Income inequality since 1820

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Chapter 11

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This chapter focuses on income inequality as measured by gross (i.e. pre-tax) household income across individuals within a country. It builds upon a number of large-scale initiatives to chart income inequality trends over time, supplementing them with data on wages and heights for the earlier period. Income inequality trends follow a U-shape in most Western European countries and the Western Offshoots. It declined between the end of the 19th century until about 1970, followed by a rise. In Eastern Europe, communism resulted in strong declines in income inequality, followed by a sharp increase after its disintegration in the 1980s. In other parts of the world (China in particular) income inequality is on the rise recently. The chapter also provides evidence on the global income distribution, i.e. assuming all people belong to the same community. This distribution was unimodal in the 19th century, became increasingly bi-modal between 1910 and 1970 and suddenly reverted back into a unimodal distribution between 1980 and 2000.

Introduction

The importance of income inequality at the local, regional and global scale hardly needs to be stressed: the enormous increase of income inequality on a global scale is one of the most significant – and worrying – features of the development of the world economy in the past 200 years (van Zanden, et al., 2013). Several international organisations and commentators have drawn attention to the increase in income inequality in a number of developed and emerging countries in the run-up to the recent global financial crisis. For these reasons, the subject has become one of the most discussed topics in the social sciences; in particular, the debate on the measurement and interpretation of recent trends in global inequality – is it still increasing? and why or why not? – has attracted considerable attention (Anand and Segal, 2008; Bourguignon and Morrisson, 2002; Deininger and Squire, 1996; Jones, 1997; Milanovic, 2002 and 2007).

Levels and trends in income inequality are very relevant for people's and societies' well-being. In a sense, the information that income inequality provides is additional and complementary to that referring to average personal income. Since an increase in GDP per capita, by itself, gives us information only about average income gains, income inequality provides more detailed insights about how much the benefits of economic growth in a society or region are spread. It tells us who is getting the benefits of economic growth, and in what proportions. Besides this connection with well-being, an extensive literature investigates the impact of income inequality on a range of social outcomes, such as trust, crime, social mobility, health and educational achievement (Wilkinson and Pickett, 2007).

In what follows, we address and document the long-run trends in income inequality. First we present a new long-run dataset on income inequality (van Zanden et al., 2013) that has the benefit of internal consistency, but also makes it possible to describe, for the first time, historical developments in income inequality on a global scale spanning about two hundred years. Second, we use this dataset to describe historical developments in income inequality both within and between countries.

Description of the concepts used

The analysis presented in this chapter refers to the distribution of gross (i.e. pre-tax) household income across individuals, with inequality in this distribution described by the Gini coefficient. Both choices are not uncontroversial.

First, because alternative measures of household economic resources (e.g. post-tax income, consumption, including or excluding a range of more detailed components such as imputed rents or capital gains) and alternative units of analysis (e.g. households, or consumption units based on different "equivalence scales") are typically used to examine income inequality. We selected gross household income as the measure in focus due to the availability of historical data: the further back we go in time, the more data is available in gross (pre-tax) household income terms, rather than in other forms. As using different definitions can lead to different conclusions about trends in income inequality, the data

we assembled in this dataset are either based on gross household income or have been converted to a gross household income basis using various adjustments (see below for details).

Second, because other inequality measures also exist, such as the Theil index, which do not always display similar levels or trends when applied to the same distribution. However, even though many other measures have interesting properties (for example, the Theil coefficient is additive), the use of the Gini coefficient is widespread in the literature on income inequality. In addition, the Gini coefficient is used in the data sources that we heavily rely upon as a primal source of income inequality data. Hence, in this chapter we will focus on this measure.

As it is explicitly developed as a measure of income inequality, the Gini coefficient has some particular properties that make it appealing. One is that it has a direct relationship with the so-called Lorenz curve, which is obtained by plotting the cumulative percentage of income held by the cumulative percentage of the reference population. The Gini is proportional to the area between the line indicating perfect equality and the Lorenz curve, and hence is increasing with the degree of inequality. So a Gini of 0 indicates perfect equality, while a Gini of 1 indicates perfect inequality.[1] Another definition of the Gini coefficient is in terms of income differences between every pair of individuals in a population (Sen, 1973, 1976). An important property of the Gini coefficient is that any income transfer from the rich to the poor leads to a decline in the measure (i.e. the Gini coefficient moves in the "right" direction). However, as mentioned above, the Gini coefficient also has some less desirable properties, one of which is that the same Gini can be derived from very different income distributions. For example, two very different situations, one where the middle and upper classes have a much higher income than the lower class, and a second where the upper class is extremely rich compared to the other two strata, could in principle lead to the same Gini coefficient. More generally, the Gini coefficient is most sensitive to the part of the income distribution around the median (Buhmann et al., 1988).

Gini coefficients can be calculated on the basis of different income and population concepts. For example, they can refer to households or individuals, and be based on either gross (i.e. pre-tax) or net income, or on either income or consumption, or they can refer to either urban centres or the whole country. More generally, estimates of the Gini coefficient obviously depend on the data produced by statistical offices, as they require consistency over time in the concepts used and the underlying data sources (e.g. household surveys or administrative tax records), in measurement conventions, and other methodological choices. These difficulties are obviously compounded when trying to obtain historical estimates reaching back to 1820.

Beyond providing an historical perspective on income inequality in individual countries, this chapter has an additional goal: to describe changes in the global distribution of household income, i.e. the distribution that one would observe when treating all people in the world as if they were living in a single country. This implies additional challenges relative to that of reconstructing historical series of within-country income inequality, as it requires combining information from both micro-sources (e.g. tax records or surveys) and macro-sources (e.g. national accounts). This is a challenge, and requires additional assumptions, e.g. that levels and trends in the reference income variable from micro- and macro-sources are the same, an assumption that in reality may not always hold true. In the database used in this chapter, the assumption made is that cross-country differences in average household income can be proxied by differences in GDP per capita.

Historical sources

There is no single repository of Gini coefficients that contains estimates for every country and for every year. Hence, we relied on a variety of different sources to construct our dataset. For the post-1960 period most of our data came from the World Income Inequality Database (UNU-WIDER, 2008), a large compilation of country estimates coming from a variety of individual sources. For earlier periods, data were taken from a range of historical sources[2] and from studies on the top-income share that have recently become more widely available (Atkinson, Piketty and Saez, 2011). A good overview of most of the historical work on income inequality can be found in Milanovic, Lindert and Williamson (2007), and at the Global Income and Prices website at UC Davis.[3] Additional recent work has been done, for example, by Bertola et al. (2009) for parts of South America, Rossi et al. (2001) for Italy, Bergson (1984) for the Soviet Union, and Soltow and van Zanden (1998a) for the Netherlands.

As stressed by François and Rojas-Romagosa (2005), the Gini values that are available from the World Income Database refer to various concepts and data sources: both levels and the trends pertaining to particular series can be very different. They distinguish three main concepts, due to the differences in trends: gross household income, net household income and expenditure data.

In the construction of the dataset used in this chapter, we followed the methodology suggested by François and Rojas-Romagosa (2005), and converted all available estimates of Gini coefficients into a gross household income basis. To that end, we tested (across a large sample of countries) the hypothesis that trends in Gini coefficients for gross and net household income were similar to those for household income and consumption. These tests suggest that this hypothesis holds true in all countries, with the exception of a relatively short period after the Second World War. Beyond this, average consumption may evolve differently from household income through borrowing and lending, and average expenditures are not a linear function of income since wealthy people tend to save more. Changes in all these parameters probably account for diverging trends in various types of Ginis observed in the after-war period. In that sense, the post-Second World War period is special, since many countries expanded their system of income taxation and made it more progressive. After 1980, trends between gross and net household income and expenditure are again quite similar, although this may not hold in specific countries and sub-periods.[4] Based on this empirical observation, we converted post-Second World War estimates of the Gini coefficient into a gross household income basis, by using regression techniques (the details are described in Van Zanden et al., 2013).

While using the World Income Database as a reference source, a range of other sources, including SEDLAC[5] (2013) and Milanovic (2012), have been used to extend this information back in time. The first type of information used is related to top-income share estimates, and in particular to the historical development of the share of the richest 1% or 5% in total income, which was pioneered by the work of Piketty and Atkinson.[6] These data, which basically refer to a single point on the Lorenz curve, can be converted into Gini coefficients using the assumption of log-normality in the underlying (and non-observed) income distribution. In other words, by assuming that the income distribution is log-normal, we can compute the Gini coefficient of a log-normal distribution that has a given income share for people at the very top. Like most of the assumptions made in historical analysis, the assumption of log-normality is not a perfect one, and there is room for error,

particularly at the extremes of the income distribution. An alternative assumption that has been previously proposed in the literature is that household income follows a Pareto distribution. However, Soltow (1998) has demonstrated that when the entire income distribution is considered, the hypothesis of a log-normal distribution is preferable.

For the period before the Second World War, there are only a few direct estimates of income inequality, and these are available only for a small number of countries.[7] For other countries in this period, we relied on a method inspired by the "extraction rate" concept (Milanovic et al., 2007) to derive additional estimates. According to this method, changes in the Gini coefficient are linked to the development of the Williamson index, i.e. the ratio between the average family income (measured by GDP per capita) and the real wage of unskilled labour. When this ratio goes up, income inequality may also be expected to rise, and vice versa. The link has been tested empirically and used to extrapolate and interpolate Gini coefficients (details are supplied in van Zanden et al., 2013). The sources used for the real wage of unskilled labour were Williamson (1999, 2000a, 2000b), Mitchell (1998a, 1998b, 1998c), Allen (2001), Mironov (2004) and Allen et al. (2010), while estimates of the average family income were based on estimates of GDP per capita from Maddison (2003).[8]

Another source of information on income inequality in the 19th century comes from a method based on evidence of the footprint of income inequality on the human body. Baten (2000, 1999), Pradhan et al. (2003), Moradi and Baten (2005), Sunder (2003) and Guntupalli and Baten (2006) have argued that the variance in height across individuals within a country (as measured by the coefficient of variation) can be used as a proxy for income distribution. As the studies included here use large samples, individual genetic differences average out. As higher-income people have access to better nutrition and shelter and suffer less from disease, they also tend to be taller, while the opposite applies to the lower-income strata. This fact can be used to link the variation in height of a certain cohort and the income distribution during the decade of their birth.[9] Historical data on height are available from hundreds of previously published articles, as summarised in Chapter 7 of this report, and provided the basis for income inequality estimates for around one-third of our sample. Naturally, we excluded studies that referred to very small samples of height measurements, or to a special group within a given country. We were also cautious to avoid the distortion of our estimates by factors such as mixed-aged samples, military truncation, gender, prison or other sample selectivity issues.[10] Finally, for cases where these methodological approaches to the estimation of income inequality could not be applied, some of the remaining missing data on income inequality were estimated using multiple imputation methods. Besides the direct and indirect sources for income inequality information, estimates of average household income per capita are also necessary for our analysis of global inequality. As mentioned above, the proxy that we used for this was GDP per capita expressed in 1990 international dollars (the same series that is used in Chapter 3).

Table 11.1 gives an overview of the various sources used in this chapter by type of method used. Out of the 869 estimates used here, the WIID database supplied 43% of the data-points, various historical studies provided another 8%, changes in the Williamson index (the GDP/wage ratio) made it possible to estimate 6% of all estimates, and height data helped to make 33% of the country estimates. When both height data and GDP/wage ratio were available, Gini coefficients were estimated as the unweighted average of the two (8%).

Table 11.1. **Estimates of income inequality by source and year, 1820-2000**

Number of countries

Year	All	WIID	'New' ginis	GDP/wage ratio	Heights	Both 4&5 (50/50)
1820	39	0	6	6	18	6
1850	40	0	1	8	20	8
1870	54	0	11	5	27	11
1890	60	0	8	5	34	13
1910	71	1	10	7	43	10
1929	74	2	15	9	39	9
1950	81	13	10	8	41	9
1960	88	54	4	2	27	1
1970	94	60	2	2	29	1
1980	83	71	0	0	12	0
1990	99	98	1	0	0	0
2000	86	71	1	0	0	0
Total	869	370	69	52	290	68

Note: For an assessment of data quality, see Table 11.2.
Source: Clio-Infra, *www.clio-infra.eu*.

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Data quality

Table 11.2 presents our assessment of the quality of the data used. Most data concerning income inequality in the 19th century are based on indirect sources and subject to large margins of error, and hence are classified as "estimates". Only recently does the quality improve a lot, reaching level one for many world regions in the most recent period. Income inequality at the regional level also requires the aggregation of income levels of individual countries, which greatly increases the problems involved.

Table 11.2. **Quality of data on income inequality by region and benchmark year, 1820-2000**

	Western Europe (WE)	Eastern Europe (EE)	Western Offshoots (WO)	Latin America and Caribbean (LA)	Sub-Saharan Africa (SSA)	Middle East and North Africa (MENA)	East Asia (EA)	South and South-East Asia (SSEA)
1820	4	4	3	4	4	..	4	4
1870	4	4	3	4	4	4	4	4
1910	3	3	3	3	4	3	3	3
1950	2/3	3	2/3	3	3	3	3	3
1970	1	2	1	2	2	2	2	2
2000	1	1	1	1	1	1	1	1

Note: 1. High quality; 2. Moderate quality; 3. Low quality; and 4. Estimates. See the section on «Data Quality» in Chapter 1 for a description of the quality criteria.
Source: Clio-Infra, *www.clio-infra.eu*.

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Providing a historical perspective on income inequality at the global level is an even more demanding task. Although the United Nations (UNU-WIDER) now provides extensive data on within-country income inequality, they do not cover all countries for all years,

and they are not necessarily from comparable sources (Milanovic, 2006). This data source provides inequality data gathered from various national sources and methodologies that vary across countries, and across periods for a given country.[11] This implies that both cross-country and inter-temporal comparability are an issue. Alternative sources, such as the estimates compiled by the OECD Income Distribution Database, are based on consistent definitions (e.g. in terms of the components included in the basic income concept) and treatments (e.g. in terms of treatment of negative income, or choice of equivalent scales), and are adjusted for breaks in statistical methodology. However, they are not used in this chapter, first, because the estimates are limited to OECD countries and, second, because the Gini coefficients available from the OECD refer to disposable income (i.e. net of taxes) and market income (i.e. net of taxes and public transfers), rather than to the gross income concept used in this chapter. As a result, the estimates shown here for individual countries since the 1970s and 1980s may differ significantly from those reported by the OECD in its own reports on the subject (e.g. Japan). The various methods we used to provide estimates for the missing values of our income inequality series, although quite elaborate, are also imperfect. A more straightforward approach to constructing a similar long-run dataset on income inequality is found in Bourguignon and Morrisson (2002). One feature of the methodology they applied for estimating income inequality values before 1950 was the assumption that within-country income inequality remained stable over time. Also, for large parts of the world, estimates from the post-1914 or post-1945 period were used to extrapolate the country-data available for the various time periods back to the 19th century. Despite these differences in methodology, the findings reported by Bourguignon and Morrisson are remarkably similar to those shown here.

Main highlights of trends in income inequality

In this section we highlight two main sets of results: the development of within-country income inequality and the evolution of global income inequality.

Within-country trends in inequality

We begin by describing the long-run trends in income inequality in individual countries. A selection of the countries with data available for the long-run period from 1820 until 2000 is shown in Table 11.3. Values of the Gini coefficient on income inequality in 1820 ranged from the modest values of 33 for India, 35 for Poland and 38 for Spain, all the way up to 59 for the United Kingdom and France, 58 for Egypt and Turkey, and 57 for the United States. China (45), Canada (45), Germany (51), Japan (51) and Brazil (47) were among the countries in the middle ground. By 1850, all the countries shown in Table 11.3 experienced a decline in income inequality, followed by a renewed increase in the period up to 1870. However, the ups and downs of the 19th century are probably less informative than the broad trends.

In the 20th century, the trends are more pronounced. In the period between the two world wars, income inequality in most countries in Western and Eastern Europe as well as in the Western Offshoot countries rose and then dropped again, considerably so after the Second World War. Egypt, China, South Africa, Brazil, Thailand and Mexico also follow this pattern closely. A notable departure from the pattern is Sweden, which experienced a decline in income inequality from 1890 until 1980. Among the Eastern European countries, Poland also defied this trend by recording a rather slowly declining level of inequality throughout the late 19th century and first half of the 20th century. India also joined the group of outliers by maintaining a very low level of slightly increasing income inequality until around the Second World War. Finally, Kenya followed the trend in the first half of the

Table 11.3. **Income inequality in selected countries, 1820-2000**

Gini coefficient

	Western Europe (WE)							Eastern Europe (EE)		Western Offshoots (WO)			Latin America and Caribbean (LA)			Middle East and North Africa (MENA)		Sub-Saharan Africa (SSA)			East Asia (EA)		South and South-East Asia (SSEA)		
	GBR	NLD	FRA	DEU	ITA	ESP	SWE	POL	RUS	AUS	CAN	USA	MEX	BRA	ARG	EGY	TUR	KEN	NGA	ZAF	CHN	JPN	IND	IDN	THA
1820	[59]	[56]	[59]	[51]	[54]	[38]	[55]	[35]	[58]	..	[45]	[57]	[40]	[47]	[47]	[58]	[58]	..	[55]	..	[45]	[53]	[33]	[52]	[47]
1830	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1840	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1850	[43]	[48]	[54]	[40]	[51]	[32]	[46]	[36]	[54]	[41]	[27]	[44]	[32]	[37]	[34]	[63]	[37]	..	..	..	[33]	[46]	[39]	[42]	[42]
1860	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1870	[49]	[57]	[58]	[48]	[51]	[34]	[52]	[38]	[50]	[48]	[44]	[51]	[51]	[39]	[52]	[45]	[56]	[46]	..	..	[41]	[46]	[40]	[39]	[36]
1880	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1890	[37]	[42]	[48]	[39]	[46]	[31]	[59]	[30]	[38]	[39]	[41]	[46]	[44]	[36]	[45]	[33]	[..]	[33]	[37]	[36]	[31]	[47]	[32]	[39]	[34]
1900	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1910	42	47	55	44	49	35	57	28	40	41	41	51	51	38	51	42	..	[49]	..	[45]	39	52	31	42	42
1920	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1930	43	42	62	46	51	36	51	26	43	36	42	54	55	60	45	46	54	[55]	..	[59]	44	52	31	50	47
1940	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1950	30	36	58	47	43	35	40	23	36	38	36	39	52	49	41	39	49	56	..	52	32	36	35	54	39
1960	29	43	52	39	44	28	40	26	28	35	35	38	53	55	42	43	55	68	51	69	31	38	37	40	43
1970	29	36	45	40	39	35	37	29	23	32	34	36	56	58	35	43	52	50	38	70	28	35	40	44	44
1980	34	30	35	38	39	41	29	30	25	39	34	37	51	57	42	50	50	57	35	67	30	37	31	40	46
1990	39	32	37	49	33	34	31	31	26	42	32	40	48	59	43	54	44	49	44	63	34	36	40	39	50
2000	40	32	37	51	37	33	35	35	40	..	41	44	47	61	47	54	46	51	51	55	44	33	47	50	47

Notes: For an assessment of data quality, see Table 11.2. RUS 1930-1970: refers to the Soviet Union.

Values in brackets [ ] indicate very tentative data.

Source: Clio-Infra, *www.clio-infra.eu*.

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20th century, by experiencing an increasing income inequality, with a more rapid increase in the second half of the 20th century.

In the 1950s, most countries in Latin America, Asia and Africa also experienced increased income inequality, but to varying degrees. China seems to be the sole exception to this pattern, with a small decrease in income inequality from an already low level. In Europe and the Western Offshoots, the situation is more diversified, as income inequality declined in most countries but increased in others. Income inequality declined in Canada and the United States, and even more so in France, Germany, the former USSR, Spain and Australia. Conversely, income inequality increased in the Netherlands, Italy, Poland and, to a lesser degree, Sweden. The United Kingdom stands out in this period with a rather stable level of income inequality. In the 1960s, most countries experienced rather stable income inequality, although this declined in France and Sweden and increased sharply in Kenya and South Africa.

France is notable for a continuous decline in income inequality in the period from the interwar years until 1980. South Africa, Brazil and Mexico kept a high level in the 1970s, but inequality dropped sharply in Mexico, from a coefficient of 59 in 1970 to 47 by 1980. The decline was smaller in the case of Brazil, but still substantial. In South Africa, the decline in income inequality was mostly recorded during the 1990s. Starting from the 1980s, most countries experienced a rise in their inequality levels, although, based on our series, Japan maintained low inequality levels from the 1950s onwards. In the group of countries with rising inequality in the period since the 1980s, one of the most striking increases was in China, whose Gini coefficient rose by about half between 1980 and 2000.

The country with the highest income inequality over the entire period is South Africa, with a peak of 70 in the 1970s. Among the other countries, only Kenya in 1960 came close to that level, with a Gini coefficient of 68. For a long period from the beginning of the 20th century up until the 1960s, Poland achieved the lowest income inequality, with values of around 25. In the period as a whole, Spain and Thailand had the most stable level of inequality, with values staying within a relatively small range. In contrast, the former Soviet Union experienced the largest changes in inequality, followed by South Africa and Sweden.

It is hard not to notice the sharp increase in income inequality experienced by the vast majority of countries from the 1980s. There are very few exceptions to this, with Japan being the most prominent one (i.e. a decline starting from a rather low level of income inequality). Another exception is South Africa, which started-off from a staggering Gini coefficient of 70 in 1970.

Looking beyond trends in individual countries and regions, we obtain a global perspective by considering income inequality as if the world were one country. This is shown in the second column of Table 11.4 (the World Gini). Although global income inequality rises throughout the period, the third column (within-country inequality) clearly shows the "egalitarian revolution" in the mid-20th century, which translated into significant declines in this measure. However, this trend reversed strongly in the last decade, as within-country inequality levels returned to the values recorded in 1820. Overall, the increase in global inequality experienced from 1820 to 2000 was largely caused by an increase in between-country inequality (fourth column) rather than within-country inequality (third column). The exceptions to this pattern are the years leading to 2000, when the increase in within-country inequality just offset the decrease in between-country income inequality. Throughout the period as a whole from 1820 to 2000, global interpersonal income inequality increased by 30% (column 2), while between-country

inequality increased from a very low level of 16 in 1820 to 56 by 1970. However, over the last 50 years, between-country inequality has remained broadly stable, dropping only in the last two decades of the 20th century, the second decline in the dataset since 1820.

Figure 11.1 presents the same information about the evolution of global inequality in a different way. Changes in the shape of this distribution in different periods reflect the combined effects of the increase in average income levels in individual countries, the

Table 11.4. **Gini coefficients of within-country and between-country inequality, 1820-2000**

Year	World Gini	Within country inequality	Between country inequality
1820	49	45	16
1850	46	38	23
1870	55	45	32
1890	52	36	38
1910	58	40	44
1929	63	44	49
1950	65	38	55
1960	64	38	54
1970	65	37	56
1980	65	36	56
1990	66	39	56
2000	66	45	54

Note: For an assessment of data quality, see Table 11.2.
Source: Clio-Infra, *www.clio-infra.eu.*
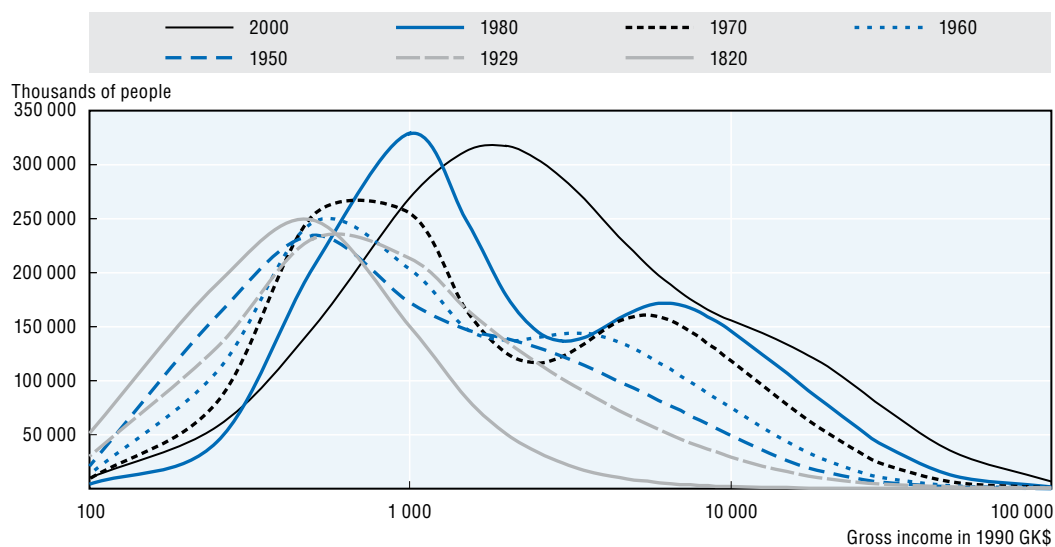
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Figure 11.1. **Global income distributions in selected years, 1820-2000**

Thousands of people at given level of income in US dollars at 1990 PPP

Note: For an assessment of data quality, see Table 11.2.
Source: Clio-Infra, *www.clio-infra.eu.*

StatLink ⟐ *http://dx.doi.org/10.1787/888933096198*

changes in its distribution within countries, and the growth of countries' population (all income levels are expressed in 1990 Geary–Khamis dollars). What is particularly striking is the change in the shape of the income distribution through time (for similar analyses of the more recent period, see Milanovic, 2002, and Sala-i-Martin, 2006). Between 1820 and 1950, the world income distribution is unimodal and basically log-normal, although, looking at the 1950 distribution, a thickening of its right "tail" can already be noticed. Over the next few decades, a different distribution starts to emerge, with two separate peaks; while this pattern is already distinguishable in 1950, it becomes more pronounced in the 1960s, 1970s and 1980s, when a big gap between the rich and poor "peaks" appears. However, in the 1990s the two peaks begin to get closer, and by 2000 the distribution has become unimodal again.

One might argue that the switch from a unimodal to a bimodal distribution in the 1960s was caused by the long wave of de-globalisation that set in after 1914, i.e. a decline in external trade caused by two world wars, a depression and a bi-polar world system. This, however, is a topic for further research – here we can observe only that this change from a unimodal world distribution towards a bimodal one was accompanied by the decline of within-country inequality: the "egalitarian revolution" of the 20th century seems to have been a phenomenon linked to the development of strong nation states, with more freedom to steer domestic policies in the de-globalised world of 1914-1960. However, almost simultaneously, these processes also gave rise to a bimodal income distribution globally. After 1980, globalisation contributed to higher income inequality within countries, while at the same time leading to a decline of income inequality between countries, again in a closely interrelated process.

When looking more closely at the different world regions (Table 11.5), Latin America and the Caribbean is one of the regions with the highest average within-country inequality for the 20th century, as many would expect. The levels of its Gini coefficients are matched by those recorded in Sub-Saharan Africa from 1950 onwards. Furthermore, there seems to be one major reversal: in the 19th century, both Asia and Latin America and the Caribbean showed the lowest levels of inequality; this completely changed by the end of the 20th century, which clearly suggests that economic growth has led to a widening of between-country inequality in both regions. The decline in income inequality is also very strong in Eastern Europe and the former Soviet Union during the period from 1950-1990. After the dissolution of the Soviet Union and the fall of the "iron curtain", this trend reversed and in the last two decades inequality has increased dramatically. Regional inequality in Western Europe and the Western Offshoots showed a major decrease in the period until 1980. Western Europe started off from a Gini of 55 in 1820 and went down to a more modest Gini of 37 in 1980. Since the 1980s, a small increase in the Gini coefficient has been observed. In the Western Offshoots, the pattern is very similar, but the rise in recent decades is much stronger. In Asia, the story is quite the opposite, at least in its beginning: starting from a low value in 1820 of 45 and 35, for East Asia and South and Southeast Asia respectively, both regions experienced a strong increase, which is most prominent in the 1960s for East Asia and in the 1980s for South and Southeast Asia. This rising trend also extended to the last three decades as well.

Table 11.5. **Regional averages of income inequality, 1820-2000**

Gini coefficients, unweighted averages

	Western Europe (WE)	Eastern Europe (EE)	Western Offshoots (WO)	Latin America and Caribbean (LA)	East Asia (EA)	South and South-East Asia (SSEA)	Middle East and North Africa (MENA)	Sub-Saharan Africa (SSA)	World
1820	54	51	56	45	45	35	..	53	45
1850	45	49	42	37	34	38	46	46	38
1870	50	48	51	48	41	42	52	50	45
1890	41	36	45	41	32	34	35	36	36
1910	46	39	50	45	40	35	40	42	40
1929	48	40	52	55	44	36	48	48	44
1950	42	35	39	47	33	39	43	43	38
1960	40	30	37	54	32	39	49	53	38
1970	38	26	36	53	29	40	47	49	37
1980	36	27	37	52	31	35	47	46	36
1990	38	27	39	52	34	41	46	47	39
2000	40	36	44	54	43	48	49	49	45

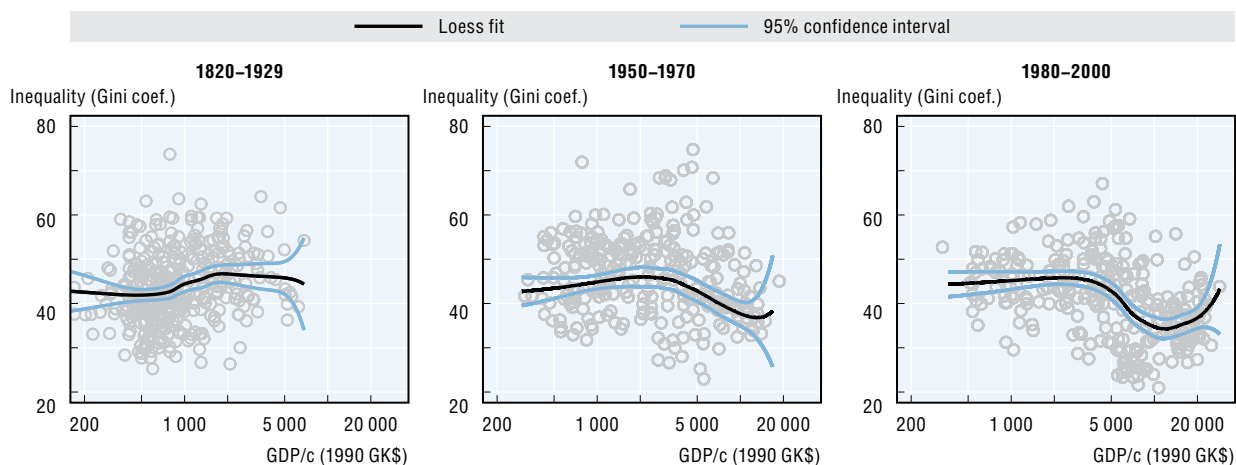*Note:* For an assessment of data quality, see Table 11.2.

Source: Clio-Infra, *www.clio-infra.eu.*

Correlation with GDP per capita

Figure 11.2 shows the correlation of GDP per capita with income inequality for all countries, with data being divided into three main periods and shown in a semi-logarithmic form. The first panel in the figure refers to the period before the 1930s, the next panel to the period from 1950 to 1970, and the last panel to the period from the 1980s onwards. In the first period, a negative correlation between GDP per capita and income inequality appears for countries with the lowest annual incomes; that correlation turns positive among countries with incomes from USD 800 up to about USD 2 000; from that point onward, the

Figure 11.2. **Correlation between Gini coefficients and GDP per capita in three time periods, 1820-2000**

Gini coefficients and US dollars at 1990 PPP (semi-logarithmic scale)
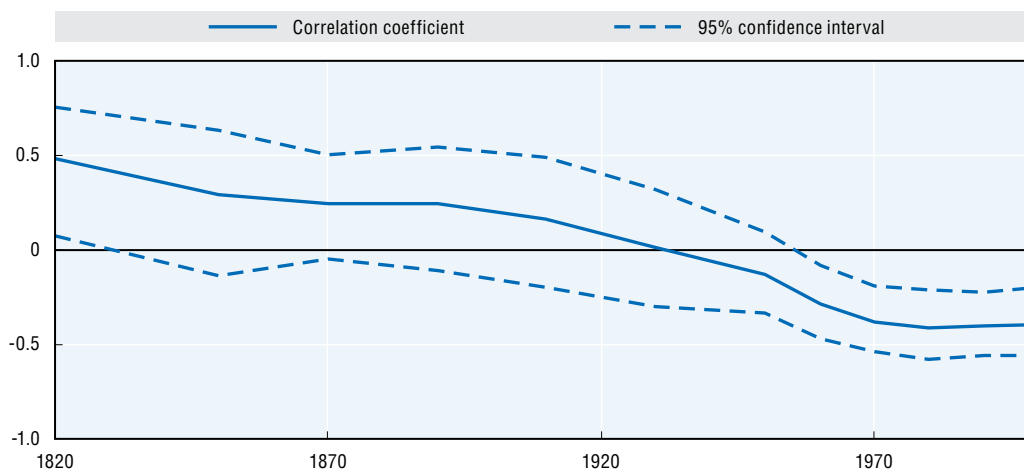

Note: For an assessment of data quality, see Table 11.2.

Source: Clio-Infra, *www.clio-infra.eu*

relation is negative again. For the two post-Second World War periods, the relationship is positive until about USD 3 000, then turns strongly negative, and finally the relationship turns positive again among the countries in the highest income layers. However in both these periods, there are very few observations in the top income region. It is important to notice that for a large income span ranging from a bit below USD 10 000 up until USD 20 000 in the 1980-2000 period, the relation dissolves completely.

This demonstrates the real complexity of the link between income inequality and GDP per capita. Figure 11.3 shows the correlation of GDP per capita and the Gini coefficient across all the available countries over time. From 1820 until 1910, income inequality appears generally positively correlated with GDP per capita: the wealthiest countries are also relatively more unequal. This relationship reverses at the turn of the century, and after the Second World War the relation turns mostly negative, remaining negative for the entire period until the most recent available data.

Figure 11.3. **Correlation between Gini coefficients and GDP per capita, 1820-2000**

Pearson correlation coefficient and upper/lower bounds of 95% confidence interval

Note: For an assessment of data quality, see Table 11.2.
Source: Clio-Infra, *www.clio-infra.eu.*

StatLink ⟨⟨ *http://dx.doi.org/10.1787/888933096236*

Priorities for future research

As the discussion of data limitations has suggested, more work on improving the comparability of the data sources and their findings would provide a more solid basis to draw conclusions about income inequality in a country or region or on a global scale. Historical estimates could be much improved by focusing more research on these issues. Whereas for most Western European countries and the Western Offshoots, we have relatively detailed studies that make use of the available historical sources, much more work can be done in this field for many Asian, African and Latin American countries (for examples of recent research see the website of the Global Price and Income History Group at UC Davis: *http://gpih.ucdavis.edu/*). The more recent work in this field also has its problems. Such work requires mobilising organisational resources on a world scale, orchestrated by international organisations. Inspiration for this type of work could be drawn from initiatives like the International Comparison Program that aims to collect comparative price data and to estimate purchasing power parity globally.

Beyond this effort, further inter-temporal investigation of the relationship between income inequality and social outcomes will help improve our understanding of the mechanisms through which higher levels of income inequality tend to make us all worse-off (Wilkinson and Pickett, 2007). With the increased availability of data, the links between income inequality and other social indicators could be further researched, and extended to other dimensions of well-being. To that end, historical global datasets would need to be constructed and utilised.

Notes

1. So a Gini coefficient equal to zero implies perfect absolute equality – i.e. all individuals have the same income – and a Gini equal to one implies absolute inequality – i.e. one individual has all the income while the rest have none. The actual impossibility of having a Gini equal to one fits well with the idea of an inequality-possibility frontier, which takes into account the subsistence income as a frontier for minimum income for survival, and of maximum possible inequality if one individual were to receive all the remaining income (Milanovic, Lindert and Williamson, 2007).

2. Studies are available for Australia (1921-2003, A.B. Atkinson and Leigh, 2007); Canada (1920-2000, Saez and Veall, 2005); France (1905-1998, Piketty, 2007); Germany (1925-1998, Dell, 2007); India (1922-1999, Banerjee and Piketty, 2005); Indonesia (1920-2004, Leigh and der Eng, 2010); Ireland (1922-2000, Nolan, 2007); Japan (1886-2002, Moriguchi and Saez, 2006); Korea (1998, Cheong, 2001); Netherlands (1914-1999, Salverda and Atkinson, 2007); New Zealand (1921-2002, Atkinson and Leigh, 2005); Spain (1981-2002, Alvaredo and Saez, 2009); Sweden (1903-2004, Roine and Waldenström, 2006); Switzerland (1933-1996, Dell, Piketty and Saez, 2007); the United Kingdom (1908-2000, Atkinson, 2007); and the United States (1913-2004, Piketty and Saez, 2003).

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4. For example, income inequality increased significantly in the United States since the 1980s, while consumption inequality was rather stable.

5. Although SEDLAC sources in *All The Ginis* dataset are treated as "gross", the data exclude wage taxes and include direct taxes. This may introduce some additional bias.

6. The data available on income shares of the top 1% and top 5% can be found for a collection of countries at "The World Top Incomes Database" created by Facundo Alvaredo, Tony Atkinson, Thomas Piketty and Emmanuel Saez. We make use of these data, but we do not present them separately.

7. For China from Brandt and Sands (1992);for Japan, several estimates by Soltow and Van Zanden (1998b); for Indonesia, Van Leeuwen and Földvári (2012).

8. Both series are also used in Chapters 3 and 4 of this report.

9. The decade of birth is used, because the strongest environmental influence on the body growth process takes place after birth during the first three to five years.

10. This measure could be affected by survivor bias, since measures of inequality in height refer only to survivors. However, this is consistent with other measures of inequality, as the income earners who are the base for Gini coefficients of household income only refer to people who survived to the age of earning an income. For further discussion, see Moradi and Baten (2005).

11. Beyond various between-country differences, there are a number of concerns embedded in the survey's methodology *per se*, particularly the under-representation or under-reporting of the poorer and richer groups of the population within a country.

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