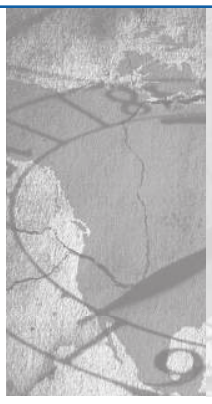

Introduction: A history of the global economy – the 'why' and the 'how'

Joerg Baten

For many years of our recent past, one's country of birth predicted the income and welfare level of the majority of the population: if you were born in a western European country or a country that was a previous European settlement (such as the US), you would be relatively well off by global standards. If you were born in the developing world, this would often not be the case. Many observers perceived this almost as a natural law. Even if that might still hold on average, the rapid rise of income in China and other threshold economies over the last years cast doubt on the persistence of development differences. This is even truer after the recent crisis in Europe and the US and after the reappearance of territorial war in Europe.

To answer today's questions, it is crucial to understand the economic history of the past: which countries developed positively during the various periods of their history? This book of the history of the global economy will trace the developments of many individual countries and their world regions. The ingredients of success (or failure) will be the main focus. What was a good economic policy? Was there investment in education? Was there an absence of war? Were there growth-promoting institutions?

In this volume, twenty-seven authors of various nationalities and intellectual traditions will present the welfare development of the global economy and its components in a concise and accessible way. The authors will reflect on the considerable increase in knowledge of global economic history and the history of world regions that has occurred over previous years, both in the developed world as well as in countries with traditionally lower research density in Africa, the Middle East, Asia and other world regions. A special focus of this volume will be on developing countries that have received less attention in former world economic histories: was, for example, Africa always a continent of relative poverty, or were there periods of economic growth in some of its regions? Why did Asia fall behind in the early nineteenth and twentieth centuries?

This book will concentrate on the period from 1500 until today but with a slightly stronger focus on the recent past. Ten world region chapters will present an economic history in a balanced way. The aim is to write a non-Eurocentric history; hence, the chapters discuss world regions that have an approximately similar population size currently. Each world region chapter will have circa 500 million inhabitants today.[1]

'Interlinking' chapters will summarize some of the core debates and topics studied recently. These interlinking chapters will also take a global perspective on some of the core indicators and growth determinants. In addition, a number of shorter 'highlight' articles will focus on particular topics in economic history that shed light on especially astonishing developments, such as why Ethiopia was not colonized and the productivity of Second World War industry in Japan.

We decided to consider a set of core indicators in the world regions so that a comparative picture emerges. Among these indicators will be estimates of national income. The political and institutional dimension will be represented by an index of democratic possibilities. In addition, recent research has suggested that indicators of nutrition and health are important. Finally educational – and numerical abilities in particular – will be traced. Indicators for these components of development will be described in the following pages. Their major advantages are as follows: (1) they approximate some of the core dimensions of development such as income, political freedom, health and education; (2) and they are available for a large number of countries also located outside the Western world and for almost the whole nineteenth and twentieth centuries (and often earlier).[2]

In particular, the long-term history of developing countries sometimes required the use of new proxy indicators that are less obvious in their informative values or in the possibility to measure them with a sufficient degree of precision. We will therefore discuss their plausibility in detail in the following.

Gross domestic product (GDP) as an indicator of productive capacity

One indicator that seems not to need much introduction is gross domestic product per capita (GDP/c). This is the total national income of a country, divided by its population, following internationally established rules to measure it. GDP has many advantages: it measures the people's command over produced goods and services. These not only provide direct utility to human beings, but they can also be used indirectly to improve health and education, which again enhances well-being and utility in the future (Bolt *et al.* 2014). Hence, the growth of GDP per capita over the last two centuries in many world regions had important consequences for the standard of living. Looking at various countries, it becomes clear in this volume that lower growth in GDP in many of them caused dissatisfaction in their inhabitants.

In sum, GDP per capita is one of the most important concepts for tracing the development of the global economy. Why, then, should we consider other indicators at all? There are several reasons why GDP should be complemented with other measures of well-being. First, the rules for measuring GDP were designed for recent decades (especially the period after the 1960s). For example, it is more difficult to estimate GDP for the UK in 1800 than in 1960 or for Malawi in 1800.

Second, one big challenge is to construct informative series of prices over long periods, often with large gaps in existing historical sources and documents. A major problem is also the appearance of new products: what would have been the price of an iPhone in 1800? Economists have invested significant thought in these problems and have devised convincing strategies, but any reader of economic history must be aware that a national income estimate in 1800 does not necessarily have the same informative value as a GDP estimate of 2014. Hence, it is helpful to complement it with other measures. Third, while higher income can be used to improve health and education, this was obviously not always achieved in human history. Also, rising inequalities within countries sometimes resulted in lower welfare for the poorer part of the population, while average GDP per capita was increasing. One strategy of economic historians has been to compare other indicators of welfare to countercheck GDP estimates, which we will discuss below.

Height as an indicator of health and the quality of nutrition

Human stature is now a well-established indicator for the so-called 'biological standard of living', positively correlated as it is, along with good health and longevity, with a nutritious diet.[3] In the 1980s, Robert F. Fogel, Richard Steckel and John Komlos pioneered its use in the field of economic history, and a large body of literature in this and other fields has emerged since (Baten and Blum 2014a, Floud *et al.* 1990, Harris 1994, Komlos and Baten 2004, Moradi and Baten 2005, Steckel 2009). Anthropometric studies of individual countries have made a significant contribution to social-welfare economics over the past several decades, particularly in developing countries hitherto neglected because reliable data were lacking, but also in the developed world.

If economists are coming to use height as a valid complement to conventional welfare indicators, this is because it has some specific advantages. A given income level permits the purchase of a given quality as well as quantity of food and medical services, and is thereby correlated with health, which in turn is correlated with height. However, this income–height correlation is not one-to-one, modified as it is by important inputs not traded in the marketplace, but provided as public goods, such as infant-nutrition programmes and public hospitals, which account for slight deviations between purchasing power-based and height-based measures of biological well-being. While height is not without its deficiencies as a measure of the standard of living of a given population, it generates insights into global changes, and is particularly valuable as a countercheck as well as a complement to conventional indicators, permitting more reliable results than might otherwise be the case.

Life expectancy is among the many health indicators with which height is positively correlated. Having analysed height data for the birth cohorts of 1860,

1900 and 1950, Baten and Komlos (1998) concluded that every centimetre above and beyond a given population's average height translates into a life-expectancy increase of 1.2 years. Thus a mere half-centimetre deviation from the average is significant, representing as it does six months of life.

The question of what role genetics, as well as nutrition, may play in determining a given population's average height was often raised in the early years of anthropometric research. It turns out that while genes are a key determinant of an individual's height, when it comes to groups of individuals genetic deviations from the mean cancel each other out. Moreover, there is considerable evidence that it is environmental conditions, not genes, which account for most of today's height gap between rich and poor populations, including those inhabiting a single nation. Habicht *et al.* (1974), for example, found that the height gap between the rich and poor sectors of a less-developed country (LDC), Nigeria, was even wider than that between an LDC's elite and a reference population in the US (see also Fiawoo 1979 on Ghana; Graitcer and Gentry 1981 on Egypt, Haiti, and Togo). What is more, the height-distribution percentiles for children from rich families in this last study are in line with those for a rich country, namely the US. Of course, not all height differentials are due exclusively to environmental conditions: African bushmen and pygmies, for example, spring to mind, although they account for only a small percentage of their respective nations' populations. However, after taking into account protein availability, disease environment, lactose tolerance and food preferences (especially in more affluent countries) the height impact of 'race' seems rather small.

One important issue for all historical indicators, but the recently developed height indicator in particular, are selectivities of the sources. Some of the sources used are samples, and it has to be assessed whether those are a representative mirror of the underlying population, or whether they might be a selected group. How substantial are these issues in the studies used? First, some typically biased samples – such as samples of students – were not included in the national height estimates considered in our study. In general, preference was given to military conscript samples and systematic anthropological measurements. The military conscript samples became available after the concept of general conscription in the French revolutionary and Napoleonic armies spread throughout continental Europe around 1800. Typically, every male of a certain age was measured and medically examined (thereafter, the lot determined who joined the army). The files recorded everyone's height.[4] Hence, height estimates based on this system are more representative than volunteer armies. Measurements recorded by scholarly anthropologists were normally also a very comprehensive source with little underlying social selectivity. However, the earliest anthropological measurements of the late nineteenth century were sometimes more difficult to use because they were often quite localized. Only if a country was documented by a large number of

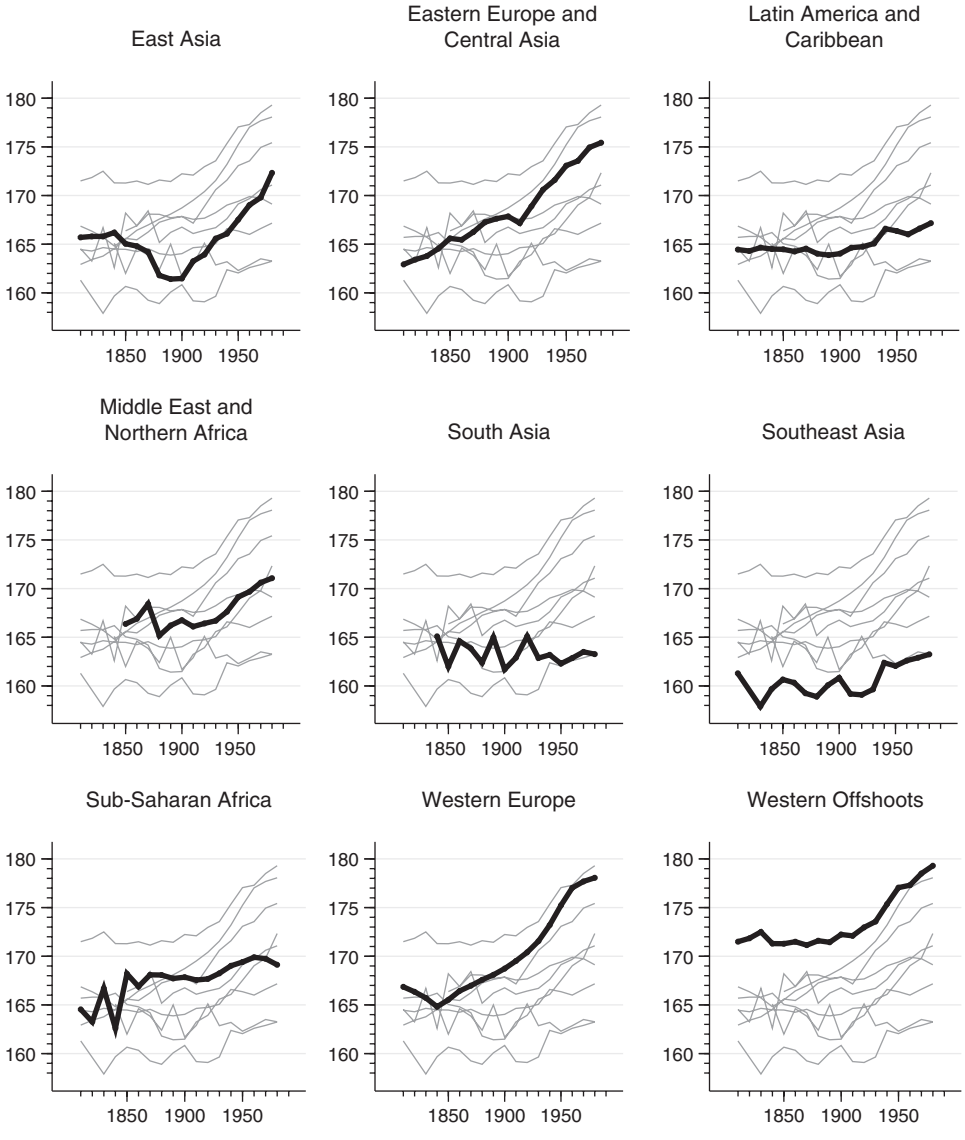

Figure I.1 Global height trends (males)
Source: modified from Baten and Blum (2014b).

regional measurements (representing the various regions) could representativeness for national means be assumed.[5] For some countries and periods, only samples of prisoners, slaves and volunteer soldiers were available. In those cases, selectivities were slightly more difficult to assess. However, for most of the

countries, several sources were available, and hence a comparison of height trends and levels recorded in different contexts was possible. Baten and Blum (2014a) also ensured that no substantial regional biases were present in the height series that was ultimately selected for a specific country (especially in large countries where regional height differences can be substantial). One obvious problem in volunteer armies and prison samples is the dependence on the opportunity costs as determined by the labour market. The preferred strategy in this case was to assess height samples that were recorded for only one year (or for a short span of time, such as the US Civil War 1861–65) and that contained different age groups. This allowed to keep the labour market conditions constant at the time of recruitment so that height, when organized by birth cohort, could be analyzed.

Estimates of world-region trends for the entire 1810–1989 period indicate that the Anglo-Saxon settlements had very high anthropometric values for much of the period under study, not converging with lower ones until the late nineteenth century, and then only moderately (Figure I.1). Both western Europe and those countries in eastern Europe and central Asia that had ever experienced socialist rule recorded a strong upward trend after the 1880s. In contrast, levels in Latin America, the Middle East, and north Africa were at relatively high levels in the nineteenth century but during the twentieth century experienced only modest increases. East Asia and Sub-Saharan Africa remained near the global average throughout the entire period, except East Asia during the late nineteenth century. Africa is the only world region in which the average height has steadily declined over the last two decades (Moradi 2009). Finally, both South and Southeast Asia remained at a low level throughout the period under study (Brennan *et al.* 1994; Guntupalli and Baten 2006). In sum, we find that after the 1880s global heights increased on average, but also became more unequal.

We would like to end this overview with an example of research on the economic history of today's developing countries in which anthropometric measures provided new insights. In the economic history of the Middle East, for example, evidence on welfare is particularly difficult to obtain. After reading studies on the deindustrialization of this world region, it was difficult to understand why the governments did not attempt a more protectionist trade policy and why they were not even alarmed. However, looking at anthropometric evidence about relatively high biological welfare levels around the mid-nineteenth century in the Middle East, it became obvious that at first there were no alarm signals from this side (this will be further discussed in Chapter 7 by Ghanem and Baten and in the Interlinking Chapter 5/6 by Williamson).

Basic numeracy as an indicator of education

A considerable number of recent studies have used a proxy of basic numeracy that is based on the so-called 'age-heaping' technique. This is the share of people who

were most likely able to report their exact age (with an annual resolution) rather than providing a rounded 'heaped' age. The age-heaping phenomenon applies to historical populations (as well as people in the poorest countries today) when a substantial share of the people were not able to state their exact age and instead gave responses, such as 'I am 30', when they were in fact 29 or 31 (A'Hearn *et al.* 2009).[6]

Duncan-Jones (1990) employed this technique to study age data from Roman tombstones. Mokyr (1983) suggested utilizing the age-heaping measure as an explicit numeracy indicator in economic history. He employed the degree of age-heaping to assess the labour-quality effect of emigration on the Irish home economy during the first half of the nineteenth century, as emigrants from pre-famine Ireland were less sophisticated than those who stayed behind.[7]

A'Hearn *et al.* (2009) found that the relationship between illiteracy and numeracy for LDCs after 1950 is very close. They calculated both measures for not less than 270,000 individuals who were organized by 416 regions, ranging from Latin America to Oceania. The correlation coefficient with illiteracy was as high as 0.7. The correlation with the PISA results for numerical skills was even as high as 0.85; hence, the ABCC numeracy index is more strongly correlated with numerical skills. They also employed a large US census sample to perform a very detailed analysis of this relationship. They subdivided by race, gender, high and low educational status and other criteria. In each case, A'Hearn *et al.* obtained a statistically significant relationship. Remarkable also is the fact that the coefficients are relatively stable between samples, i.e., a unit change in numeracy is associated with similar changes in literacy across the various tests. The results are not only valid for the US: in any country with substantial age-heaping that has been studied so far, the correlation was both statistically and economically significant.

To assess the robustness of those US census results and the similar conclusions that could be drawn from the LDCs of the late twentieth century, A'Hearn *et al.* (2009) also assessed numeracy and literacy in sixteen different European countries between the Middle Ages and the early nineteenth century. Again, they found a positive correlation between age-heaping and literacy.

There remains some uncertainty about whether age-heaping in the sources contains information about the numeracy of the responding individual, or rather about the diligence of the reporting personnel who wrote down the statements. The age data of the relevant age groups were normally derived from statements from the person himself or herself. However, it is possible that a second party, especially the husband, may have made or influenced the age statement, or even that the enumerator estimated the age without asking the individual. If the latter occurred, we would not be able to measure the numeracy of the person interviewed. In contrast, if the enumerator asked and obtained no response, a round age estimated by him would still measure basic numeracy correctly. A large body of literature has investigated the

issue of other persons reporting. Recently, Friesen *et al.* (2013) compared systematically the evidence of a gender gap in numeracy and in literacy for the late nineteenth century and early twentieth century and found a strong correlation between countries. They argued that there is no reason why the misreporting of literacy and age should have yielded exactly the same gap between genders. A more likely explanation is that the well-known correlation between numeracy and literacy also applies to gender differences.

There are various examples of how age-heaping based on estimates of numeracy have improved our understanding of long-term development. One example is the relative decline of numeracy that took place in Latin America and China during the nineteenth century: Latin America had a steep increase in numeracy in the eighteenth century and China had already reached a high level by this time. But during the mid- to late-nineteenth century, both world regions experienced declining or stagnating numeracy, whereas in western Europe and North America levels remained high or increased. This might have contributed to the failure of China and Latin America of participating in the second Industrial Revolution, which depended strongly on abilities in science and mathematics as those were necessary to develop the new chemical and electrical industries.

In sum, age-heaping-based numeracy estimates education and, in particular, is a proxy for numerical skills. As such, it is an important component of human capital and a precondition for more advanced skills. A perfect human capital measure would be a composite index of basic and advanced text-related skills, of basic and advanced numerical skills, of technological skills, of social and organizational creativity and perhaps of other components. However, given that such perfect composite indexes are impossible to construct in most real world situations, scholars often use proxy indicators for more broad concepts. Numeracy has the additional advantage that it is particularly growth-relevant (see Interlinking Chapter I.2 by Baten).

The polity IV index as an indicator of democracy

Marshall *et al.* (2009) suggested approximating the development of democratic values with the polity IV dataset. In this dataset, countries are characterized by a score between +10 (fully democratic) and −10 (fully autocratic). The score is actually a composite index that is based on six component variables because the authors argue that political participation is not only a suffrage right but also access to executive function and constraining mechanisms. Among the six components, there are three that relate to the access possibilities to executive functions in the government: (1) how is the recruitment of the chief executive regulated? (2) Is the recruitment of executives in general competitive, or is it clear from the beginning who will obtain power? (3) How open is executive recruitment? Next, there is a variable (4) that considers the constraints of the executive: can the government

executive act at will, or do other political bodies and institutions constrain their activities? Finally, the last two components indicate whether participation in elections is (5) regulated and (6) competitive. Each of the six components is characterized with a numerical index value, and the final polity IV measure is the average of these individual component values.

In many cases, these six variables tend to be correlated with each other. However, there are also cases, for example, in which 'show-case' elections are held, whereas the access to executive power is de facto in the hands of a political or ethnic group; this reduces the democratic value of elections greatly, of course.

In the economic history literature, the component of 'constraining the executive' has received particular attention; Acemoglu *et al.* (2001) argued that an unconstrained executive is more likely to expropriate business enterprises and to develop a climate that is not growth promoting. Therefore, there are at least two dimensions that make this variable so important in our volume: the growth-retarding function of unconstrained executives but also the more general welfare function of democratic participation. The world region trends are characterized by an early lead of the 'Western offshoots', and substantial variability during the twentieth century (Figure I.2).

In sum, this set of four variables allows us to provide evidence on income, health, education and democracy in a large number of countries over past

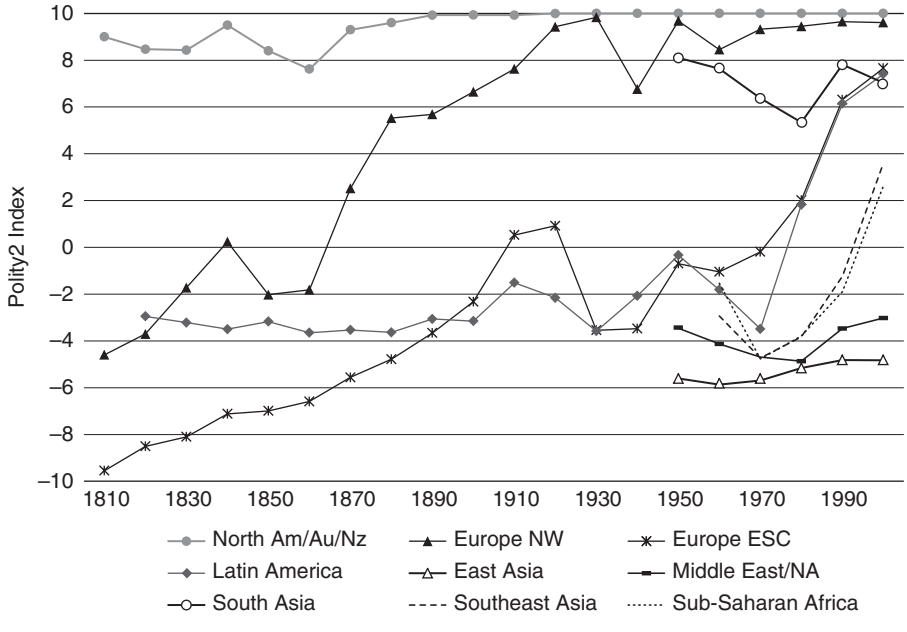

Figure I.2 Regional averages of democracy scores (polity2), 1810–2000s
Source: based on Marshall, Jaggers and Gurr (2011). 'Western offshoots' includes North America, Australia and New Zealand, 'NW' means north-west; 'ESC' means East–South–Central.

centuries. While the indicators are not without potential problems, they allow us to trace a global economic history even for world regions that received less attention before, such as Africa, Asia and Latin America. Of course, these four indicators are not appropriate for all countries and world regions, hence they are not all employed in each chapter. The chapters also differ intentionally in their focus on historical description (of which more is included in Chapter 2, on eastern, southern and central Europe) or historical analysis (north-western Europe, for example), because some world regions such as the latter have been described by many previous authors, hence the descriptive part can be slightly shorter here.

Clearly, there are many measurement issues if these indicators are estimated for individual countries and world regions. In a relatively short book, not all country-specific issues can be discussed. Some general issues have been addressed in this short introduction. Readers who would like to learn more about the data quality and data availability in individual countries can obtain more information using the internet platform www.clio-infra.eu and the recent book by van Zanden *et al.* (2014).

How was the group of twenty-seven authors of this volume formed? An important institution in the discipline of economic history is its global organization, the International Economic History Association (IEHA). This institution was founded in the early 1960s and regularly organizes world congresses.[8] The authors of this volume meet regularly at these occasions, and the idea to write a balanced history of the global economy was born at one of its meetings (in the Executive Committee); the Secretary General at that time (Joerg Baten) was asked to realize the creation of this volume, acting as editor. Cambridge University Press and its history editor, Michael Watson, agreed to publish the book, for which we are very thankful, and our thanks also go to several readers who reflected on both the initial proposal as well as the whole book manuscript, and to Sevket Pamuk for his comments on the Middle East chapter. Last but not least, we thank all participants at world congresses and all students of economic history for their important input in this volume.

Notes

1. Only China and South Asia are substantially above average as large countries cannot be appropriately split. Chapters on Japan and China were introduced separately. One world region is slightly smaller than the average: north-western Europe. However, as it is likely that much more than half of the whole economic history literature refers to this region, we think that this exception is justified.
2. The historical values for countries whose size changed over time will refer generally to current territory (to make long-run comparisons possible). All world regions and the global average are weighted by their corresponding population size. Additional indicators of development – which will be discussed if evidence is available – are life expectancy, real wages, school enrolment, war and civil war occurrence and others.