

From:
How Was Life?
Global Well-being since 1820

Access the complete publication at:
<http://dx.doi.org/10.1787/9789264214262-en>

GDP per capita since 1820

jutta Bolt, Marcel Timmer, Jan Luiten van Zanden

Please cite this chapter as:

Bolt, jutta, Marcel Timmer and Jan Luiten van Zanden (2014), "GDP per capita since 1820", in Jan Luiten van Zanden, *et al.* (eds.), *How Was Life?: Global Well-being since 1820*, OECD Publishing.
<http://dx.doi.org/10.1787/9789264214262-7-en>

This work is published on the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of the OECD member countries, or those of the IISH.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Chapter 3

GDP per capita since 1820

by

Jutta Bolt and Marcel Timmer, University of Groningen

and

Jan Luiten van Zanden, University of Utrecht, Groningen, Stellenbosch

Since 1820, the world economy experienced spectacular growth in output and income. This chapter builds upon the work by Angus Maddison and shows that the world's average GDP per capita increased by a factor of 10 between 1820 and the 2010. Yet, this growth was spread very unevenly, resulting in a considerable increase in average income disparities between countries. In 1820, the richest countries were about five times as wealthy as the poorest countries, whereas they were more than thirty times as well-off in 1950. This divergence 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. The chapter discusses the strong and weak spots in our current knowledge on historical GDP series and points to areas for future research.

Introduction

Economic well-being – people’s command over produced goods and services – can be assessed in an historical perspective through measures of gross domestic product (GDP) per capita, which is the natural point of departure for any historical investigation of well-being. GDP (per capita) is an important indicator for measuring the economic performance of countries, which is a central driver of people’s economic well-being. This is true not only because an increased output of goods and services, which is what GDP measures, tends to translate into an increased ability by residents to buy these goods and services, but also because higher GDP provides the means for spending on non-material components of well-being, such as education and health. The growth of GDP and productivity thus had important consequences for changes in well-being over the past 200 years. Building on Angus Maddison’s estimates of GDP and population in the world economy between Roman times and the present, this chapter presents trends in GDP per capita since 1820 in a global perspective. The key message from the chapter is that, overall, the world has experienced a substantial improvement in people’s command over resources since the early 19th century. The average GDP per capita of the world’s population has increased more than tenfold since 1820. Yet, this rise has benefitted different parts of the world very unequally. Until the mid-20th century, the more developed parts of the world grew much more rapidly than the poorer regions, contributing to the considerable increase in income inequality between countries. But poverty is not destiny, and there have been spectacular transitions of countries from poverty to richness over the last 200 years.

Description of the concepts used

Gross Domestic Product (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 it. Economic statistics were among the first statistics to be produced, and this long tradition has led to consistency in the way they are measured within the System of National Accounts. In terms of the development of economics and statistics, the System of National Accounts was “one of the great inventions of the 20th century”.¹ In principle, GDP summarises in a single figure the value of all the goods and services produced in a society, or alternatively, the value of the total income earned.² From the perspective of people’s well-being, the concept of household income would be more relevant to look at than that of the income of the economic system as a whole, which includes income accruing to other institutional sectors, such as firms or general government. Due to data limitations, the distinction between household and economy-wide income is largely ignored in this chapter. We do, however, provide a comparison between income and consumption (although at a national level) to partially address this problem (see below).

The GDP concept plays a central role in our thinking about economic growth and development, and a large part of economic theorising uses (changes in) GDP as the main variable to be explained. Macro-economic growth theory evolved only after the concept of

GDP was defined clearly. Moreover, economic historians consider the “sustained growth” of per capita GDP as the most significant feature of the “modern” economy as it came into existence after the Industrial Revolution. It is GDP growth – driven by investment and technological change – that ultimately led a substantial part of the world’s population out of the mass poverty of the pre-industrial world.

GDP includes both consumption and investment expenditure. From a welfare perspective, it makes sense to distinguish between the two, as the former pertains to current welfare, while the latter leads to the build-up of capital stock that enhances production capacity in the future. When the economy is fully using all its available resources, each society faces a fundamental trade-off between more consumption now or in the future. Therefore, to better track changes in current command over resources, one would like to have information on Gross National Disposable Income, or how much resources are available for consumption. Unfortunately, this measure is not available for the pre-1950 period. An alternative would be to look at what people actually spend on the consumption of goods and services, complemented by data on government consumption, as public expenditures on, for example, education and healthcare also increase people’s well-being.³ Yet historical data on consumption are very scarce. This chapter therefore relies principally on data on GDP per capita to discuss the main developments in people’s command over resources since 1820. Evidence for the most recent period also shows that consumption/GDP ratios can vary substantially across countries and tended to decline when rapid GDP growth set in.

Studies reconstructing historical national accounts generally contain series in national currencies of the individual countries. As our goal is to discern the long-term trends in people’s command over resources across the globe between 1820 and today, we need data on GDP per capita that are expressed in a common currency, taking into account differences in price levels and consumption structures, both between countries and over time. This is important, as price levels are correlated with levels of economic development, i.e. prices are on average higher in more developed countries. Not taking this factor into account would lead to an overestimation of incomes in the developed countries. There are various ways to correct for differences in price levels. The data presented here are based on international prices, using common prices of goods and services averaged over all countries. In this way, the purchasing power of residents in each country, or how much one dollar can buy in one country relative to another, is taken into account.

Historical sources

For the recent period, official statistical agencies provide estimates of GDP and its components, which are harmonised and standardised by various international organisations (OECD, UN, World Bank). The relevant PPPs used to convert GDP values expressed in the prices of each specific country into an international standard are derived from the International Comparison Program (ICP) organised by the World Bank.⁴ However, international organisations do not produce historical time-series of real GDP. This is done in research-driven datasets such as the Penn World Tables, which go back to 1950,⁵ and the so-called Maddison dataset, which goes back further in time. Based on a large set of individual country studies, Angus Maddison constructed a set of estimates of real GDP and GDP per capita for (almost) the entire world economy, going back to 1 AD, using PPPs for 1990 to express all national series in a common currency (Maddison, 2005, 2008).

After his demise in 2010, a team of scholars set up “the Maddison project” to further extend and update this dataset.⁶ The initial results of this project were published recently (Bolt and Van Zanden, 2014), and provide the basis for this chapter. Most of the revisions undertaken by the Maddison project concerned the period before 1820, but new data for various regions and countries (e.g. Switzerland, South Africa, Russia, Singapore and various Latin American countries) have also been included. This has enabled us to fill various knowledge gaps in the original dataset created by Maddison. For the post-1820 period, however, these extensions did not significantly alter the picture of long-term economic growth provided by Maddison (Bolt and Van Zanden, 2014).

Research on the systematic measurement and international comparison of national income and product started in the 1930s, with major publications by Colin Clark and Simon Kuznets. After 1945, Kuznets set up an international team of scholars working in this field, with the explicit aim of constructing historical time-series of GDP and its components. This formed the basis for Kuznets’ well-known studies into the process of “modern economic growth” published in the 1960s. Kuznets used estimates for a number of advanced countries, including Japan, covering a century of data. Since then, the number of historical studies quantifying economic growth has grown very rapidly; for almost all major countries there are now reconstructions of the historical national accounts going back to the early 19th century, and sometimes even much further back in time (e.g. for England going back to the 1260s, for Peru to 1700, and for Japan to 720 – Bolt and Van Zanden, 2014). These historical studies use a large variety of sources to reconstruct the development of national income and product. This includes labour force and production censuses, tax records, data on international trade, wage and price data from various sources, etc.

Generally, the further one goes back in time, the scarcer the data become and the poorer the quality of the GDP estimates. Yet, especially in these circumstances, using the system of national accounts to reconstruct the development of the national product has great advantages. All sectors have their place in the system, and all contributions are calculated consistently. There are three ways to measure a country’s GDP within the System of National Accounts: as the total output of goods and services, as the sum total of expenditures (such as consumption and investment), and as the total income earned (wages, profits, etc.). This allows one to use all the information available (about levels of output, income and expenditure) as pieces in a large jigsaw puzzle: almost never do we have all the pieces, but quite often the information is enough to obtain a good picture of the economy concerned.

The starting point in historical national accounting is establishing the size of the population. Population estimates, possibly complemented by labour force data, can be used to estimate the size of various sectors by determining employment per sector. Depending on data availability, population estimates can also be used to estimate the demand for agricultural consumption goods such as wheat and meat, which allows estimations of one part of the output of the agricultural sector. Population can also be used as a cross-check to see whether estimated agricultural output, or output series for salt or cotton, etc., translates into a reliable estimate of per capita consumption.

The estimation of historical economic activity often starts from the output approach, complemented, depending on data availability, by information on income and expenditure. As described above, one way to establish (part of the) agricultural production is to use the demand for agricultural consumption goods. Information on yields and land under

cultivation can also be used to calculate total agricultural output. Information on total land under cultivation can again be cross-checked by the total population to see whether the trends obtained are plausible. The output of cash crops can in most instances be obtained from export statistics. Care is taken to make imputations for the non-market production of food, which, especially in pre-industrial societies, was an important part of the economy. One way to circumvent this problem is to use information on population and real wages to establish the subsistence income.

Measuring the output and productivity of the service sector is more difficult than for the goods-producing sector. Frequently, the output of services is measured indirectly, for example, from the income side of the national accounts. An alternative way to measure the output of services is to use quantity indicators, or to assume that the output growth in services follows the output growth in commodity sectors.

Typically, the statistical coverage of these historical estimates is skewed towards the more dynamic sectors of the economy, such as foreign trade, shipping, railway transport and commercial agriculture. This means that the output of the industrial sector is typically better recorded than the output of large parts of the agricultural sector or of the service sector (e.g. domestic work). Conversely, government incomes and expenditures are generally relatively well documented.

Data quality

There are well-known limitations with regard to *what* GDP actually measures and *how* it is measured. One important limitation is that GDP does not include non-market services (other than dwelling services) produced and consumed within the household. This is especially important for historical analysis, as a larger part of consumption was produced by households in the past, implying that the growth of GDP may be biased upward as a result of the commercialisation of this part of consumption (for example, more people eat out instead of preparing their own food now than 50 years ago). Also, the way market activities are recorded has improved over time, implying that production might have been there for a long time, but that it starts to contribute to economic development only when it is recorded. Statistical improvements might therefore also lead to an upward bias in GDP growth. The GDP series presented here are adjusted to include the auto-consumption by farmers (the share of output that does not leave the farm), although the quality of these estimates varies across countries and over time.

How GDP is measured has limitations as well. The estimates of the national accounts of countries in the past – and in particular in the more distant past – are subject to certain margins of error. They are often based on partial data and on assumptions about the links between these data (e.g. the proceeds of a specific tax) and the economic activities they represent. In general, the further one goes back in time, the larger the margins of error will be, although there may be exceptions to this rule: we know more about Medieval England than, for example, 19th-century Sub-Saharan Africa, or pre-Colombian Latin America. Moreover, the quality of the data does not always linearly decrease further back in time. Occasionally, detailed censuses or sources make it possible to create a reliable benchmark estimate for a given year. Moreover, an international comparison of such benchmark estimates, e.g. for the Netherlands and parts of China in the early 1820s, makes it possible to check the consistency of the estimates. Also, international comparisons of real wages supply proxies that can be used to check the plausibility of the GDP estimates. For the period after the 1820s, the historical estimates presented here are deemed to be

relatively good, although different researchers may reach different conclusions in the case of different countries, and the quality of these estimates will improve as new data sources are identified.

The historical data shown in this chapter are expressed in 1990 constant prices. In other words, a benchmark year PPP is estimated for the year 1990, which is used to compute a comparative GDP level for all countries in that year. From this benchmark year, the original GDP per capita series for all countries are extrapolated (backward and forward) using volume growth rates of GDP for the countries included in the set. The key characteristic of the constant price PPP approach for long-term analysis is that it replicates the relative moments of real GDP in national currencies. In other words, the original time series are unaffected by the choice of the benchmark year. The main drawback of this approach is that the underlying price structure of each economy is that of the benchmark year. As a result, a comparison of GDP levels between countries further away from 1990 might be biased, especially if the price structures of countries included in the comparison change in very different ways.

The quality of the National Accounts estimates made by official statistical agencies is generally high; however, some problems do remain even for the most recent period. Regular revisions of GDP estimates by these agencies – the result of new information and/or revisions of the internationally accepted System of National Accounts (SNA) – sometimes result in breaks in historical time series that limit comparison in time and space. The quality of the official statistics is related to the quality of censuses and, more generally, to the capacity of the government to register and “monitor” its population. In particular, new, relatively weak states may have an incentive to under-estimate their economic performance (e.g. to qualify for certain forms of international aid). Moreover, international comparisons are constrained by the limitations both of the PPP approach and of the various ICP-rounds carried out by the World Bank. Modern statistical work in this field began on a global scale in the 1950s. Almost all estimates for the period before the 1940s are the result of research in economic history, which also began in earnest in the 1950s, although a few official statistical agencies published studies on GDP and its components for earlier years. The classification of the quality of the historical estimates presented in Table 3.1 is based on what is known about available sources and studies (see Bolt and Van Zanden, 2014,


Table 3.1. Quality of data on GDP 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	3	4	3	4	4	4	3	4
1870	2	3	3	3	4	4	3	4
1920	2	3	2	3	4	3	3	3
1950	1	1	1	1	1	1	1	1
1970	1	1	1	1	1	1	1	1
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.

StatLink  <http://dx.doi.org/10.1787/888933096711>

for a recent overview). Most problematic are the estimates for Sub-Saharan Africa, which (with the exception of South Africa) are highly speculative for the pre-1950 period (and also weak for the second half of the 20th century). Western Europe, the Western Offshoots and Japan have the highest quality data for the 19th century. Moreover, various studies have been carried out to test the plausibility of the results gained through the backward projection of time-series linked to the 1990 benchmark created by Maddison; these studies generally confirm the robustness of the estimates based on this method (for example, the ratio between estimates of GDP per capita in 1820 for the Netherlands, on the one hand, and Indonesia or China, on the other hand, is confirmed by an independent benchmark for that year).

The number of countries for which long-term GDP per capita series are available varies considerably between regions (see Table 3.3). The best-covered regions are Western Europe and the Western Offshoots. For the other regions, the number of countries included increases substantially over time: from 9 in Latin America and 10 in the Middle East and North Africa in 1820, to 23 and 20, respectively, in 2010. The most important increase in coverage for all regions (except Europe and the Western Offshoots) took place after 1950.

This increase in country coverage within regions complicates the interpretation of the regional average. When levels of GDP per capita between countries in a region differ substantially, the regional average will be significantly influenced by the inclusion of more countries. For example, the increase in GDP per capita in Eastern Europe between 1940 and 1950 coincides with a more than doubling of the number of countries for which we have estimates. The same holds for Southeast Asia between 1930 and 1950, and for the Middle East and North Africa between 1910 and 1950. However, in other cases major changes in the regional GDP per capita do not reflect changes in country coverage. For the Middle East and North Africa, for example, there are substantial changes in GDP per capita between 1950 and 1960, although the country coverage during the period remains constant. Similarly, in Eastern Europe the number of countries covered remains constant between 1990 and 2000, while GDP per capita increases considerably. It is therefore important to verify what is driving changes in the regional GDP per capita before drawing conclusions.

Comparable data for Africa are so scarce that it is difficult to draw any general conclusions (the Sub-Saharan Africa estimates for the 19th century presented in Table 3.1 relate only to South Africa, and are therefore not representative for the region as a whole). The data availability and quality for many African countries in the post-1950 period also varies greatly (Lehohla, 2008; De Vries et al., 2013), and statistical capacities in many African countries increased significantly after 1990. This led various national statistical offices to revise their GDP levels upward in recent years (by as much as 62% in Ghana, and 30% in Malawi). The data used in this chapter do not yet reflect these upward revisions.

We know relatively little of China's long-run GDP growth and how it compares to other countries. The best documented pre-WWII year of the Chinese economy is 1933, which was a relatively good year, as the level of GDP per capita was higher than in the early 1950s. Based on scattered information from studies into different sectors and time periods prior to 1933, the 1933 GDP per capita level has been extrapolated backwards to 1890, which suggests that the Chinese economy had been largely stagnant in per capita terms. Recently, much work has been devoted to producing a detailed set of estimates of the structure and level of GDP in the most advanced part of the empire, the Yangtze Delta (in fact, in a part of that region, Hua-Lou district) in the 1820s (Li and Van Zanden, 2012). These benchmarks provide the first stepping stone for creating long-term time series of Chinese GDP.

Main highlights of GDP trends since 1820

The evolution of GDP per capita since 1820 is a fairly well-known story, based largely on the Maddison dataset, with some good and some bad news. The good news is that since the 1820s the average GDP per capita of the world's population has increased by a factor of 10, a growth that contributed immensely to increased economic well-being. No region or country saw its real income decline in over this long period, although during shorter time periods – e.g. China in the 19th century, Eastern Europe after the abolition of central planning, parts of Africa during the 1980s and 1990s – real GDP per capita did fall substantially. The process of “modern growth” of GDP per capita started in the early 19th century and was primarily the result of the spread of the Industrial Revolution. It resulted in a strong decline in agriculture's share in the economy and the rise of manufacturing and services as sources of income and employment.

The bad news is that GDP growth was very unevenly distributed across the various regions: during the 19th century, rich countries became richer and poor countries fell behind, resulting in a substantial increase in global inequality in GDP per capita. Global inequality kept rising during the first half of the 20th century, when the United States economy grew more rapidly than the rest of the world. After the 1950s, however, this process slowly started to reverse. For the first time, the economic growth rates experienced by poor economies were of a similar magnitude as those of rich economies. And, since the 1970s, low-income countries, in particular in Asia, grew much faster than high-income countries. This picture does not change greatly when we move from GDP to consumer expenditure. Generally, cross-country differences are somewhat smaller in terms of consumption, due to the fact that in low-income countries consumption generally represents a higher share of GDP than it does in high-income countries. For middle-income countries – notably China – the share of consumption was much lower than in other countries, which was reflected in the much higher investment share of these often rapidly-growing countries.

Already in the 1820s, GDP per capita in Western Europe and the Western Offshoots had forged ahead relative to the rest of the world (Table 3.2). This early divergence in per capita GDP between (North Western) Europe and Asia has been the topic of a fierce debate (Pomeranz, 2000; Parthasarathi, 1998; Broadberry and Gupta, 2006; Li and Van Zanden, 2012). The key question in this literature is whether the level of economic development (in terms of GDP per capita) in China (as well as India and Japan) before industrialisation was comparable to that in Western Europe. Most recent historical estimates in fact indicate that already in 1820 GDP per capita in (North) Western Europe (with an average value of about 1400 dollars) was much higher than in the rest of the world (with the exception of the United States – Bolt and van Zanden, 2014). For example, comparing the most advanced part of the Chinese empire (the Hua-Lou district) with the Netherlands (one of the more advanced parts of Western Europe) in 1820 shows a real income gap of about 40-50% (Li and Van Zanden, 2012).

At the same time, substantial differences in GDP per capita existed within Western Europe. The richest country in 1820 was Great Britain,⁷ at around USD 2100 per capita, while the poorest country was Finland with an average of USD 781 per capita. North America (e.g. the United States, at around USD 1300) and the southern cone of Latin America (e.g. Argentina, with USD 998, and Uruguay, at USD 1165) came very close to the Western European average (or even surpassed it, as in the case of the United States). GDP per capita for Latin America was much lower, with an average value of USD 620. Other countries in the southern hemisphere had comparable low levels of GDP per capita: the average GDP

per capita for the Cape Colony in 1820 was about USD 800, while it was even lower in Australia, at around USD 518. The most populous countries of the world – China, India, Indonesia – had GDP per capita ranging between USD 530 and USD 600 in 1820, about half the Western European level. Japan recorded a somewhat higher per capita GDP (USD 660), as did the Ottoman Empire (USD 740). Global inequality in GDP per capita was still modest: the wealthiest developed country (Great Britain) was “only” about four times as rich as the poorest one in 1820 (Australia, at USD 518).

Since 1820, the world has witnessed a spectacular growth of economic well-being and production capacity. On a global scale, GDP per capita has risen 10-fold since 1820 (Table 3.2). The average level of world GDP per capita increased from USD 650 in the 1820s to USD 1 291 in the 1900s, and from USD 2 405 in the 1950s to almost USD 7 000 in the 2000s. However, growth in per capita GDP accelerated more slowly: it took about 80 years (from 1820 to 1900) for the world average level of GDP per capita to double, 55 years to double again (in 1956), and 45 years to double for the third time (in 1991).

In the long run, all countries (Tables 3.2 and 3.4) and regions (Figure 3.1) experienced gains in real income levels. China is the only country that experienced a strong decline in GDP per capita in the 19th century (Table 3.4). During the 20th century, and in particular after 1950, all parts of the world experienced real, and sometimes accelerating, economic

Table 3.2. Regional averages of GDP per capita, 1820–2010

US dollars at 1990 PPPs

Decade	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	1 226	..	1 294	595	579	..	580	..	605
1830	1 344	..	1 489	..	..	..	..	..	..
1840	1 522	..	1 641	..	..	..	..	..	..
1850	1 589	..	1 809	663	599	..	..	..	706
1860	1 823	..	2 200	676	..	..	..	..	..
1870	1 976	719	2 421	754	543	516	720	..	837
1880	2 190	..	3 135	846	..	..	..	..	..
1890	2 506	1 002	3 375	998	582	572	..	..	1 058
1900	2 912	1 273	4 013	1 129	607	597	..	..	1 225
1910	3 172	1 433	4 915	1 433	..	674	..	..	1 399
1920	3 070	927	5 396	1 540	..	662	..	..	1 381
1930	4 006	1 597	6 025	1 795	723	756	..	..	1 673
1940	4 472	2 097	6 837	1 981	..	749	..	..	1 878
1950	4 518	2 583	9 258	2 502	655	675	1 459	843	2 082
1960	6 825	3 627	10 954	3 119	1 082	814	1 977	987	2 709
1970	10 108	5 138	14 554	3 977	1 796	977	3 020	1 239	3 599
1980	13 127	6 216	18 054	5 436	2 479	1 196	4 102	1 282	4 372
1990	15 919	6 389	22 347	5 047	3 782	1 609	3 807	1 135	5 023
2000	19 315	4 950	27 572	5 848	5 451	2 198	4 497	1 099	5 957
2010	20 841	8 027	29 581	7 109	9 804	3 537	5 743	1 481	7 890

Note: For an assessment of data quality, see Table 3.1.

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


StatLink  <http://dx.doi.org/10.1787/888933096730>

Table 3.3. Number of countries in GDP dataset by region and year, 1820-2010

	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	11	1	3	9	5	9	10	..	49
1830	9	..	3	..	..	2	..	..	15
1840	10	..	3	..	..	2	..	..	16
1850	15	1	4	9	2	3	..	..	35
1860	15	..	4	9	..	2	..	..	31
1870	16	7	4	11	6	10	11	..	67
1880	15	1	4	10	1	3	..	..	35
1890	15	8	4	11	2	4	..	..	45
1900	15	8	4	11	3	6	..	..	48
1910	16	8	4	11	6	10	11	..	68
1920	16	8	4	16	4	8	1	..	58
1930	16	7	4	17	4	8	1	..	58
1940	16	6	4	20	3	5	1	..	56
1950	16	14	4	23	7	15	21	46	146
1960	16	14	4	23	7	15	21	46	146
1970	16	29	4	23	7	15	21	46	161
1980	16	14	4	23	7	15	21	46	146
1990	16	28	4	23	7	15	21	46	160
2000	16	28	4	23	7	15	21	46	160
2010	16	28	4	14	5	12	18	20	117

Note: For an assessment of data quality, see Table 3.1.

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

StatLink  <http://dx.doi.org/10.1787/888933096749>

growth. Real declines in material standards of living over long periods are exceptional for the post-1950 period; the most important case was the decline in GDP per capita experienced in the former Soviet Union (by around one-third between 1990 and 2000), following the dismantling of the centrally planned economies (Bolt and van Zanden, 2014). But other regions also experienced disappointing GDP performance during those years. Sub-Saharan Africa, for example, experienced its “lost decades” during the 1980s and 1990s, while Latin America’s growth performance was also quite poor in that period. East Asia, and to a lesser extent, South- and Southeast Asia, were the most dynamic parts of the world economy from the 1960s, although there were exceptions even in these regions: Japan, after catching up in the 1980s, experienced very slow growth since then (Table 3.4).

As described by Maddison (2001; 2003), world leadership in terms of GDP per capita (as well as labour productivity, measured as GDP per hour worked) has changed only a few times: the Netherlands was the productivity leader in the 17th and 18th centuries, until the United Kingdom took over world leadership after about 1780. The United Kingdom was in turn surpassed by the United States between 1870 and 1900, in terms of both GDP per capita and labour productivity. The Trans-Atlantic productivity gap widened substantially between 1900 and 1950, and Western Europe only started to catch up after 1950. The gap in GDP per capita between the United States and Western Europe persisted, however, partly due to higher levels of labour force participation and working hours in the United States (Maddison, 2001).

Table 3.4. GDP per capita in selected countries, 1820-2010

US dollars at 1990 PPPs

Decade	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	2 074	1 874	1 135	..	1 511	..	888	..	..	518	904	1 361	627	683	998	475	740	..	..	745	600	..	..	528	570
1830	2 227	1 893	1 191	..	1 507	..	921	..	..	848	1 000	1 547	..	..	..	..	..	..	..	..	..	..	..	525	..
1840	2 521	2 257	1 428	..	1 537	..	984	..	..	1 374	1 162	1 690	..	..	..	..	..	..	..	736	..	..	..	564	..
1850	2 330	2 355	1 597	1 428	1 481	1 079	1 076	..	..	1 975	1 330	1 849	656	683	1 251	..	..	..	..	654	600	681	..	462	..
1860	2 830	2 392	1 892	1 639	1 459	1 236	1 218	..	..	2 894	1 451	2 241	573	680	1 355	..	..	..	..	812	..	..	..	523	..
1870	3 190	2 755	1 876	1 839	1 542	1 207	1 345	946	..	3 273	1 695	2 445	651	713	1 468	649	825	..	..	807	530	737	533	517	608
1880	3 477	2 927	2 120	1 991	1 589	1 646	1 480	..	..	4 285	1 816	3 184	..	752	1 604	..	..	..	..	1 439	..	863	..	665	..
1890	4 009	3 186	2 376	2 428	1 690	1 624	1 635	1 284	866	4 458	2 378	3 392	976	794	2 416	..	..	..	..	1 148	540	1 012	584	657	784
1900	4 492	3 329	2 876	2 985	1 855	1 786	2 083	1 536	1 196	4 013	2 911	4 091	1 319	678	2 875	..	..	..	..	937	545	1 180	599	734	..
1910	4 611	3 783	2 965	3 348	2 176	1 895	2 543	1 690	1 348	5 210	4 066	4 964	1 694	769	3 822	..	..	..	..	1 151	..	1 304	697	807	..
1920	4 548	4 220	3 227	2 796	2 153	2 177	3 004	..	575	4 766	3 861	5 552	1 823	963	3 473	..	..	..	..	..	..	1 696	635	899	..
1930	5 441	5 603	4 532	3 973	2 631	2 620	4 238	1 994	1 448	4 708	4 811	6 213	1 618	1 048	4 080	..	1 249	..	..	1 413	568	1 850	726	1 087	..
1940	6 856	4 831	4 042	5 403	2 897	2 080	4 855	..	2 144	6 166	5 368	7 010	1 852	1 250	4 161	..	1 675	..	..	2 145	..	2 874	686	1 127	..
1950	6 939	5 996	5 186	3 881	3 172	2 189	6 739	2 447	2 841	7 412	7 291	9 561	2 365	1 672	4 987	910	1 623	651	753	2 535	448	1 921	619	817	817
1960	8 645	8 287	7 398	7 705	5 456	3 072	8 688	3 215	3 945	8 791	8 753	11 328	3 155	2 335	5 559	991	2 247	726	820	3 041	662	3 986	753	1 015	1 078
1970	10 767	11 967	11 410	10 839	9 367	6 319	12 716	4 428	5 575	12 024	12 050	15 030	4 320	3 057	7 302	1 254	3 078	915	1 094	4 045	778	9 714	868	1 231	1 694
1980	12 931	14 705	14 766	14 114	12 927	9 203	14 937	5 740	6 427	14 412	16 176	18 577	6 320	5 195	8 206	2 069	4 022	1 051	1 305	4 390	1 061	13 428	938	1 898	2 554
1990	16 430	17 262	17 647	15 929	16 313	12 055	17 609	5 113	6 894	17 173	18 872	23 201	6 085	4 920	6 433	2 523	5 399	1 117	1 112	3 834	1 871	18 789	1 309	2 514	4 633
2000	21 046	22 148	20 392	18 944	18 761	15 724	20 871	7 309	5 261	21 378	22 488	28 702	7 275	5 418	8 410	3 258	6 502	1 013	1 041	3 920	3 421	20 481	1 882	3 229	6 440
2010	23 777	24 303	21 477	20 661	18 520	16 797	25 306	10 762	8 660	25 584	24 941	30 491	7 716	6 879	10 256	4 267	8 225	1 141	1 876	5 080	8 032	21 935	3 372	4 722	9 372

Note: For an assessment of data quality, see Table 3.1.


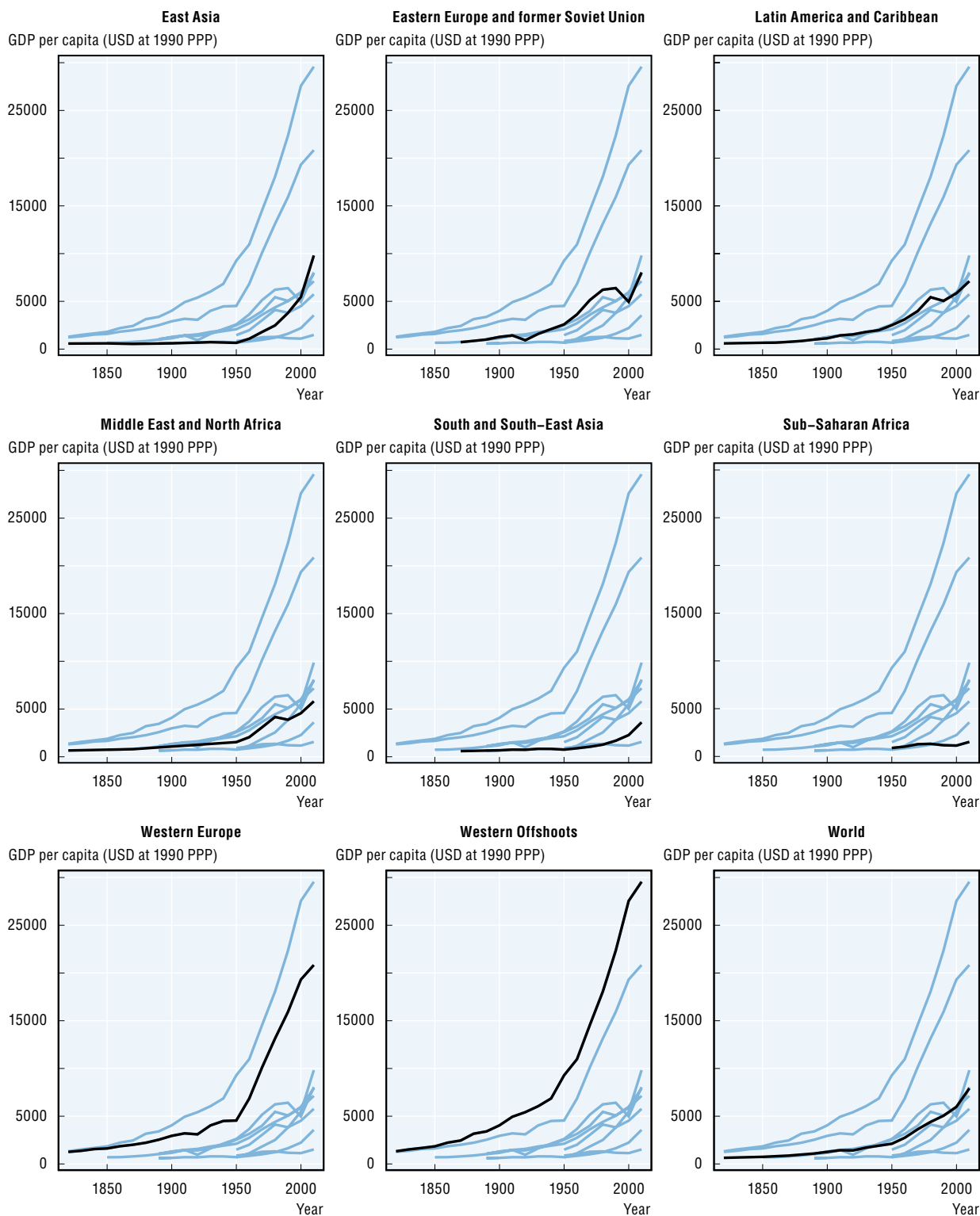

Source: Clio-Infra, www.clio-infra.eu.StatLink  <http://dx.doi.org/10.1787/888933096768>

Figure 3.1. **Regional averages of GDP per capita, 1820-2010**

US dollars at 1990 PPPs



Note: For an assessment of data quality, see Table 3.1.
Source: Clio-Infra, www.clio-infra.eu.

StatLink  <http://dx.doi.org/10.1787/888933095571>

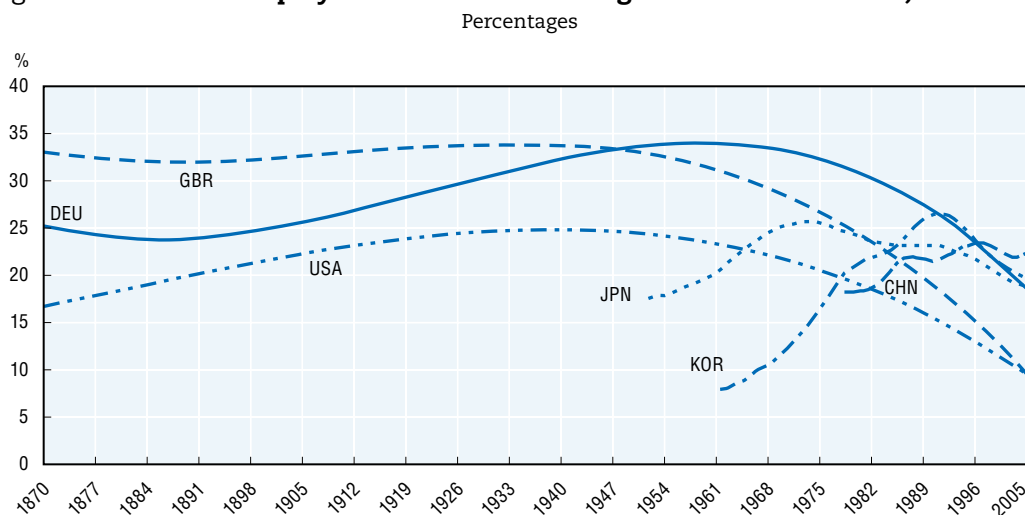
Structural changes

One way of relating technological leadership to changes in production capacity is to look at structural changes in the economy. The share of employment in manufacturing is especially relevant for making an historical analysis of this. This indicator allows us to observe the point at which economies shift from agriculture to manufacturing as the main source of production. This shift of economic activity from agriculture to first manufacturing and later services is one of the main drivers of modern economic growth (Kuznets, 1966).

Consistent information about employment broken down by economic sector is available only for a few countries. Figure 3.2 provides evidence on the world's first industrialising countries, the United Kingdom, the United States and Germany, and the two first industrialising countries in Asia, i.e. Japan and Korea, as well as China. The United Kingdom was the first country to experience a shift to manufacturing, with manufacturing having the largest share of employment already back in 1870 (33%). It was only in the early 1950s that Germany took over in terms of manufacturing's share in employment. While this share continued to grow in Germany or to remain stable in the United Kingdom until 1970, in the United States the share of manufacturing started to decline from the early 1950s onward. Even at its height in 1953, the share of manufacturing in the United States was around six per cent smaller than in the United Kingdom and Germany. Since the 1970s, all three countries have experienced a rapid decrease in the share of people employed in manufacturing.

The Asian countries covered in Figure 3.2 industrialised much later than the Western world. But when industrialisation did start, it proceeded very rapidly. This is the main reason why Asia has been the most dynamic part of the world economy since the 1960s. Japan was the first non-Western country to reach a front position in the world economy, with employment in manufacturing overtaking the United States in the early 1960s, and the United Kingdom in 1980. However, Japan never overtook Germany, whose

Figure 3.2. **Share of employment in manufacturing in selected countries, 1870-2005**



Note: For an assessment of data quality see Table 3.1.

Sources: Broadberry (2005) for the years 1870-1950; the 10-Sector database for 1950-2005, www.rug.nl/research/ggdc/data/10-sector-database; accessed 27 November 2013; World Development indicators for China; the data for Japan, Korea and China are based on Timmer and De Vries (2007); the data for Germany, the United Kingdom and the United States are based on an update of Van Ark (1996).

StatLink  <http://dx.doi.org/10.1787/888933095590>

employment share in manufacturing after the 1970s decreased only slowly. South Korea, with a very low level of manufacturing in the first half of the 20th century, experienced rapid GDP growth after the 1950s, and by the early 1990s had the world's highest employment share in manufacturing. After this, employment in the manufacturing sector decreased nearly as sharply as it had increased prior to the 1990s. For China, data from the second half of the 1970s onwards highlight very rapid growth. China is the only country in this sample that has not (yet) experienced a hump shape in the share of employment in manufacturing. For all other countries, the available historical data show, first, an increase in employment in manufacturing (people moving from agriculture to industry), followed by a decline in employment in manufacturing (as people move out of manufacturing and into services).

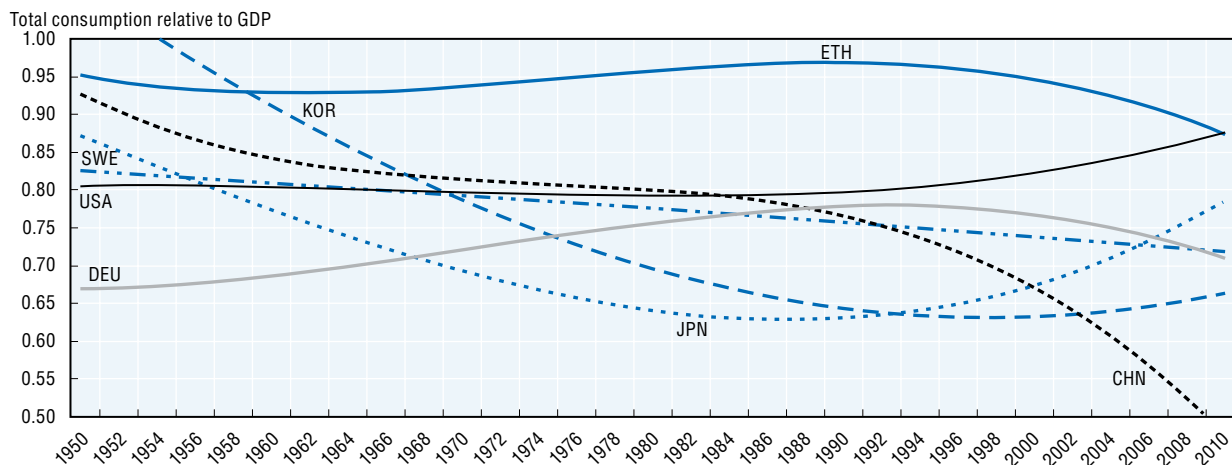
Consumption shares in GDP

Several authors have argued that, from the perspective of current well-being, looking at consumption is more informative than looking at GDP as a whole. Consumer (and government) expenditure on goods and services has a direct link to material welfare, while this link is more indirect in the case of capital formation (investments), and only visible in the long term. Initially, when countries are poor, the share of consumption in GDP will be high, as current needs are met out of the available production. During the initial stages (or catch-up phase) of growth in GDP per capita, a country will need to invest more (Rostow, 1960). This means that fewer economic resources are available for consumption, hence the share of consumption will be lower. This implies that there is a trade-off between current and future consumption possibilities. If we look at this in a longer time perspective, this is exactly the pattern we observe. The Penn World Tables, covering all major countries in the world since the 1950s, show that in 2000 the share of consumer and government expenditure in GDP was on average 81% for low-income countries, whereas this share was 71% for high-income countries. For middle-income countries, this share (at 59%) was even lower than in high-income countries, mainly due to the much higher investment share of these often rapidly-growing economies (Figure 3.3). China is a case in point, and a well-known example of “unbalanced” distribution of GDP: the share of consumption in GDP was only 46% in 2010, while it was as high as 91% in 1952. This reflects China's extremely rapid economic growth in recent decades, the result of a growth strategy that focuses on high levels of capital formation and exports.

Poor countries have a consumption share of 85% or even higher, as in the case of Ethiopia in recent decades (Figure 3.3). When countries start to grow, consumption declines to 75% or even lower. This can be clearly seen in the case of Japan, where consumption shares rapidly declined after 1950, followed by Korea and more recently by China (Figure 3.3). When economies are mature, the consumption rate tends to increase again, as in the case of Japan after 1990, or to remain high, as in the case of the United States and most European countries (e.g. Sweden in Figure 3.3). Germany (also included in the figure) displays a specific pattern compared to the rest of Europe, with a consumption share that was much lower than in other countries in 1950, gains in the following years and declines again at the end of the century, reflecting high shares in investment.

Overall, international disparities in consumption per head are somewhat lower than in terms of GDP per capita, because poor countries tend to invest less and have smaller governments, both of which result in a higher share of consumption in GDP.

Figure 3.3. Share of total consumption in GDP in selected countries, 1950-2010



Note: For an assessment of data quality see Table 3.1.

Source: Penn World Tables 8.0, www.rug.nl/research/ggdc/data/penn-world-table, accessed January 2014.

StatLink  <http://dx.doi.org/10.1787/888933095609>

Priorities for future research

This chapter has presented the main trends in GDP per capita over the past 200 years, including the increase in global between-countries inequality up through the mid-20th century, followed by a slow reversal of that trend thereafter. An important blank spot in our knowledge of long-term economic development is Africa. Currently, most of the available income estimates start only in 1950. A number of scholars are trying to chart developments in economic well-being based on various methods, ranging from reconstructing historical national accounts to estimating real wages. Despite large between-country differences, the general picture painted by these innovative studies suggests that the average level of economic well-being in African countries was above subsistence from the 1870s onwards, and that most countries experienced an improvement until the 1950s. The increase appears to have been the most substantial in West Africa and only modest in most of East Africa, with the notable exception of Mauritius. More work is needed to construct consistent series of GDP for all African countries.

Another priority for further work is the use of the new PPP estimates from the 2005 and 2011 ICP rounds organised by the World Bank, which have produced new sets of PPPs for those years. The debate about the strengths and weaknesses of the 2005 PPPs is still ongoing, while the new 2011 PPPs may help to resolve this discussion and prepare the way for a thorough reassessment of relative levels of economic growth and well-being at the start of the 21st century.

Notes

1. See: Samuelson P. A. and W. D. Nordhaus (2000)
2. The identity between production and income holds only when ignoring the effect of changes in terms of trade (the price of a country's exports relative to its imports) and capital depreciation.
3. Money spent on investment is of course important for future consumption, and hence well-being.
4. See: World Bank, International Comparison Program (ICP).

5. Feenstra, R. C., R. Inklaar and M. P. Timmer (2013).
6. See Bolt, J. and J.L. Van Zanden (2014).
7. Estimates up to 1850 apply to Great Britain, and from 1851 onwards to the United Kingdom.

References

- Ark, B. (1996), "Sectoral Growth Accounting and Structural Change in Post-War Europe", in B. van Ark and N.F.R. Crafts, eds., *Quantitative Aspects of Post-War European Economic Growth*, CEPR/Cambridge University Press, pp. 84-164.
- Bolt, J. and J.L. Van Zanden (2014), The Maddison Project. Collaborative research on historical national accounts, *The Economic History Review*, www.ggdcc.net/maddison/maddison-project/home.htm.
- Broadberry, S. and B. Gupta (2006), "The early modern great divergence: wages, prices and economic development in Europe and Asia, 1500-1800," *Economic History Review*, Vol. 59/1, pp. 2-31.
- Broadberry, S.N. (2005), *The productivity race, British manufacturing in international perspective, 1850-1990* (Cambridge: Cambridge University Press).
- De Vries, G.J., M.P. Timmer, and K. de Vries (2013), "Structural Transformation in Africa: Static gains, dynamic losses," *GGDC research memorandum* 136.
- Feenstra, R.C., R. Inklaar and M.P. Timmer (2013), "The Next Generation of the Penn World Table", <http://www.rug.nl/research/ggdc/data/penn-world-table>.
- Kuznets, S. (1966), *Modern Economic Growth*, Yale University Press, New Haven, CT.
- Lehohla, P. (2008), "Statistical Development in Africa in the Context of the Global Statistical System", *Statistical Journal of the International Association for Official Statistics*, Vol. 25/1, pp. 27-45.
- Li, B., and J.L. van Zanden (2012), "Before the Great Divergence? Comparing the Yangzi Delta and the Netherlands at the Beginning of the Nineteenth Century", *The Journal of Economic History*, Vol. 72, pp. 956-989.
- Maddison, A. (2003), *The World Economy: Historical Statistics*, Development Centre Studies, OECD Publishing, <http://dx.doi.org/10.1787/9789264104143-en>.
- Maddison, A. (2001), *The World Economy: A Millennial Perspective*, Development Centre Studies, OECD Publishing, <http://dx.doi.org/10.1787/9789264189980-en>.
- Nordhaus, W.D. (1999) *The Health of Nations: The Contribution of Improved Health to Living Standards*, Yale University, www.laskerfoundation.org/media/pdf/healthofnations.pdf.
- Nordhaus, W.D. (1996). "Do Real-Output and Real-Wage Measures Capture Reality? The History of Lighting Suggests Not", in T. F. Bresnahan and R. J. Gordon, eds., *The Economics of New Goods*, Vol. 58, 1997, pp. 29-66.
- Parthasarathi, p. (1998), "Rethinking wages and competitiveness in the Eighteenth century: Britain and South India", *Past and Present*, Vol. 158, pp. 79-109.
- Pomeranz, K. (2000), *The Great Divergence. China, Europe and the making of the modern world Economy* (Princeton, 2000).
- Rostow, W. W. (1960), *The Stages of Economic Growth: A Non-Communist Manifesto* (Cambridge: Cambridge University Press).
- Samuelson P.A. and W.D. Nordhaus (2000), United States Department of Commerce Bureau of Economic Analysis *Survey of Current Business: GDP: One of the Great Inventions of the 20th Century*, www.bea.gov/scb/pdf/BEAWIDE/2000/0100od.pdf.
- Timmer, M.P. and G.J. de Vries (2007), "A Cross-Country Database For Sectoral Employment And Productivity In Asia And Latin America, 1950-2005", *GGDC Research memorandum* GD-98, Groningen Growth and Development Centre, August 2007.
- World Bank, International Comparison Program (ICP), <http://icp.worldbank.org/>.