

Chapter 1

Global well-being since 1820

by

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This chapter provides an introduction to, and summary of, the contents of this book. It outlines the aim of the project and provides an overview of the indicators covered, comparing them with those used in the OECD Better Life Initiative. The chapter also presents the criteria used throughout the report to assess the quality of the indicators used, and discusses practical issues concerning country and period coverage and calculation of regional trends. Finally, the chapter summarises the content of each chapter and their main highlights.

Introduction

Global inequality in well-being across countries has been one of the persistent features of the world economy since, at least, the Industrial Revolution that began some 200 years ago. Around 1820 average real incomes in the richest regions in the world economy were at most about five times the levels in the poorest regions. And, as shown in this volume, the spread in terms of other welfare measures was even smaller. Since then a “Great Divergence” has occurred, resulting in the massive levels of inequality that characterise the world today. This has been a key issue addressed by the economics profession ever since Adam Smith wrote *Wealth of Nations*. Divergence is not a state of nature, however. We live in historical times and, from today’s standpoint it would seem that, due to the rapid growth of real incomes in China, India and Africa the trend towards worldwide inequality reached a peak around the end of the 20th century (see Chapter 11). This suggests that we may be entering a new phase in the development of the world economy characterised by the catching-up of lagging regions instead of the forging ahead of advanced nations.

A great deal of what we know about long-term trends in welfare is based on the pioneering historical estimates of real gross domestic product (GDP) by Angus Maddison, summarised in his books *The World Economy – a Millennial Perspective* (2001) and *The World Economy – Historical Statistics* (2003). In his view, which is confirmed by more recent research, Western Europe was already much wealthier than the rest of the world at the start of the industrialisation process (i.e. around 1820). However, the ratio between the United Kingdom, the “productivity leader” at the time, and the poorest parts of the world was at most 5 to 1. The 19th century was a period of divergence, during which the rich became richer – Western Europe and its Offshoots (the United States, Canada, Australia) profited from the technological changes unleashed by the Industrial Revolution, whereas other parts of the world economy (China, India, Indonesia) saw their GDP per capita fall or stagnate at best, due in part to de-industrialisation and colonial exploitation. During the first half of the 20th century, it was mainly the United States that forged ahead, but the Atlantic income gap that emerged as a result narrowed again during the post-war boom between 1950 and 1973. Gradually, other parts of the world also began to participate in the process of modern growth, sometimes helped by decolonisation. In particular East Asia fared well after the 1960s, and became the most dynamic centre of the world economy after 1980 when China also joined the convergence club. But economic growth in Africa has been much more incidental, and this continent has continued to lag behind the rest of the world economy. In this volume, we try to find out whether these patterns based on GDP are confirmed when we broaden the scope of analysis and include a number of other indicators reflecting broader trends in well-being.

The measurement of welfare by levels of GDP has been criticised for quite a long time, and this debate has in recent years received new impetus from the Stiglitz, Sen and Fitoussi report (2009). There is today an increasing awareness that GDP figures provide only a partial perspective on the multi-dimensional nature of well-being – what matters to people’s

lives. Many old and new indicators of quality of life, such as life expectancy and level of schooling, have been suggested to supplement GDP estimates. Much progress has been made in deriving complementary summary measures, such as the Human Development Index (HDI) of the UNDP (e.g. UNDP, 2010), and in constructing scoreboards on headline indicators, such as the one used by the OECD in its Better Life Initiative (e.g. OECD, 2013). This volume contributes to this debate by taking a long-term perspective of trends in well-being and development, and by systematically looking into the often-changing relationship between GDP per capita and these other indices of well-being. This long-term perspective is taken from today's standpoint (i.e. based on those concerns that most of today's observers would regard as critical to a good life) and is informed by statistical indicators that, while not always satisfying all of the present-day requirements for good quality statistics, provide the best long-term comparative assessment of the issues at hand.

Aim of this study

The aim of this volume is to provide a truly long-run perspective on measures of well-being that complement GDP per capita. Notwithstanding a few exceptions, most of the existing compilations of historical data cover the period since the Second World War. This report provides a variety of additional time-series going back to 1820, covering a wide range of countries in all regions in the world. We take the work done by Maddison and his co-workers as the starting point, and in Chapter 2 present the latest findings about changes in real GDP in the world economy over the past 200 years. The concept of GDP and related concepts such as national income have been used and (therefore) criticised so much that we sometimes forget what a good idea it was – and still is – to measure GDP when we want to have a comparable indicator of economic output over time and across countries. GDP measures the quantity of goods and services produced (within the boundaries of the System of National Accounts) in a given country and year. It provides (subject to a number of conditions) a good proxy of the degree to which people in a certain society have command over goods and services, which is clearly a vital ingredient of their economic well-being. Economic historians consider the “sustained growth” of per capita output to be the most significant feature of the “modern” economy as it came into existence after the Industrial Revolution, as this phenomenon offered opportunities for improvement in many areas of life, such as health status and education. It is economic growth – driven by investment and technological change – that ultimately lifted a substantial part of the world population out of the mass poverty of the pre-industrial world. But how well did GDP per capita correlate with other indicators covering other dimensions of well-being? In certain cases, progress in health and life expectancy, or in access to education, may have been much faster than the increase of GDP per capita (perhaps due to autonomous changes in medical technology or in government policy regulating the schooling system). In other cases, during early industrialisation for example, improvements in the typical citizen's well-being may have seriously lagged behind economic growth, perhaps due to increased inequality within a country. In order to understand more fully the long-term patterns of development of the world economy, a much broader perspective on people's well-being is required. This is the overarching theme motivating our work.

The subsequent chapters present indicators for other dimensions of well-being, including the real wages of unskilled labourers (to capture trends at the bottom of the income pyramid), life expectancy, height, educational attainment, the quality of institutions (including human and political rights), gender inequality and income inequality. In

addition, indicators of environmental stress are also presented. These various indicators of well-being have been constructed in a systematic way, with a particular emphasis on comparability both across countries and over time, in a truly Maddisonian tradition. The choice for particular indicators has been inspired by the multi-dimensional approach to well-being used in the OECD Better Life Initiative. The focus of the report is on the period after the Industrial Revolution, when the process of global divergence clearly accelerated, and because historical data and estimates are relatively abundant for this period.¹ Based on these indicators, we provide a set of stylised trends that cover the entire world economy and all major regions. Data limitations put certain constraints on the indicators and countries that could be covered, but thanks to the ingenuity of historians working with a large variety of sources, we have been able to reconstruct various dimensions of well-being in a hopefully convincing way.

We believe that there is added value in developing long time-series of well-being indicators, beyond simply satisfying historical and scientific curiosity. Their usefulness derives from the increasing recognition that the processes of economic growth and development have deep historical roots. First of all, it has been found that many differences in well-being already existed before the Second World War and are highly persistent. Institutional differences have a similar persistence, as much of the recent literature on this topic illustrates. There is also a rapidly growing economic literature suggesting that “history matters”, and that this is equally relevant for countries which have changed track and shown “unexpected” success in generating well-being for their citizens. The East Asian economies, Japan at first, gradually followed by Korea, Singapore, and China, are cases in point. Has the East Asian economic miracle resulted in equally dramatic increases in well-being? How should India’s performance be assessed? And how does the United States compare in the long run with continental Western Europe, with its different socio-political institutions? These are some of the questions we can start answering on the basis of the historical data presented here.

The underlying ideas for approaching well-being are most clearly expressed by Sen (see for instance 1993) and Nussbaum (2000). The theoretical framework designed by Sen is based on the distinction between functionings and capabilities. Functionings can be interpreted as a person’s actual achievements, i.e. what he or she manages to do or be. In other words, they comprise an individual’s activities and his or her states of being, for example, being in a good health, being able to move freely, etc. Capabilities are the individual’s real abilities to achieve these functionings, i.e. the person’s freedoms to choose between different ways of living (Kuklys and Robeyns, 2004). The novelty and the advantage of this approach is that it breaks with the traditional utility or resource-based views of well-being that relate economic welfare to income or wealth, thereby enabling us to view life as a combination of various “doings and beings”, with quality of life assessed in terms of the capability to achieve valuable functionings (Sen, 1993). While theoretically appealing, this framework is difficult to implement in empirical investigations. Therefore, Nussbaum (2000) identified ten different groups of capabilities that fit Sen’s framework and helped to overcome the measurement-related problems to some extent.² Some of these capabilities relate to the dimensions of well-being used by the OECD in its report *How’s Life?* and also identified here. For example, the capabilities “Life” and “Bodily health” can be measured by “Life expectancy” (Chapter 5) and by “Height” (Chapter 6). Similarly, “Bodily integrity” is related to “Personal security” (Chapter 7), “Ability to control his or her environment”

is related to “Political rights” (Chapter 9) and “Environmental quality” (Chapter 8) reflects Nussbaum’s capability “Other species”.

Overview of indicators covered

The choice of indicators has been guided by three considerations: first, the theoretical literature such as Nussbaum’s list of capabilities; second, the OECD’s *How’s Life?* report, to which this book adds an historical dimension; and third, the availability of historical and international comparative datasets. Table 1.1 provides an overview of the indicators covered in this volume. Each indicator is covered in a separate chapter and reflects a particular dimension of well-being. Most chapters focus on one key indicator (such as GDP per capita), but a single headline indicator is not available for all fields. Other chapters therefore present two indicators (for example, Chapter 9 presents two measures of political rights), or proxies covering various approaches to the dimension of well-being considered (for example, gender inequality is measured in this report in a number of complementary ways).

The topics covered in this report mirror the dimensions of well-being distinguished in the OECD’s *How’s Life?* report (see Table 1.1 below). Because of data limitations, this report does not cover housing conditions, work-life balance and social connections, which were included in the OECD report; conversely it includes separate chapters on gender and income inequalities over time.³ One further limitation of this historical report is that it does not cover subjective well-being – happiness, for example – for societies in the more distant past, as the types of surveys that are used today to elicit people’s self-reports of their subjective well-being obviously did not exist then. The coverage of indicators is therefore somewhat different from the dimensions that feature in the *How’s Life?* report, but the aim (i.e. to present a more balanced, multi-dimensional picture of well-being) is the same.

Below we introduce each indicator in turn, and briefly discuss the rationale for choosing it. Chapter 2, on demographic trends, set the stage for the rest of the volume by providing a brief summary of the development of the world’s population between 1820 and the present. Next follow chapters providing evidence on the various dimensions of well-being:

- **GDP per capita** discusses the trends in economic growth in the world economy, based on the (updated) Maddison dataset (Chapter 3).
- **Real wages** supply an additional angle on material welfare, approached as the real wages of unskilled labourers: how much did they profit (or not) from GDP growth? (Chapter 4).
- **Education** is a basic ingredient of well-being; the chapter presents new data on the degree of schooling of the world’s population (Chapter 5).
- **Life expectancy**, reflecting the health status of the population, is another fundamental dimension of people’s capabilities (Chapter 6).
- **Height** is an important proxy for the quality of people’s bodily health and nutrition, in particular during childhood (Chapter 7).
- **Personal security** – measured by the homicide rate and the incidence of warfare – is another major determinant of well-being reflecting “bodily integrity” (Chapter 8).
- **Political institutions** allow people to participate in political decision-making, and therefore to control their political environment (Chapter 9).

- **Environmental quality** is obviously of great relevance for long-term well-being and shapes the sustainability of economic growth over time (Chapter 10).
- **Income inequality** relates to the distribution of income within countries and has a direct and indirect impact on well-being (Chapter 11).
- **Gender inequality** strongly affects the well-being of at least half, if not all of the world's population (Chapter 12).
- **Composite views of well-being** are discussed in the final chapter, which also summarises the key results of the volume (Chapter 13).

The availability of historical and international comparative datasets varies across indicators. The first two indicators, GDP per capita and real wages, are the workhorses of economic history for which large datasets are available. Both cover dimensions of material living conditions and nicely supplement each other: GDP per capita measures the average level of economic output and income, while real wages reflect the incomes of the bottom of the income pyramid. Income inequality is covered in Chapter 11. A second set of chapters focuses on quality of life (i.e. the non-material aspects of well-being), such as educational attainment (Chapter 5); life expectancy (Chapter 6); the “biological standard of living” as proxied by the development of the population's height (Chapter 7); personal security (Chapter 8); and political rights (Chapter 9). For all these dimensions, relatively good historical data are available making it possible to chart long-term trends, albeit for a more limited set of countries. Chapter 10 presents historical estimates of various indices of environmental quality, such as (the loss of) biodiversity and the increase of pollution (SO₂): while this chapter covers many countries, the historical data are rather weak and relies mostly on model estimates. To trace gender inequality in Chapter 12, relatively good historical data are available. Chapter 13 describes long-term trends in overall well-being using a number of different ways of aggregating the trends highlighted in the previous chapters. This final chapter, which is highly experimental, aims to demonstrate that steps can be taken to provide a comprehensive measure of the long-term trends in well-being.

All the chapters present state-of-the-art datasets on the development of different dimensions of well-being, many of which are the result of recent research by the Clio-Infra team in cooperation with experts in specific fields (such as in the Maddison project). Often this research has already resulted in publications in international journals (see the lists of publications in the various chapters). There are different research traditions to build on: scholarly work on historical national accounting is well established since the 1950s, but similar research on, for example, long-term trends in personal security or environmental quality started only recently. This obviously also affects the quality of the historical datasets presented here. This report not only reviews the data and historical sources for the dimensions of well-being, but also challenges researchers to expand the available datasets and produce more high-quality data.

The unit of observation is, as in most comparative studies, the country, and this report typically presents average values per country. The data used for this report are available online through the Digital Object Identifier (DOI) link appearing just underneath the sources of each table and chart. More detailed and complete datasets are available on the Clio-Infra website (www.clio-infra.eu).

Table 1.1. **Dimensions covered in this volume and in the OECD Better Life Initiative**

How Was Life?	How's Life?
Income (GDP)	Income and wealth
Income inequality (measures not available)	
Real wages	Housing
Life expectancy	Jobs and earnings
Height (measures not available)	Health status
Education	Work-life balance
(measures not available)	Education and skills
Personal security	Social connections
Institutions	Personal security
Environmental quality	Civic engagement and governance
(measures not available)	Environmental quality
Gender inequality	Subjective well-being (covered in other chapters)
Overall indicator of well-being	

Data quality

Much effort has been put into making the data comparable over time and space. But obviously, one is constrained by the amount and quality of the available historical sources. In order to help assess the quality of the data presented in this report, each chapter includes a table providing our own assessment. The data quality is assessed in terms of three criteria, i.e. **credibility** (the degree to which the sources of the data can be confidently relied on), **accuracy** (the extent to which the data are valid and reliably represent what they purport to measure), and **comparability** across countries (the extent to which data from different sources are collected under the same methodology and measure the same concept). Each chapter includes separate tables illustrating how data quality varies over time and across countries. Four classes of data are distinguished:

1. *High-quality* data are the product of an official statistical agency (national or international) or of using techniques that ensure equivalent credibility; high standards of accuracy are maintained, and data are collected by a consistent methodology for different countries;
2. *Moderate-quality* data are the product of historical research using sources and methods comparable with, but not necessarily similar to those applied by official statistical agencies; consistency over time and across countries is generally good, but there may be some small issues.
3. *Low-quality* data result from historical research in a data-scarce environment that inevitably makes use of indirect data and estimates, resulting in some loss of accuracy; not all country estimates are based on data collected with the same methodology
4. *Estimates* data are those based on “guestimates”, conjectures, and interpolation between benchmark years, where there may be significant inconsistencies between countries or gaps in coverage.

Various indicators sets are constructed within the framework of an international standard. For example, in the chapter on GDP per capita use is made of the results of the International Comparison Project (ICP) on estimating Purchasing Power Parities (PPPs) to

generate a consistent system of (inter)national income accounts. In the chapter on real wages, the international standardisation method developed by Allen (2001) and Allen et al. (2011) is used to measure real wages as the number of subsistence-budgets that can be bought by an unskilled labourer. There are similar standards in the measurement of institutions and civil rights (such as the PolityIV dataset). This work is reflected in the chapters, which explain in detail which concepts are actually used and measured, and how international comparability is achieved. In many cases, the chapters refer to underlying working papers that give more details of the estimations involved.

For recent years, this report makes use as much as possible of OECD data, but it is not always possible to link recent datasets to the historical evidence collected and presented here. Therefore small discrepancies between the data presented here and in comparable OECD publications might exist for some series starting in the 1970s or 1980s.

Practical issues regarding country coverage

The unit of observation is, as in most comparative studies, the country, more specifically the 19th-21st century nation state. One of the recurrent issues in historical research is the changing borders of the countries that are studied. Germany in 2013 is different from Germany in 1989, 1938 and 1913 – not to mention Germany before 1871. This applies to almost all the countries covered, although not to the same extent. There are in principle two solutions to this problem. The first is the one used by Maddison, who created a dataset for GDP and population by taking the borders of 1990 as the starting point and correcting for changes in borders whenever these occurred. The second is to simply accept differences in countries' borders over time. This report relies on a combination of both approaches. In the chapters on GDP, income inequality and environmental quality, we have used the first method. In the other chapters, it was not possible to adopt the same approach, and we measure the level of democracy of actual states or the homicide rate in the historically existing countries. So, for 1913 or 1820 the Germany that is referred to in Chapter 3 is somewhat different from the Germany of Chapter 9. There are similar problems for most other countries, though these are usually of a much smaller magnitude for most Western countries, but possibly even larger for some of the countries that experienced colonisation and de-colonisation in the 19th and 20th centuries.

In addition to country-level data we also present average values for major world regions and, where possible, for the world as a whole. To construct these regional averages, we aggregate country data weighted by population, thus giving China a much bigger weight than Belgium or Nepal. The chapter on income inequality also presents estimates of global income inequality, i.e. the inequality of the distribution of income across all the world's inhabitants as if they were living in a single country.

In the presentation of the data we focus on long-term trends; hence, we present most estimates in the form of averages over a ten-year period, where the 1820s refers to the average for 1820 to 1829, or in the form of specific benchmark years (1820, 1850, 1870, 1890, 1913, etc.). For historical societies we do not always have annual observations, and data were often interpolated such that “1820” may mean “observation closest to 1820”. Alternatively, Chapter 7 on height presents data by birth cohorts, that is, people born in the 1820s, 1830s, etc. We also provide regional averages, distinguishing between eight world regions: Western Europe, Eastern Europe, the Western Offshoots, East Asia, South and Southeast Asia, the Middle East and North Africa, Sub-Saharan Africa, and Latin America.⁴

Eastern and Western Europe are divided (rather arbitrarily) by the former “iron curtain” (a border that is, however, almost identical to the Hajnal line separating the European marriage pattern and the Eastern European family system, used in many economic-historical and demographic studies (Hajnal, 1965)). Eastern Europe, as defined in this report, includes the territory of the former USSR, including its Asian parts. The Western Offshoots, a concept borrowed from Maddison, consists of the United States, Canada, Australia and New Zealand, regions of recent immigration from Western Europe that shared a common development path. East Asia consists of China, Hong Kong (China), Japan and Korea, while South- and Southeast Asia covers the rest of Asia, with the exception of the countries to the west of Afghanistan. The Middle East and North Africa (MENA) region covers all African countries bordering the Mediterranean plus Iran, the Middle East and Turkey. Finally, the Latin America and Caribbean region consists of the Americas except for the United States and Canada. Some regions are dominated by one large country (China towers over East Asia, the United States has a huge weight among the Western Offshoots). To deal with this, we also present additional tables with data for a sample of 25 countries, which together cover a large part of the world’s population.

In calculating the regional averages, it was necessary to prevent one or a few unrepresentative countries driving the regional trends. For example, sometimes only historical data for South Africa are available within the Sub-Saharan Africa region. However, South African trends may not be representative for the wider region. Therefore data had to be imputed in order to increase country coverage. A method similar to that of Maddison was used. Years between two available benchmark observations (say 1820 and 1850) were interpolated based on the average growth rate for the country in that period (1820-1850). When the data had to be backwards extrapolated for a country, the growth rate from a similar country from the region (for which data were available) was taken and used to project its level backwards in time. Since it is undesirable to present data based largely on imputations, the regional averages were set to missing if the non-imputed countries covered less than 40% of the regional population. The exceptions to this rule are represented by the data on education, where the countries in Eastern Europe were judged to be sufficiently representative of the region to settle for a 30% threshold, and homicide rates where a more stringent coverage threshold of 45% was used because of the high variation in homicide rates.

Main highlights

In the remainder of this chapter, we briefly summarise the most significant results, focusing on the question of the extent to which different measures of well-being shed new light on long-term trends in world development.

Chapter 2 sketches how the **global population** grew from about 1 billion at the start of the 19th century to more than 7 billion today, showing the huge challenge the world economy has faced over the past 200 years: how to feed, clothe and house this growing world population. This chapter describes how demographic systems rapidly changed around the world: mortality rates declined while fertility rates declined as well, albeit at lower and varying speeds. The first demographic transition took place in Western Europe and Western Offshoots during the 19th century. This had huge consequences for the age structure of the population, labour force participation, the role of women within the household, and for educational investment in children. Elsewhere the transition is still ongoing as new technologies in health and fertility control were introduced in the course

of the 20th century, initiating a move away from high mortality and fertility to longer life expectancy and fewer children per women. Initially, this provided a demographic dividend facilitating economic growth, but soon this will turn into a burden as problems of ageing may have negative effects on economic growth.

Chapter 3 focuses on the spectacular growth of the output and income of the world economy since 1820. The world's average **GDP per capita** increased by a factor of 10 between 1820 and 2010; as total population increased seven-fold, total real GDP went up by a factor of 70. Yet this growth was spread very unevenly, resulting in a considerable increase in income disparities between countries. In 1820, the richest countries were about five times as wealthy as the poorest countries, while they were more than thirty times as well-off in 1950. This was driven by a process of rapid industrialisation. Only recently, as a result of the rapid growth experienced by China and India, has global income inequality begun to decline.

Chapter 4 provides evidence on the development of the **real wages** of unskilled labourers. This evidence largely confirms the results for the rise in GDP per capita. During the first half of the 19th century, the average unskilled labourer could barely maintain a family from his wage – only in parts of Western Europe and the Western Offshoots were real wages really above “subsistence”, while in Africa they were probably below that threshold (but the number of observations is limited). In the 2000s, the average real wages of unskilled workers are about 8 times the level attained at the start of the 19th century. International differences in the real wages of unskilled workers have also become much larger, with Southeast Asia trailing behind and Africa catching up in recent decades. Another striking feature is the gap in real wages between the Western Offshoots, where real wages were very high already in the 19th century, and Western Europe, with a much lower wage level; this gap has closed only recently.

Chapter 5 looks at the advance of **education**, which has been as impressive, or perhaps even more impressive, than the growth in real income. In about 1820, less than 20% of the world's population was literate, and this group was heavily concentrated in Western Europe and its Offshoots. Nowadays, the levels of literacy reach close to 100% almost everywhere, with Africa being the most significant exception at 64%, and MENA and Southeast Asia at about 75%. Much of this increase in literacy was achieved after 1945, often following de-colonisation, which was given an extra impetus by government efforts in this field. In the wake of the expansion of basic education, secondary and tertiary education also expanded, first in the Western Offshoots, then in Western Europe. More recently this became a global phenomenon, resulting in a strong increase in the average years of education in all parts of the world. The levels of global inequality are much lower for education than they are for real income, and they are declining, making education a significant force for greater equality of well-being around the world.

Chapter 6 shows that the slow decline seen in inequality in GDP per capita between the world's countries has also been witnessed in relation to **life expectancy**, particularly in recent generations. At the start of industrialisation, average life expectancy at birth was about 40 years in Western Europe and its Offshoots, and probably not higher than 25 to 35 years in most of the rest of the world. Only after the late 1890s did life expectancy start to rise significantly. Initially, this systematic rise in life expectancy was the result of the decline in infant mortality, but subsequently was due to a significant fall in mortality later in life. In the OECD countries, this process resulted in almost doubling life expectancy at

birth – to almost 80 years – while elsewhere a process of catching up started after 1945. The greater equality in life expectancy has presently allowed most world regions to reach an average life expectancy of about 60 to 70 years, with only Africa lagging significantly behind. However, within the world's regions, in the last two decades levels of life expectancy appear to be diverging once more.

Chapter 7 provides a somewhat different perspective on developments in health and nutritional status by looking at data on changes in people's **height** around the world since the 1820s. During the 19th century, the tall Americans, Canadians and Australians stood out, mirroring the high real wages earned in the Western Offshoots. However, during the middle decades of the 19th century, the difference between Western Europe and the rest of the world (Eastern Europe, East Asia) was marginal, in spite of the much higher real incomes in the former region. This changed after about 1870, when height began to increase in Western Europe, whereas it lagged elsewhere. Africans were relatively tall during much of the period studied, but experienced declining height in many countries after the 1960s. People in Southeast Asia stayed relatively short, which fits the real wage evidence for the region.

Chapter 8 is devoted to **personal security**, which is a fundamental capability but one that it is not easy to measure historically. This chapter relies on homicide rates (the number of intentional deaths per 100 000 inhabitants) to get an idea of the spread of violence over time and space. There are striking patterns here: Western Europe was already quite peaceful from the 19th century onwards, but homicide rates in the United States (but not in other Western Offshoots) were and remain high by comparison. Large parts of Latin America and Africa are also violent crime “hotspots”, and so is the former Soviet Union (especially since the fall of communism), while large parts of Asia have low homicide rates. The historical evidence is often patchy, however, for the non-Western world, with the exception of Japan.

Chapter 9 presents data on the evolution of **political institutions**, reflecting trends in civil rights. Two projects to measure this are discussed: the PolityIV dataset, which arguably reflects a typically United States perspective on this topic (the United States was already highly democratic at the start of the 19th century, and other countries converge – or not); and the Vanhanen dataset, which focuses on electoral participation and competition. Global averages show a rising trend in both cases, but also significant differences in timing. Both datasets show that the Western Offshoots and Western Europe took the lead in this process, while other parts of the globe often experienced a much less gradual evolution, with sometimes violent swings in political rights (as also happened in Western Europe during the 1930s and 1940s). Yet in the long run, there has been an impressive increase in the quality of political institutions, contributing significantly to people's well-being.

Chapter 10 looks at the **quality of the environment**, which is obviously important for well-being but not easy to quantify historically. The chapter presents historical trends in sustainability and environmental quality based on measures of biodiversity and emissions of CO₂ and SO₂. It finds evidence of long-term declines of biodiversity worldwide, as well as of increasing emissions. These indicators are mostly model based: biodiversity measures are derived from the GLOBIO model, while CO₂ and SO₂ emissions are mostly based on data on energy production. Assumptions and limitations are reviewed, including a warning about the partial and possibly biased nature of these indices, which give only a glimpse of the complex interactions between humanity and nature.

Chapter 11 focuses on **income inequality**, a dimension that is related to people's well-being both directly and indirectly. The evidence about long-term trends on income inequality both within and between countries makes it possible to chart global inequality between 1820 and the present. Within-country income inequality over time shows a U-curve in most OECD countries, declining between the end of the 19th century until about 1970, followed by a rise that is very sharp in the Anglo-Saxon countries (United States, United Kingdom), and relatively modest in Continental Western Europe. Similar but often more extreme versions of this U-curve are found in Eastern Europe, where communism resulted in strong declines in income inequality, followed by a sharp increase after the disintegration of central planning. In other parts of the world (China in particular), recent trends have led to greater income inequality. Global income inequality was largely driven by between-country inequality, which went up until the 1950s, and stabilised since.

Chapter 12 is about **gender inequality**, a major determinant of the well-being of 50% (if not 100%) of the world's population. The chapter documents the changes in different measures of gender inequalities via the construction of a gender inequality index reflecting inequalities in health, marriage, socio-economic status and political rights. The index shows strong progress in reducing gender discrimination during the past 60 years, but the differences between regions did not disappear in this period: Europe (including communist Eastern Europe) and the Western Offshoots performed best (but no country, not even Sweden, reached full gender equality), while MENA (due to weak political rights) and Southeast Asia (due to the many "missing girls") performed worst. One important outcome is the low score on the index (i.e. high gender equality) for former communist countries (before 1989), followed by a temporary decline after 1989.

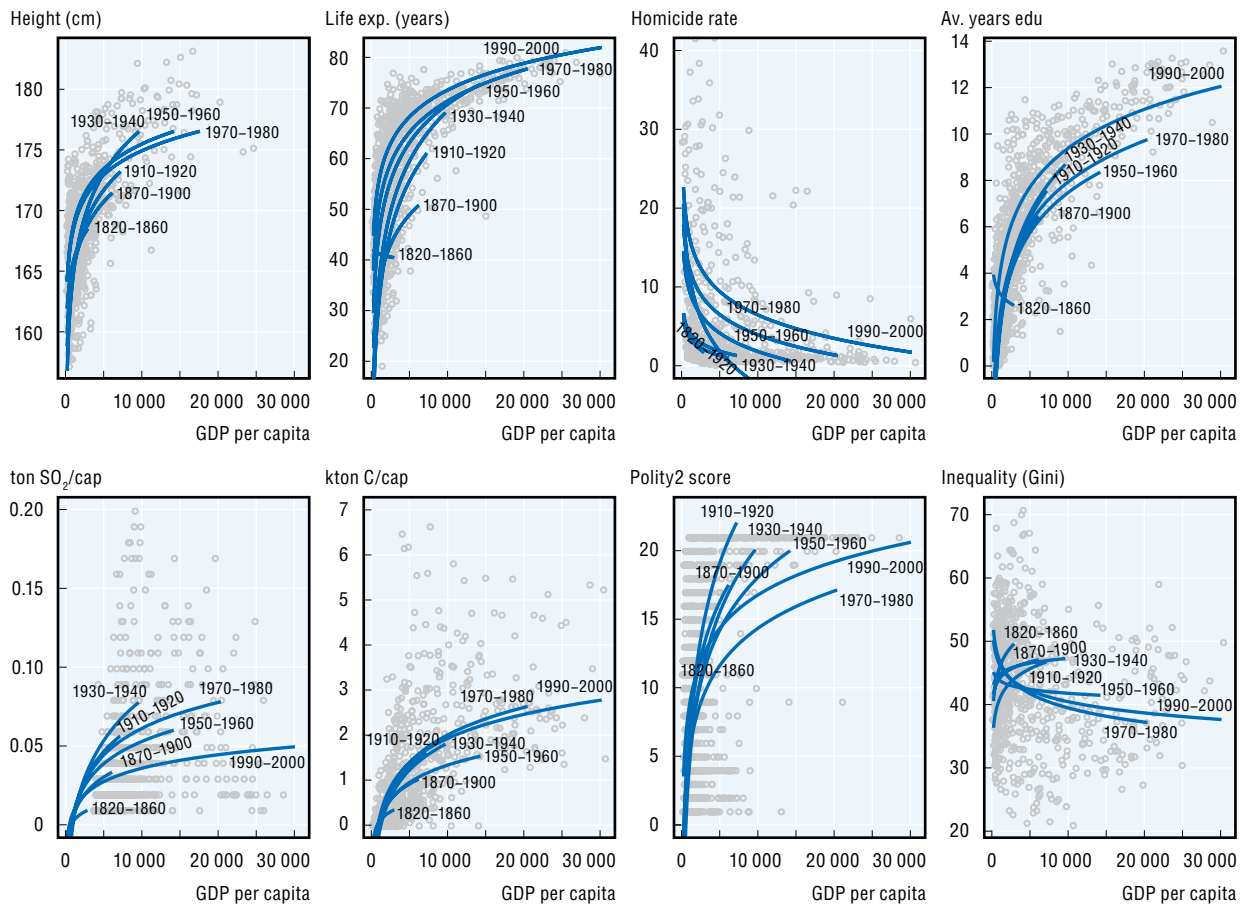
Chapter 13 synthesises the results of the report by constructing a **composite index of well-being**. The crucial problems when constructing a composite index are, of course, how to determine a set of weights to calculate for the index, how to normalise the individual indices about the various dimensions of well-being and how to deal with missing observations. The chapter discusses various options, and their implications. Using a wide range of aggregation options, however, tends to show similar results. Progress in well-being was commonplace since the early 20th century, with the possible exception of Sub-Saharan Africa. Between-country inequality in well-being is also lower than it is when considering GDP alone. However, this is a phenomenon of the 1970s and after; before this time the increase in between-country inequality in well-being was actually more pronounced compared to GDP.

Most of the well-being indicators discussed in this book have a strong correlation with GDP, though this is less so with the indicators measuring political institutions, environmental quality, inequality and personal security (Figure 1.1). Generally speaking, the relationship with per capita GDP is much weaker up to 1870, in part due to the quality of the data for the earlier period.

At the same time, the relation between well-being indicators sometimes changes noticeably. Preston (1975) has analysed this change for life expectancy and per capita GDP, observing that the same per capita GDP level was associated with much higher life expectancy in 1960 than in 1930 – the curve had shifted upwards. He suggested that this was due to improved healthcare technology. The long-term data presented in this book confirm this trend, from around 1900.

Figure 1.1. **Evolution of GDP per capita and selected well-being indicators, 1820-2000**

Height (cm), life expectancy at birth (years), homicide rates (per 100 000), education (years), SO₂ pollution (ton SO₂ per capita), CO₂ pollution (kiloton C per capita), polity2 scores, income inequality (Gini coefficient) and per capita GDP (US dollars at 1990 PPP). Logarithmic fits for seven periods



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

StatLink  <http://dx.doi.org/10.1787/888933095495>

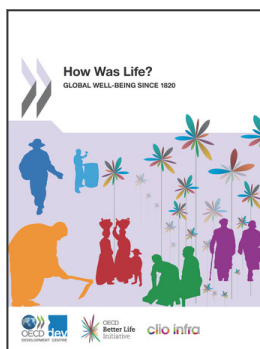
Life expectancy seems to be fairly unique in showing unambiguous improvements at the same income level. Height, for example, shows a stable relationship with GDP until at least the 1980s. However, there are also some interesting shifts to note. From 1950-60 onward homicide rates seem to be rising at a given level of income, but the scarcity of pre-1980 data outside Western Europe means that this finding is subject to important caveats about data coverage. Education shows a shift after 1980, implying that at all levels of per capita GDP, average years of education have increased. Air pollution due to sulphur dioxide in the second half of the 20th century shows a downward shift relative to the first half of the century, showing production at similar income levels to be getting cleaner. Unfortunately, no such shift can be observed for carbon dioxide production. The curves for inequality and political institutions have shifted multiple times, showing the relation with per capita GDP to be unstable.

Notes

1. But much new work has recently been done for the pre-1820 period; see Bolt and Van Zanden (2014) for a review.
2. These capabilities are: (1) life, (2) bodily health, (3) bodily integrity, (4) senses, imagination and thought, (5) emotions, (6) practical reason, (7) affiliation, (8) other species, (9) play and (10) control over one's environment.
3. The *How's Life?* framework considers inequality as a cross-cutting theme, relevant for each of the 11 dimensions of current well-being, rather than as a stand-alone dimension. OECD (2103) provides an in-depth focus on gender differences in well-being.
4. The regions used in this report are those used by Maddison in his own work for the OECD.

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