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International Inequality and Polarization in Living Standards, 1870-2000: Evidence from the Western World

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International Inequality and Polarization in Living Standards, 1870-2000: Evidence from the Western World

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Introduction

The widening gap between rich and poor countries since the Industrial Revolution seems an uncontested fact to most people, including academic economists and economic historians, and has been reiterated in the Human Development Reports (HDR) since its appearance in 1990. Simultaneously, recent research on world income distribution suggests a decline in inequality or, at least, stabilization since mid-twentieth century. Can these apparently opposite views be reconciled? In this paper I explored whether they can be reconciled with the help of decomposable inequality and ‘polarization’ indices –that is, given two groups, a rise in ‘polarization’ represents an increase in the homogeneity of each group while the distance between the two groups broadens simultaneously.

Inferences on long-run international or global inequality, it is worth recalling, rest almost exclusively on GDP or GNP per head. This exclusive reliance on product per capita is at odds with the increasing challenge to GDP (or GNP) per head as a measure of well-being.¹ Alternative socio-economic indicators to GDP per head have been explored among which the Basic Needs Approach (Hicks and Streeten 1979, Streeten et al. 1981) and the Physical Quality of Life Index (PQLI) (Morris 1979, Larson and Wilford 1979) are widely known. The United Nations Development Programme’s [UNDP] Human Development Index was the latest addition. Has inequality in living standards - defined as achievements in longevity, knowledge and per capita income- cumulated over time? Do inequality trends in alternative measures of well-being concur? Has the gap between Core and Periphery widened in the long run and, thus, contributed to a rising trend in inequality? These are recurring questions. Assessing long-run international differences in well-being for a sample of up to 41 countries in the Western World -which includes Western Europe, the Americas, and Oceania- is attempted in this paper on the basis of a new set of well-being indicators including life expectancy, literacy, enrolment, real income, and human development.

A word of warning is needed about the quantitative evidence used here. I have tried to avoid the risk that “the results driven by various assumptions may vastly outstrip the part based on actual data” (Milanovic 2006). Only countries for which data on GDP and social indicators of well-being actually exist are comprised in the sample, and this explains why Africa and Asia (except Japan) have been left out. No ‘heroic’ assumptions are introduced in an attempt to widen the geographical coverage of the sample. Needless to say, the quality and coverage of the estimates show a large variance and usually fall as one goes back in time, but no ‘imaginative’ solutions for missing countries, such as assuming identical levels of income or growth rates to their neighbors, are employed. Unfortunately, in the present state of the art, it is not possible to derive within-country income inequality measures for a large sample.² Fortunately, for the purpose of the paper, empirical evidence for the late twentieth century suggests, however, that inter-country inequality provides a lower-bound for ‘world’ inequality (Li, Squire and Zou 1998, Bourguignon and Morrisson 2002, Milanovic 2006, Sala-i-Martin 2006).

The paper is organized as follows: an overview of the issues and findings of the empirical literature on international inequality provides, in section II, the hypotheses that will be explored for

¹ Actually, the questioning of income per head as a well-being indicator has been recurrent since the spread of national accounts half a century ago (United Nations 1954, Dasgupta 1993, Engerman 1997).

² For the OECD sample, evidence on income distribution can be found in Lindert (2000) and Morrisson (2000), but with limited time and space coverage. For post-1950 estimates for a sample of European countries, see Gottschalk and Smelding (2000). As for Latin America in the second half of the twentieth century, see Astorga and Fitzgerald (1998) and Astorga, Berges, and Fitzgerald (2005). A promising alternative is Williamson’s (1997) short cut measures of within-country inequality: the GDP per worker-unskilled wage ratio, that I used it to derive trends in Latin American inequality over 1870-2000 (Prados de la Escosura 2007b).

the Western World in the long-run. In section III, new measures of international living standards are computed from the original values of life expectancy, literacy, school enrolment, a new comparable data set for per capita income; these allow me to construct a new, improved human development index (IHDI). Section IV presents different measures of long-run international inequality in the Western World for each well-being indicator. Then, overall inequality is decomposed into inequality within and across countries using two generalized entropy indices (MLD and Theil), and the existence of polarization is explored.³ A summary of my findings closes the paper.

International Differences in Well-being: Some Stylized Facts

Quantitative assessments of international inequality have been carried out since the 1960s, focusing almost exclusively on the late twentieth century. A worsening over time in the international distribution of income, led by between-group rather than by within-group inequality, has been the dominant conclusion until recently (Theil 1979, 1989 and Ram 1979). The widespread view of a widening gap between developed and developing countries was challenged by Berry, Bourguignon, and Morrisson (1983), who pointed to large countries as determinants of the exhibited trends: China contributed to reduce inequality while India played the opposite role.⁴ Recently, Milanovic (2005) has shown that international population-weighted inequality declined in the second half of the twentieth century and that a sustained increase is only observed for unweighted inequality.⁵

‘World’ rather than ‘international’ economic inequality (that is, income distribution among individuals, not just across countries’ averages) has been the focus of recent research as data on household surveys have been available since the 1980s (Milanovic 2005). The new approach initially confirmed the view of a substantial increase in world inequality as the widening in inter-country income differentials more than offset the decline in within-country inequality (Korzeniewicz and Moran 1997). The consensus was broken when Schultz (1998) showed that inequality had fallen since the mid-1970s, with the contraction in across-country inequality canceling any increases in within-country inequality. Firebaugh (1999) noticed, in turn, a remarkable stability in world income distribution between 1960 and 1989. Inter-country inequality remained stable as the divergence in income growth favorable to rich countries was offset by the faster population growth in poor countries. Later, the revisionist view has been assuaged by Dowrick and Akmal (2005) who, on the basis of a ‘true’ Afriat index of PPP-adjusted income, concluded that inequality increased slightly between 1980 and 1993, while Milanovic’s (2005) showed that inequality among world citizens remained stable between 1950 and 2000. Thus a new, less pessimistic consensus has replaced the established view of a widening gap between the world rich and poor in the late twentieth century.

Long run inequality has, in fact, received little quantitative attention. Lindert and Williamson (2003) provided some tentative results but did not attempt to systematically quantify world inequality. More assertively, Bourguignon and Morrisson (2002) concluded that world inequality was much larger in 1992 than in 1820. This result derives from a rise in inequality from the early nineteenth century to the mid-twentieth century that tended to stabilize over the last half a century (although cross-country inequality continued to increase until 1992 (Theil) or up to 1980 (MLD)). Within-country income distribution dominated world inequality during the nineteenth century, while cross-country income distribution prevailed during the twentieth century. The main element behind world income inequality in the long-run has been, according to Bourguignon and Morrisson, the disparity across regions, while the reduction in within-country income distribution of European countries and

³ These entropy measures correspond to the generalized entropy index with coefficients 0 and 1, respectively. $G(0)$ corresponds to Henri Theil’s population weighted index, also known as Bourguignon’s L and Mean Logarithmic Deviation (MLD), and $G(1)$ to Theil’s income weighted index, known for short, as Theil.

⁴ The determinant role played by China and India in the international income distribution is a recurrent feature in later studies, cf. Firebaugh (1999), Bourguignon and Morrisson (2002), Milanovic (2005), and Sala-i-Martin (2006).

⁵ Also a result in Sala-i-Martin (2006) for the period 1970-2000.

their offshoots in the early twentieth century acted as a counter-balancing force, a fact linked to the increasing voice of workers in political life (Eichengreen 1992).

The empirical evidence on which Bourguignon and Morrisson's (2002) conclusions about long-run inequality are grounded deserves a few remarks. They combined Maddison's (1995) data on GDP per head (expressed in 1990 Geary-Khamis dollars) built on historical national accounts, with scattered evidence on within-country income distribution (often from household surveys) and made some remarkable simplifying assumptions that bias the estimates.⁶ Real income for missing Eastern European and non-European countries in the nineteenth century, for example, was interpolated with the growth rates of 'comparable neighboring countries' (sic), carrying Maddison's (1995) explicit assumptions a step further. As regards within-countries income distribution, the procedures used to obtain pre-1950 (and often pre-1970) estimates can be dubbed (with the exception of a few Western countries) arbitrary, as the available evidence for one country at a given point in time was used over space and time.⁷ Countries were, then, grouped in thirty three larger trans-national units, on the basis of 'historical consistency and homogeneity', with the unintended consequence of erasing whatever effect domestic policies, institutions and relative factor endowments may have had on income distribution and national growth.⁸ Though Bourguignon and Morrisson's (2002) empirical evidence is unconvincing, their conclusions provide a most challenging set of hypotheses and conjectures that, no doubt, deserve exploration.

Per capita income is, however, just one dimension of material well-being and social scientists are currently looking at multidimensional indicators of well-being and inequality. Ram (1980) showed a sustained decline in inequality in terms of the Physical Quality of Life Index over 1950-70 which is at odds with the rising trend observed in income. The discrepancy between high inter-country inequality in income per capita and low inequality in human development was confirmed by Ram (1992). Bourguignon and Morrisson (2002) computed cross-country inequality for (the original values of) life expectancy and found sustained increase in inequality between 1820 and 1910 that stabilized during the interwar, declined over the Golden Age (1950-70) and remained unaltered afterwards, so that late twentieth century levels were similar to those of the early nineteenth century.⁹ Goesling and Firebaugh (2004) computed inequality of (untransformed) life expectancy and found that it did not change over 1980-2000. Moreover, by combining life expectancy at birth with GDP per head, Bourguignon and Morrisson (2002) observed an increase in world lifetime income inequality that peaked in 1950 and then stabilized or even converged thereafter. Recently, for Bourguignon and Morrisson's 33 trans-national units, Morrisson and Murtin (2005) found a long-term decline in inequality in 'world' education on the basis of (untransformed) average years of schooling and an inverted U-shape evolution that peaked during the Interwar years for a slightly modified human development index.

The view that standards of living converged in the late twentieth century has been disputed by Hobbijn and Franses (2001), who, on the basis of 'achievement indices' for different social indicators, computed unweighted inequality measures that pointed to a widening gap between Core and Periphery

⁶ Bourguignon and Morrisson (2002) electronic data base can be found in www.delta.ens.fr/XIX.

⁷ Perhaps one example will suffice, 'Estimates [for Egypt] are those from Bourguignon and Morrisson (1990) for 1970. The distribution was assumed to have remained the same ever since 1820'. Similar assumptions are made for Brazil, Mexico, Argentina and Chile over 1820-1950, while Colombia, Peru and Venezuela had identical distribution to Brazil. As for Iberia, France's income distribution (!?) is accepted for 1950-92 while the one for 1950 was considered acceptable over 1820-1950.

⁸ Thus, Australia and Canada were in the same group. In Latin America five regions were considered: Argentina and Chile (actually included in the Western offshoots grouping); Brazil; Mexico; Colombia, Peru and Venezuela; and the rest. A similar aggregation was done for Eastern Europe, Asia and Africa.

⁹ Bourguignon and Morrisson (2002: 741) apply the same type of assumptions employed in the case of per capita income. Thus, when no direct estimate was available for a country or period, they assume that life expectancy was that of a comparable neighboring country.

since the 1960s. Neumayer (2003) rejected the use of ‘achievement indices’ and, using the original values of social variables, reinstated the view of a reduction in inequality over the last four decades.

To sum up, the main stylized fact that can be established about the long-run evolution of living standards is a long-term rise in inequality that peaked by the mid-twentieth century and gave way to a decline or, at least, stability during the last fifty years. Paradoxically, no attempt has been made to reconcile two apparently contradictory claims: the widening gap between rich and poor, and the declining world inequality.¹⁰ The possibility of two distinctive processes occurring simultaneously; one of falling global (or international) inequality and another of polarization (namely, a tendency to hollow the middle of the distribution and shift it towards the two tails) deserves to be explored.¹¹ In the paper, I will take these neglected issues on board.

New Measures of International Living Standards

In international comparisons, use of real income (the conversion into a common currency with purchasing power parity (PPP) exchange rates) has become generalized. Unfortunately, the construction of PPP converters involves high costs in terms of time and resources. Only PPP exchange rates for a restricted country sample, that does not include Latin America, have been constructed for earlier periods.¹² An indirect method to derive historical estimates of real income levels for a large sample of countries is the backward projection of PPP-adjusted GDP per capita for a recent benchmark with volume indices derived from national accounts data. It is worth noting that fixed-base real (PPP-adjusted) product data represent a most convenient alternative to carrying out painstaking direct comparisons across space and time and have the presentational advantage that their growth rates are identical to those calculated from national accounts. Alas, a distant PPP benchmark introduces distortions in inter-temporal comparisons since its validity depends on how stable the basket of goods and services used to construct the original PPP converters remains over time.

In the absence of current price PPP-adjusted GDP levels, I have chosen to use real income at 1960 US prices, as it provides an intermediate year for the time span considered. For Latin America, I resorted to a set of own-country weights (Paasche) PPP direct computations for 1960 by the Economic Commission for Latin America [ECLA] (Braithwaite 1968, ECLA 1968).¹³ For OECD countries, real income per head for 1960 expressed in US relative prices comes from Prados de la Escosura (2000). Then, a new set of real product per head estimates, that includes western Europe, the Americas, and Oceania, was constructed by projecting backwards 1960 per capita GDP levels, at US relative prices, with volume indices taken from historical national accounts (Prados de la Escosura (2007a).

As regards non-economic indicators of standards of living, different options are available: the direct use of their original values and a linear or non-linear transformation of their values. In this paper I consider indicators of well-being such as life expectancy, literacy, and enrolment that share the feature of having asymptotic limits that reflect biological or physical maxima. Hence, a transformation is required to measure their changes within upper and lower bounds. A possibility is a linear transformation such as, for example, has been the case of the United Nations Development

¹⁰ Sala-i-Martin’s (2006: 382) stress on the mismeasurement of cross country inequality by the use of unweighted instead of (population) weighted indices simply reduces the debate to a technicality.

¹¹ Seshanna and Decornez (2003) represent an exceptional attempt to measure inequality and polarization in the world over 1960-2000.

¹² See Prados de la Escosura (2000) and Ward and Devereux (2003).

¹³ The commodity basket included 261 consumption goods and 113 investment goods for capital cities in nineteen Latin American countries and the U.S. (Houston and Los Angeles). Prices were collected in 1960/62. Quantity expenditure weights for a Latin American average and the US in 1960 were used (ECLA 1968, Braithwaite 1968). PPPs in ECLA (1960) appear, thus, to be superior in country coverage but not in commodity coverage to ECIEL benchmark estimates for 1970 and 1975 (Salazar-Carrillo 1983, Salazar-Carrillo and Tirado de Alonso 1988, Salazar-Carrillo and Prasada Rao 1988).

Programme's (UNDP) index of human development. Thus, indices for each dimension (I_x) are computed according to the following formula,

$$I_x = (x - Mo) / (M - Mo), \quad [1]$$

where x is the observed value of a given dimension of welfare, and Mo and M represent the minimum and maximum values, or goalposts.

However, the relationship between the value of each social indicator and its achievement may be non linear. If, for example, when the standard of living indicator reaches higher limits, its improvement corresponds to a much higher level of achievement than a similar gain from a lower basis, then a different transformation of the original value of the social indicator will be required to reflect its true achievement (Dasgupta 1990, Srinivasan 1994).¹⁴

Using an axiomatic approach Kakwani (1993) constructed a normalized index from an achievement function that satisfied this proposition, so an increase in the standard of living of a country that it is already at a higher level implies a greater achievement than would have been the case had the increase taken place at a lower level. The achievement function is, following Atkinson (1970),

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

where, x is an indicator of a country's standard of living, and M and Mo are the maximum and minimum values, respectively.

The achievement function is a convex function of x , and it is equal to 0, if $x = Mo$, and equal to 1, if $x = M$, ranging, then, between 0 and 1.

In the case favored by Kakwani's axiomatic approach, ε takes a value of 1, turning into,

$$f(x, Mo, M) = (\log(M - Mo) - \log(M - x)) / (\log(M - Mo)), \quad [3]$$

where \log stands for the natural logarithm.

It is worth noting that the UNDP's linear transformation represents a particular case in which $\varepsilon = 0$, yielding expression [1] for each social dimension of the index.¹⁵

In the transformation of the social or well-being indicators I will use the non-linear transformation proposed by Kakwani. In the case of life expectancy, maximum and minimum values will be 80 and 20 years, respectively, while 0 and 100 will be the upper and lower bounds for literacy and enrolment.¹⁶

Finally, I computed a new, 'improved' index of human development (IHDI).¹⁷ As a synthetic measure of Human Development, the index captures a country's achievements in longevity, knowledge, and living standards through various indices: 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 logarithm of) *per capita* GDP is a surrogate (UNDP 2001:

¹⁴ A non-linear relationship between the original values of social indicators and their real achievement has been suggested by Dasgupta (1990), Kakwani (1993), and Srinivasan (1994).

¹⁵ This particular case does not satisfy, however, one of the axioms of the achievement index defined by Kakwani (1993): namely, that the index should give greater weight to the improvement of a country which has higher level for each social indicator.

¹⁶ Both Dasgupta (1990) and Kakwani (1993: 316) used 80 years as the maximum goalpost for life expectancy at birth in present time developing countries, while Kakwani used 30 years as a minimum. Life expectancy was below 25 years in some late nineteenth century Latin American countries (Astorga et al. 2005).

¹⁷ Cf. Prados de la Escosura (2007a) in which the sources and data for the new human development index and its components are provided.

240).¹⁸ I have drawn on the social well-being variables previously constructed with a convex achievement function, while I maintained the logarithmic transformation of per capita income (which implies diminishing marginal utility of income) used in UNDP's HDI. The maximum and minimum values are the logarithms of 40,000 and 100 dollars, respectively. The education component combines adult literacy and gross enrolment (primary, secondary and tertiary), with two-thirds and one-third weights, respectively. A geometric average, suggested by Sagar and Najam (1998: 251-2) as a better way of representing the notion that "its three dimensions are equally essential in determining the level of human development", was employed to combine its three main dimensions (longevity, knowledge, and income) into the new IHDI.

International Inequality and Polarization

Was inequality in terms of well-being significantly larger in 2000 than in 1870 in the Western World?, Did polarization between Core and Periphery occur? Were inequality and polarization parallel or opposite phenomena? These are questions addressed in this section.

Different inequality measures are presented: the widely used Gini coefficient, the Mean Logarithmic Deviation (MLD), also known as G(0) in the generalized entropy indices literature, and the Theil index, or G(1). Each index is more sensitive to changes in the middle, bottom, or top of the distribution, respectively. The last two represent entropy decomposable measures of inequality (MLD is population-weighted; Theil is income-weighted) and are defined as,

$$\text{MLD}_{yi} = \sum p_i \ln (p_i/y_i) \quad [4]$$

$$\text{Theil}_{yi} = \sum y_i \ln (y_i/p_i) \quad [5],$$

with p_i and y_i representing the shares of country i in total population and total well-being indicator (i.e., GDP, life expectancy times population, etc.).

All measures of inequality are simultaneously provided for four alternative country samples starting in 1870, 1900, 1925, and 1950, respectively, and reaching up to 2000. The longer is the time span, the narrower is the coverage. The use of different country samples and time coverage allows testing the sensitivity of the results to alternative specifications. The results obtained appear to be robust.

Following the usual approach I will look first at average per capita GDP inequality across countries in the Western World. Gini, MLD (or G(0)), and Theil (or G(1)) indices are provided for four different country samples in an attempt to prevent spurious inequality tendencies derived from differences in sample composition (Figure 1).¹⁹

A long-term rise in per capita income inequality across countries is confirmed for the Western World. Alternative country samples provide a robust picture and it is worth noting that inequality rises as the country coverage widens. The increase is more intense when computed with MLD, a measure that gives more weight to changes at the bottom of the distribution. The evolution of inequality was not steady and different phases can be established. A moderate increase in inequality took place between 1890 and 1929. After a decline during the Depression years, the disruption brought about by World War II provoked a dramatic upsurge in inequality. The Golden Age (1950-73) was a period of

¹⁸ 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).

¹⁹ In Figure 1 a simplified version is presented in which two alternative estimates only overlap in one year aims to facilitate its reading. See Prados de la Escosura (2007c) for the complete inequality benchmark estimates for each country sample.

inequality reduction that gave way to a remarkable increase since 1980, reaching a historical peak in 2000 (except for the Gini coefficient).

How do these results compare with analogous estimates for the whole world? A comparison between the Western World and Bourguignon and Morrisson (2002) 'world', shows that, in both cases, inequality reached a peak by 1950 (although it grew faster up to 1929 for the 'world'). 'World' inequality would continue rising, though at a very mild pace, until 1980 when it initiated a decline until 2000. Conversely, in the Western World, the end of the twentieth century was a period of rising inequality associated to the 'lost decades' in Latin America.

Alternatively, we can compare the evolution of 'international' income distribution in the Western World with the 'whole' world's, as defined in Maddison's (2003) data set, and, given the relatively high impact of populous countries on distribution, also with the 'world' without China and India (Figure 2). While the three geographical samples present a rise in inequality up to 1950, their evolution in the late twentieth century is quite different. In the 'whole' world sample, inter-country inequality presents an inverted U shape and fell since 1973. In the two lower-coverage samples (the 'world' excluding China and India, and the Western World), however, MLD inequality in 2000 was higher than in 1950, resulting from the sustained increase since 1980. Such differential behavior singles out the singular impact of large countries on aggregate inequality measures and points to the fact that the 'lost decades' not only affected Latin America but also Africa and the former communist countries (Easterly 2001).

The computation of weighted inequality measures for the 'whole' world allow us to quantify the apparently contradictory trends between 'international' income inequality and the gap between the 'West' (western Europe, North America, Oceania, plus Japan, roughly present day's OECD) and the "Rest" (most of Asia, Africa, and Latin America). While 'world' average per capita income multiplied approximately by 10 between 1820 and 2000 the West-Rest gap rose from 1.9 to 6.5. In the Western World, a similar ratio, in which the 'Rest' is identified with Latin America, rose from 2.5 to 6.3. The comparison between international inequality and the West-Rest gap shows a parallel evolution until 1973 when international inequality fell, while the west-rest gap kept rising up to 1990 (and stabilized, then, at a high value). Can these opposite trends be reconciled? I will address this question later with the help of the concept of 'polarization'.

As one would expect, population and GDP expanded with different intensity across countries between 1870 and 2000. Did inequality rise because per capita income grew at different rates across countries or just because population grew faster in countries with either low or high income? A way to provide an answer is to simulate the yearly rates at which, other things being equal, inequality would have fallen had all countries in the sample enjoyed identical population (per capita income) growth. The simulation exercise has been carried out for each of four waves of globalization in which the period studied can be divided: the late nineteenth and early twentieth century, the Interwar period, and the Golden Age of growth, and the post-1980 years. The actual way of carrying out the simulation was to compute weighted inequality measures in which, *ceteris paribus*, population (per capita income) remained unchanged over each epoch. This amounts to allocating identical growth rates to population (per capita income) for all countries in the sample.

The results suggest that, in the late nineteenth and early twentieth century, both differences in demographic expansion and economic performance prevented a significant increase in inequality. Faster population growth in the rich European Offshoots resulting from higher fertility rates and immigrants' flows provides an explanatory hypothesis (Taylor and Williamson 1994). Per capita income convergence within the OECD group, largely resulting from catching up with Britain is also part of the explanation. In the Interwar period (1913-38) the variance in income growth contributed to the decline in inequality, while it preventing a larger increase over 1938-50. Again, in the second half of the twentieth century, cross-country dispersion in income growth pulled down inequality, possibly

a result of catching up to the U.S., while population growth dispersion, mostly stemming from Latin America's late demographic transition, represented an obstacle to reduce inequality in the Western World. Thus, in the long-run, the variance in per capita GDP growth rates had a mollifying effect on income inequality.

When we turn to life expectancy, international inequality exhibits, contrary to that of per capita income, a decline in the long-run and starts from a higher level (Figure 3). Distinctive phases can be identified in its evolution: a falling trend over 1870-1913; a rise up to the mid-1920s, followed by stability up to the eve of World War II; a sustained, but decelerating, contraction in the Golden Age; and, finally, a gradual increase that peaked in 1990 and resumed the late nineties. Changes in inequality in life expectancy are more intense when measured by the Gini coefficient, that being particularly sensitive to the middle of the distribution, lends support to the intuition that within-country dispersion of life expectancy is lower than that of income (namely, the longevity of the rich is less than proportional to their wealth). One of the main differences between the evolution of inequality in income and life expectancy takes place during World War II and its aftermath (1938-50). While war disruption helps explain the growing trend in income inequality, the diffusion of medical advances might underlie the inequality contraction in life expectancy. The appearance and diffusion of new drugs to cure infectious diseases from the late 1930s onwards (Easterlin 1999) and the introduction of antibiotics in the 1950s played a part but, the generalized improvement across the world in life expectancy –that lies beneath the decline in inequality- suggest that other factors (improvements in public health –some at low cost- and the diffusion of knowledge through school education) may have contributed significantly (Riley 2005b).

How does the evolution of inequality in life expectancy in the Western World compare with that of the world? Unfortunately strict comparisons cannot be carried out between my estimates and those for the world since, in the few instances in which this kind of estimates are available, inequality has been computed for the original values of life expectancy and not for their non-linear transformation. Therefore, given the biological bounds of life expectancy, estimates derived with the original values will downward bias the inequality estimates. Goesling and Firebaugh (2004: 133), on the basis of Easterlin (1996), suggest that world inequality in life expectancy increased in the late nineteenth and early twentieth century, to peak in the Interwar and, then, experienced a sustained contraction up to 1980. Bourguignon and Morrisson (2002: 731-2) computed the Theil index for untransformed life expectancy in the 'world' and its evolution confirms Goesling and Firebaugh (2004) intuition. For the last two decades of the last century, Goesling and Firebaugh (2004) quantitative estimates point to a decline from 1980 to 1992, with a reversal between 1992 and 2000, so inequality remained roughly unchanged. Thus, trends in 'world' inequality are at odds with those in the Western World for the late nineteenth and early twentieth century, when the latter exhibit a decline, and, again, for the post-1980 period, in which inequality rises.

Are there contradictory trends between 'international' inequality and the *Core-Periphery* gap for life expectancy? James Riley's (2005a: 541) estimates of the highest and lowest life expectancy over 1800-2000 allow us to compute that the gap (that is, the ratio of the highest to the lowest) starting at 1.35 in 1800/20 peaked at 1.93 in 1900/13, stabilized up to 1950 (1.82) and declined to 1.51 in 1973, though it remained the same in 1990/2001 (1.52), partly as a result of HIV/AIDS in Africa. In the Western World life expectancy improved in the *Periphery* (Latin America) faster than in the *Core* (OECD) and a similar ratio –computed with a non-linear transformation of life expectancy original values– fell steadily from 3.5 to 1.2. Hence, no opposite trends are found between the 'rich-poor' or *Core-Periphery* gap and the evolution of inequality for the case of life expectancy.

The variance in life expectancy improvement across countries, as well as that of population increase, explained the contraction in inequality over 1870-1913. In the Interwar years, the dispersion in life expectancy progress prevented a worsening of inequality while, conversely, the variance in population growth rates tended to increase it. Uneven life expectancy gains across countries contributed significantly to inequality decline during 1950-80, while the variance in population

growth represented an obstacle to its reduction. Thus, in the long-run, the variance in life expectancy gains across countries represented a contribution to inequality decline.

Access to knowledge is the third element of well-being considered here. Data constraints prevent me from employing more comprehensive measures such as years of schooling that are available only from 1960 onwards and do not allow us to carry out long-run comparisons (Cohen and Soto 2001). Thus, following the convention in the UNDP Human Development Reports, I have used both literacy and overall enrolment (covering primary, secondary, and tertiary education) rates.

Inequality in literacy experienced a steady long-run decline that intensified throughout the second half of the twentieth century (Figure 4). In the case of enrolment a completely different pattern appears, closer to that of life expectancy (Figure 5). After a decline over 1870-1913, inequality increased up to 1929 reaching a plateau on which it remained until 1950. A sustained contraction took place between 1950 and 1990, and an inequality reversal occurred in the 1990s.

How do inequality trends in the Western World compare to those for other geographical aggregates? Morrisson and Murtin (2005) have computed inter-country education inequality on the basis of the original values of average years of schooling for Bourguignon and Morrisson's 'world' (33 trans-national units). As one would expect when untransformed values of bounded social variables are employed, inequality fell more acutely when measured using years of schooling. In any case, both in the 'world' and the Western World education inequality appears to have experienced a steady, long-run decline, more intense when MLD (the measure especially sensitive to the bottom of the distribution) is used.

No contradictory trends appear between 'international' inequality and the *Core-Periphery* gap in the case of education. In literacy, the gap between OECD and Latin America fell from 4.2 in 1870 to only 1.1 in 2000, while for enrolment it went down from 5.6 to 1.1.

Moreover, in the case of literacy, the dispersion of its improvement across countries largely explains the inequality contraction over the long-run. The variance in population growth represented an obstacle to a further contraction in inequality during the second half of the twentieth century. As for enrolment, improvement differences across countries played a significant role in the decline in inequality over 1870-1980, while population growth variance stimulated inequality during 1950-80.

Then, when we turn to the composite 'improved' index of human development we find that, in the long run, inequality fell, a result clearly at odds with the rise in real income inequality. The steady fall in inequality that took place in the late nineteenth and early twentieth century and, again, in the Golden Age (1950-75), account for most of it (Figure 6). No contradictory trends appear between 'international' inequality and the *Core-Periphery* gap that fell from 3.8 to 1.7 over 1870-2000.

The variance in human development improvement across countries explained most of the long-run contraction in inequality. Population growth variance presented an obstacle to its reduction over 1950-80 but the effect reversed after 1980.

A deeper understanding of inequality can be obtained through its decomposition into the share attributable to distribution changes within each region and the share that stems from differences among regions. Generalized entropy measures of inequality such as MLD and the Theil Index can be decomposed into within-regions and between-regions inequality (Theil 1979, 1989). 'Within-regions' inequality is obtained by adding up the results of weighting each region's inequality measure either by its population share, in the case of MLD, or by its income share, in the case of the Theil index. 'Between-regions' inequality is, then, obtained as the difference between total inequality and 'within-regions' inequality.

In particular, I would like to distinguish two regions, the *Core* and the *Periphery* that, in the context of the Western World, will be identified with OECD countries and Latin America. This way, the extent to which the gap between *Core* and *Periphery* underlies the changes in aggregate inequality will be uncovered. Furthermore, it will be possible to establish whether polarization existed.

Figure 7 presents the decomposition of aggregate per capita income inequality in the Western World.²⁰ It is noticeable that ‘between-regions’ inequality experienced a sustained rise since 1890, that intensified from 1938 onwards, while ‘within-regions’ inequality did not change significantly between the beginning and the end of the period considered, except for a marked increase consequent on World War II. The deepening gap between ‘OECD’ and Latin America appears, hence, as the main element underlying the observed increase in inequality over the long-run.

If inter-country income inequality within each region is examined, two clear trends emerged in Latin America: a steep rise prior to 1914, followed by a sustained decline over the ‘short’ twentieth century (1914-1989), with a reversal in the 1990s. All in all, inequality levels in 2000 were lower than in the late nineteenth century. The long-run fall in twentieth century inequality is, no doubt, conditioned by the Southern Cone’s and, particularly, Argentina’s collapse in its international position. A sustained decline in inequality is found for OECD countries interrupted only by World War II and its aftermath.

When aggregate inequality in life expectancy is decomposed we find that ‘within-regions’ inequality is the dominant force (Figure 8). Thus, the sharp reduction in inequality over 1870-1913 and, again, during 1938-55, is largely the result of a collapse in ‘within-regions’ inequality. A life expectancy gap between *Core* and *Periphery* remained in 2000. If the individual evolution of inequality in each region is considered, then the drastic contraction in Latin America between 1938 and 1955 comes out.

As regards the decomposition of education inequality we find that, in the case of literacy, ‘within-regions’ inequality accounts for all of the reduction in aggregate inequality until 1970 (Figure 9). Both inequality components declined thereafter. A literacy gap between OECD and Latin America still persists. In the case of enrolment (Figure 10), most of the reduction in inequality prior to 1950 is associated to ‘within-regions’ inequality, which experienced a contraction up to 1913 and, after a reversal, another sustained decline between 1929 and 1965 which then stabilized until 1990. In the 1990s, ‘within-regions’ inequality suffered a reversal. A closer look into inequality within each region shows that, in Latin America, inequality in literacy rose up to 1929, and up to 1913 for enrolment, to decline in both cases thereafter, while education inequality experienced a sustained contraction in OECD.

Lastly, if we look at the decomposition of human development inequality, it appears that ‘within-regions’ inequality dominates its long run decline. A human development gap between *Core* and *Periphery* remained by 2000 (Figure 11). Inequality plummeted both within the OECD and within Latin America, but while a sustained fall occurred in the OECD, in Latin America an upsurge of inequality that peaked in the Interwar was followed by a sharp contraction until the end of the Golden Age (1950-75), that stabilized thereafter. Thus, the key to income inequality is the increase between regions while the key to human development inequality is the decline within regions.

We are now in a position to investigate whether we are in the presence of polarization. Namely, to what extent is population clustered in terms of income, life expectancy, literacy, etc., around a small number of groups that become internally more homogeneous while their differences with other groups widen?²¹ Polarization can be depicted as an increase in between-group inequality, that is a growing gap between *Core* and *Periphery*, simultaneous with a decline in within-group inequality. Thus, we can expect to find situations in which inequality and polarization exhibit opposite trends. Therefore, a new measure of polarization can be obtained from the components of the entropy

²⁰ In this section I will focus on the decomposition of MLD. The alternative results obtained with the Theil index are not significantly different. See Prados de la Escosura (2007c).

²¹ For a discussion of the concept of polarization and its measurement, cf. Esteban and Ray (1994), Wolfson (1994), and Esteban, Gradín, Ray (1999).

MLD and Theil indices. A polarization index will be defined as the difference between ‘between-group’ inequality and ‘within-group’ inequality,

$$\text{Polarization}_{\text{MLD}} = \text{MLD}_{\text{between}} - \text{MLD}_{\text{within}} \quad [6]$$

$$\text{Polarization}_{\text{Theil}} = \text{Theil}_{\text{between}} - \text{Theil}_{\text{within}} \quad [7],$$

Figure 12 offers the new measures of polarization for real per capita income. It clearly shows that polarization is a post-1950 phenomenon, especially acute in the Golden Age and again in the 1980s. Moreover, polarization and inequality (Graph 1) evolve in opposite directions, except in the post-1980 era. How does it compare with the situation described for the Western World with that for the ‘world’? Here again, ‘world’ polarization is mainly a post-1950 phenomenon, especially acute since 1980, but also existing prior to 1913. Contrary to the Western World, ‘world’ polarization seems more marked when measured with the Theil index.

If polarization is measured in terms of life expectancy, only two mild episodes in 1938-50 and the 1990s are observed (Figure 13). As regards education, we observe a mild increase in polarization between the mid-1920s and 1970, while inequality declined in the case of literacy (Figure 14); as for enrolment, polarization was even milder, lasting only until the 1960s (Figure 15). A look at polarization in terms of human development shows a sustained increase between 1913 and 1970, which since the 1920s, has paralleled a reduction in inequality (Figure 16).

Summary of Findings

This paper has provided, for the first time, a long-run view of inter-country inequality in living standards based on a new data set. The exercise has focused on the Western World because it is the best documented part of the world. Thus, I avoided data over-simplification that might have generated results driven by assumptions and not by actual data. Some tentative answers can be extracted from this preliminary attempt.

A long term rise in real per capita income inequality is found for a partial but significant sample of the world which includes Western Europe, the European Offshoots, and Japan -that is, the core of today’s OECD- and Latin America. This finding concurs with the trend observed for the whole world when China and India are excluded. This finding is at odds with the benign view of a decline in world inequality during the late twentieth century, as put forward by Bourguignon and Morrisson (2002) and Sala-i-Martin (2006). The bottom line is that inequality results are extremely sensitive to the behavior of China and India because they are two large, populous countries.

An interesting finding is that polarization, especially in terms of income, took place in the Western World. In fact, the deepening gap between OECD and Latin America was the major factor beneath the observed increase in real income inequality. It is worth noting that polarization was also found for the whole world, a phenomenon that paralleled the decline in inequality.

In the case of other well-being indicators (longevity, education, and human development) inequality fell in the long run. Such a reduction in aggregate inequality in terms of life expectancy, education, and human development did not mean that, by the dawn of the twenty-first century, a non-negligible gap remained between OECD and Latin America. In terms of social well-being, polarization is also observed during the Golden Age.

The variance in cross-country improvements in living standards contributed to the inequality reduction. Nonetheless, national differences in population growth, largely a consequence of the late demographic transition in Latin America, tended to increase it. Such a finding is at odds with the Bourguignon and Morrisson (2002) contention that population growth rates are not associated with significant changes in world income distribution.

References

- Astorga, P. and V. Fitzgerald (1998), "Statistical Appendix", in R. Thorp, *Progress, Poverty and Exclusion. An Economic History of Latin America in the 20th Century*, Washington: Inter-American Development Bank, pp. 307-65.
- Astorga, P., A. R. Berges and E.V.K. Fitzgerald (2005), "The Standard of Living in Latin America During the Twenty Century", *Economic History Review* 63, 4: 765-96.
- Atkinson, A.B. (1970), "On Measurement of Inequality", *Journal of Economic Theory* 2: 244-63.
- Berry, A., F. Bourguignon and C. Morrisson (1983), "Changes in the World Distribution between 1950 and 1977", *Economic Journal* 93 (37): 331-50
- Bourguignon, F. and C. Morrisson (2002), "Inequality among World Citizens", *American Economic Review* 92, 4: 727-44.
- Braithwaite, S.N. (1968), "Real Income Levels in Latin America", *Review of Income and Wealth* 14: 113-82.
- Dasgupta, P. (1990), "Well-Being and the Extent of its Realization in Poor Countries", *Economic Journal* 100, 400: 1-32.
- Dasgupta, P. (1993), *An Inquiry into Well-Being and Destitution*, Oxford: Clarendon Press.
- Dowrick, S. and M. Akmal (2005), "Contradictory Trends in Global Income Inequality: A Tale of Two Biases", *Review of Income and Wealth* 51,2: 201-30.
- Easterlin, R. (1999), "How Beneficent is the Market? A Look at the Modern History of Mortality", *European Review of Economic History* 3, 3: 257-94.
- Easterly, W. (1999), "Life during Growth", *Journal of Economic Growth* 4, 3: 239-75.
- Easterly, W. (2001), "The Lost Decades. Developing Countries' Stagnation in Spite of Policy Reform", *Journal of Economic Growth* 6, 2: 135-57.
- Economic Commission for Latin America [ECLA] (1968), "The Measurement of Latin American Real Income in U.S. Dollars", *Economic Bulletin for Latin America* XII, 2: 107-41.
- Ehrlich, E. (1969), "Dynamic International Comparisons of National Incomes Expressed in Terms of Physical Indicators", *Osteuropa Wirtschaft* 14, 1.
- Eichengreen, B. (1992), *Golden Fetters: The Gold Standard and the Great Depression 1919-1939*, Oxford: Oxford University Press.
- Engerman, S.L. (1997), "The Standard of Living Debate in International Perspective: Measures and Indicators", in R.H. Steckel and R. Floud (eds.), *Health and Welfare during Industrialization*, Chicago: University of Chicago Press, pp. 17-45.
- Esteban, J. and D. Ray (1994), "On the Measurement of Polarization", *Econometrica* 62: 819-52.
- Esteban, J., J.C. Gradín, and D. Ray (1999), "Extensions of a Measure of Polarization, with an Application to the Income Distribution of Five OECD Countries" Luxembourg Income Studies Working Papers.
- Federico, G. and G. Toniolo (1991), "Italy", in R. Sylla and G. Toniolo (eds.), *Patterns of European Industrialization. The Nineteenth Century*, London: Routledge, pp. 197-217.
- Firebaugh, G. (1999), "Empirics of World Income Inequality", *American Journal of Sociology* 104 (6): 1597-1630.
- Goesling, B. and G. Firebaugh (2004), "The Trend in International Health Inequality", *Population and Development Review* 30, 1: 131-46.
- Gottschalk, P. and T.M. Smelding (2000), "Empirical Evidence on Income Inequality in Industrial Countries", in A.B. Atkinson and F. Bourguignon (eds.), *Handbook of Income Distribution*, 2 vols., Amsterdam: Elsevier, I, pp. 261-307.
- Hicks, N. and P. Streeten (1979), "Indicators of Development: The Search for a Basic Needs Yardstick", *World Development* 7: 567-80.

- Hobijn, B. and P.H. Franses (2001), “Are Living Standards Converging?”, *Structural Change and Economic Dynamics* 12: 171-200.
- Kakwani, N. (1993), “Performance in Living Standards. An International Comparison”, *Journal of Development Economics* 41: 307-36.
- Korzeniewicz, R.P. and T.P. Moran (1997), “World Economic Trends in the Distribution of Income, 1965-1992”, *American Journal of Sociology* 102 (4): 1000-39
- Kuznets, S. (1966), *Modern Economic Growth: Rate, Structure, and Spread*, New Haven: Yale University Press.
- Lai, D. (2000), “Temporal Analysis of Human Development Indicators: Principal Component Approach”, *Social Indicators Research* 51, 3: 331-66.
- Lains, P. (1989), “How Far Can We Go? Measuring and Explaining Portuguese Economic Growth” (mimeo).
- Larson, D. A. and W.T. Wilford, 1979, “The Physical Quality of Life Index: A Useful Social Indicator?”, *World Development*, 581-84.
- Lewis, W.A. (1955), *The Theory of Economic Growth*, London: George Allen and Unwin.
- Li, H., L. Squire and H. Zou (1998), “Explaining International and Intertemporal Variations in Income Inequality”, *Economic Journal* 108: 26-43.
- Lindert, P.H. (2000), “Three Centuries of Inequality in Britain and America,” in A.B. Atkinson and F. Bourguignon (eds.), *Handbook of Income Distribution*, Amsterdam: Elsevier.
- Lindert, P.H. and J. G. Williamson (2003), “Does Globalization Make the World More Unequal?”, in M. D. Bordo, A. M. Taylor and J. G. Williamson (eds.), *Globalization in Historical Perspective*, Chicago: University of Chicago Press, chap. 5.
- Maddison (1995), *Monitoring the World Economy, 1820-1992*, Paris: OECD Development Centre.
- Maddison, A. (2003), *The World Economy: Historical Statistics*, Paris: OECD Development Centre.
- Milanovic, B. (2005), *Worlds Apart. Measuring International and Global Inequality*. Princeton: Princeton University Press.
- Milanovic, B. (2006), “Global Income Inequality: What It Is and Why It Matters”, *World Economics* 7, 1, .
- Morris, M.D. (1979), *Measuring the Condition of the World’s Poor: The Physical Quality of Life Index*, New York: Pergamon.
- Morrisson, C. (2000), “Historical Perspectives on Income Distribution: The Case of Europe,” in A.B. Atkinson and F. Bourguignon (eds.), *Handbook of Income Distribution*, Amsterdam: Elsevier.
- Morrisson, C. and F. Murtin (2005), “The World Distribution of Human Capital, Life Expectancy and Income: A Multi-dimensional Approach” (mimeo).
- Neumayer, E. (2003), “Beyond Income: Convergence in Living Standards, Big Time”, *Structural Change and Economic Dynamics* 14: 275-96
- Nuxoll, D.A. (1994), “Differences in Relative Prices and International Differences in Growth Rates”, *American Economic Review* 84, 1423-36.
- Ogwan, T. (1994), “The Choice of Principal Components for Computing the Human Development Index”, *World Development* 19: 1461-8.
- Ogwan, T. and A. Abdou (2003), “The Choice of Principal Variables for Computing Some Measures of Human Well-Being”, *Social Indicators Research* 64: 139-52.
- Prados de la Escosura, L. (2000), “International Comparisons of Real Product, 1820-1990: An Alternative Data Set”, *Explorations in Economic History* 37, 1: 1-41.
- Prados de la Escosura, L. (2007a), “Improving the Human Development Index: A New Data Set for the Western World, 1850-2000” (mimeo).
- Prados de la Escosura, L. (2007b), “Inequality and Poverty in Latin America: a Long-Run Exploration”, in T.J. Hatton, K.H. O’Rourke, and A.M. Taylor (eds.) *New Comparative Economic History*. Cambridge, M.A.: M.I.T. Press, pp. 291-315.

- Prados de la Escosura, L. (2007c), "International Inequality and Polarization in Living Standards, 1870-2000: Evidence from the Western World". Universidad Carlos III de Madrid Working Papers in Economic History WP 07-05.
- Pritchett, L. and L.H. Summers (1996), "Wealthier is Healthier", *Journal of Human Resources* 31, 4: 841-68.
- Ram, R. (1979), "International income inequality: 1970 and 1978", *Economic Letters* 4: 187-90.
- Ram, R. (1980), "Physical quality of life index and inter-country inequality", *Economic Letters*, 195-99.
- Ram, R. (1992), "International Inequalities in Human Development and Real Income", *Economic Letters* 38: 351-4.
- Riley, J.C. (2005a), "Estimates of Regional and Global Life Expectancy, 1800-2001", *Population and Development Review* 31, 3: 537-43.
- Riley, J.C. (2005b), "The Timing and Pace of Health Transitions Around the World", *Population and Development Review* 31, 4: 741-64.
- Sagar, A. D. and A. Najam (1998), "The Human Development Index: A Critical Review", *Ecological Economics* 25: 249-64.
- Sala-i-Martin, X. (2006), "The World Distribution of Income: Falling Poverty ..and Convergence, Period", *Quarterly Journal of Economics* 121, 2: 351-97.
- Salazar-Carrillo, J. (1983), "Real Product and Price Comparisons for Latin America and Other World Countries", *Economic Development and Cultural Change* 31, 4: 757-73.
- Salazar-Carrillo, J. and I. Tirado de Alonso (1988), "Real Product and Price Comparisons between Latin America and the Rest of the World", *Review of Income and Wealth* 34, 1: 27-43.
- Salazar-Carrillo, J. and D.S. Prasada Rao (1988), "Real Product and Price Comparisons among Latin American Countries", in J. Salazar-Carrillo and D.S. Prasada Rao (eds.), *World Comparison of Incomes, Prices and Product*, Amsterdam: North Holland, pp. 195-205.
- Schultz, T.P. (1998), "Inequality in the distribution of personal income in the world: How it is changing and why", *Journal of Population Economics* 11: 307-44.
- Seshanna, S. and S. Decornez (2003), "Income Polarization and Inequality Across Countries: An Empirical Study", *Journal of Policy Modeling* 25: 335-58.
- Srinivassan, T.N. (1994), "Human Development: A New Paradigm or Reinvention of the Wheel?", *American Economic Review, Papers and Proceedings* 84, 2: 238-43.
- Streeten et al. (1981), *First Things First: Meeting Basic Human Needs in Developing Countries*, New York: Oxford University Press.
- Taylor, A.M. and J.G. Williamson (1994), "Capital Flows to the New World as an Intergenerational Transfer", *Journal of Political Economy* 102, 2: 348-71.**
- Theil, H. (1979), "World Income Inequality and its Components", *Economics Letters* 2, 99-102.
- Theil, H. (1989), "The Development of International Inequality: 1960-1985", *Journal of Econometrics* 42 (1): 145-55
- United Nations Development Program [UNDP] (1990), *Human Development Report*, New York: Oxford University Press.
- United Nations Development Program [UNDP] (2001), *Human Development Report*, New York: Oxford University Press.
- Ward, M. and J. Devereux (2003), "New Evidence on Catch-Up and Convergence after 1870". Department of Economics, Loyola College in Maryland Baltimore (mimeo).
- Williamson, J.G. (1997), "Globalization and Inequality, Past and Present", *World Bank Economic Observer* 12, 2: 117-35.
- Wolfson, M.C. (1994), "When Inequalities Diverge", *American Economic Review. Papers and Proceedings* 84, 2: 353-8.

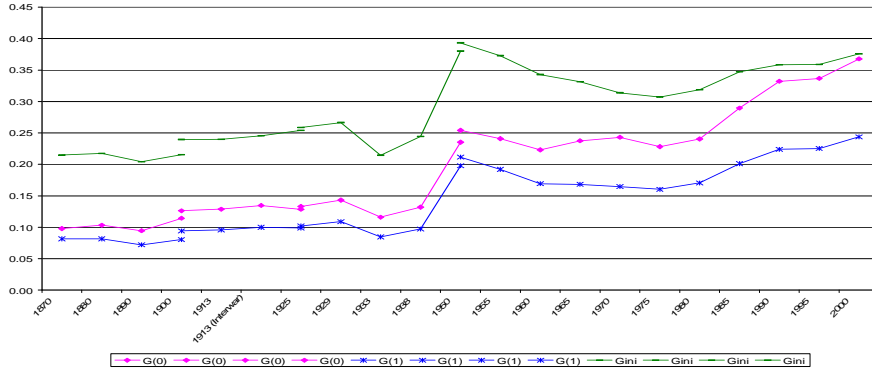


Figure 1. International Per Capita GDP Inequality in the Western World, 1870-2000

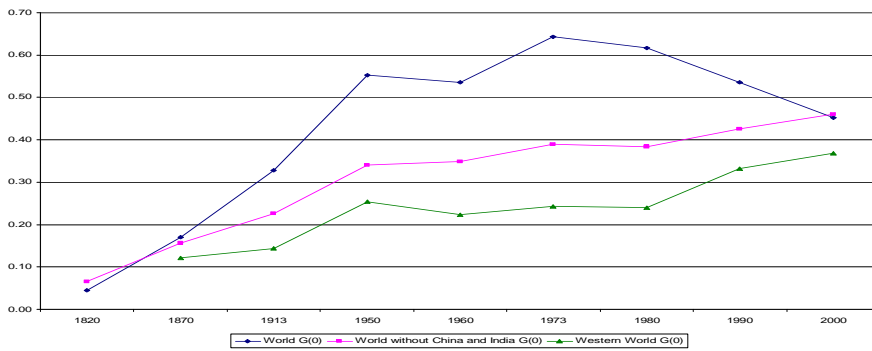


Figure 2. International Per Capita GDP Inequality in the Western World and in Maddison's 'World' with and without China and India, 1820-2000: G(0)

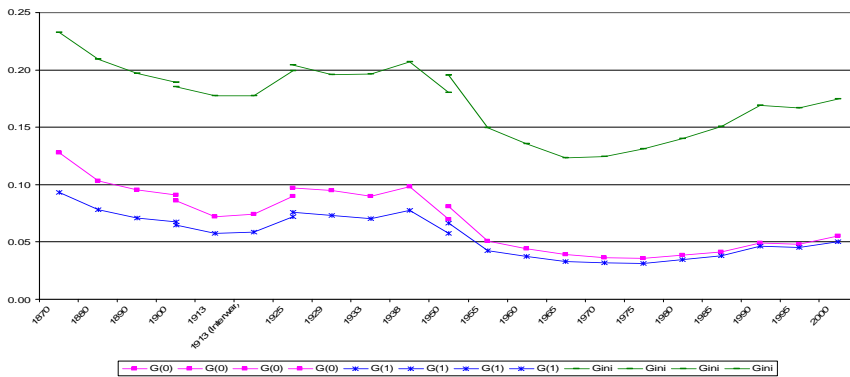


Figure 3. International Life Expectancy Inequality in the Western World, 1870-2000

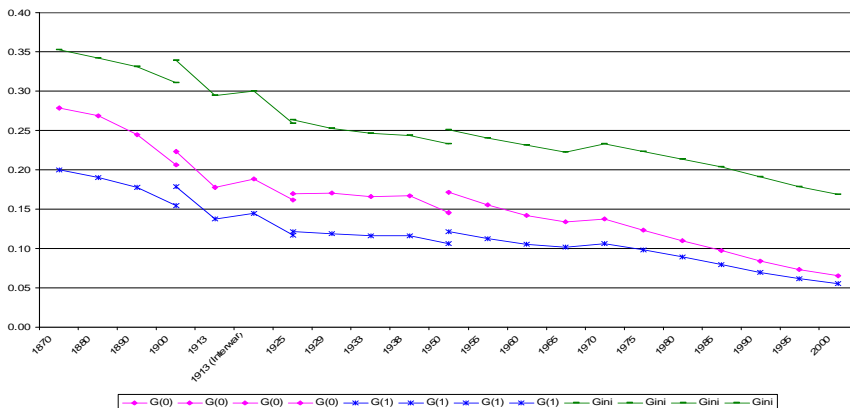


Figure 4. International Literacy Inequality in the Western World, 1870-2000

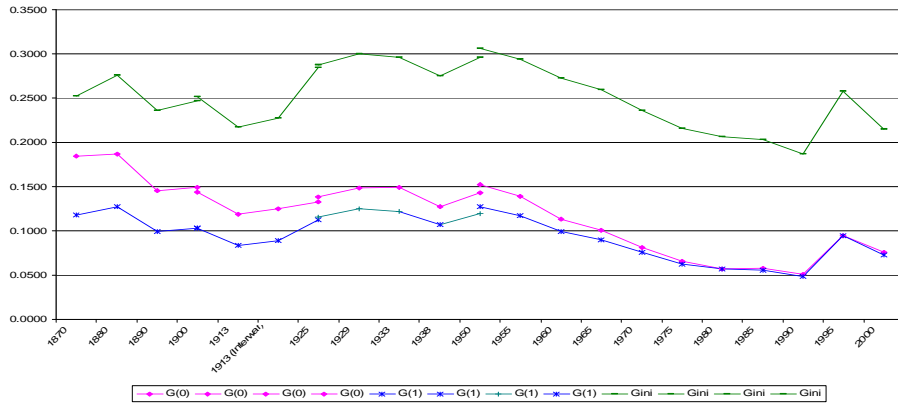


Figure 5. International Enrolment Inequality in the Western World, 1870-2000

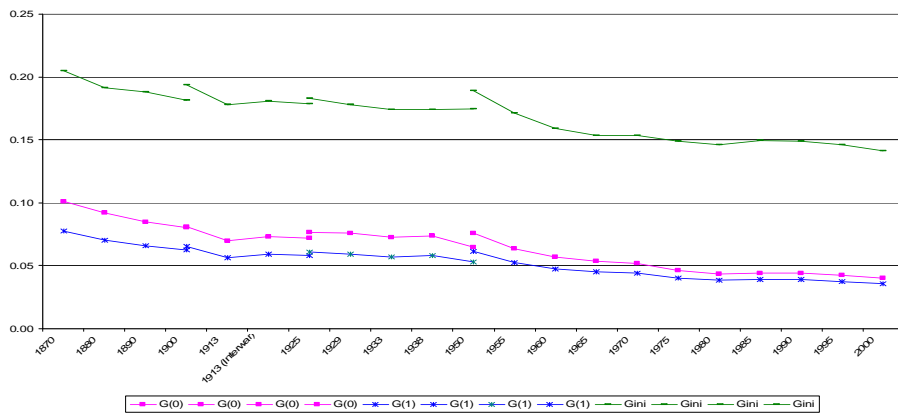


Figure 6. International Human Development Inequality in the Western World, 1870-2000

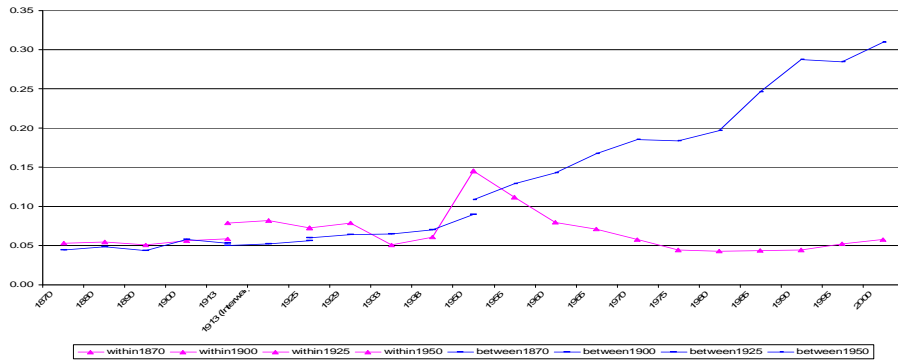


Figure 7. Decomposing Per Capita GDP Inequality: Within- and Between-regions Inequality: MLD

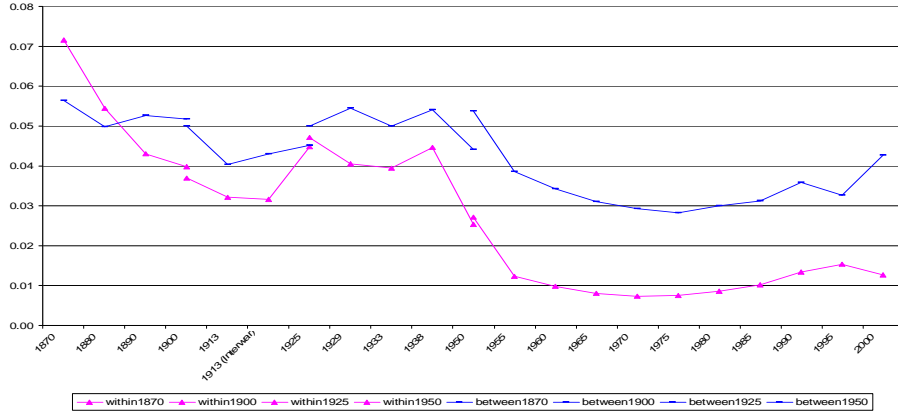


Figure 8. Decomposing Life Expectancy Inequality: Within- and Between-regions Inequality: MLD



Figure 9. Decomposing Literacy Inequality: Within-regions and Between-regions Inequality: MLD

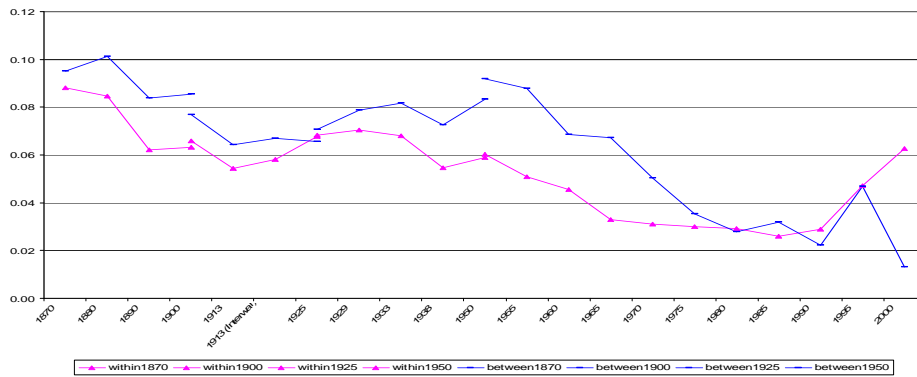


Figure 10. Decomposing Enrolment Inequality: Within-regions and Between-regions Inequality: MLD



Figure 11. Decomposing Human Development Inequality: Within- and Between-regions Inequality: MLD

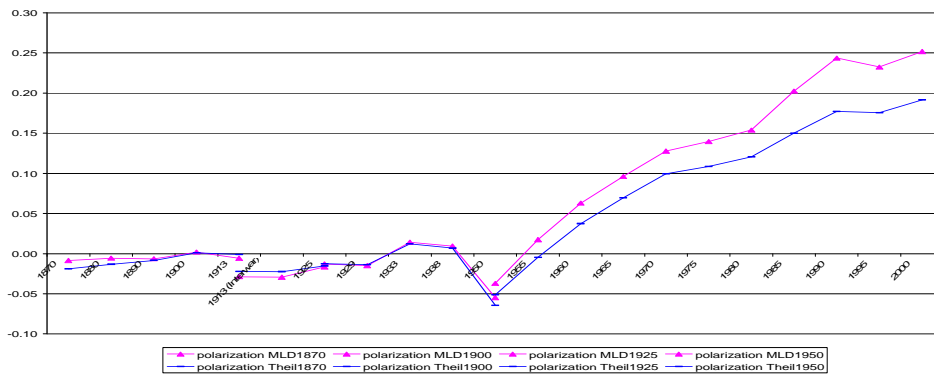


Figure 12. Per Capita GDP Polarization in the Western World, 1870-2000: MLD and Theil Indices

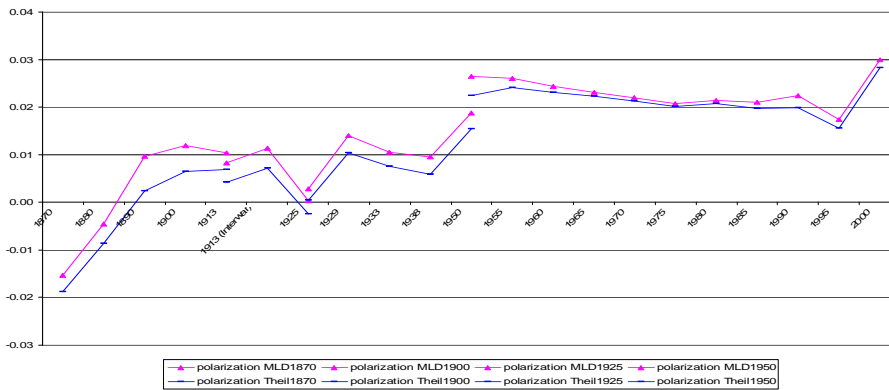


Figure 13. Life Expectancy Polarization in the Western World, 1870-2000: MLD and Theil Indices

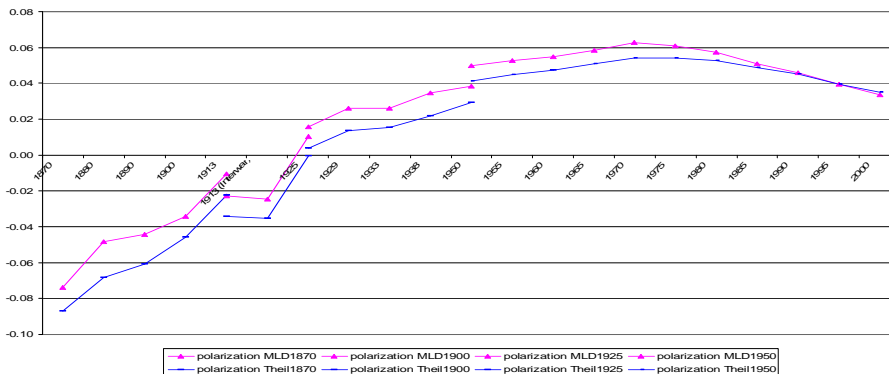


Figure 14. Literacy Polarization in the Western World, 1870-2000: MLD and Theil Indices



Figure 15. Enrolment Polarization in the Western World, 1870-2000: MLD and Theil Indices



Figure 16. Human Development Polarization in the Western World, 1870-2000: MLD and Theil Indices