both UNDP indices), their differences derive from the way in which the original values of the social variables (life expectancy at birth and education) are transformed and whether an arithmetic or geometric average is used to aggregate them. Thus, if the income dimension is excluded from the human development index, the absolute gap between the *HIHD** and the UNDP 'old' and 'hybrid' HDI* indices broadens (Figure 3).

INSERT FIGURE 3 OVER HERE

The pace of improvement in human development shown by the new historical index (*HIHD*) seems to be steady between 1880 and 1980 but for a slow down in the 1930s and a phase of acceleration in the 1940s. The 1980s represent a major discontinuity with the pace of improvement in human development falling sharply. Although gradual, steady improvement is, perhaps, the best depiction of human development evolution in Latin America since 1870, four main phases could be distinguished: a first one, up to 1913, of increasing progress; a second one of deceleration during the interwar years; a third phase of sustained and faster improvement over 1938-1980, in which the 1940s and 1950s deserve to be highlighted; and, finally, a contraction in the pace of growth from 1980 to the eve of the great recession but for a short-lived recovery in the 1990s (Table 1).

INSERT TABLE 1 OVER HERE

Trends in well-being, as those captured by the historical index of human development do not match closely those observed for real GDP per head (Figure 4). In fact, when the income per head dimension is excluded, the progress of human development appears steady as opposed to GPD per head that presents a more

[18] When the alternative UNDP indices are compared, the 'hybrid' index remains systematically below the 'old' HDI.

volatile and cyclical pattern, including episodes of stagnation in the 1930s and contraction in the 1980s. Overall, human development (excluding income) grew faster than real GDP per head over the four main phases previously established and, consequently, over the entire time span considered, 1870-2007.

INSERT FIGURE 4 OVER HERE

It is during the globalization backlash of the 1930s and 1940s when clear discrepancies emerged. Most significantly, while real GDP per head declined or slowed down as world commodity and factor markets disintegrated, health and education practices became increasingly globalized and human development progressed steadily. Since 1970, the pace of advancement in human development has not matched that of economic growth, with a dramatic contrast in the 1980s when the collapse in per capita incomes paralleled moderate gains in well-being.

A better understanding of the evolution of human development is obtained by looking at the role played by its dimensions. The growth of human development (*HIHD*) can be distributed into the contribution of its different components -life expectancy at birth (*LEB*), education (*EDU*) and truncated income (*UNY*)- on the basis of expression [3]. Using low case to denote rates of variation,

$$hihd = 1/3\ leb + 1/3\ edu + 1/3\ uny \qquad [5]$$

It appears that social dimensions drove Latin America's human development gains over the long run, with balanced contributions of life expectancy and education. Longevity accounts for the larger share during the first half of the twentieth century, and was clearly the driving force between 1938 and 1950. Access to knowledge had, instead, a leading role in the late nineteenth century and during the second half of the twentieth century, but for the 1980s (Table 2 and Figure 5).

INSERT TABLE 2 AND FIGURE 5 OVER HERE

Major gains in longevity up to mid-twentieth century were associated to advances in medical science and technology, such as the diffusion of the germ theory of disease (1880s) (Preston 1975), new vaccines (1890s), and sulpha drugs to cure infectious diseases (late 1930s) and antibiotics (1950s) (Easterlin 1999, Jayachandran *et al*. 2010), that facilitated a first health or epidemiological transition in which infectious disease gave way to chronic disease (Riley, 2005b, 2005c). Economic growth

also contributed to expanding longevity through nutrition improvements -that strengthens the immune system and reduce morbidity (Stolnitz 1955, McKeown et al. 1962, 1975, Fogel 2004)- and public provision of health (Loudon 2000; Cutler and Miller 2005).

Did the gap between *OECD* and Latin America deepen over time? Latin America experienced moderate and steady catching-up to *OECD* between 1880 and 1980 that intensified during 1900-1913, the 1940s and, again, in the 1970s (Figure 6). Relative to *OECD,* Latin America presents comparatively lower levels when measured by *HIHD* than with UNDP indices, for which catching up continued although at slower pace until 2007. Thus, Latin America represented below two-thirds of the *OECD* level in 2007, according to the *HIHD*, and reached over four-fifths with the UNDP indices.

INSERT FIGURE 6 OVER HERE

In comparison to other developing regions, Latin America's catching up was stronger during the 1940s and extended beyond the 1970 boundaries reaching 1980 (Figure 7). As a result, by 2007, levels of human development in Latin America matched those of the *OECD* in the late 1960s; while, on average, human development in developing regions only reached the *OECD* level in 1950.

INSERT FIGURE 7 OVER HERE

Latin America's position relative to the *OECD* differs significantly in terms of human development (excluding its income dimension) and GDP per head. While sustained catching-up over the twentieth century achieved Latin America almost two-thirds of *OECD* human development (excluding income), after a long phase of stability Latin America's GDP per head declined since 1950, representing only one-fourth of *OECD*'s by 2000 (Figure 8). On the whole, Latin America performed better in human development than in income per head terms. Thus, in 2007, real per capita GDP in Latin America reached the late 1950s *OECD* level while for developing regions, as a whole, only that of 1938 (Prados de la Escosura, 2015).

INSERT FIGURE 8 OVER HERE

Latin America catching-up to *OECD*, as measured by their difference in human development growth rates, shows that education has been the leading dimension,

especially, during the second half of the twentieth century (but for the 1980s) (Figure 9). Life expectancy only made a substantial contribution to catching up during the 1938-1950, the fastest period of shortening differences with *OECD*. It is worth highlighting that such an advance often did not result of widespread treatment of infectious diseases with sulpha drugs and antibiotics and vaccination against tuberculosis, largely inaccessible to its low-income population, but was achieved through low-cost public health measures and the diffusion of hygienic practices, often during periods of economic stagnation (Riley 2001).[19]

INSERT FIGURE 9 OVER HERE

In Latin America, longevity gains slowed down as the early-life, *first* health transition was exhausted. In the late twentieth century a *second* health transition has taken place in the developed world, with mortality falling among the elderly -as respiratory and cardiovascular diseases were fought more efficiently and their health and nutrition in childhood had been better ((Cutler et al., 2006; Eggleston and Fuchs, 2012). Latin America's absence in this second health transition helps to explain why the region has fallen behind.

A Closer Look at Countries' Performance

Were the fruits of human development progress in Latin America evenly distributed or country differences widen? The dispersion of human development across Latin American countries fell between 1913 and 2000 (Figure 10). However, since the coefficient of variation remained above one-fourth up to 1970, a closer look at countries' performance is needed. Human development ranking reveals high stability over time, particularly between 1870 and 1950 (Table 3). Uruguay, Argentina and Cuba, Jamaica, and Chile stayed at the top of the league, to which Costa Rica incorporated from 1913 onwards (once data permitted to produce estimates). After 1950, when information on them is available, Caribbean countries (Bahamas,

[19] Low-cost public health measures and diffusion of health knowledge played a major role in eradicating communicable diseases (diarrheal diseases, malaria, and tuberculosis), prior to the introduction of antibiotics (Riley, 2005a). In Jamaica, mortality declined sharply during the late 1920s and 1930s while real per capita GDP was relatively stagnant. A similar experience is found in British Guiana (Mandle, 1970).

Barbados, Trinidad-Tobago, and Puerto Rico) joined the top group but, since 1980, Jamaica, Trinidad-Tobago, and Bahamas gradually lost ground. The bottom's composition also exhibits high persistence including the Andean countries (Bolivia, Ecuador, and Peru) plus Venezuela and, from 1913 onwards -once information is available for them- Central American countries (Costa Rica excluded)- joined them with even lower levels of human development. Haiti, for which information only exists after 1950, held the last position over 1950-2007.

INSERT TABLE 3 AND FIGURE 10 OVER HERE

Was, then, no catching-up and convergence within Latin America over the one and a half centuries considered? A glance at country growth ranking shows that the countries that exhibit the largest gains in human development are not necessarily those occupying the top positions (Table 4), so a certain degree of convergence can be conjectured. Simple regressions between growth rates over initial levels for each of the main phases established indicate beta-convergence over the long run (Figure 11). A closer look shows that it was only over 1938-1980 when catching up did actually happen (Figures 12a-d). Furthermore, even though convergence remained weak over the long run, the variance among countries declined (Figure 10). It can be argue, therefore, that across-countries differences in the level of human development diminished despite the fact that the country ranking remained largely unaltered.

INSERT TABLE 4 AND FIGURE 11 OVER HERE

Why such a weak convergence occurred and catching up was restricted to the 1938-1980 period can be understood better by looking at the immediate sources of human development improvement (Table 5). Thus, improvements in education help to explain why Argentina, Chile, and Cuba stayed at the top over 1870-1913. In the Interwar, substantial improvements in life expectancy in Ecuador, Peru, and Mexico and Costa Rica, while Venezuela also did it on the basis of a more balanced combination of longevity and education gains, help to explain very weak beta-convergence. Then, major achievements in longevity and education account for stronger and more widespread catching up during 1938-1980, while weak progress in life expectancy help to explain sluggish catching-up after 1980.

INSERT FIGURES 12a-d AND TABLE 5 OVER HERE

Human Development, Freedom, and Agency

Free markets, it has been argued, would not have contributed to control disease transmission, encourage immunization, nor stimulate medical research, so public intervention was required (Easterlin 1999). As socialism provides the framework for an active role of government, do socialist societies have an advantage over capitalist ones at lifting human well-being, at least, in early stages of development?

Does the evidence on human development support this view in Latin America? Cuba, the only long-term socialist experience in the Americas, achieved remarkable success since the 1959 Revolution, driven exclusively by its non-income dimensions.[20] The origins of the improvement pre-date, however, the 1959 Revolution. In fact, a sustained improvement in life expectancy took place during the first half of the twentieth century, so by eve of the 1959 Revolution, Cuba was above the average Latin American and Southern European countries (McGuire and Frankel 2005, Devereux 2010; Ward and Devereux 2010, 2012). The mortality decline, initiated after the U.S. occupation, was associated to sanitary and public health innovation, and largely independent from Cuba's level of economic development (Díaz-Briquets 1981). After the Revolution, a further and impressive improvement in life expectancy has taken place, as a result of the success in fighting and eradicating infant mortality. Interestingly, there is continuity in the post-1959 era, as human development success has occurred in striking contrast with its poor economic performance. Such an achievement has been attributed to the coercive power of the socialist state (Devereux 2010, Mesa-Lago 2005).

Does the evidence suggest a positive answer to the initial question? Before providing an answer an important caveat is necessary. In the short-cut approach to 'measure' human development used here, agency and freedom are left aside. Without agency and freedom, the human development index becomes simply a 'basic needs' index (Ivanov and Peleah 2010). A comprehensive depiction of human development needs incorporate the opportunities individuals have of exercising their political

[20] I have chosen to use the term 'socialist' rather than 'communist' as in the Marxist thought the latter was the goal to be reached and socialism was the means to reach it. See a discussion in Ivanov and Peleah (2010).

capabilities and influencing public decisions (Dasgupta and Weale 1992; Cheibub 2010). The case of Cuba presents an extreme contrast between the success in achieving 'basic needs' and the failure to enlarging people's choices –the core of human development- as agency and freedom are curtailed by the political regime. Restrictions of individual choice in Cuba -as collectivization, forced industrialization, and political repression exemplify-, suggest that achievements in health and education could be, strictly speaking, depicted as 'basic needs' rather than as human development (Ivanov and Peleah 2010).[21] The same caveat applies to fascism and other totalitarian regimes under capitalism that suppressed freedom and agency across Latin America.

It is, nonetheless, reassuring that, since 1950, human development and democratization are correlated and their association grows stronger as their levels get higher (positive sign of the quadratic term in the regression) (Figure 13).[22]

INSERT FIGURE 13 OVER HERE

Conclusions

Human development improved in Latin America during the last century and a half, especially between 1900 and 1980, when gains were significant and across the board. Remarkable progress in life expectancy and education occurred between 1938 and 1950, precisely at the time of an economic globalization backlash.

This points to a development puzzle. Why are trends in GDP per capita and human development uncorrelated over long periods of time when increases in per capita income would surely contribute to better nutrition, health and education? Does the explanation lie more with public policy (e.g. public schooling, public health, the rise of the welfare state), or with the fact that medical technology is a public good?

[21] From this perspective, the demise of socialism after 1989 would have represented an advance in terms of human development. However, as regards agency, advances in civil and political liberties the outcome has been quite uneven with political voice and participation restricted in the countries of the former Soviet Union (Central Asia, in particular) and indisputable progress in Central Europe and the Baltic republics (Brainerd 2010a).

[22] The index of democratization comes from Vanhanen (2011), normalized by dividing its value by its potential maximum so it ranges between 0 and 1, and becomes comparable to the HIHD.

The last three decades have witnessed a widening in the absolute gap between developed countries and Latin America. Differences in the behaviour of human development dimensions help to explain it. In Latin America, life expectancy played a major role in human development gains and catching up, but only until the mid-twentieth century. With completion of the *first* health transition, its dynamic role faded. A second wave of life expectancy gains comparable with those of developed countries has yet to take place. Instead, education was mainly responsible for long run progress and catching up in human development.

This development puzzle raises a number of key questions. For example, why did life expectancy stop being the driving force of world human development as the *first* health transition was concluded? Why Latin America has been left aside from the *second* health transition? Is there a lack of public policies, or a polarizing effect of new medical technologies? Is it that health and education are highly income-elastic? To what extent did restricted access to health and education, as a result of income inequality, play a role? These questions deserve further investigation, as the answers are likely to have far-reaching policy ramifications for future generations.

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Table 1 ***Human Development in Latin America, 1870-2007: Alternative Indices***

Panel A: Levels

	HIHD	Hybrid HDI	'Old' HDI
1870	0.055	0.140	0.177
1880	0.060	0.151	0.189
1890	0.071	0.177	0.221
1900	0.083	0.203	0.250
1913	0.106	0.253	0.301
1929	0.137	0.316	0.359
1938	0.156	0.352	0.391
1950	0.215	0.453	0.496
1960	0.263	0.526	0.565
1970	0.313	0.594	0.629
1980	0.374	0.670	0.694
1990	0.403	0.691	0.718
2000	0.481	0.749	0.776
2007	0.520	0.778	0.804

Panel B: Average Growth Rates (%)

1870-1880	0.8	0.7	0.7
1880-1890	1.7	1.6	1.6
1890-1900	1.6	1.4	1.2
1900-1913	1.9	1.7	1.4
1913-1929	1.6	1.4	1.1
1929-1938	1.4	1.2	0.9
1938-1950	2.7	2.1	2.0
1950-1960	2.0	1.5	1.3
1960-1970	1.7	1.2	1.1
1970-1980	1.8	1.2	1.0
1980-1990	0.7	0.3	0.3
1990-2000	1.8	0.8	0.8
2000-2007	1.1	0.6	0.5
1870-1913	1.5	1.4	1.2
1913-1938	1.5	1.3	1.1
1938-1980	2.1	1.5	1.4
1980-2007	1.2	0.6	0.5
1870-2007	1.6	1.3	1.1

Table 2 ***Latin America's Human Development and its Dimensions, 1870-2007***

Panel A: Levels

	HIHD	Life Expectancy	Education	Adjusted Income
1870	0.055	0.026	0.026	0.249
1880	0.060	0.028	0.029	0.260
1890	0.071	0.032	0.038	0.291
1900	0.083	0.038	0.051	0.292
1913	0.106	0.052	0.065	0.349
1929	0.137	0.074	0.088	0.398
1938	0.156	0.090	0.105	0.404
1950	0.215	0.175	0.128	0.443
1960	0.263	0.221	0.168	0.488
1970	0.313	0.262	0.219	0.534
1980	0.374	0.300	0.290	0.602
1990	0.403	0.354	0.314	0.589
2000	0.481	0.417	0.435	0.614
2007	0.520	0.459	0.476	0.642

Panel B: HIHD Growth and its Drivers (%)

	HIHD	Contribution of Life Expectancy	Contribution of Education	Contribution of Adjusted Income
1870-1880	0.8	0.2	0.4	0.1
1880-1890	1.7	0.4	0.9	0.4
1890-1900	1.6	0.6	0.9	0.0
1900-1913	1.9	0.8	0.6	0.5
1913-1929	1.6	0.7	0.6	0.3
1929-1938	1.4	0.7	0.6	0.1
1938-1950	2.7	1.9	0.6	0.3
1950-1960	2.0	0.8	0.9	0.3
1960-1970	1.7	0.6	0.9	0.3
1970-1980	1.8	0.5	0.9	0.4
1980-1990	0.7	0.6	0.3	-0.1
1990-2000	1.8	0.5	1.1	0.1
2000-2007	1.1	0.5	0.4	0.2
1870-1913	1.5	0.5	0.7	0.3
1913-1938	1.5	0.7	0.6	0.2
1938-1980	2.1	1.0	0.8	0.3
1980-2007	1.2	0.5	0.6	0.1
1870-2007	1.6	0.7	0.7	0.2

Table 3 ***Latin American Country Ranking in Human Development: HIHD Estimates***

1870		**1880**		**1890**		**1900**	
Uruguay	0.130	**Uruguay**	0.139	**Uruguay**	0.158	**Uruguay**	0.172
Argentina	0.088	**Argentina**	0.098	**Argentina**	0.136	**Argentina**	0.159
Cuba	0.081	**Cuba**	0.095	**Cuba**	0.119	**Cuba**	0.128
Jamaica	0.070	**Jamaica**	0.084	**Jamaica**	0.104	**Jamaica**	0.117
Chile	0.065	**Chile**	0.071	**Chile**	0.090	**Chile**	0.109
Colombia	0.054	**Colombia**	0.058	**Venezuela**	0.062	**Colombia**	0.072
Brazil	0.050	**Brazil**	0.051	**Brazil**	0.060	**Brazil**	0.069
Mexico	0.048	**Mexico**	0.051	**Mexico**	0.059	**Venezuela**	0.064
Peru	0.047	**Venezuela**	0.050	**Colombia**	0.057	**Mexico**	0.064
Bolivia	0.036	**Peru**	0.042	**Bolivia**	0.046	**Ecuador**	0.058
Venezuela	0.035	**Bolivia**	0.041	**Peru**	0.045	**Bolivia**	0.054
Ecuador	0.034	**Ecuador**	0.041	**Ecuador**	0.044	**Peru**	0.053

1913		**1929**		**1938**	
Uruguay	0.213	**Uruguay**	0.256	**Uruguay**	0.287
Argentina	0.207	**Argentina**	0.251	**Argentina**	0.279
Cuba	0.165	**Cuba**	0.190	**Cuba**	0.202
Chile	0.142	**Chile**	0.179	***Costa Rica***	0.200
Costa Rica	0.128	***Costa Rica***	0.167	**Chile**	0.192
Jamaica	0.119	**Jamaica**	0.152	**Jamaica**	0.183
Colombia	0.092	**Colombia**	0.122	**Mexico**	0.140
Honduras	0.087	**Mexico**	0.115	**Colombia**	0.137
Mexico	0.086	**Peru**	0.111	**Peru**	0.132
Brazil	0.084	**Brazil**	0.107	**Venezuela**	0.130
Peru	0.077	***Honduras***	0.104	**Brazil**	0.122
Bolivia	0.076	**Venezuela**	0.101	**Ecuador**	0.114
Venezuela	0.074	**Bolivia**	0.098	**Bolivia**	0.108
El Salvador	0.070	**Ecuador**	0.094	***Nicaragua***	0.101
Nicaragua	0.066	***Nicaragua***	0.087	***Honduras***	0.101
Ecuador	0.063	***El Salvador***	0.073	***El Salvador***	0.101
Guatemala	0.062	***Guatemala***	0.069	***Guatemala***	0.085

Sources: See the text.
Note: coverage, **bold**, 1870-2007; ***bold italics***, 1913-2007; versalitas, 1950-2007.

Table 3 ***Latin American Country Ranking in Human Development: HIHD Estimates (cont.)***

1950		1960		1970	
Uruguay	0.351	Barbados	0.407	Puerto Rico	0.486
Bahamas	0.348	Puerto Rico	0.396	Barbados	0.477
Argentina	0.337	**Uruguay**	0.394	Bahamas	0.442
Trinidad-Tobago	0.311	Trinidad-Tobago	0.385	Trinidad-Tobago	0.439
Puerto Rico	0.305	**Argentina**	0.380	**Uruguay**	0.439
Barbados	0.299	Bahamas	0.378	**Argentina**	0.428
Chile	0.276	**Cuba**	0.331	**Cuba**	0.407
Cuba	0.273	**Chile**	0.324	**Chile**	0.395
Belize	0.259	**Jamaica**	0.324	**Jamaica**	0.386
Costa Rica	0.256	***Costa Rica***	0.315	***Costa Rica***	0.384
Paraguay	0.248	**Venezuela**	0.305	**Venezuela**	0.366
Jamaica	0.244	Guyana	0.293	Panama	0.356
Panama	0.240	Panama	0.290	**Mexico**	0.323
Venezuela	0.230	Paraguay	0.277	Guyana	0.321
Guyana	0.228	Belize	0.269	Paraguay	0.311
Mexico	0.208	**Mexico**	0.265	Belize	0.308
Colombia	0.190	**Colombia**	0.243	**Colombia**	0.303
Peru	0.187	**Ecuador**	0.233	**Peru**	0.293
Ecuador	0.186	**Peru**	0.229	**Ecuador**	0.284
Brazil	0.179	**Brazil**	0.226	**Brazil**	0.268
El Salvador	0.155	Dominican R.	0.222	Dominican R.	0.264
Dominican R.	0.153	***El Salvador***	0.203	***El Salvador***	0.246
Nicaragua	0.146	***Nicaragua***	0.186	***Nicaragua***	0.243
Honduras	0.141	***Honduras***	0.175	***Honduras***	0.213
Bolivia	0.137	***Guatemala***	0.163	**Bolivia**	0.213
Guatemala	0.134	**Bolivia**	0.146	***Guatemala***	0.208
Haiti	0.084	Haiti	0.113	Haiti	0.131

Sources: See the text.
Note: coverage, **bold**, 1870-2007; ***bold italics***, 1913-2007; versalitas, 1950-2007

Table 3 ***Latin American Country Ranking in Human Development: HIHD Estimates (cont.)***

1980		1990		2000		2007	
Barbados	0.517	Barbados	0.557	Puerto Rico	0.636	**Cuba**	0.732
Puerto Rico	0.509	Puerto Rico	0.546	Barbados	0.606	Barbados	0.674
Cuba	0.507	**Cuba**	0.508	**Argentina**	0.580	Puerto Rico	0.659
Bahamas	0.473	Bahamas	0.507	**Chile**	0.575	**Chile**	0.633
Argentina	0.465	**Argentina**	0.506	**Uruguay**	0.567	**Uruguay**	0.631
Trinidad-Tobago	0.455	**Uruguay**	0.505	**Cuba**	0.552	**Argentina**	0.609
Uruguay	0.454	**Chile**	0.493	***Costa Rica***	0.527	***Costa Rica***	0.578
Chile	0.433	Trinidad-Tobago	0.479	Bahamas	0.503	**Venezuela**	0.559
Costa Rica	0.429	***Costa Rica***	0.474	Panama	0.498	**Mexico**	0.544
Panama	0.425	**Venezuela**	0.463	Trinidad-Tobago	0.494	Bahamas	0.543
Venezuela	0.421	Panama	0.434	**Mexico**	0.490	Panama	0.539
Mexico	0.405	**Mexico**	0.431	**Venezuela**	0.480	Trinidad-Tobago	0.519
Jamaica	0.405	**Jamaica**	0.422	**Brazil**	0.478	**Brazil**	0.503
Belize	0.388	**Ecuador**	0.410	**Peru**	0.458	**Peru**	0.501
Ecuador	0.375	Belize	0.389	**Ecuador**	0.454	**Colombia**	0.498
Peru	0.351	**Peru**	0.378	**Colombia**	0.449	**Ecuador**	0.494
Colombia	0.351	Paraguay	0.377	Dominican R.	0.421	Belize	0.467
Guyana	0.347	**Colombia**	0.375	Paraguay	0.417	Guyana	0.462
Brazil	0.342	**Brazil**	0.369	Belize	0.416	Dominican R.	0.454
Paraguay	0.340	Guyana	0.346	**Jamaica**	0.416	Paraguay	0.449
Dominican R.	0.315	Dominican R.	0.338	Guyana	0.412	**Jamaica**	0.441
Nicaragua	0.263	***El Salvador***	0.314	**Bolivia**	0.377	**Bolivia**	0.411
Honduras	0.260	**Bolivia**	0.304	***El Salvador***	0.358	***Honduras***	0.405
Bolivia	0.255	***Honduras***	0.292	***Honduras***	0.356	***El Salvador***	0.404
El Salvador	0.253	***Nicaragua***	0.266	***Guatemala***	0.345	***Guatemala***	0.389
Guatemala	0.240	***Guatemala***	0.260	***Nicaragua***	0.343	***Nicaragua***	0.378
Haiti	0.175	Haiti	0.187	Haiti	0.215	Haiti	0.225

Sources: See the text.
Note: coverage, **bold**, 1870-2007; ***bold italics***, 1913-2007; versalitas, 1950-2007

Table 4 ***Human Development Growth in Latin America (%): Country Ranking***

1870-1880		1880-1890		1890-1900		1900-1913		1913-1929	
Chile	3.0	**Argentina**	6.1	**Ecuador**	2.7	**Cuba**	3.3	**Venezuela**	6.8
Venezuela	2.4	**Mexico**	4.3	**Peru**	2.7	**Uruguay**	3.1	**Colombia**	3.9
Colombia	1.8	**Cuba**	3.2	**Chile**	1.2	**Peru**	2.7	**Peru**	3.5
Cuba	1.7	**Venezuela**	2.8	**Uruguay**	0.8	**Venezuela**	2.6	***Nicaragua***	3.3
Ecuador	1.1	**Chile**	1.1	**Bolivia**	0.8	**Argentina**	2.5	**Ecuador**	2.2
Mexico	1.1	**Uruguay**	0.8	**Jamaica**	0.5	**Chile**	2.3	**Bolivia**	1.8
Argentina	0.8	**Bolivia**	0.4	**Mexico**	0.4	**Colombia**	2.3	***Honduras***	1.4
Brazil	0.4	**Jamaica**	0.2	**Colombia**	-0.1	**Brazil**	2.2	**Brazil**	1.4
Bolivia	0.3	**Brazil**	0.0	**Argentina**	-0.8	**Bolivia**	1.9	**Uruguay**	0.9
Jamaica	0.2	**Ecuador**	-0.2	**Brazil**	-0.9	**Mexico**	1.6	**Argentina**	0.9
Uruguay	0.0	**Peru**	-0.2	**Venezuela**	-1.5	**Ecuador**	1.6	**Chile**	0.9
Peru	-6.7	**Colombia**	-2.1	**Cuba**	-2.8	**Jamaica**	0.4	**Jamaica**	0.9
								Guatemala	0.7
								El Salvador	0.6
								Mexico	0.6
								Costa Rica	0.1
								Cuba	-0.4

1929-1938		1938-1950		1950-1960		1960-1970		1970-1980	
Jamaica	3.7	**Venezuela**	4.3	**Jamaica**	6.9	Puerto Rico	6.2	**Brazil**	6.0
Guatemala	2.6	***El Salvador***	3.8	Trinidad-Tobago	5.3	Barbados	5.2	Paraguay	5.9
Costa Rica	1.9	***Nicaragua***	3.7	Puerto Rico	4.7	Panama	4.8	**Ecuador**	5.7
Colombia	1.4	**Mexico**	3.5	Barbados	4.6	**Jamaica**	3.7	Belize	5.4
Brazil	1.0	**Ecuador**	3.4	Guyana	3.9	***Nicaragua***	3.6	Dominican R.	4.3
Ecuador	0.8	**Cuba**	2.8	***Costa Rica***	3.7	**Mexico**	3.6	Trinidad-Tobago	4.1
Venezuela	0.5	**Jamaica**	2.6	**Venezuela**	3.6	Bahamas	3.5	Barbados	3.6
Mexico	0.4	**Bolivia**	1.7	**Brazil**	3.5	**Bolivia**	3.1	**Mexico**	3.5
Uruguay	0.1	**Argentina**	1.7	**Peru**	2.9	Trinidad-Tobago	2.8	**Cuba**	3.2
Peru	0.1	**Peru**	1.6	**Mexico**	2.8	**Argentina**	2.7	Haiti	3.2
Bolivia	-0.6	**Brazil**	1.6	**Ecuador**	2.3	***Costa Rica***	2.7	**Colombia**	3.1
El Salvador	-0.7	**Colombia**	1.5	***Nicaragua***	2.0	***Guatemala***	2.7	***Costa Rica***	2.9
Argentina	-0.8	**Uruguay**	1.5	Panama	2.0	**Brazil**	2.6	***Guatemala***	2.9
Chile	-0.8	***Honduras***	1.4	Dominican R.	2.0	**Venezuela**	2.3	Panama	2.8
Cuba	-1.2	**Chile**	1.3	**Colombia**	1.6	**Peru**	2.3	**Uruguay**	2.6
Honduras	-3.4	***Costa Rica***	0.4	***El Salvador***	1.5	Belize	2.2	Puerto Rico	2.5
Nicaragua	-5.4	***Guatemala***	-0.1	**Chile**	1.2	***El Salvador***	2.2	***Honduras***	2.3
				Argentina	1.1	**Colombia**	2.1	**Bolivia**	1.4
				Guatemala	1.0	Paraguay	2.0	Guyana	1.3
				Uruguay	0.7	**Chile**	1.9	**Peru**	1.0
				Paraguay	0.3	Dominican R.	1.8	**Chile**	1.0
				Honduras	0.0	***Honduras***	1.5	**Argentina**	0.9
				Haiti	-0.2	**Ecuador**	1.4	**Venezuela**	0.6
				Cuba	-0.4	Guyana	1.2	Bahamas	0.6
				Belize	-1.7	**Uruguay**	0.5	***El Salvador***	-0.2
				Bolivia	-1.7	**Cuba**	-0.7	**Jamaica**	-2.1
				Bahamas	-2.4	Haiti	-1.2	***Nicaragua***	-2.7

Table 4 ***Human Development Growth in Latin America (%): Country Ranking (cont.)***

1980-1990		1990-2000		2000-2007	
Puerto Rico	2.5	Guyana	4.8	Trinidad-Tobago	7.6
Belize	2.3	**Chile**	4.6	**Cuba**	6.0
Jamaica	2.2	Dominican R.	4.1	**Peru**	4.0
Bahamas	1.8	Trinidad-Tobago	3.7	Panama	4.0
Colombia	1.3	Panama	2.9	Dominican R.	3.5
Chile	1.2	Puerto Rico	2.9	**Colombia**	3.3
Cuba	1.1	**Argentina**	2.8	***Costa Rica***	3.3
Dominican R.	0.3	***Costa Rica***	2.6	**Ecuador**	3.2
Paraguay	0.2	***El Salvador***	2.4	**Chile**	3.2
Barbados	0.1	**Uruguay**	2.3	***Honduras***	3.0
Mexico	-0.1	**Peru**	2.3	**Argentina**	2.8
Uruguay	-0.3	Belize	1.8	**Venezuela**	2.6
Costa Rica	-0.3	***Guatemala***	1.7	**Uruguay**	2.6
Brazil	-0.5	**Mexico**	1.7	Belize	2.3
Ecuador	-0.5	**Bolivia**	1.4	**Brazil**	1.9
Honduras	-0.6	***Nicaragua***	1.2	***Nicaragua***	1.9
Panama	-0.8	**Brazil**	1.0	Guyana	1.6
El Salvador	-1.5	**Colombia**	0.9	**Mexico**	1.5
Guatemala	-1.5	***Honduras***	0.8	Barbados	1.5
Bolivia	-2.0	Barbados	0.7	Paraguay	1.4
Venezuela	-2.1	Bahamas	0.6	**Bolivia**	1.3
Argentina	-2.6	**Ecuador**	0.0	***Guatemala***	1.3
Guyana	-2.8	**Venezuela**	0.0	Puerto Rico	1.2
Haiti	-3.0	**Jamaica**	-0.2	**Jamaica**	1.1
Peru	-3.5	Paraguay	-0.5	***El Salvador***	1.1
Trinidad-Tobago	-3.7	Haiti	-1.9	Bahamas	0.7
Nicaragua	-3.8	**Cuba**	-1.9	Haiti	-1.2

Sources: See the text.
Note: coverage, **bold**, 1870-2007; ***bold italics***, 1913-2007; versalitas, 1950-2007

Table 5 ***Human Development Growth and its Drivers: Country Ranking***

1870-1913	HIHD	Contribution of Life Expectancy	Contribution of Education	Contribution of Adjusted Income
Argentina	2.0	0.7	1.0	0.3
Chile	1.8	0.6	0.9	0.3
Bolivia	1.8	0.5	1.1	0.2
Venezuela	1.7	0.5	0.8	0.5
Cuba	1.7	0.6	0.8	0.2
Ecuador	1.4	0.0	0.9	0.5
Mexico	1.4	0.5	0.5	0.4
Jamaica	1.2	0.3	0.9	0.1
Colombia	1.2	0.6	0.5	0.1
Brazil	1.2	0.3	0.7	0.1
Uruguay	1.1	0.4	0.5	0.2
Peru	1.1	0.4	0.8	0.0

1913-1938	HIHD	Contribution of Life Expectancy	Contribution of Education	Contributio of Adjusted Income
Ecuador	2.4	1.2	0.8	0.4
Venezuela	2.3	0.7	0.8	0.7
Peru	2.2	1.1	0.7	0.4
Mexico	1.9	1.0	0.9	0.1
Costa Rica	1.8	1.1	0.6	0.1
Nicaragua	1.7	1.3	0.4	0.0
Jamaica	1.7	0.6	0.6	0.5
Colombia	1.6	0.6	0.4	0.6
Brazil	1.5	0.6	0.7	0.3
El Salvador	1.5	1.1	0.3	0.0
Bolivia	1.4	1.0	0.2	0.2
Guatemala	1.2	0.6	0.4	0.2
Chile	1.2	0.8	0.4	0.0
Argentina	1.2	0.6	0.6	0.0
Uruguay	1.2	0.5	0.6	0.1
Cuba	0.8	0.6	0.3	-0.1
Honduras	0.6	0.9	-0.3	-0.1

Sources: See the text.
Note: coverage, **bold**, 1870-2007; ***bold italics***, 1913-2007; versalitas, 1950-2007

Table 5 ***Human Development Growth and its Drivers: Country Ranking (cont.)***

1938-1980	HIHD	Contribution of Life Expectancy	Contribution of Education	Contribution of Adjusted Income
Ecuador	2.8	1.4	1.0	0.5
Venezuela	2.8	1.3	1.2	0.3
Mexico	2.5	1.1	1.0	0.4
Guatemala	2.5	1.6	0.7	0.2
Brazil	2.4	1.1	0.9	0.5
Peru	2.3	1.0	1.1	0.2
Nicaragua	2.3	1.2	0.8	0.3
Honduras	2.3	1.0	1.1	0.2
Colombia	2.2	1.2	0.8	0.3
El Salvador	2.2	0.9	0.9	0.3
Cuba	2.2	1.1	0.9	0.2
Bolivia	2.0	0.6	1.3	0.2
Chile	1.9	1.2	0.6	0.1
Jamaica	1.9	0.9	0.6	0.5
Costa Rica	1.8	0.9	0.6	0.3
Argentina	1.2	0.5	0.5	0.2
Uruguay	1.1	0.4	0.5	0.1

1980-2007	HIHD	Contribution of Life Expectancy	Contribution of Education	Contributio of Adjusted Income
Guatemala	1.8	0.7	1.0	0.0
Bolivia	1.8	0.7	1.0	0.0
El Salvador	1.7	0.8	0.8	0.1
Honduras	1.6	0.7	0.8	0.1
Brazil	1.4	0.6	0.8	0.1
Chile	1.4	0.7	0.5	0.3
Cuba	1.4	0.4	0.9	0.1
Dominican R.	1.3	0.6	0.5	0.3
Nicaragua	1.3	0.8	0.6	-0.1
Peru	1.3	0.7	0.5	0.1
Colombia	1.3	0.4	0.7	0.2
Uruguay	1.2	0.4	0.7	0.1
Costa Rica	1.1	0.5	0.4	0.2
Mexico	1.1	0.6	0.4	0.1
Guyana	1.1	0.3	0.6	0.2
Venezuela	1.1	0.3	0.7	0.0
Paraguay	1.0	0.3	0.7	0.0
Ecuador	1.0	0.7	0.2	0.1
Argentina	1.0	0.4	0.6	0.1
Barbados	1.0	0.4	0.6	0.1
Puerto Rico	1.0	0.4	0.4	0.2
Haiti	0.9	0.6	0.8	-0.4
Panama	0.9	0.4	0.3	0.2
Belize	0.7	0.4	0.1	0.2
Bahamas	0.5	0.3	0.1	0.1
Trinidad-Tobago	0.5	0.1	0.2	0.2
Jamaica	0.3	0.1	0.1	0.1

Sources: See the text.
Note: coverage, **bold**, 1870-2007; ***bold italics***, 1913-2007; versalitas, 1950-2007

Table 5 ***Human Development Growth and its Drivers: Country Ranking (cont.)***

1870-2007	HIHD	Contribution of Life Expectancy	Contribution of Education	Contribution of Adjusted Income
Venezuela	2.0	0.8	0.9	0.4
Ecuador	1.9	0.8	0.8	0.4
Bolivia	1.8	0.7	1.0	0.1
Mexico	1.8	0.8	0.7	0.3
Peru	1.7	0.8	0.8	0.2
Brazil	1.7	0.7	0.8	0.2
Chile	1.7	0.8	0.6	0.2
Colombia	1.6	0.7	0.6	0.3
Cuba	1.6	0.7	0.8	0.1
Argentina	1.4	0.6	0.7	0.2
Jamaica	1.3	0.5	0.6	0.3
Uruguay	1.2	0.4	0.6	0.1

1913-2007	HIHD	Contribution of Life Expectancy	Contribution of Education	Contributio of Adjusted Income
Ecuador	2.2	1.1	0.7	0.3
Venezuela	2.2	0.9	1.0	0.3
Peru	2.0	0.9	0.8	0.2
Mexico	2.0	0.9	0.8	0.2
Guatemala	1.9	1.0	0.7	0.2
Brazil	1.9	0.8	0.8	0.3
El Salvador	1.9	1.0	0.7	0.2
Nicaragua	1.9	1.1	0.6	0.1
Colombia	1.8	0.8	0.7	0.3
Bolivia	1.8	0.8	0.9	0.1
Honduras	1.6	0.9	0.6	0.1
Costa Rica	1.6	0.8	0.6	0.2
Chile	1.6	0.9	0.5	0.2
Cuba	1.6	0.8	0.7	0.1
Jamaica	1.4	0.6	0.4	0.4
Uruguay	1.2	0.4	0.6	0.1
Argentina	1.2	0.5	0.6	0.1

Sources: See the text.
Note: coverage, **bold**, 1870-2007; ***bold italics***, 1913-2007; versalitas, 1950-2007

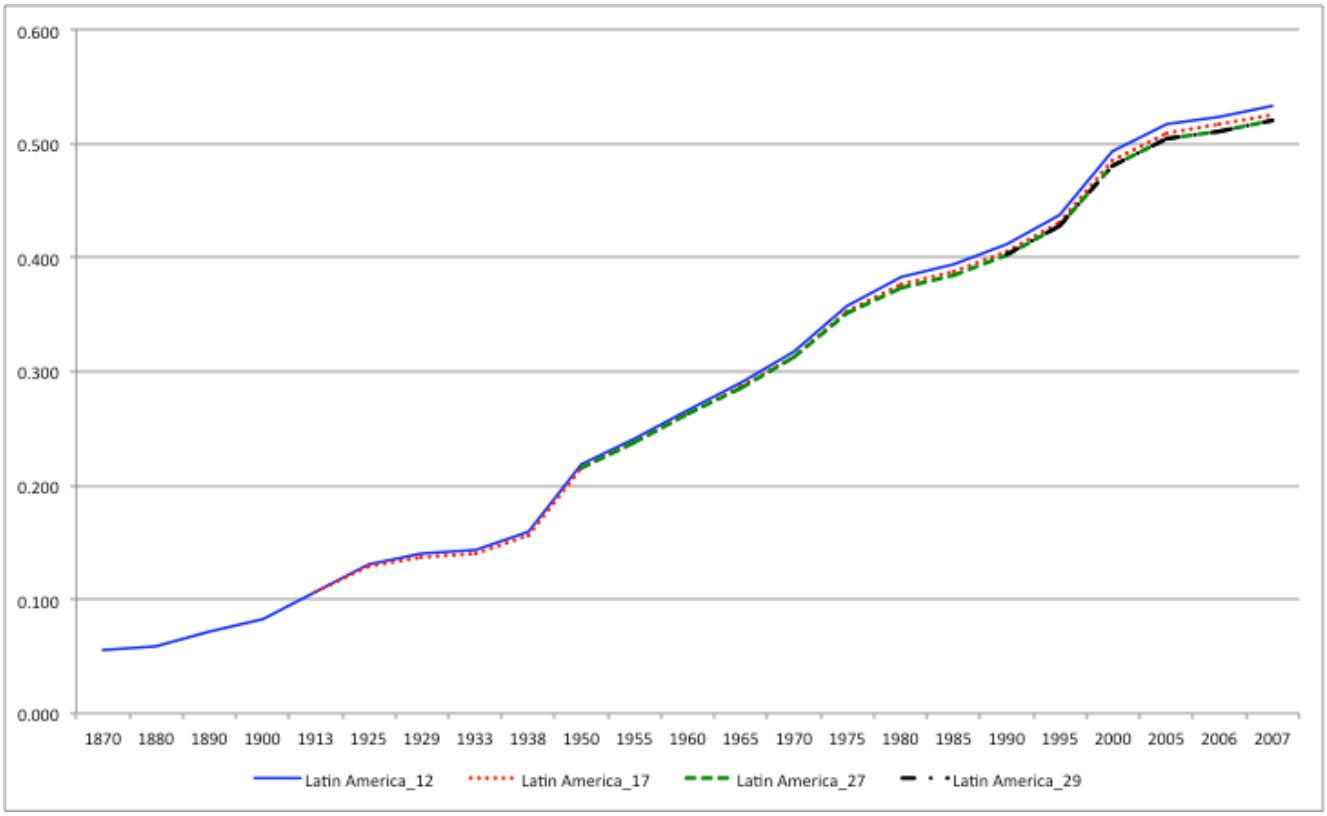

Figure 1 Historical Index of Human Development (HIHD) in Latin America, 1870-2007: Alternative Country Samples (population-weighted averages) *Source*: See the text.

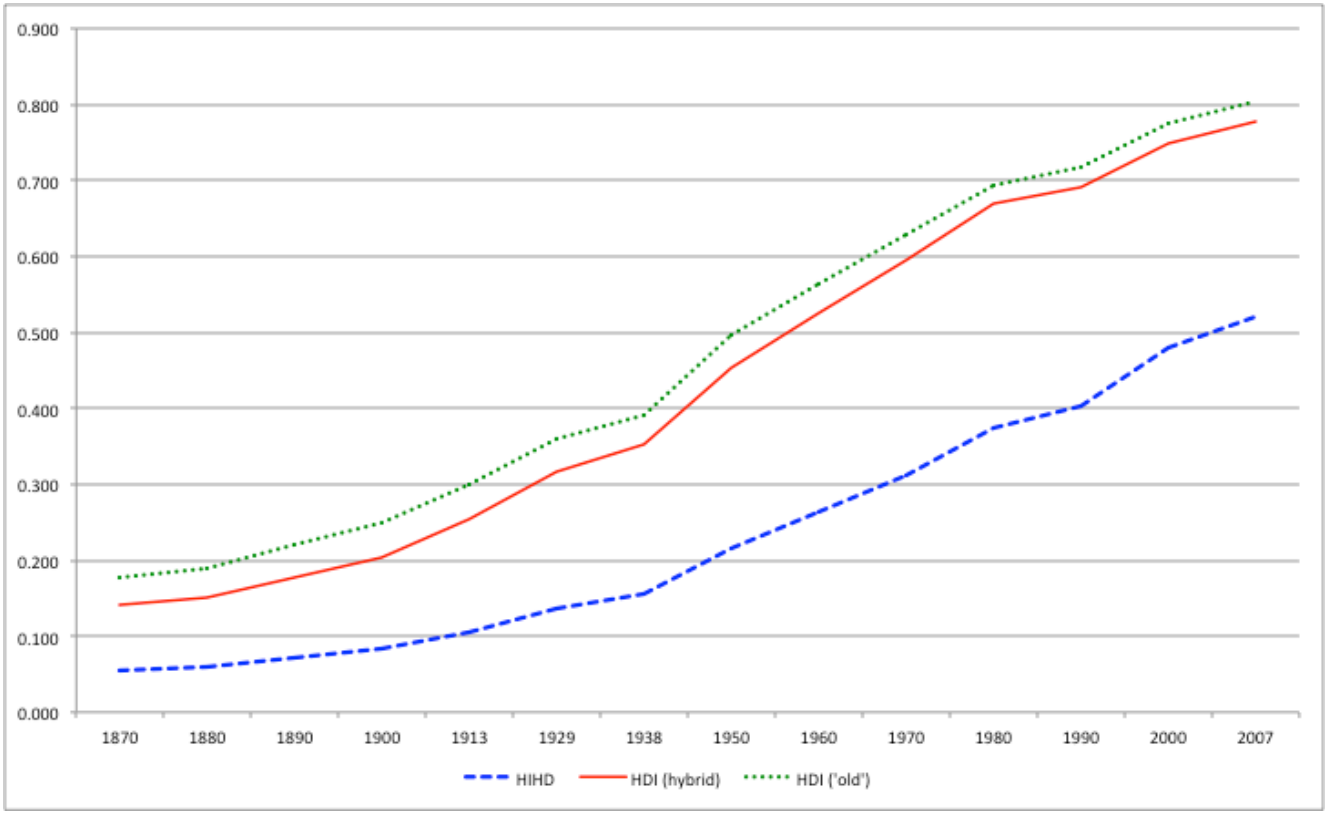

Figure 2 Human Development Measures: HIHD and HDI (*hybrid* and *old*) *Source*: See the text.

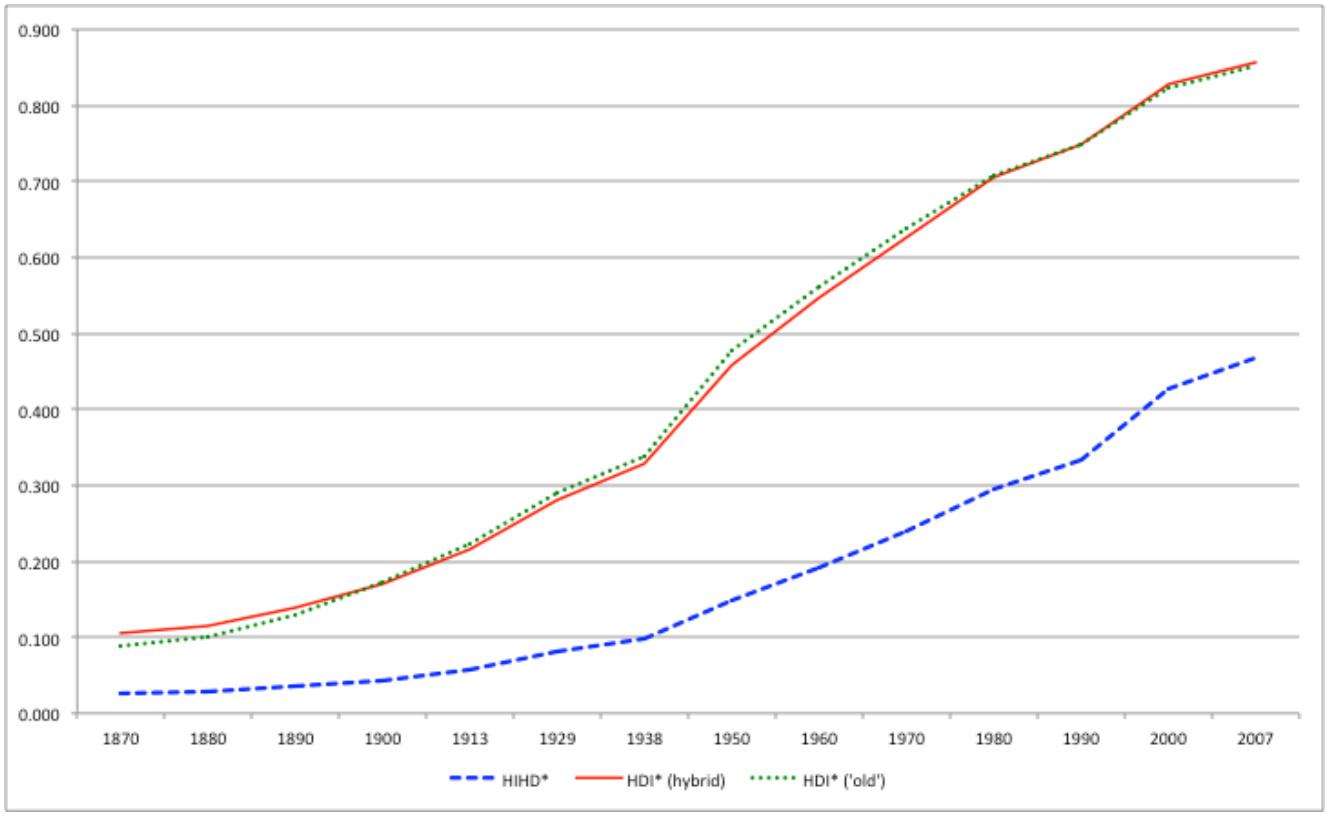

Figure 3 Human Development (excluding income): HIHD* and HDI* (*hybrid* and *old*)
Source: See the text.

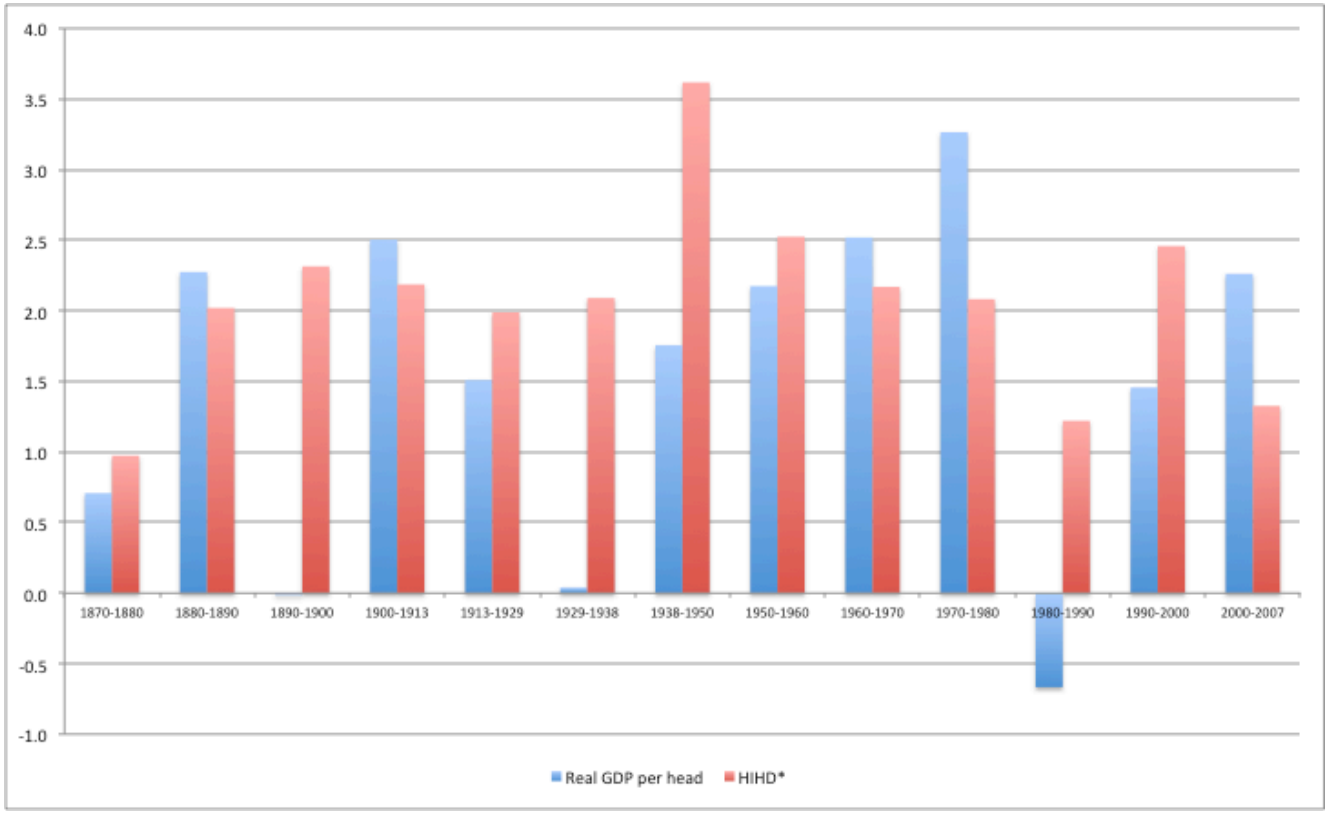

Figure 4 Real GDP per Head and Human Development (excluding income) Growth (%)
Source: See the text.

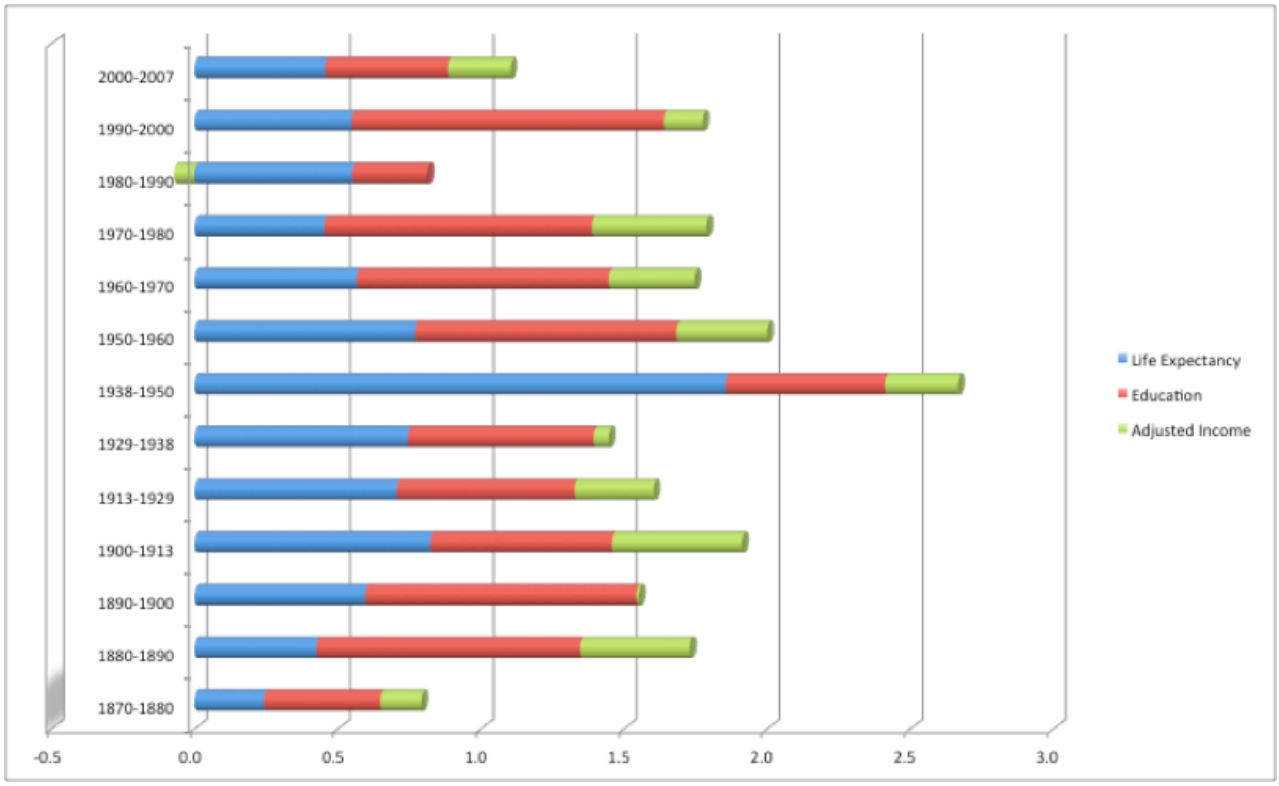

Figure 5 Drivers of HIHD Growth in Latin America, 1870-2007 (%)
Source: See the text.

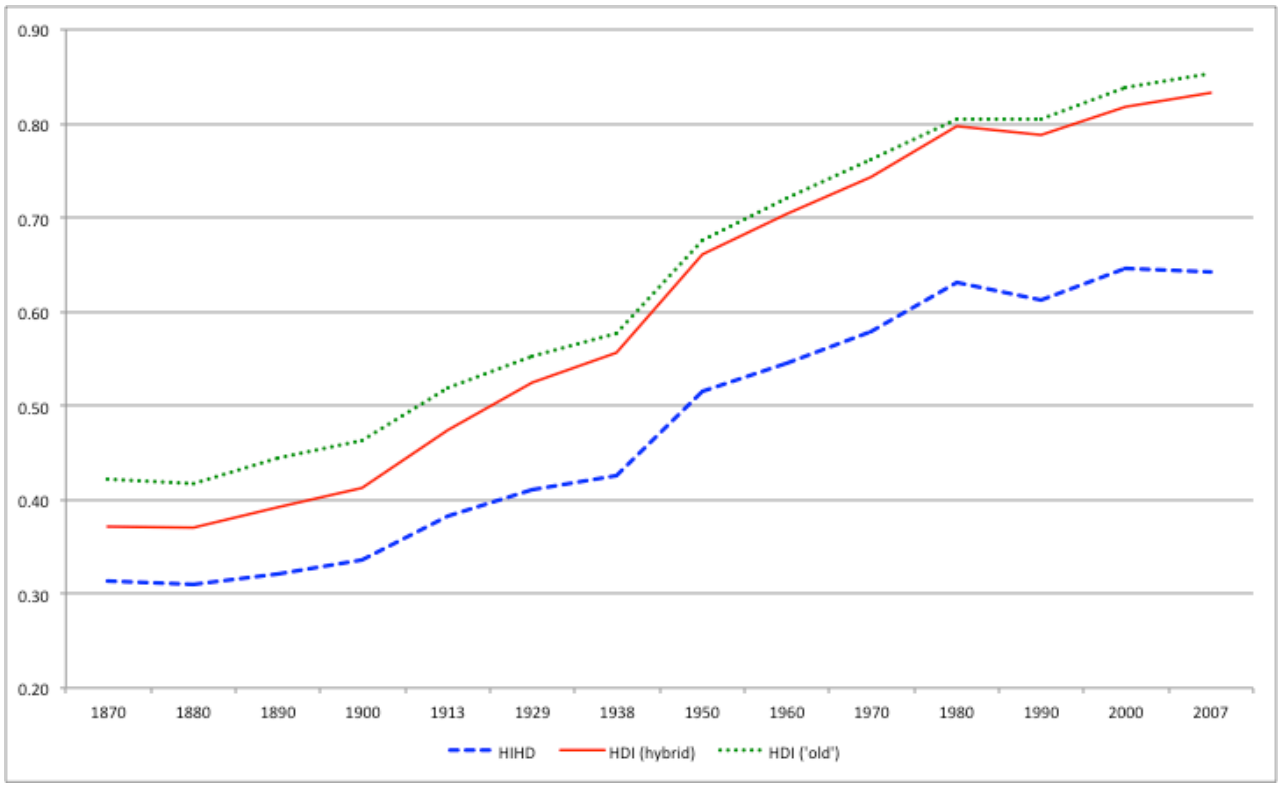

Figure 6 Relative Human Development in Latin America: HIHD and HDI (*OECD* = 1)
Sources: text and Prados de la Escosura (2015).

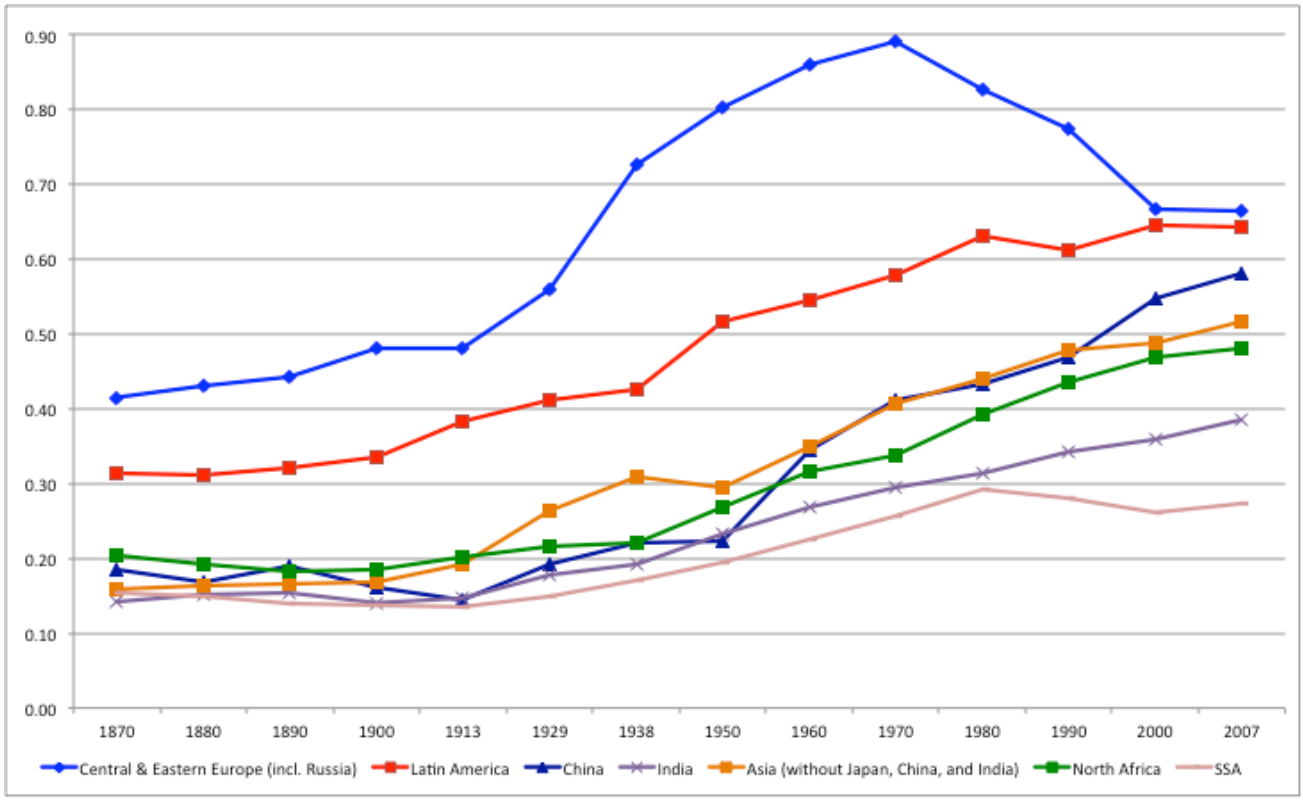

Figure 7 Relative HIHD: Latin America in World Perspective 1870-2007 (OECD = 1)
Sources: text and Prados de la Escosura (2015).

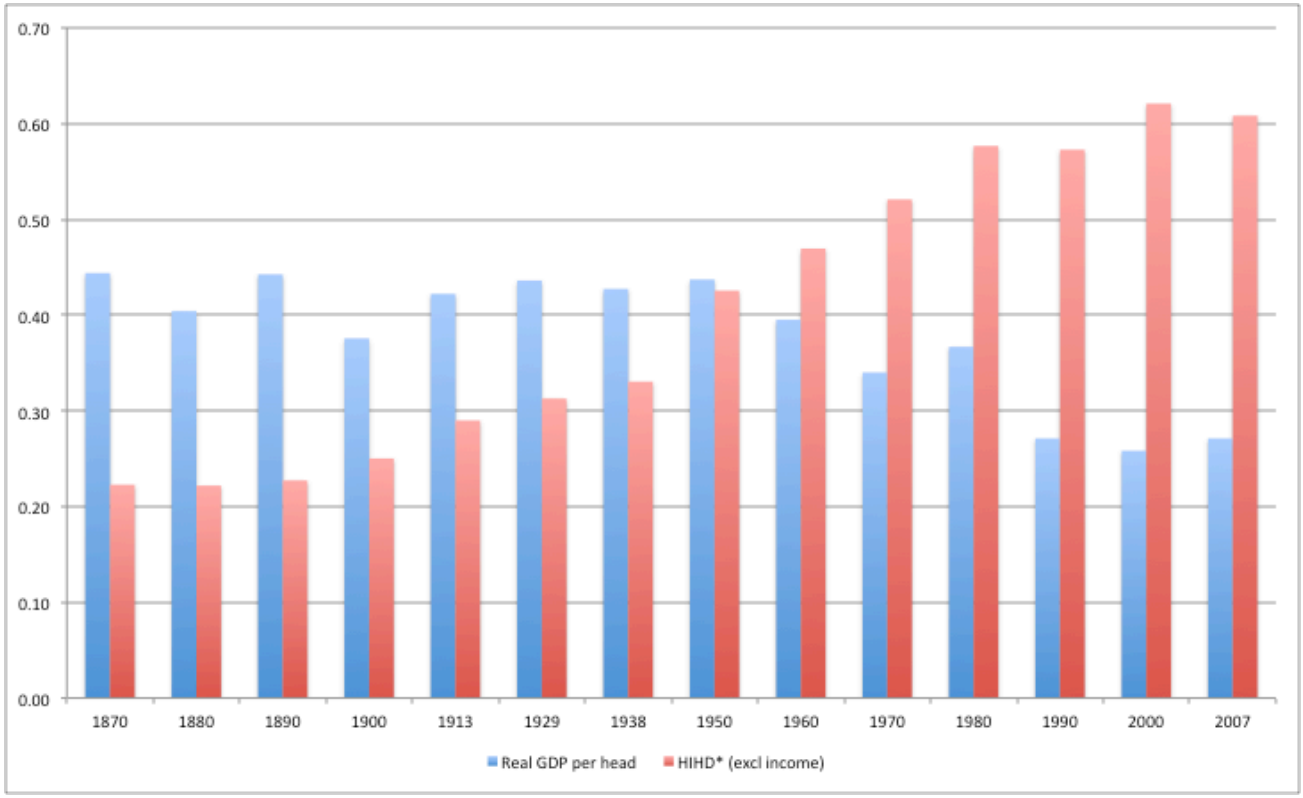

Figure 8 Relative Latin America's GDP per Head and HIHD* (excl. income) (OECD=1)
Sources: text and Prados de la Escosura (2015).

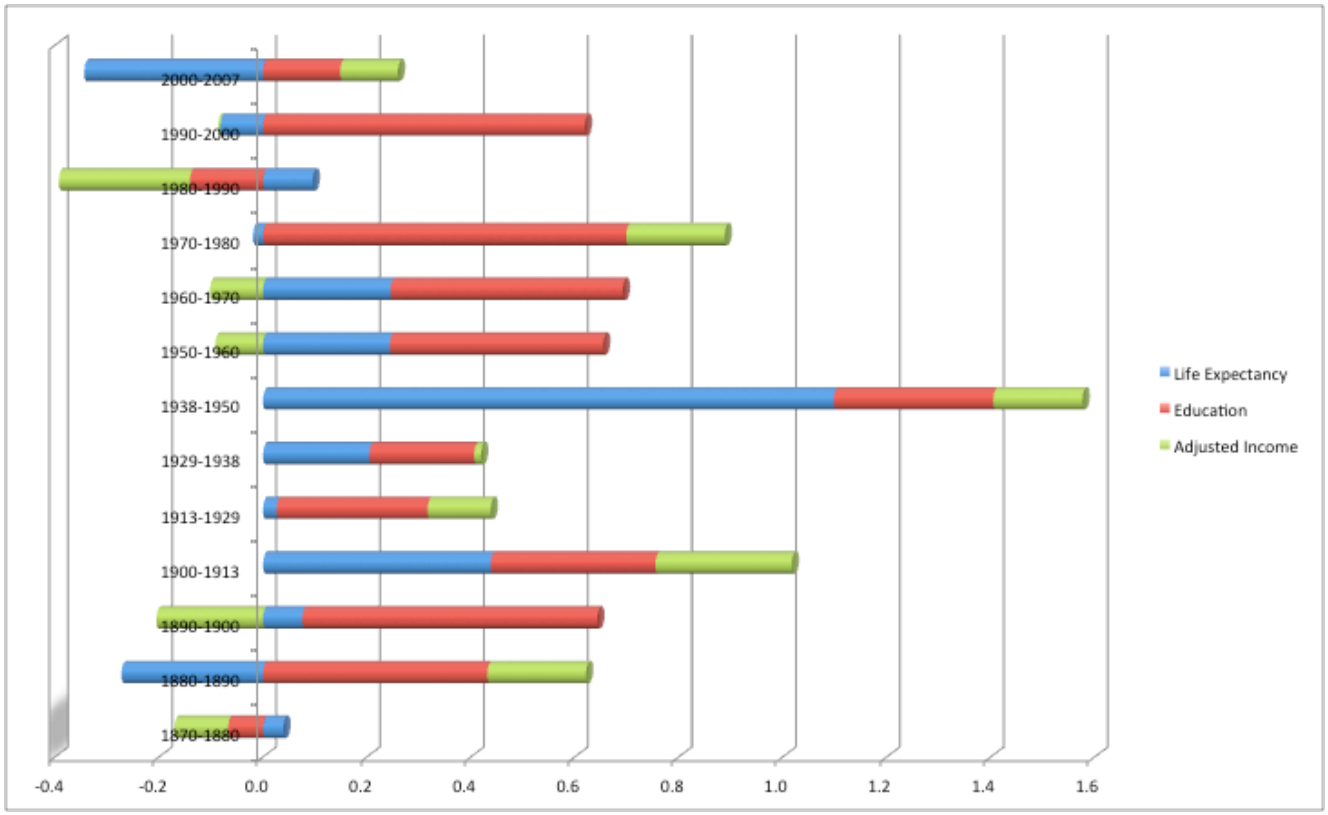

Figure 9 Latin America's HIHD Catching-up with OECD, 1870-2007 (%)
Sources: text and Prados de la Escosura (2015).

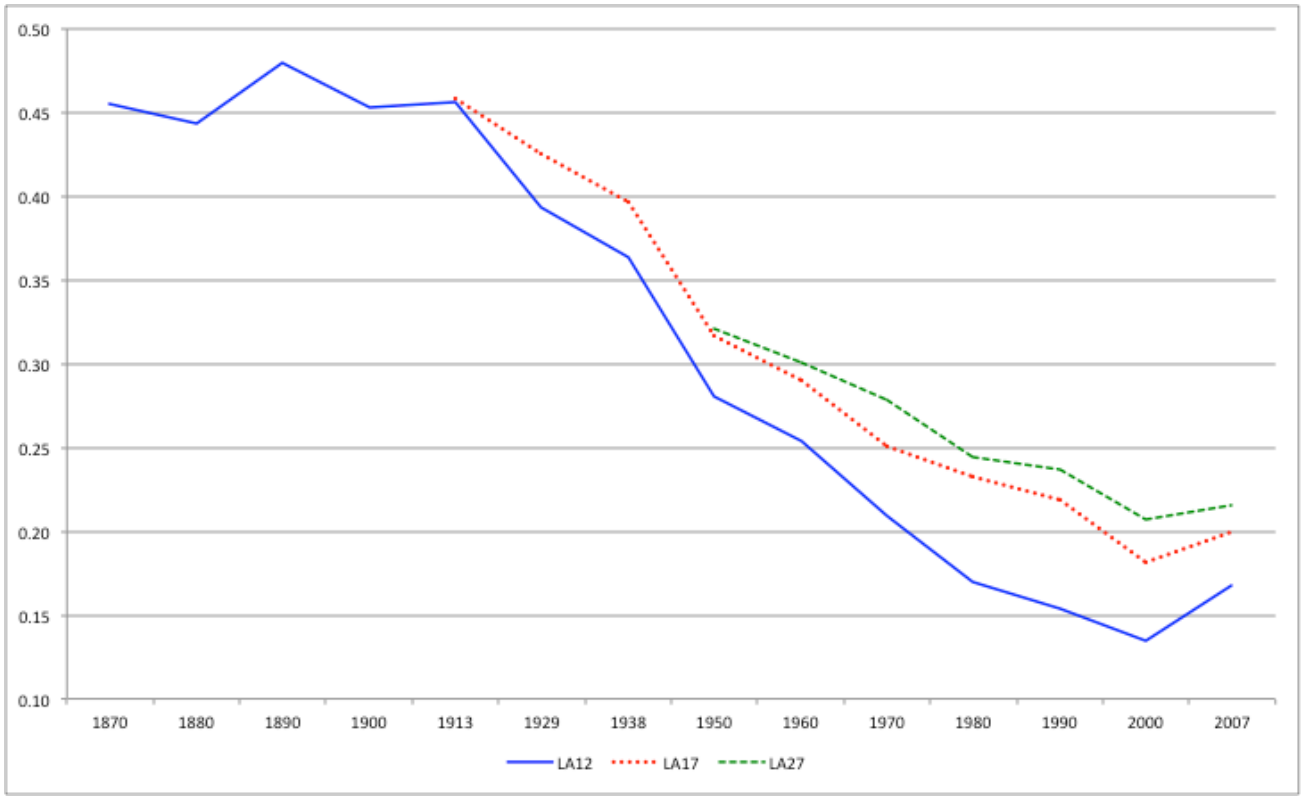

Figure 10 HIHD Inequality, 1870-2007: Alternative Country Samples (unweighted c.v.)
Source: See the text.

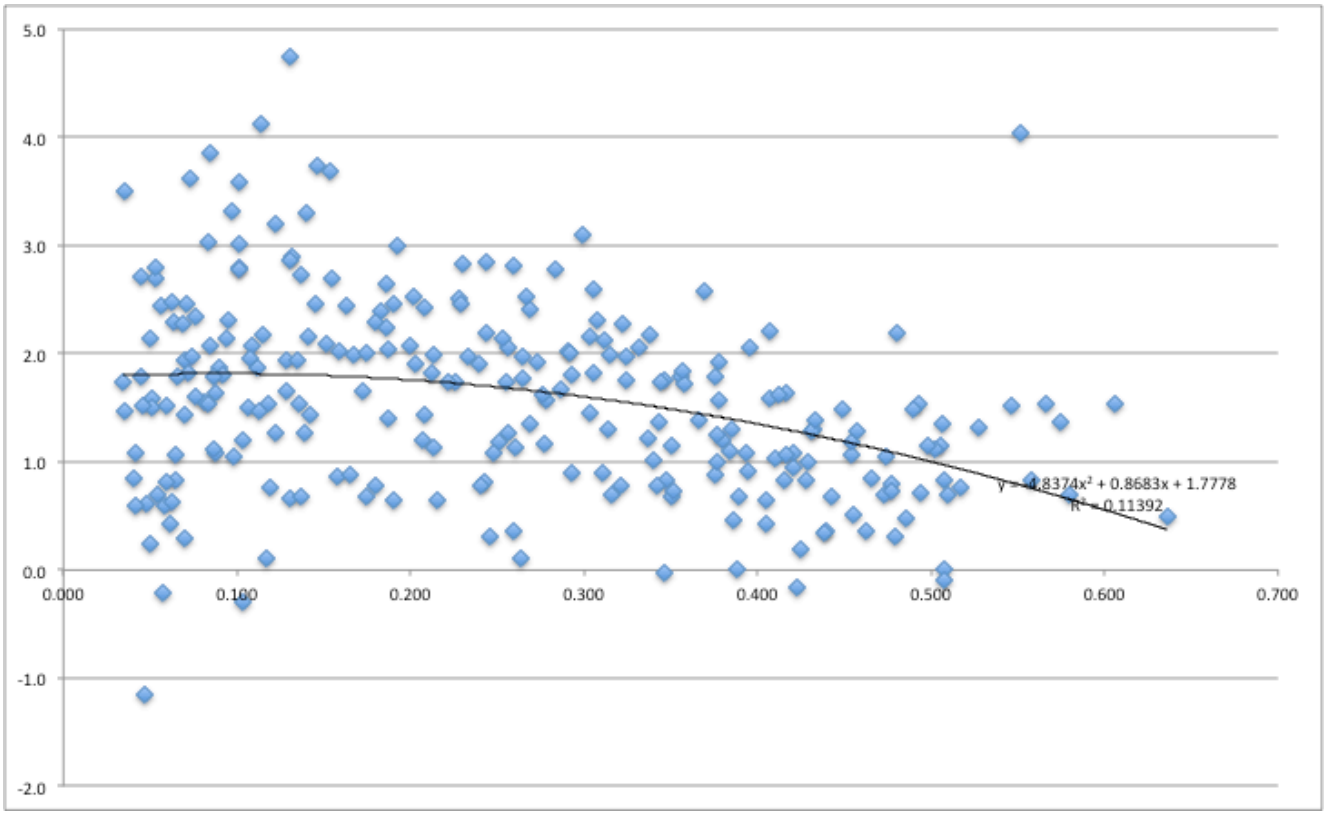

Figure 11 Beta-Convergence in Human Development, 1870-2007
Source: See the text.

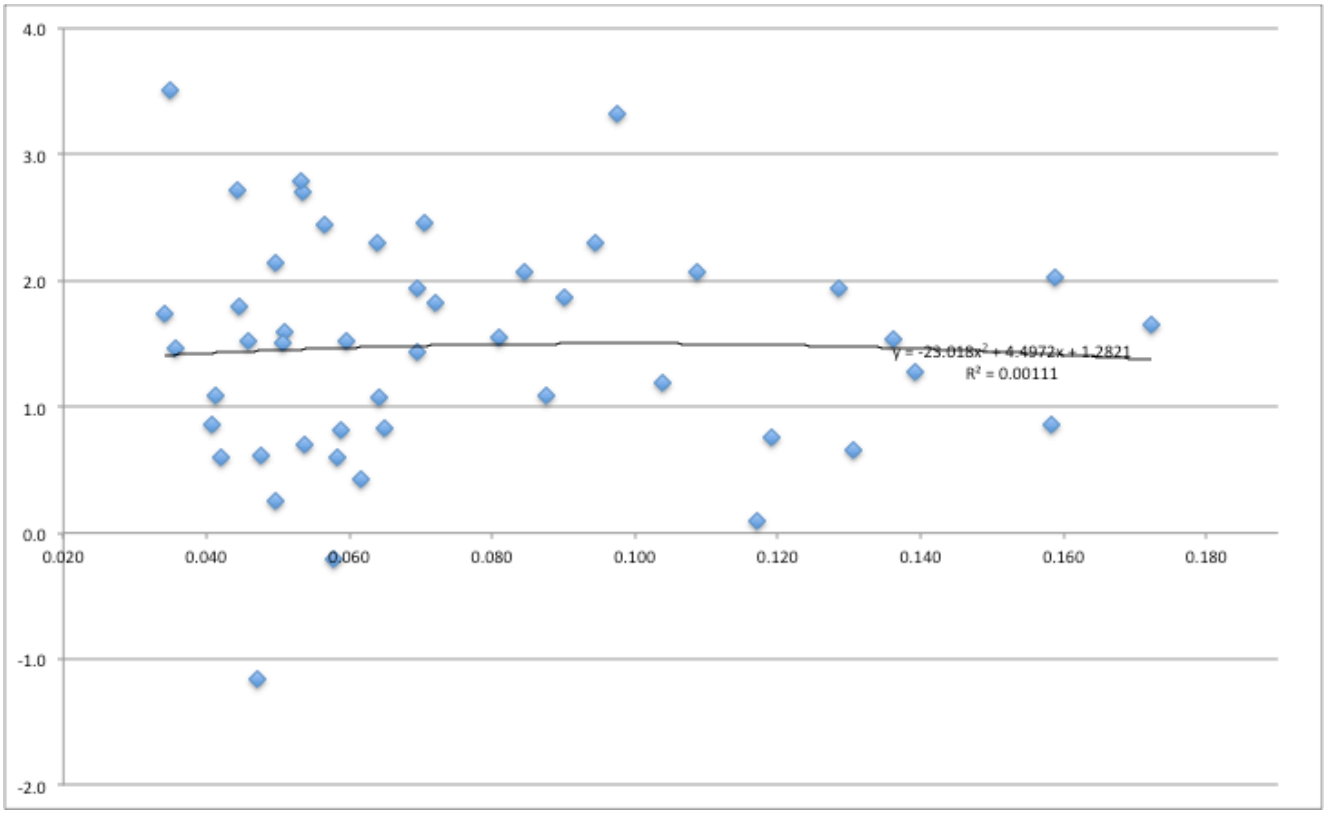

Figure 12a Beta-Convergence in Human Development, 1870-1913
Source: See the text.

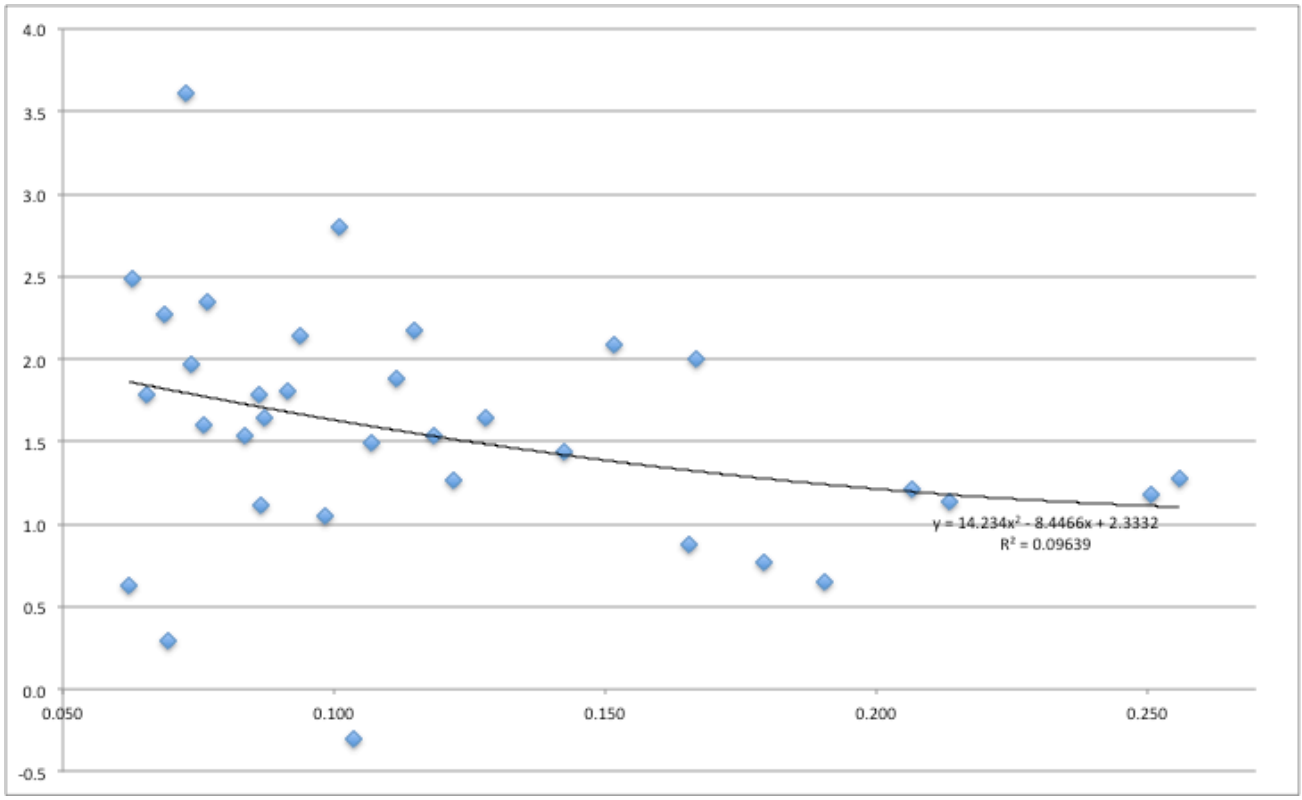

Figure 12b Beta-Convergence in Human Development, 1913-1938
Source: See the text.

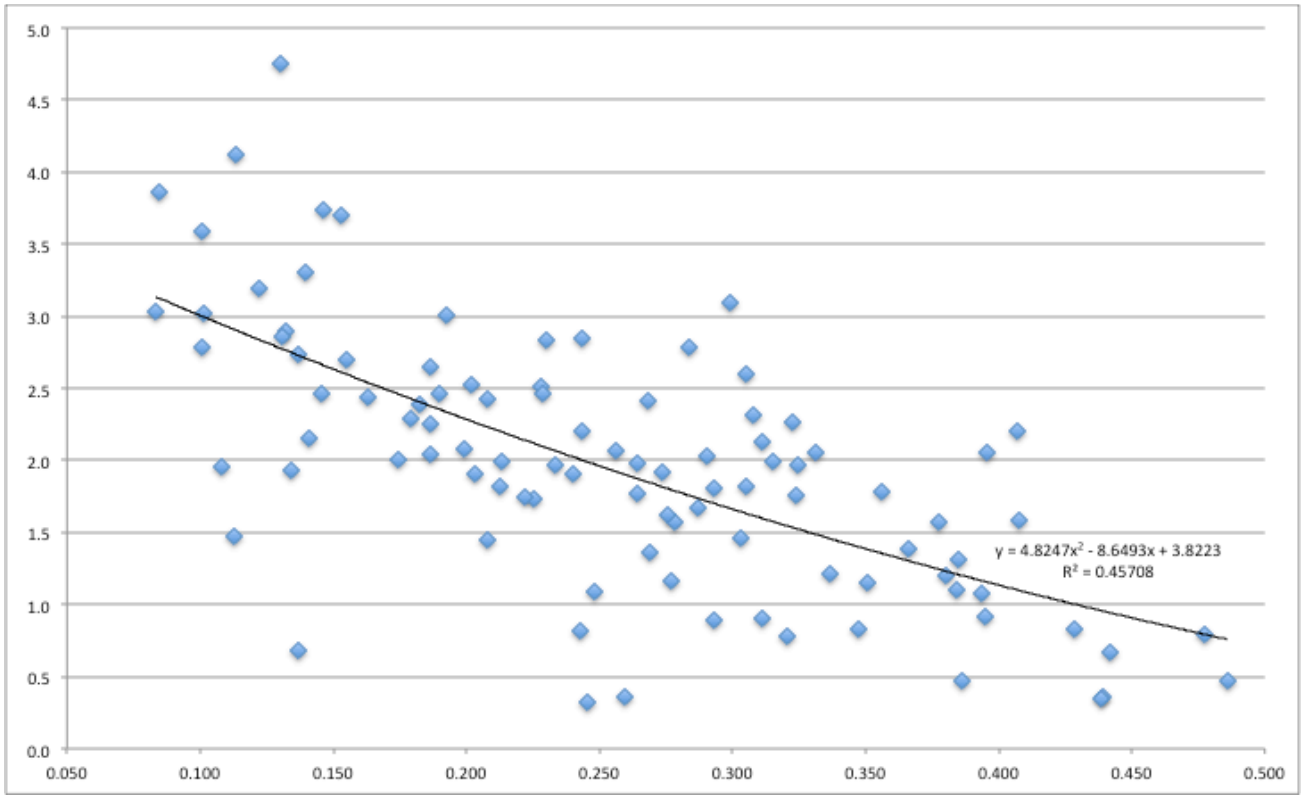

Figure 12c Beta-Convergence in Human Development, 1938-1980
Source: See the text.

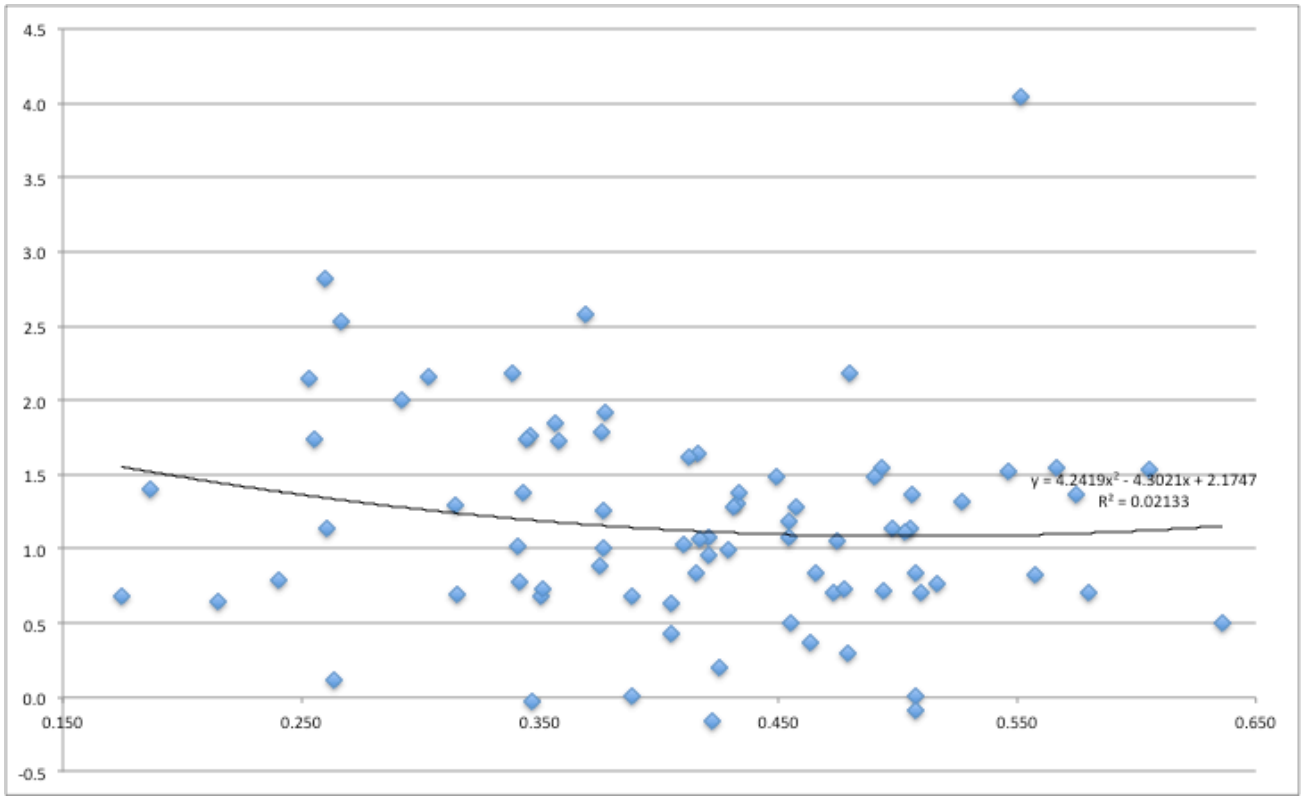

Figure 12d Beta-Convergence in Human Development, 1980-2007
Source: See the text.

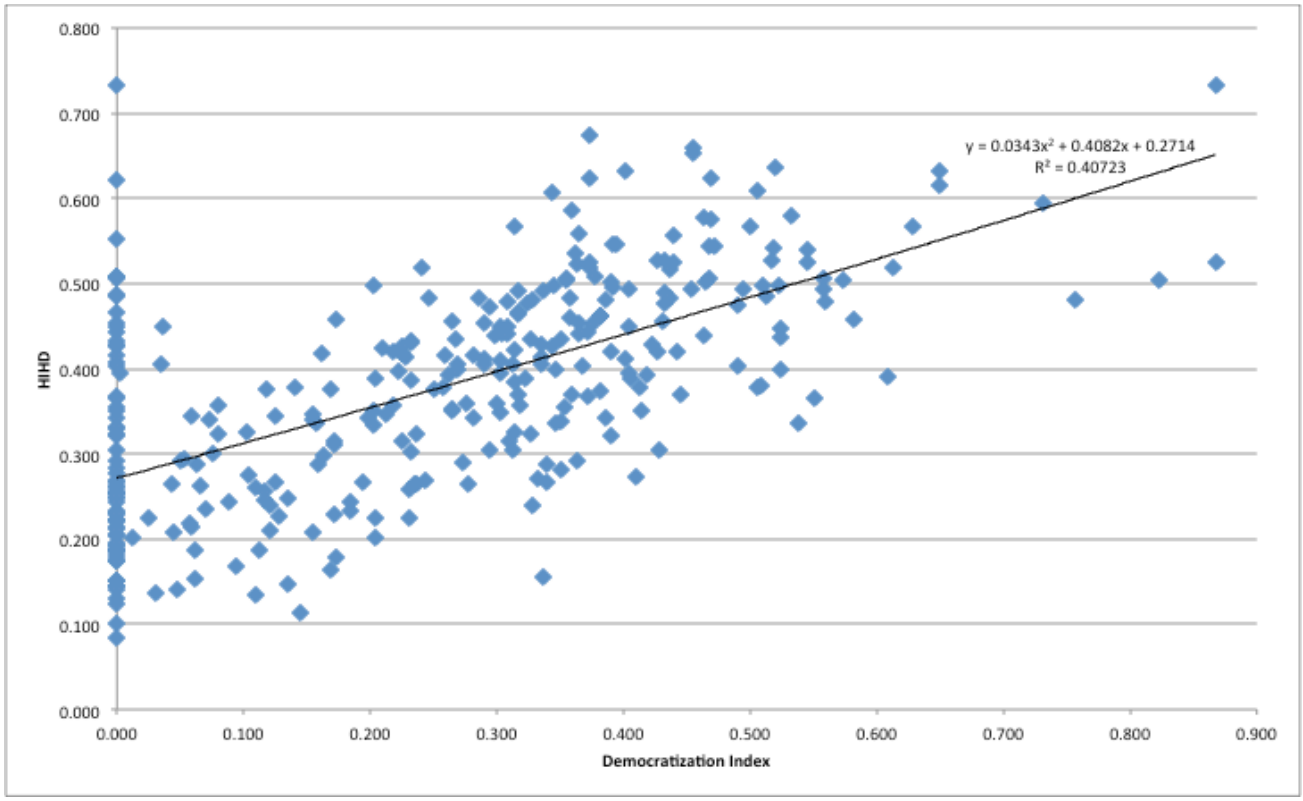

Figure 13 Human Development and Democratization in Latin America, 1870-2007
Source: Democratization index, Vanhanen (2010), normalized; *HIHD*, see the text.

ONLINE APPENDIX.

Sources and Procedures

Life Expectancy at birth

Most data come from the MOxLAD database for Latin America (Astorga *et al*. 2003) -(supplemented with the working sheets prepared by Shane and Barbara Hunt and kindly provided by Pablo Astorga)- and Arriaga (1968). In addition, national sources used are:

Argentina, 1870-1890, Recchini de Lattes and Lattes (1975).

Chile, 1890-1900, and Uruguay, 1870-1900, assumed to have evolved along Argentina.

Uruguay, 1900-1938, Ministerio de Salud Pública (2001),

Life expectancy in Colombia, 1870-1900, Cuba, 1870-1900, Panama, 1880-1900, Honduras, 1890-1900, Puerto Rico, 1870-1890, and Venezuela, 1880-1900, has been assumed to evolve along Costa Rica's (same trend but different levels).

Peru, 1913-1938, assumed to evolve along Bolivia's.

Puerto Rico, 1870-1890, assumed it evolves along Costa Rica; 1890, Riley (2005b); 1900-1938, UN (1993).

Jamaica, 1880-1938, Riley (2005a: 198); 1870-1880, assumed it evolves along Costa Rica.

Trinidad-Tobago, 1860-1900, assumed to evolve along Jamaica's.

In the absence of life expectancy estimates for early years projecting the available figures with infant survival rates (that is, 400 –as the maximum infant mortality rate per thousand- less the country's infant mortality rate) has derived them for Panama, 1900-1929 and Guyana, 1950-1960. Such a procedure was also used to distribute the average life expectancy estimate for Argentina, 1869-1894.

Literacy

MOxLAD database (Astorga et al. 2003) (plus the working sheets prepared by Shane and Barbara Hunt and kindly provided by Pablo Astorga) and Newland (1991) provide most of the data. Otherwise, the sources are:

Chile, 1870, Braun et al. (2000)

Cuba, 1870-1890, Newland (1991)

Nicaragua, 1900, Núñez (2005)

Literacy rates have been backwards projected with the rate of primary enrolment for Bolivia, 1870-1890, and Puerto Rico, 1870-1890.

Literacy rates have been backwards projected with years of primary education for the population above 15 years (Morrisson and Murtin (2009) for Dominican Republic, 1870-1900; El Salvador, 1870-1890; Uruguay, 1870-1890, and Venezuela, 1870-1880.

Enrolment

Most data come from MOxLAD database (Astorga et al. 2003), supplemented it with the working sheets prepared by Shane and Barbara Hunt. Otherwise, the sources are:

Puerto Rico, 1870-1880, Newland (1991)

Venezuela, 1870-1890, Newland (1991)

All enrolment derived with primary enrolment in Benavot and Riddle (1988), adjusted with the ratio of those aged 5-14 years to those aged 5-24 years, for Dominican Rep., 1870-1913; Ecuador, 1870-1880.

All enrolment rates have been backwards projected with years of primary education for the population above 15 years (Morrisson and Murtin (2009) for Cuba, 1870-1890; Honduras, 1870-1880; Panama, 1870-1890, and Paraguay, 1870-1880.

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.

Per Capita GDP

Data for the twentieth-century -except for Cuba (see below)- comes from CEPAL (2009) from 1950 onwards, Astorga and Fitzgerald (1998) and MOxLAD database (Astorga *et al*. 2003). Otherwise national sources have been used. GDP per head is expressed in 1990 Geary-Khamis dollars.

Argentina, Della Paolera *et al*. (2003), 1884-1950, assuming the rate of growth over 1870-84 was identical to that for 1884-90. The alternative option of projecting backwards the level for 1884 to 1875 with Cortés Conde (1997) casts too low a figure. I assumed the level for 1870 was identical to that of 1875.

Brazil, 1870-1950, Goldsmith, (1986)

Bolivia, 1870-1950, Herranz-Loncán and Peres Cajías (2015). Figures for 1870 and 1880 interpolated from those for 1850 and 1883 (worksheets kindly provided by the authors).

Chile, 1870-1950,Díaz, Lüders and Wagner (2007)

Colombia, 1870-1905, Kalmanovitz Krauter and López Rivera (2009) and data kindly provided by Salomon Kalmanovitz in private communication; 1905-1950, GRECO (2002).

Cuba, up to 1902, Santamaría (2005); 1902-1958, Ward and Devereux (2012); 1958 onwards, Maddison (2010)

An important caveat in the case of Cuba is that Maddison (2006) level for 1990 has not been accepted. The reason is that, given the lack of PPPs for Cuba in 1990, Maddison (2006: 192) assumed Cuban per capita GDP was 15 per cent below the Latin American average. Since this is an arbitrary assumption, I started from Brundenius and Zimbalist's (1989) estimate of Cuba's GDP per head relative to six major Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela, LA6) in 1980 (provided in Astorga and Fitzgerald 1998) and applied this ratio to the average per capita income of LA6 in 1980 Geary-Khamis dollars to derive Cuba's level in 1980. Then, following Maddison (1995: 166), I derived the level for 1990 with the growth rate of real per capita GDP at national prices over 1980-1990 and reflated the result with the US implicit GDP deflator in order to arrive to an estimate of per capita GDP in 1990 at 1990 Geary-Khamis dollars. Interestingly, Cuba's position relative to the US in 1929 and 1955 is very close to the one Ward and Devereux (2012) estimated using a different approach.

Ecuador, 1870-1890, I assumed it evolved as Peru over 1880-1900, yielding $447 for 1880, and I arbitrarily assumed a per capita GDP of $400 for 1870.

Mexico, 1870-1900, Coatsworth (1989: 41); 1896-1950, INEGI (1995)

Peru, 1870-1950, Seminario (2011)

Uruguay, 1870-1938, Bértola (1998)

Venezuela, 1870-1950, Baptista (1997)

Central America (Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua), I derived the level for 1913 by assuming the growth over 1913-20 was identical to that of 1920-25, the latter derived from OxLAD database (Astorga *et al*. 2003).

Caribbean. Bahamas, Barbados, Belize, Guyana, 1950-2007, and St. Kitts and Nevis, St. Vincent and the Grenadines, 1990-2007, Maddison (2006, 2010), Conference Board (2010), and Bulmer-Thomas (personal communication)
Trinidad-Tobago, 1950-1970, Maddison (2010)
Jamaica, 1870-1929, Eisner (1961); 1938, Maddison (2010)
Puerto Rico, 1950-2007, Maddison (2010)

Population

All figures are adjusted to refer to mid-year and to take into account the territorial changes and are derived from Maddison (2010) and Mitchell (2003a, 2003b, 2003c), completed for Latin America and the Caribbean with OxLAD database (Astorga et al. 2003), 1900-1938, and CEPAL (2009), 1950-2007. Otherwise, national sources were used.

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