

# CAPITAL IN THE TWENTY-FIRST CENTURY

Thomas Piketty

*Translated by Arthur Goldhammer*

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## *Income and Output*

On August 16, 2012, the South African police intervened in a labor conflict between workers at the Marikana platinum mine near Johannesburg and the mine's owners: the stockholders of Lonmin, Inc., based in London. Police fired on the strikers with live ammunition. Thirty-four miners were killed.<sup>1</sup> As often in such strikes, the conflict primarily concerned wages: the miners had asked for a doubling of their wage from 500 to 1,000 euros a month. After the tragic loss of life, the company finally proposed a monthly raise of 75 euros.<sup>2</sup>

This episode reminds us, if we needed reminding, that the question of what share of output should go to wages and what share to profits—in other words, how should the income from production be divided between labor and capital?—has always been at the heart of distributional conflict. In traditional societies, the basis of social inequality and most common cause of rebellion was the conflict of interest between landlord and peasant, between those who owned land and those who cultivated it with their labor, those who received land rents and those who paid them. The Industrial Revolution exacerbated the conflict between capital and labor, perhaps because production became more capital intensive than in the past (making use of machinery and exploiting natural resources more than ever before) and perhaps, too, because hopes for a more equitable distribution of income and a more democratic social order were dashed. I will come back to this point.

The Marikana tragedy calls to mind earlier instances of violence. At Haymarket Square in Chicago on May 1, 1886, and then at Fourmies, in northern France, on May 1, 1891, police fired on workers striking for higher wages. Does this kind of violent clash between labor and capital belong to the past, or will it be an integral part of twenty-first-century history?

The first two parts of this book focus on the respective shares of global income going to labor and capital and on how those shares have changed since the eighteenth century. I will temporarily set aside the issue of income inequality between workers (for example, between an ordinary worker, an engineer,

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and a plant manager) and between capitalists (for example, between small, medium, and large stockholders or landlords) until Part Three. Clearly, each of these two dimensions of the distribution of wealth—the “factorial” distribution in which labor and capital are treated as “factors of production,” viewed in the abstract as homogeneous entities, and the “individual” distribution, which takes account of inequalities of income from labor and capital at the individual level—is in practice fundamentally important. It is impossible to achieve a satisfactory understanding of the distributional problem without analyzing both.<sup>3</sup>

In any case, the Marikana miners were striking not only against what they took to be Lonmin’s excessive profits but also against the apparently fabulous salary awarded to the mine’s manager and the difference between his compensation and theirs.<sup>4</sup> Indeed, if capital ownership were equally distributed and each worker received an equal share of profits in addition to his or her wages, virtually no one would be interested in the division of earnings between profits and wages. If the capital-labor split gives rise to so many conflicts, it is due first and foremost to the extreme concentration of the ownership of capital. Inequality of wealth—and of the consequent income from capital—is in fact always much greater than inequality of income from labor. I will analyze this phenomenon and its causes in Part Three. For now, I will take the inequality of income from labor and capital as given and focus on the global division of national income between capital and labor.

To be clear, my purpose here is not to plead the case of workers against owners but rather to gain as clear as possible a view of reality. Symbolically, the inequality of capital and labor is an issue that arouses strong emotions. It clashes with widely held ideas of what is and is not just, and it is hardly surprising if this sometimes leads to physical violence. For those who own nothing but their labor power and who often live in humble conditions (not to say wretched conditions in the case of eighteenth-century peasants or the Marikana miners), it is difficult to accept that the owners of capital—some of whom have inherited at least part of their wealth—are able to appropriate so much of the wealth produced by their labor. Capital’s share can be quite large: often as much as one-quarter of total output and sometimes as high as one-half in capital-intensive sectors such as mining, or even more where local monopolies allow the owners of capital to demand an even larger share.

Of course, everyone can also understand that if all the company’s earnings from its output went to paying wages and nothing to profits, it would proba-

bly be difficult to attract the capital needed to finance new investments, at least as our economies are currently organized (to be sure, one can imagine other forms of organization). Furthermore, it is not necessarily just to deny any remuneration to those who choose to save more than others—assuming, of course, that differences in saving are an important reason for the inequality of wealth. Bear in mind, too, that a portion of what is called “the income of capital” may be remuneration for “entrepreneurial” labor, and this should no doubt be treated as we treat other forms of labor. This classic argument deserves closer scrutiny. Taking all these elements into account, what is the “right” split between capital and labor? Can we be sure that an economy based on the “free market” and private property always and everywhere leads to an optimal division, as if by magic? In an ideal society, how would one arrange the division between capital and labor? How should one think about the problem?

*The Capital-Labor Split in the Long Run: Not So Stable*

If this study is to make even modest progress on these questions and at least clarify the terms of a debate that appears to be endless, it will be useful to begin by establishing some facts as accurately and carefully as possible. What exactly do we know about the evolution of the capital-labor split since the eighteenth century? For a long time, the idea accepted by most economists and uncritically repeated in textbooks was that the relative shares of labor and capital in national income were quite stable over the long run, with the generally accepted figure being two-thirds for labor and one-third for capital.<sup>5</sup> Today, with the advantage of greater historical perspective and newly available data, it is clear that the reality was quite a bit more complex.

For one thing, the capital-labor split varied widely over the course of the twentieth century. The changes observed in the nineteenth century, which I touched on in the Introduction (an increase in the capital share in the first half of the century, followed by a slight decrease and then a period of stability), seem mild by comparison. Briefly, the shocks that buffeted the economy in the period 1914–1945—World War I, the Bolshevik Revolution of 1917, the Great Depression, World War II, and the consequent advent of new regulatory and tax policies along with controls on capital—reduced capital’s share of income to historically low levels in the 1950s. Very soon, however, capital

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began to reconstitute itself. The growth of capital's share accelerated with the victories of Margaret Thatcher in England in 1979 and Ronald Reagan in the United States in 1980, marking the beginning of a conservative revolution. Then came the collapse of the Soviet bloc in 1989, followed by financial globalization and deregulation in the 1990s. All of these events marked a political turn in the opposite direction from that observed in the first half of the twentieth century. By 2010, and despite the crisis that began in 2007–2008, capital was prospering as it had not done since 1913. Not all of the consequences of capital's renewed prosperity were negative; to some extent it was a natural and desirable development. But it has changed the way we look at the capital-labor split since the beginning of the twenty-first century, as well as our view of changes likely to occur in the decades to come.

Furthermore, if we look beyond the twentieth century and adopt a very long-term view, the idea of a stable capital-labor split must somehow deal with the fact that the nature of capital itself has changed radically (from land and other real estate in the eighteenth century to industrial and financial capital in the twenty-first century). There is also the idea, widespread among economists, that modern economic growth depends largely on the rise of "human capital." At first glance, this would seem to imply that labor should claim a growing share of national income. And one does indeed find that there may be a tendency for labor's share to increase over the very long run, but the gains are relatively modest: capital's share (excluding human capital) in the early decades of the twenty-first century is only slightly smaller than it was at the beginning of the nineteenth century. The importance of capital in the wealthy countries today is primarily due to a slowing of both demographic growth and productivity growth, coupled with political regimes that objectively favor private capital.

The most fruitful way to understand these changes is to analyze the evolution of the capital/income ratio (that is, the ratio of the total stock of capital to the annual flow of income) rather than focus exclusively on the capital-labor split (that is, the share of income going to capital and labor, respectively). In the past, scholars have mainly studied the latter, largely owing to the lack of adequate data to do anything else.

Before presenting my results in detail, it is best to proceed by stages. The purpose of Part One of this book is to introduce certain basic notions. In the remainder of this chapter, I will begin by presenting the concepts of domestic product and national income, capital and labor, and the capital/income ratio.

Then I will look at how the global distribution of income has changed since the Industrial Revolution. In Chapter 2, I will analyze the general evolution of growth rates over time. This will play a central role in the subsequent analysis.

With these preliminaries out of the way, Part Two takes up the dynamics of the capital/income ratio and the capital-labor split, once again proceeding by stages. Chapter 3 will look at changes in the composition of capital and the capital/income ratio since the eighteenth century, beginning with Britain and France, about which we have the best long-run data. Chapter 4 introduces the German case and above all looks at the United States, which serves as a useful complement to the European prism. Finally, Chapters 5 and 6 attempt to extend the analysis to all the rich countries of the world and, insofar as possible, to the entire planet. I also attempt to draw conclusions relevant to the global dynamics of the capital/income ratio and capital-labor split in the twenty-first century.

### *The Idea of National Income*

It will be useful to begin with the concept of “national income,” to which I will frequently refer in what follows. National income is defined as the sum of all income available to the residents of a given country in a given year, regardless of the legal classification of that income.

National income is closely related to the idea of GDP, which comes up often in public debate. There are, however, two important differences between GDP and national income. GDP measures the total of goods and services produced in a given year within the borders of a given country. In order to calculate national income, one must first subtract from GDP the depreciation of the capital that made this production possible: in other words, one must deduct wear and tear on buildings, infrastructure, machinery, vehicles, computers, and other items during the year in question. This depreciation is substantial, today on the order of 10 percent of GDP in most countries, and it does not correspond to anyone’s income: before wages are distributed to workers or dividends to stockholders, and before genuinely new investments are made, worn-out capital must be replaced or repaired. If this is not done, wealth is lost, resulting in negative income for the owners. When depreciation is subtracted from GDP, one obtains the “net domestic product,” which I will refer

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to more simply as “domestic output” or “domestic production,” which is typically 90 percent of GDP.

Then one must add net income received from abroad (or subtract net income paid to foreigners, depending on each country’s situation). For example, a country whose firms and other capital assets are owned by foreigners may well have a high domestic product but a much lower national income, once profits and rents flowing abroad are deducted from the total. Conversely, a country that owns a large portion of the capital of other countries may enjoy a national income much higher than its domestic product.

Later I will give examples of both of these situations, drawn from the history of capitalism as well as from today’s world. I should say at once that this type of international inequality can give rise to great political tension. It is not an insignificant thing when one country works for another and pays out a substantial share of its output as dividends and rent to foreigners over a long period of time. In many cases, such a system can survive (to a point) only if sustained by relations of political domination, as was the case in the colonial era, when Europe effectively owned much of the rest of the world. A key question of this research is the following: Under what conditions is this type of situation likely to recur in the twenty-first century, possibly in some novel geographic configuration? For example, Europe, rather than being the owner, may find itself owned. Such fears are currently widespread in the Old World—perhaps too widespread. We shall see.

At this stage, suffice it to say that most countries, whether wealthy or emergent, are currently in much more balanced situations than one sometimes imagines. In France as in the United States, Germany as well as Great Britain, China as well as Brazil, and Japan as well as Italy, national income is within 1 or 2 percent of domestic product. In all these countries, in other words, the inflow of profits, interest, dividends, rent, and so on is more or less balanced by a comparable outflow. In wealthy countries, net income from abroad is generally slightly positive. To a first approximation, the residents of these countries own as much in foreign real estate and financial instruments as foreigners own of theirs. Contrary to a tenacious myth, France is not owned by California pension funds or the Bank of China, any more than the United States belongs to Japanese and German investors. The fear of getting into such a predicament is so strong today that fantasy often outstrips reality. The reality is that inequality with respect to capital is a far greater domestic issue than it is an international one. Inequality in the ownership of capital brings the rich and poor within each country into

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conflict with one another far more than it pits one country against another. This has not always been the case, however, and it is perfectly legitimate to ask whether our future may not look more like our past, particularly since certain countries—Japan, Germany, the oil-exporting countries, and to a lesser degree China—have in recent years accumulated substantial claims on the rest of the world (though by no means as large as the record claims of the colonial era). Furthermore, the very substantial increase in cross-ownership, in which various countries own substantial shares of one another, can give rise to a legitimate sense of dispossession, even when net asset positions are close to zero.

To sum up, a country's national income may be greater or smaller than its domestic product, depending on whether net income from abroad is positive or negative.

National income = domestic output + net income from abroad<sup>6</sup>

At the global level, income received from abroad and paid abroad must balance, so that income is by definition equal to output:

Global income = global output<sup>7</sup>

This equality between two annual flows, income and output, is an accounting identity, yet it reflects an important reality. In any given year, it is impossible for total income to exceed the amount of new wealth that is produced (globally speaking; a single country may of course borrow from abroad). Conversely, all production must be distributed as income in one form or another, to either labor or capital: whether as wages, salaries, honoraria, bonuses, and so on (that is, as payments to workers and others who contributed labor to the process of production) or else as profits, dividends, interest, rents, royalties, and so on (that is, as payments to the owners of capital used in the process of production).

### *What Is Capital?*

To recapitulate: regardless of whether we are looking at the accounts of a company, a nation, or the global economy, the associated output and income can be decomposed as the sum of income to capital and income to labor:

National income = capital income + labor income

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But what is capital? What are its limits? What forms does it take? How has its composition changed over time? This question, central to this investigation, will be examined in greater detail in subsequent chapters. For now it will suffice to make the following points:

First, throughout this book, when I speak of “capital” without further qualification, I always exclude what economists often call (unfortunately, to my mind) “human capital,” which consists of an individual’s labor power, skills, training, and abilities. In this book, capital is defined as the sum total of nonhuman assets that can be owned and exchanged on some market. Capital includes all forms of real property (including residential real estate) as well as financial and professional capital (plants, infrastructure, machinery, patents, and so on) used by firms and government agencies.

There are many reasons for excluding human capital from our definition of capital. The most obvious is that human capital cannot be owned by another person or traded on a market (not permanently, at any rate). This is a key difference from other forms of capital. One can of course put one’s labor services up for hire under a labor contract of some sort. In all modern legal systems, however, such an arrangement has to be limited in both time and scope. In slave societies, of course, this is obviously not true: there, a slaveholder can fully and completely own the human capital of another person and even of that person’s offspring. In such societies, slaves can be bought and sold on the market and conveyed by inheritance, and it is common to include slaves in calculating a slaveholder’s wealth. I will show how this worked when I examine the composition of private capital in the southern United States before 1865. Leaving such special (and for now historical) cases aside, it makes little sense to attempt to add human and nonhuman capital. Throughout history, both forms of wealth have played fundamental and complementary roles in economic growth and development and will continue to do so in the twenty-first century. But in order to understand the growth process and the inequalities it engenders, we must distinguish carefully between human and nonhuman capital and treat each one separately.

Nonhuman capital, which in this book I will call simply “capital,” includes all forms of wealth that individuals (or groups of individuals) can own and that can be transferred or traded through the market on a permanent basis. In practice, capital can be owned by private individuals (in which case we speak of “private capital”) or by the government or government agencies

(in which case we speak of “public capital”). There are also intermediate forms of collective property owned by “moral persons” (that is, entities such as foundations and churches) pursuing specific aims. I will come back to this. The boundary between what private individuals can and cannot own has evolved considerably over time and around the world, as the extreme case of slavery indicates. The same is true of property in the atmosphere, the sea, mountains, historical monuments, and knowledge. Certain private interests would like to own these things, and sometimes they justify this desire on grounds of efficiency rather than mere self-interest. But there is no guarantee that this desire coincides with the general interest. Capital is not an immutable concept: it reflects the state of development and prevailing social relations of each society.

### *Capital and Wealth*

To simplify the text, I use the words “capital” and “wealth” interchangeably, as if they were perfectly synonymous. By some definitions, it would be better to reserve the word “capital” to describe forms of wealth accumulated by human beings (buildings, machinery, infrastructure, etc.) and therefore to exclude land and natural resources, with which humans have been endowed without having to accumulate them. Land would then be a component of wealth but not of capital. The problem is that it is not always easy to distinguish the value of buildings from the value of the land on which they are built. An even greater difficulty is that it is very hard to gauge the value of “virgin” land (as humans found it centuries or millennia ago) apart from improvements due to human intervention, such as drainage, irrigation, fertilization, and so on. The same problem arises in connection with natural resources such as petroleum, gas, rare earth elements, and the like, whose pure value is hard to distinguish from the value added by the investments needed to discover new deposits and prepare them for exploitation. I therefore include all these forms of wealth in capital. Of course, this choice does not eliminate the need to look closely at the origins of wealth, especially the boundary line between accumulation and appropriation.

Some definitions of “capital” hold that the term should apply only to those components of wealth directly employed in the production process. For instance, gold might be counted as part of wealth but not of capital, because

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gold is said to be useful only as a store of value. Once again, this limitation strikes me as neither desirable nor practical (because gold can be a factor of production, not only in the manufacture of jewelry but also in electronics and nanotechnology). Capital in all its forms has always played a dual role, as both a store of value and a factor of production. I therefore decided that it was simpler not to impose a rigid distinction between wealth and capital.

Similarly, I ruled out the idea of excluding residential real estate from capital on the grounds that it is “unproductive,” unlike the “productive capital” used by firms and government: industrial plants, office buildings, machinery, infrastructure, and so on. The truth is that all these forms of wealth are useful and productive and reflect capital’s two major economic functions. Residential real estate can be seen as a capital asset that yields “housing services,” whose value is measured by their rental equivalent. Other capital assets can serve as factors of production for firms and government agencies that produce goods and services (and need plants, offices, machinery, infrastructure, etc. to do so). Each of these two types of capital currently accounts for roughly half the capital stock in the developed countries.

To summarize, I define “national wealth” or “national capital” as the total market value of everything owned by the residents and government of a given country at a given point in time, provided that it can be traded on some market.<sup>8</sup> It consists of the sum total of nonfinancial assets (land, dwellings, commercial inventory, other buildings, machinery, infrastructure, patents, and other directly owned professional assets) and financial assets (bank accounts, mutual funds, bonds, stocks, financial investments of all kinds, insurance policies, pension funds, etc.), less the total amount of financial liabilities (debt).<sup>9</sup> If we look only at the assets and liabilities of private individuals, the result is private wealth or private capital. If we consider assets and liabilities held by the government and other governmental entities (such as towns, social insurance agencies, etc.), the result is public wealth or public capital. By definition, national wealth is the sum of these two terms:

National wealth = private wealth + public wealth

Public wealth in most developed countries is currently insignificant (or even negative, where the public debt exceeds public assets). As I will show, private wealth accounts for nearly all of national wealth almost everywhere.

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This has not always been the case, however, so it is important to distinguish clearly between the two notions.

To be clear, although my concept of capital excludes human capital (which cannot be exchanged on any market in nonslave societies), it is not limited to “physical” capital (land, buildings, infrastructure, and other material goods). I include “immaterial” capital such as patents and other intellectual property, which are counted either as nonfinancial assets (if individuals hold patents directly) or as financial assets (when an individual owns shares of a corporation that holds patents, as is more commonly the case). More broadly, many forms of immaterial capital are taken into account by way of the stock market capitalization of corporations. For instance, the stock market value of a company often depends on its reputation and trademarks, its information systems and modes of organization, its investments, whether material or immaterial, for the purpose of making its products and services more visible and attractive, and so on. All of this is reflected in the price of common stock and other corporate financial assets and therefore in national wealth.

To be sure, the price that the financial markets sets on a company’s or even a sector’s immaterial capital at any given moment is largely arbitrary and uncertain. We see this in the collapse of the Internet bubble in 2000, in the financial crisis that began in 2007–2008, and more generally in the enormous volatility of the stock market. The important fact to note for now is that this is a characteristic of all forms of capital, not just immaterial capital. Whether we are speaking of a building or a company, a manufacturing firm or a service firm, it is always very difficult to set a price on capital. Yet as I will show, total national wealth, that is, the wealth of a country as a whole and not of any particular type of asset, obeys certain laws and conforms to certain regular patterns.

One further point: total national wealth can always be broken down into domestic capital and foreign capital:

National wealth = national capital = domestic capital + net foreign capital

Domestic capital is the value of the capital stock (buildings, firms, etc.) located within the borders of the country in question. Net foreign capital—or net foreign assets—measures the country’s position vis-à-vis the rest of the world: more specifically, it is the difference between assets owned by the

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country's citizens in the rest of the world and assets of the country owned by citizens of other countries. On the eve of World War I, Britain and France both enjoyed significant net positive asset positions vis-à-vis the rest of the world. One characteristic of the financial globalization that has taken place since the 1980s is that many countries have more or less balanced net asset positions, but those positions are quite large in absolute terms. In other words, many countries have large capital stakes in other countries, but those other countries also have stakes in the country in question, and the two positions are more or less equal, so that net foreign capital is close to zero. Globally, of course, all the net positions must add up to zero, so that total global wealth equals the "domestic" capital of the planet as a whole.

### *The Capital/Income Ratio*

Now that income and capital have been defined, I can move on to the first basic law tying these two ideas together. I begin by defining the capital/income ratio.

Income is a flow. It corresponds to the quantity of goods produced and distributed in a given period (which we generally take to be a year).

Capital is a stock. It corresponds to the total wealth owned at a given point in time. This stock comes from the wealth appropriated or accumulated in all prior years combined.

The most natural and useful way to measure the capital stock in a particular country is to divide that stock by the annual flow of income. This gives us the capital/income ratio, which I denote by the Greek letter  $\beta$ .

For example, if a country's total capital stock is the equivalent of six years of national income, we write  $\beta = 6$  (or  $\beta = 600\%$ ).

In the developed countries today, the capital/income ratio generally varies between 5 and 6, and the capital stock consists almost entirely of private capital. In France and Britain, Germany and Italy, the United States and Japan, national income was roughly 30,000–35,000 euros per capita in 2010, whereas total private wealth (net of debt) was typically on the order of 150,000–200,000 euros per capita, or five to six times annual national income. There are interesting variations both within Europe and around the world. For instance,  $\beta$  is greater than 6 in Japan and Italy and less than 5 in the United States and Germany. Public wealth is just barely positive in some countries

and slightly negative in others. And so on. I examine all this in detail in the next few chapters. At this point, it is enough to keep these orders of magnitude in mind, in order to make the ideas as concrete as possible.<sup>10</sup>

The fact that national income in the wealthy countries of the world in 2010 was on the order of 30,000 euros per capita per annum (or 2,500 euros per month) obviously does not mean that everyone earns that amount. Like all averages, this average income figure hides enormous disparities. In practice, many people earn much less than 2,500 euros a month, while others earn dozens of times that much. Income disparities are partly the result of unequal pay for work and partly of much larger inequalities in income from capital, which are themselves a consequence of the extreme concentration of wealth. The average national income per capita is simply the amount that one could distribute to each individual if it were possible to equalize the income distribution without altering total output or national income.<sup>11</sup>

Similarly, private per capita wealth on the order of 180,000 euros, or six years of national income, does not mean that everyone owns that much capital. Many people have much less, while some own millions or tens of millions of euros' worth of capital assets. Much of the population has very little accumulated wealth—significantly less than one year's income: a few thousand euros in a bank account, the equivalent of a few weeks' or months' worth of wages. Some people even have negative wealth: in other words, the goods they own are worth less than the debts they owe. By contrast, others have considerable fortunes, ranging from ten to twenty times their annual income or even more. The capital/income ratio for the country as a whole tells us nothing about inequalities within the country. But  $\beta$  does measure the overall importance of capital in a society, so analyzing this ratio is a necessary first step in the study of inequality. The main purpose of Part Two is to understand how and why the capital/income ratio varies from country to country, and how it has evolved over time.

To appreciate the concrete form that wealth takes in today's world, it is useful to note that the capital stock in the developed countries currently consists of two roughly equal shares: residential capital and professional capital used by firms and government. To sum up, each citizen of one of the wealthy countries earned an average of 30,000 euros per year in 2010, owned approximately 180,000 euros of capital, 90,000 in the form of a dwelling and another 90,000 in stocks, bonds, savings, or other investments.<sup>12</sup> There are interesting

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variations across countries, which I will analyze in Chapter 2. For now, the fact that capital can be divided into two roughly equal shares will be useful to keep in mind.

*The First Fundamental Law of Capitalism:  $\alpha = r \times \beta$*

I can now present the first fundamental law of capitalism, which links the capital stock to the flow of income from capital. The capital/income ratio  $\beta$  is related in a simple way to the share of income from capital in national income, denoted  $\alpha$ . The formula is

$$\alpha = r \times \beta$$

where  $r$  is *the rate of return on capital*.

For example, if  $\beta = 600\%$  and  $r = 5\%$ , then  $\alpha = r \times \beta = 30\%$ .<sup>13</sup>

In other words, if national wealth represents the equivalent of six years of national income, and if the rate of return on capital is 5 percent per year, then capital's share in national income is 30 percent.

The formula  $\alpha = r \times \beta$  is a pure accounting identity. It can be applied to all societies in all periods of history, by definition. Though tautological, it should nevertheless be regarded as the first fundamental law of capitalism, because it expresses a simple, transparent relationship among the three most important concepts for analyzing the capitalist system: the capital/income ratio, the share of capital in income, and the rate of return on capital.

The rate of return on capital is a central concept in many economic theories. In particular, Marxist analysis emphasizes the falling rate of profit—a historical prediction that turned out to be quite wrong, although it does contain an interesting intuition. The concept of the rate of return on capital also plays a central role in many other theories. In any case, the rate of return on capital measures the yield on capital over the course of a year regardless of its legal form (profits, rents, dividends, interest, royalties, capital gains, etc.), expressed as a percentage of the value of capital invested. It is therefore a broader notion than the “rate of profit,”<sup>14</sup> and much broader than the “rate of interest,”<sup>15</sup> while incorporating both.

Obviously, the rate of return can vary widely, depending on the type of investment. Some firms generate rates of return greater than 10 percent per

## INCOME AND OUTPUT

year; others make losses (negative rate of return). The average long-run rate of return on stocks is 7–8 percent in many countries. Investments in real estate and bonds frequently return 3–4 percent, while the real rate of interest on public debt is sometimes much lower. The formula  $\alpha = r \times \beta$  tells us nothing about these subtleties, but it does tell us how to relate these three quantities, which can be useful for framing discussion.

For example, in the wealthy countries around 2010, income from capital (profits, interests, dividends, rents, etc.) generally hovered around 30 percent of national income. With a capital/income ratio on the order of 600 percent, this meant that the rate of return on capital was around 5 percent.

Concretely, this means that the current per capita national income of 30,000 euros per year in rich countries breaks down as 21,000 euros per year income from labor (70 percent) and 9,000 euros income from capital (30 percent). Each citizen owns an average of 180,000 euros of capital, and the 9,000 euros of income from capital thus corresponds to an average annual return on capital of 5 percent.

Once again, I am speaking here only of averages: some individuals receive far more than 9,000 euros per year in income from capital, while others receive nothing while paying rent to their landlords and interest to their creditors. Considerable country-to-country variation also exists. In addition, measuring the share of income from capital is often difficult in both a conceptual and a practical sense, because there are some categories of income (such as nonwage self-employment income and entrepreneurial income) that are hard to break down into income from capital and income from labor. In some cases this can make comparison misleading. When such problems arise, the least imperfect method of measuring the capital share of income may be to apply a plausible average rate of return to the capital/income ratio. At this stage, the orders of magnitude given above ( $\beta = 600\%$ ,  $\alpha = 30\%$ ,  $r = 5\%$ ) may be taken as typical.

For the sake of concreteness, let us note, too, that the average rate of return on land in rural societies is typically on the order of 4–5 percent. In the novels of Jane Austen and Honoré de Balzac, the fact that land (like government bonds) yields roughly 5 percent of the amount of capital invested (or, equivalently, that the value of capital corresponds to roughly twenty years of annual rent) is so taken for granted that it often goes unmentioned. Contemporary readers were well aware that it took capital on the order of 1 million francs to produce an annual rent of 50,000 francs. For nineteenth-century novelists

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and their readers, the relation between capital and annual rent was self-evident, and the two measuring scales were used interchangeably, as if rent and capital were synonymous, or perfect equivalents in two different languages.

Now, at the beginning of the twenty-first century, we find roughly the same return on real estate, 4–5 percent, sometimes a little less, especially where prices have risen rapidly without dragging rents upward at the same rate. For example, in 2010, a large apartment in Paris, valued at 1 million euros, typically rents for slightly more than 2,500 euros per month, or annual rent of 30,000 euros, which corresponds to a return on capital of only 3 percent per year from the landlord's point of view. Such a rent is nevertheless quite high for a tenant living solely on income from labor (one hopes he or she is paid well) while it represents a significant income for the landlord. The bad news (or good news, depending on your point of view) is that things have always been like this. This type of rent tends to rise until the return on capital is around 4 percent (which in this example would correspond to a rent of 3,000–3,500 euros per month, or 40,000 per year). Hence this tenant's rent is likely to rise in the future. The landlord's annual return on investment may eventually be enhanced by a long-term capital gain on the value of the apartment. Smaller apartments yield a similar or perhaps slightly higher return. An apartment valued at 100,000 euros may yield 400 euros a month in rent, or nearly 5,000 per year (5 percent). A person who owns such an apartment and chooses to live in it can save the rental equivalent and devote that money to other uses, which yields a similar return on investment.

Capital invested in businesses is of course at greater risk, so the average return is often higher. The stock-market capitalization of listed companies in various countries generally represents 12 to 15 years of annual profits, which corresponds to an annual return on investment of 6–8 percent (before taxes).

The formula  $\alpha = r \times \beta$  allows us to analyze the importance of capital for an entire country or even for the planet as a whole. It can also be used to study the accounts of a specific company. For example, take a firm that uses capital valued at 5 million euros (including offices, infrastructure, machinery, etc.) to produce 1 million euros worth of goods annually, with 600,000 euros going to pay workers and 400,000 euros in profits.<sup>16</sup> The capital/income ratio of this company is  $\beta = 5$  (its capital is equivalent to five years of output), the capital share  $\alpha$  is 40 percent, and the rate of return on capital is  $r = 8$  percent.

Imagine another company that uses less capital (3 million euros) to produce the same output (1 million euros), but using more labor (700,000 euros in wages, 300,000 in profits). For this company,  $\beta = 3$ ,  $\alpha = 30$  percent, and  $r = 10$  percent. The second firm is less capital intensive than the first, but it is more profitable (the rate of return on its capital is significantly higher).

In all countries, the magnitudes of  $\beta$ ,  $\alpha$ , and  $r$  vary a great deal from company to company. Some sectors are more capital intensive than others: for example, the metal and energy sectors are more capital intensive than the textile and food processing sectors, and the manufacturing sector is more capital intensive than the service sector. There are also significant variations between firms in the same sector, depending on their choice of production technology and market position. The levels of  $\beta$ ,  $\alpha$ , and  $r$  in a given country also depend on the relative shares of residential real estate and natural resources in total capital.

It bears emphasizing that the law  $\alpha = r \times \beta$  does not tell us how each of these three variables is determined, or, in particular, how the national capital/income ratio ( $\beta$ ) is determined, the latter being in some sense a measure of how intensely capitalistic the society in question is. To answer that question, we must introduce additional ideas and relationships, in particular the savings and investment rates and the rate of growth. This will lead us to the second fundamental law of capitalism: the higher the savings rate and the lower the growth rate, the higher the capital/income ratio ( $\beta$ ). This will be shown in the next few chapters; at this stage, the law  $\alpha = r \times \beta$  simply means that regardless of what economic, social, and political forces determine the level of the capital/income ratio ( $\beta$ ), capital's share in income ( $\alpha$ ), and the rate of return on capital ( $r$ ), these three variables are not independent of one another. Conceptually, there are two degrees of freedom, not three.

### *National Accounts: An Evolving Social Construct*

Now that the key concepts of output and income, capital and wealth, capital/income ratio, and rate of return on capital have been explained, I will examine in greater detail how these abstract quantities can be measured and what such measurements can tell us about the historical evolution of the distribution of wealth in various countries. I will briefly review the main stages in the history of national accounts and then present a portrait in broad brushstrokes of how the global distribution of output and income has changed since the

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eighteenth century, along with a discussion of how demographic and economic growth rates have changed over the same period. These growth rates will play an important part in the analysis.

As noted, the first attempts to measure national income and capital date back to the late seventeenth and early eighteenth century. Around 1700, several isolated estimates appeared in Britain and France (apparently independently of one another). I am speaking primarily of the work of William Petty (1664) and Gregory King (1696) for England and Pierre le Pesant, sieur de Boisguillebert (1695), and Sébastien Le Prestre de Vauban (1707) for France. Their work focused on both the national stock of capital and the annual flow of national income. One of their primary objectives was to calculate the total value of land, by far the most important source of wealth in the agrarian societies of the day, and then to relate the quantity of landed wealth to the level of agricultural output and land rents.

It is worth noting that these authors often had a political objective in mind, generally having to do with modernization of the tax system. By calculating the nation's income and wealth, they hoped to show the sovereign that it would be possible to raise tax receipts considerably while keeping tax rates relatively low, provided that all property and goods produced were subject to taxation and everyone was required to pay, including landlords of both aristocratic and common descent. This objective is obvious in Vauban's *Projet de dîme royale* (Plan for a Royal Tithe), but it is just as clear in the works of Boisguillebert and King (though less so in Petty's writing).

The late eighteenth century saw further attempts to measure income and wealth, especially around the time of the French Revolution. Antoine Lavoisier published his estimates for the year 1789 in his book *La Richesse territoriale du Royaume de France* (The Territorial Wealth of the Kingdom of France), published in 1791. The new tax system established after the Revolution, which ended the privileges of the nobility and imposed a tax on all property in land, was largely inspired by this work, which was widely used to estimate expected receipts from new taxes.

It was above all in the nineteenth century, however, that estimates of national wealth proliferated. From 1870 to 1900, Robert Giffen regularly updated his estimates of Britain's stock of national capital, which he compared to estimates by other authors (especially Patrick Colquhoun) from the early 1800s. Giffen marveled at the size of Britain's stock of industrial capital as

well as the stock of foreign assets acquired since the Napoleonic wars, which was many times larger than the entire public debt due to those wars.<sup>17</sup> In France at about the same time, Alfred de Foville and Clément Colson published estimates of “national wealth” and “private wealth,” and, like Giffen, both writers also marveled at the considerable accumulation of private capital over the course of the nineteenth century. It was glaringly obvious to everyone that private fortunes were prospering in the period 1870–1914. For the economists of the day, the problem was to measure that wealth and compare different countries (the Franco-British rivalry was never far from their minds). Until World War I, estimates of wealth received much more attention than estimates of income and output, and there were in any case more of them, not only in Britain and France but also in Germany, the United States, and other industrial powers. In those days, being an economist meant first and foremost being able to estimate the national capital of one’s country: this was almost a rite of initiation.

It was not until the period between the two world wars that national accounts began to be established on an annual basis. Previous estimates had always focused on isolated years, with successive estimates separated by ten or more years, as in the case of Giffen’s calculations of British national capital in the nineteenth century. In the 1930s, improvements in the primary statistical sources made the first annual series of national income data possible. These generally went back as far as the beginning of the twentieth century or the last decades of the nineteenth. They were established for the United States by Kuznets and Kendrick, for Britain by Bowley and Clark, and for France by Dugé de Bernonville. After World War II, government statistical offices supplanted economists and began to compile and publish official annual data on GDP and national income. These official series continue to this day.

Compared with the pre-World War I period, however, the focal point of the data had changed entirely. From the 1940s on, the primary motivation was to respond to the trauma of the Great Depression, during which governments had no reliable annual estimates of economic output. There was therefore a need for statistical and political tools in order to steer the economy properly and avoid a repeat of the catastrophe. Governments thus insisted on annual or even quarterly data on output and income. Estimates of national wealth, which had been so prized before 1914, now took a backseat, especially after the economic and political chaos of 1914–1945 made it difficult to interpret their meaning. Specifically, the prices of real estate and financial assets

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fell to extremely low levels, so low that private capital seemed to have evaporated. In the 1950s and 1960s, a period of reconstruction, the main goal was to measure the remarkable growth of output in various branches of industry.

In the 1990s–2000s, wealth accounting again came to the fore. Economists and political leaders were well aware that the financial capitalism of the twenty-first century could not be properly analyzed with the tools of the 1950s and 1960s. In collaboration with central banks, government statistical agencies in various developed countries compiled and published annual series of data on the assets and liabilities of different groups, in addition to the usual income and output data. These wealth accounts are still far from perfect: for example, natural capital and damages to the environment are not well accounted for. Nevertheless, they represent real progress in comparison with national accounts from the early postwar years, which were concerned solely with endless growth in output.<sup>18</sup> These are the official series that I use in this book to analyze aggregate wealth and the current capital/income ratio in the wealthy countries.

One conclusion stands out in this brief history of national accounting: national accounts are a social construct in perpetual evolution. They always reflect the preoccupations of the era when they were conceived.<sup>19</sup> We should be careful not to make a fetish of the published figures. When a country's national income per capita is said to be 30,000 euros, it is obvious that this number, like all economic and social statistics, should be regarded as an estimate, a construct, and not a mathematical certainty. It is simply the best estimate we have. National accounts represent the only consistent, systematic attempt to analyze a country's economic activity. They should be regarded as a limited and imperfect research tool, a compilation and arrangement of data from highly disparate sources. In all developed countries, national accounts are currently compiled by government statistical offices and central banks from the balance sheets and account books of financial and nonfinancial corporations together with many other statistical sources and surveys. We have no reason to think a priori that the officials involved in these efforts do not do their best to spot inconsistencies in the data in order to achieve the best possible estimates. Provided we use these data with caution and in a critical spirit and complement them with other data where there are errors or gaps (say, in

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dealing with tax havens), these national accounts are an indispensable tool for estimating aggregate income and wealth.

In particular, as I will show in Part Two, we can put together a consistent analysis of the historical evolution of the capital/income ratio by meticulously compiling and comparing national wealth estimates by many authors from the eighteenth to the early twentieth century and connecting them up with official capital accounts from the late twentieth and early twenty-first century. The other major limitation of official national accounts, apart from their lack of historical perspective, is that they are deliberately concerned only with aggregates and averages and not with distributions and inequalities. We must therefore draw on other sources to measure the distribution of income and wealth and to study inequalities. National accounts thus constitute a crucial element of our analyses, but only when completed with additional historical and distributional data.

### *The Global Distribution of Production*

I begin by examining the evolution of the global distribution of production, which is relatively well known from the early nineteenth century on. For earlier periods, estimates are more approximate, but we know the broad outlines, thanks most notably to the historical work of Angus Maddison, especially since the overall pattern is relatively simple.<sup>20</sup>

From 1900 to 1980, 70–80 percent of the global production of goods and services was concentrated in Europe and America, which incontestably dominated the rest of the world. By 2010, the European–American share had declined to roughly 50 percent, or approximately the same level as in 1860. In all probability, it will continue to fall and may go as low as 20–30 percent at some point in the twenty-first century. This was the level maintained up to the turn of the nineteenth century and would be consistent with the European–American share of the world’s population (see Figures 1.1 and 1.2).

In other words, the lead that Europe and America achieved during the Industrial Revolution allowed these two regions to claim a share of global output that was two to three times greater than their share of the world’s population simply because their output per capita was two to three times

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INCOME AND CAPITAL

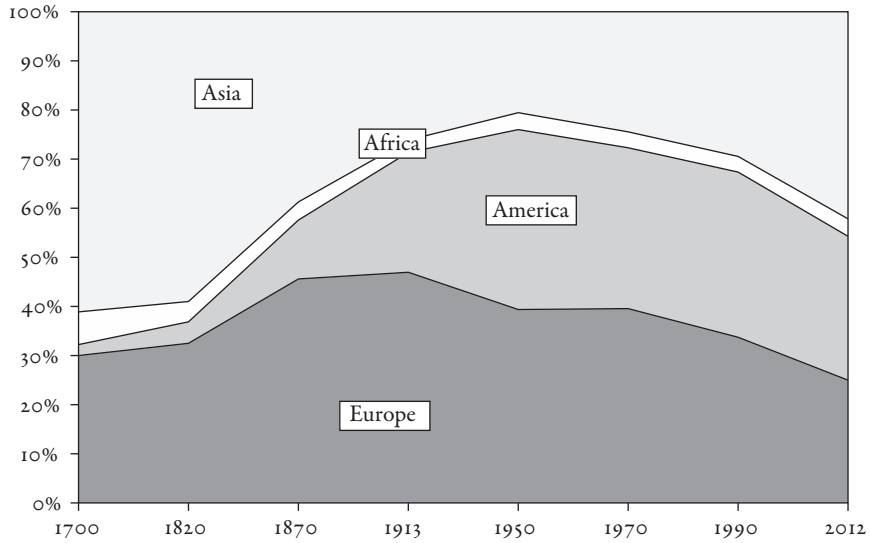


FIGURE 1.1. The distribution of world output, 1700–2012

Europe’s GDP made 47 percent of world GDP in 1913, down to 25 percent in 2012. Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

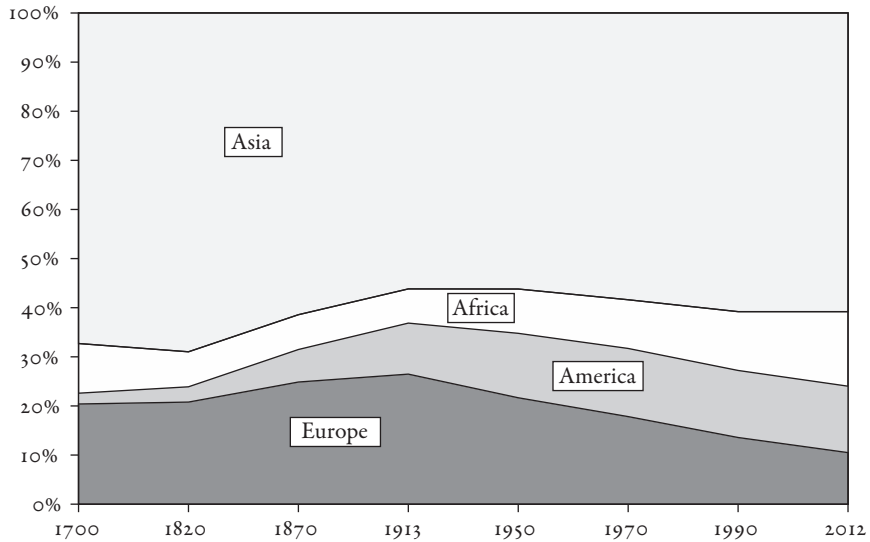


FIGURE 1.2. The distribution of world population, 1700–2012

Europe’s population made 26 percent of world population in 1913, down to 10 percent in 2012.

Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

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## INCOME AND OUTPUT

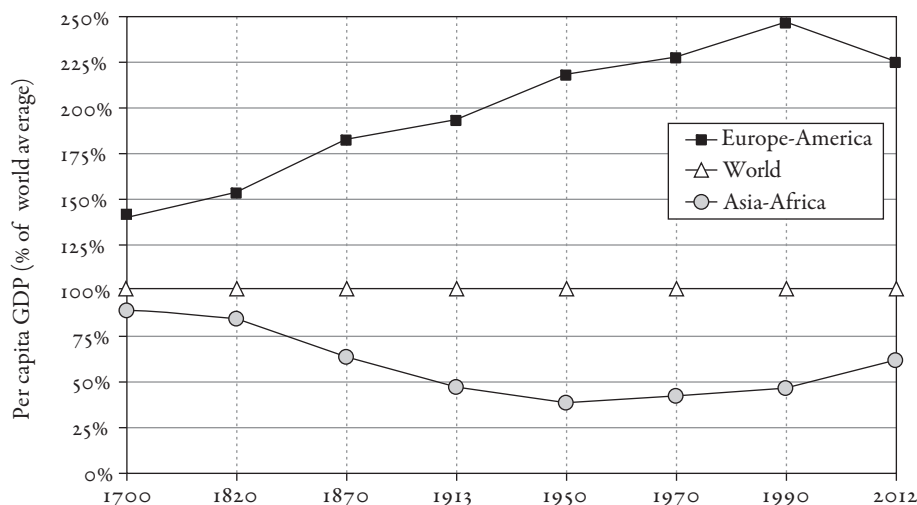


FIGURE 1.3. Global inequality 1700–2012: divergence then convergence?

Per capita GDP in Asia-Africa went from 37 percent of world average in 1950 to 61 percent in 2012.

Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

greater than the global average.<sup>21</sup> All signs are that this phase of divergence in per capita output is over and that we have embarked on a period of convergence. The resulting “catch-up” phenomenon is far from over, however (see Figure 1.3). It is far too early to predict when it might end, especially since the possibility of economic and/or political reversals in China and elsewhere obviously cannot be ruled out.

### *From Continental Blocs to Regional Blocs*

The general pattern just described is well known, but a number of points need to be clarified and refined. First, putting Europe and the Americas together as a single “Western bloc” simplifies the presentation but is largely artificial. Europe attained its maximal economic weight on the eve of World War I, when it accounted for nearly 50 percent of global output, and it has declined steadily since then, whereas America attained its peak in the 1950s, when it accounted for nearly 40 percent of global output.

Furthermore, both Europe and the Americas can be broken down into two highly unequal subregions: a hyperdeveloped core and a less developed

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periphery. Broadly speaking, global inequality is best analyzed in terms of regional blocs rather than continental blocs. This can be seen clearly in Table 1.1, which shows the distribution of global output in 2012. All these numbers are of no interest in themselves, but it is useful to familiarize oneself with the principal orders of magnitude.

The population of the planet is close to 7 billion in 2012, and global output is slightly greater than 70 trillion euros, so that global output per capita is almost exactly 10,000 euros. If we subtract 10 percent for capital depreciation and divide by 12, we find that this yields an average per capita monthly income of 760 euros, which may be a clearer way of making the point. In other words, if global output and the income to which it gives rise were equally divided, each individual in the world would have an income of about 760 euros per month.

The population of Europe is about 740 million, about 540 million of whom live in member countries of the European Union, whose per capita output exceeds 27,000 euros per year. The remaining 200 million people live in Russia and Ukraine, where the per capita output is about 15,000 euros per year, barely 50 percent above the global average.<sup>22</sup> The European Union itself is relatively heterogeneous: 410 million of its citizens live in what used to be called Western Europe, three-quarters of them in the five most populous countries of the Union, namely Germany, France, Great Britain, Italy, and Spain, with an average per capita GDP of 31,000 euros per year, while the remaining 130 million live in what used to be Eastern Europe, with an average per capita output on the order of 16,000 euros per year, not very different from the Russia-Ukraine bloc.<sup>23</sup>

The Americas can also be divided into distinct regions that are even more unequal than the European center and periphery: the US-Canada bloc has 350 million people with a per capita output of 40,000 euros, while Latin America has 600 million people with a per capita output of 10,000 euros, exactly equal to the world average.

Sub-Saharan Africa, with a population of 900 million and an annual output of only 1.8 trillion euros (less than the French GDP of 2 trillion), is economically the poorest region of the world, with a per capita output of only 2,000 euros per year. India is slightly higher, while North Africa does markedly better, and China even better than that: with a per capita output of

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TABLE I.1.  
*Distribution of world GDP, 2012.*

Region	Population (million inhabitants)	GDP (billion euros 2012)	Per capita GDP (euros 2012)	Equivalent per capita monthly income (euros 2012)
World	7,050	71,200	10,100	760
Europe	740	17,800	24,000	1,800
incl. European Union	540	14,700	27,300	2,040
incl. Russia/Ukraine	200	3,100	15,400	1,150
America	950	20,600	21,500	1,620
incl. United States/Canada	350	14,300	40,700	3,050
incl. Latin America	600	6,300	10,400	780
Africa	1,070	2,800	2,600	200
incl. North Africa	170	1,000	5,700	430
incl. Sub-Saharan Africa	900	1,800	2,000	150
Asia	4,290	30,000	7,000	520
incl. China	1,350	10,400	7,700	580
incl. India	1,260	4,000	3,200	240
incl. Japan	130	3,800	30,000	2,250
incl. other	1,550	11,800	7,600	570

*Note:* World GDP, estimated in purchasing power parity, was about 71,200 billion euros in 2012. World population was about 7,050 billion inhabitants, hence a per capita GDP of €10,100 (equivalent to a monthly income of about €760 per month). All numbers were rounded to the closed dozen or hundred.

*Sources:* See piketty.pse.ens.fr/capital21c.

8,000 euros per year, China in 2012 is not far below the world average. Japan's annual per capita output is equal to that of the wealthiest European countries (approximately 30,000 euros), but its population is such a small minority in the greater Asian population that it has little influence on the continental average, which is close to that of China.<sup>24</sup>

*Global Inequality: From 150 Euros per Month to  
3,000 Euros per Month*

To sum up, global inequality ranges from regions in which the per capita income is on the order of 150–250 euros per month (sub-Saharan Africa, India) to regions where it is as high as 2,500–3,000 euros per month (Western Europe, North America, Japan), that is, ten to twenty times higher. The global average, which is roughly equal to the Chinese average, is around 600–800 euros per month.

These orders of magnitude are significant and worth remembering. Bear in mind, however, that the margin of error in these figures is considerable: it is always much more difficult to measure inequalities between countries (or between different periods) than within them.

For example, global inequality would be markedly higher if we used current exchange rates rather than purchasing power parities, as I have done thus far. To understand what these terms mean, first consider the euro/dollar exchange rate. In 2012, a euro was worth about \$1.30 on the foreign exchange market. A European with an income of 1,000 euros per month could go to his or her bank and exchange that amount for \$1,300. If that person then took that money to the United States to spend, his or her purchasing power would be \$1,300. But according to the official International Comparison Program (ICP), European prices are about 10 percent higher than American prices, so that if this same European spent the same money in Europe, his or her purchasing power would be closer to an American income of \$1,200. Thus we say that \$1.20 has “purchasing power parity” with 1 euro. I used this parity rather than the exchange rate to convert American GDP to euros in Table 1.1, and I did the same for the other countries listed. In other words, we compare the GDP of different countries on the basis of the actual purchasing power of their citizens, who generally spend their income at home rather than abroad.<sup>25</sup>

## INCOME AND OUTPUT

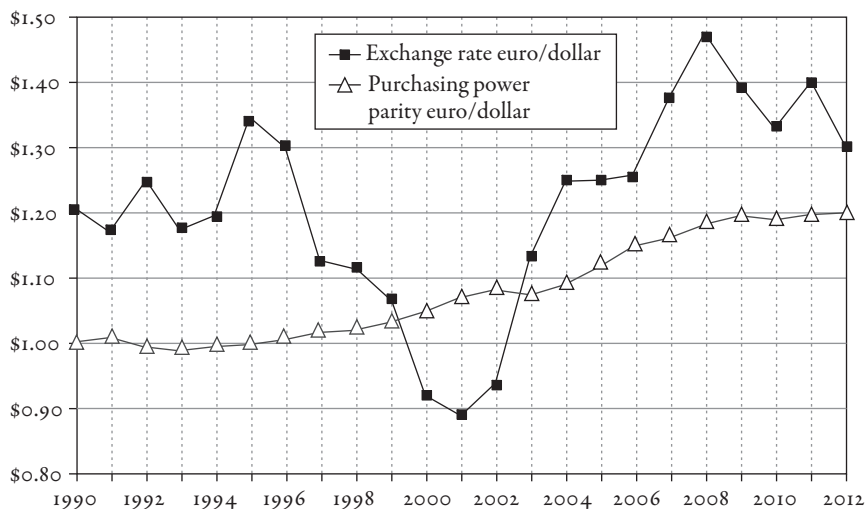


FIGURE 1.4. Exchange rate and purchasing power parity: euro/dollar

In 2012, 1 euro was worth \$1.30 according to current exchange rate, but \$1.20 in purchasing power parity.

Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

The other advantage of using purchasing power parities is that they are more stable than exchange rates. Indeed, exchange rates reflect not only the supply and demand for the goods and services of different countries but also sudden changes in the investment strategies of international investors and volatile estimates of the political and/or financial stability of this or that country, to say nothing of unpredictable changes in monetary policy. Exchange rates are therefore extremely volatile, as a glance at the large fluctuations of the dollar over the past few decades will show. The dollar/euro rate went from \$1.30 per euro in the 1990s to less than \$0.90 in 2001 before rising to around \$1.50 in 2008 and then falling back to \$1.30 in 2012. During that time, the purchasing power parity of the euro rose gently from roughly \$1 per euro in the early 1990s to roughly \$1.20 in 2010 (see Figure 1.4).<sup>26</sup>

Despite the best efforts of the international organizations involved in the ICP, there is no escaping the fact that these purchasing power parity estimates are rather uncertain, with margins of error on the order of 10 percent if not higher, even between countries at comparable levels of development. For example, the most recent available survey shows that while some European prices (for energy, housing, hotels, and restaurants) are indeed higher than

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comparable American prices, others are sharply lower (for health and education, for instance).<sup>27</sup> In theory, the official estimates weight all prices according to the weight of various goods and services in a typical budget for each country, but such calculations clearly leave a good deal of room for error, particularly since it is very hard to measure qualitative differences for many services. In any case, it is important to emphasize that each of these price indices measures a different aspect of social reality. The price of energy measures purchasing power for energy (which is greater in the United States), while the price of health care measures purchasing power in that area (which is greater in Europe). The reality of inequality between countries is multidimensional, and it is misleading to say that it can all be summed up with a single index leading to an unambiguous classification, especially between countries with fairly similar average incomes.

In the poorer countries, the corrections introduced by purchasing power parity are even larger: in Africa and Asia, prices are roughly half what they are in the rich countries, so that GDP roughly doubles when purchasing power parity is used for comparisons rather than the market exchange rate. This is chiefly a result of the fact that the prices of goods and services that cannot be traded internationally are lower, because these are usually relatively labor intensive and involve relatively unskilled labor (a relatively abundant factor of production in less developed countries), as opposed to skilled labor and capital (which are relatively scarce in less developed countries).<sup>28</sup> Broadly speaking, the poorer a country is, the greater the correction: in 2012, the correction coefficient was 1.6 in China and 2.5 in India.<sup>29</sup> At this moment, the euro is worth 8 Chinese yuan on the foreign exchange market but only 5 yuan in purchasing power parity. The gap is shrinking as China develops and revalues the yuan (see Figure 1.5). Some writers, including Angus Maddison, argue that the gap is not as small as it might appear and that official international statistics underestimate Chinese GDP.<sup>30</sup>

Because of the uncertainties surrounding exchange rates and purchasing power parities, the average per capita monthly incomes discussed earlier (150–250 euros for the poorest countries, 600–800 euros for middling countries, and 2,500–3,000 euros for the richest countries) should be treated as approximations rather than mathematical certainties. For example, the share of the rich countries (European Union, United States, Canada, and Japan) in global income was 46 percent in 2012 if we use purchasing power parity but 57 per-

## INCOME AND OUTPUT

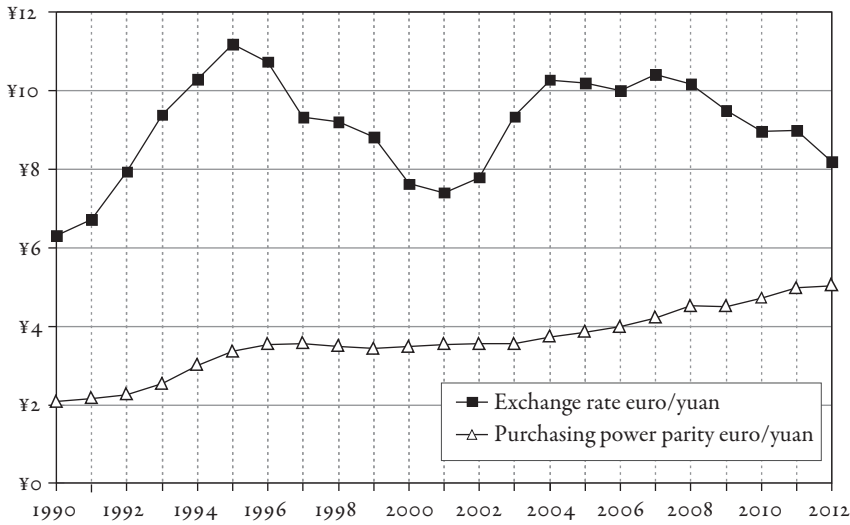


FIGURE 1.5. Exchange rate and purchasing power parity: euro/yuan

In 2012, one euro was worth eight yuan according to current exchange rate, but five yuan in purchasing power parity.

Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

cent if we use current exchange rates.<sup>31</sup> The “truth” probably lies somewhere between these two figures and is probably closer to the first. Still, the orders of magnitude remain the same, as does the fact that the share of income going to the wealthy countries has been declining steadily since the 1970s. Regardless of what measure is used, the world clearly seems to have entered a phase in which rich and poor countries are converging in income.

### *The Global Distribution of Income Is More Unequal Than the Distribution of Output*

To simplify the exposition, the discussion thus far has assumed that the national income of each continental or regional grouping coincided with its domestic product: the monthly incomes indicated in Table 1.1 were obtained simply by deducting 10 percent from GDP (to account for depreciation of capital) and dividing by twelve.

In fact, it is valid to equate income and output only at the global level and not at the national or continental level. Generally speaking, the global income

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distribution is more unequal than the output distribution, because the countries with the highest per capita output are also more likely to own part of the capital of other countries and therefore to receive a positive flow of income from capital originating in countries with a lower level of per capita output. In other words, the rich countries are doubly wealthy: they both produce more at home and invest more abroad, so that their national income per head is greater than their output per head. The opposite is true for poor countries.

More specifically, all of the major developed countries (the United States, Japan, Germany, France, and Britain) currently enjoy a level of national income that is slightly greater than their domestic product. As noted, however, net income from abroad is just slightly positive and does not radically alter the standard of living in these countries. It amounts to about 1 or 2 percent of GDP in the United States, France, and Britain and 2–3 percent of GDP in Japan and Germany. This is nevertheless a significant boost to national income, especially for Japan and Germany, whose trade surpluses have enabled them to accumulate over the past several decades substantial reserves of foreign capital, the return on which is today considerable.

I turn now from the wealthiest countries taken individually to continental blocs taken as a whole. What we find in Europe, America, and Asia is something close to equilibrium: the wealthier countries in each bloc (generally in the north) receive a positive flow of income from capital, which is partly canceled by the flow out of other countries (generally in the south and east), so that at the continental level, total income is almost exactly equal to total output, generally within 0.5 percent.<sup>32</sup>

The only continent not in equilibrium is Africa, where a substantial share of capital is owned by foreigners. According to the balance of payments data compiled since 1970 by the United Nations and other international organizations such as the World Bank and International Monetary Fund, the income of Africans is roughly 5 percent less than the continent's output (and as high as 10 percent lower in some individual countries).<sup>33</sup> With capital's share of income at about 30 percent, this means that nearly 20 percent of African capital is owned by foreigners: think of the London stockholders of the Marikana platinum mine discussed at the beginning of this chapter.

It is important to realize what such a figure means in practice. Since some kinds of wealth (such as residential real estate and agricultural capital) are rarely owned by foreign investors, it follows that the foreign-owned share of

Africa's manufacturing capital may exceed 40–50 percent and may be higher still in other sectors. Despite the fact that there are many imperfections in the balance of payments data, foreign ownership is clearly an important reality in Africa today.

If we look back farther in time, we find even more marked international imbalances. On the eve of World War I, the national income of Great Britain, the world's leading investor, was roughly 10 percent above its domestic product. The gap was more than 5 percent in France, the number two colonial power and global investor, and Germany was a close third, even though its colonial empire was insignificant, because its highly developed industrial sector accumulated large claims on the rest of the world. British, French, and German investment went partly to other European countries and the United States and partly to Asia and Africa. Overall, the European powers in 1913 owned an estimated one-third to one-half of the domestic capital of Asia and Africa and more than three-quarters of their industrial capital.<sup>34</sup>

### *What Forces Favor Convergence?*

In theory, the fact that the rich countries own part of the capital of poor countries can have virtuous effects by promoting convergence. If the rich countries are so flush with savings and capital that there is little reason to build new housing or add new machinery (in which case economists say that the “marginal productivity of capital,” that is, the additional output due to adding one new unit of capital “at the margin,” is very low), it can be collectively efficient to invest some part of domestic savings in poorer countries abroad. Thus the wealthy countries—or at any rate the residents of wealthy countries with capital to spare—will obtain a better return on their investment by investing abroad, and the poor countries will increase their productivity and thus close the gap between them and the rich countries. According to classical economic theory, this mechanism, based on the free flow of capital and equalization of the marginal productivity of capital at the global level, should lead to convergence of rich and poor countries and an eventual reduction of inequalities through market forces and competition.

This optimistic theory has two major defects, however. First, from a strictly logical point of view, the equalization mechanism does not guarantee global convergence of per capita income. At best it can give rise to convergence

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of per capita output, provided we assume perfect capital mobility and, even more important, total equality of skill levels and human capital across countries—no small assumption. In any case, the possible convergence of output per head does *not* imply convergence of income per head. After the wealthy countries have invested in their poorer neighbors, they may continue to own them indefinitely, and indeed their share of ownership may grow to massive proportions, so that the per capita national income of the wealthy countries remains permanently greater than that of the poorer countries, which must continue to pay to foreigners a substantial share of what their citizens produce (as African countries have done for decades). In order to determine how likely such a situation is to arise, we must compare the rate of return on capital that the poor countries must pay to the rich to the growth rates of rich and poor economies. Before proceeding down this road, we must first gain a better understanding of the dynamics of the capital/income ratio within a given country.

Furthermore, if we look at the historical record, it does not appear that capital mobility has been the primary factor promoting convergence of rich and poor nations. None of the Asian countries that have moved closer to the developed countries of the West in recent years has benefited from large foreign investments, whether it be Japan, South Korea, or Taiwan and more recently China. In essence, all of these countries themselves financed the necessary investments in physical capital and, even more, in human capital, which the latest research holds to be the key to long-term growth.<sup>35</sup> Conversely, countries owned by other countries, whether in the colonial period or in Africa today, have been less successful, most notably because they have tended to specialize in areas without much prospect of future development and because they have been subject to chronic political instability.

Part of the reason for that instability may be the following. When a country is largely owned by foreigners, there is a recurrent and almost irrepressible social demand for expropriation. Other political actors respond that investment and development are possible only if existing property rights are unconditionally protected. The country is thus caught in an endless alternation between revolutionary governments (whose success in improving actual living conditions for their citizens is often limited) and governments dedicated to the protection of existing property owners, thereby laying the groundwork for the next revolution or coup. Inequality of capital ownership is already dif-

difficult to accept and peacefully maintain within a single national community. Internationally, it is almost impossible to sustain without a colonial type of political domination.

Make no mistake: participation in the global economy is not negative in itself. Autarky has never promoted prosperity. The Asian countries that have lately been catching up with the rest of the world have clearly benefited from openness to foreign influences. But they have benefited far more from open markets for goods and services and advantageous terms of trade than from free capital flows. China, for example, still imposes controls on capital: foreigners cannot invest in the country freely, but that has not hindered capital accumulation, for which domestic savings largely suffice. Japan, South Korea, and Taiwan all financed investment out of savings. Many studies also show that gains from free trade come mainly from the diffusion of knowledge and from the productivity gains made necessary by open borders, not from static gains associated with specialization, which appear to be fairly modest.<sup>36</sup>

To sum up, historical experience suggests that the principal mechanism for convergence at the international as well as the domestic level is the diffusion of knowledge. In other words, the poor catch up with the rich to the extent that they achieve the same level of technological know-how, skill, and education, not by becoming the property of the wealthy. The diffusion of knowledge is not like manna from heaven: it is often hastened by international openness and trade (autarky does not encourage technological transfer). Above all, knowledge diffusion depends on a country's ability to mobilize financing as well as institutions that encourage large-scale investment in education and training of the population while guaranteeing a stable legal framework that various economic actors can reliably count on. It is therefore closely associated with the achievement of legitimate and efficient government. Concisely stated, these are the main lessons that history has to teach about global growth and international inequalities.

*Growth: Illusions and Realities*

A global convergence process in which emerging countries are catching up with developed countries seems well under way today, even though substantial inequalities between rich and poor countries remain. There is, moreover, no evidence that this catch-up process is primarily a result of investment by the rich countries in the poor. Indeed, the contrary is true: past experience shows that the promise of a good outcome is greater when poor countries are able to invest in themselves. Beyond the central issue of convergence, however, the point I now want to stress is that the twenty-first century may see a return to a low-growth regime. More precisely, what we will find is that growth has in fact always been relatively slow except in exceptional periods or when catch-up is occurring. Furthermore, all signs are that growth—or at any rate its demographic component—will be even slower in the future.

To understand what is at issue here and its relation to the convergence process and the dynamics of inequality, it is important to decompose the growth of output into two terms: population growth and per capita output growth. In other words, growth always includes a purely demographic component and a purely economic component, and only the latter allows for an improvement in the standard of living. In public debate this decomposition is too often forgotten, as many people seem to assume that population growth has ceased entirely, which is not yet the case—far from it, actually, although all signs indicate that we are headed slowly in that direction. In 2013–2014, for example, global economic growth will probably exceed 3 percent, thanks to very rapid progress in the emerging countries. But global population is still growing at an annual rate close to 1 percent, so that global output per capita is actually growing at a rate barely above 2 percent (as is global income per capita).

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*Growth over the Very Long Run*

Before turning to present trends, I will go back in time and present the stages and orders of magnitude of global growth since the Industrial Revolution. Consider first Table 2.1, which indicates growth rates over a very long period of time. Several important facts stand out. First, the takeoff in growth that began in the eighteenth century involved relatively modest annual growth rates. Second, the demographic and economic components of growth were roughly similar in magnitude. According to the best available estimates, global output grew at an average annual rate of 1.6 percent between 1700 and 2012, 0.8 percent of which reflects population growth, while another 0.8 percent came from growth in output per head.

Such growth rates may seem low compared to what one often hears in current debates, where annual growth rates below 1 percent are frequently dismissed as insignificant and it is commonly assumed that real growth doesn't begin until one has achieved 3–4 percent a year or even more, as Europe did in the thirty years after World War II and as China is doing today.

In fact, however, growth on the order of 1 percent a year in both population and per capita output, if continued over a very long period of time, as was the case after 1700, is extremely rapid, especially when compared with the virtually zero growth rate that we observe in the centuries prior to the Industrial Revolution.

TABLE 2.1.

*World growth since the Industrial Revolution (average annual growth rate).*

Years	World output (%)	World population (%)	Per capita output (%)
0–1700	0.1	0.1	0.0
1700–2012	1.6	0.8	0.8
1700–1820	0.5	0.4	0.1
1820–1913	1.5	0.6	0.9
1913–2012	3.0	1.4	1.6

*Note:* Between 1913 and 2012, the growth rate of world GDP was 3.0% per year on average. This growth rate can be broken down between 1.4% for world population and 1.6% for per capita GDP.

*Sources:* See [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

Indeed, according to Maddison's calculations, both demographic and economic growth rates between year 0 and 1700 were below 0.1 percent (more precisely, 0.06 percent for population growth and 0.02 percent for per capita output).<sup>1</sup>

To be sure, the precision of such estimates is illusory. We actually possess very little information about the growth of the world's population between 0 and 1700 and even less about output per head. Nevertheless, no matter how much uncertainty there is about the exact figures (which are not very important in any case), there is no doubt whatsoever that the pace of growth was quite slow from antiquity to the Industrial Revolution, certainly no more than 0.1–0.2 percent per year. The reason is quite simple: higher growth rates would imply, implausibly, that the world's population at the beginning of the Common Era was minuscule, or else that the standard of living was very substantially below commonly accepted levels of subsistence. For the same reason, growth in the centuries to come is likely to return to very low levels, at least insofar as the demographic component is concerned.

### *The Law of Cumulative Growth*

In order to understand this argument better, it may be helpful to pause a moment to consider what might be called “the law of cumulative growth,” which holds that a low annual growth rate over a very long period of time gives rise to considerable progress.

Concretely, the population of the world grew at an average annual rate of barely 0.8 percent between 1700 and 2012. Over three centuries, however, this meant that the global population increased more than tenfold. A planet with about 600 million inhabitants in 1700 had more than 7 billion in 2012 (see Figure 2.1). If this pace were to continue for the next three centuries, the world's population would exceed 70 billion in 2300.

To give a clear picture of the explosive effects of the law of cumulative growth, I have indicated in Table 2.2 the correspondence between the annual growth rate (the figure usually reported) and the long-term growth multiplier. For example, a growth rate of 1 percent per year will multiply the population by a factor of 1.35 after thirty years, 3 after one hundred years, 20 after three hundred years, and more than 20,000 after one thousand years. The simple conclusion that jumps out from this table is that growth rates greater

## GROWTH: ILLUSIONS AND REALITIES

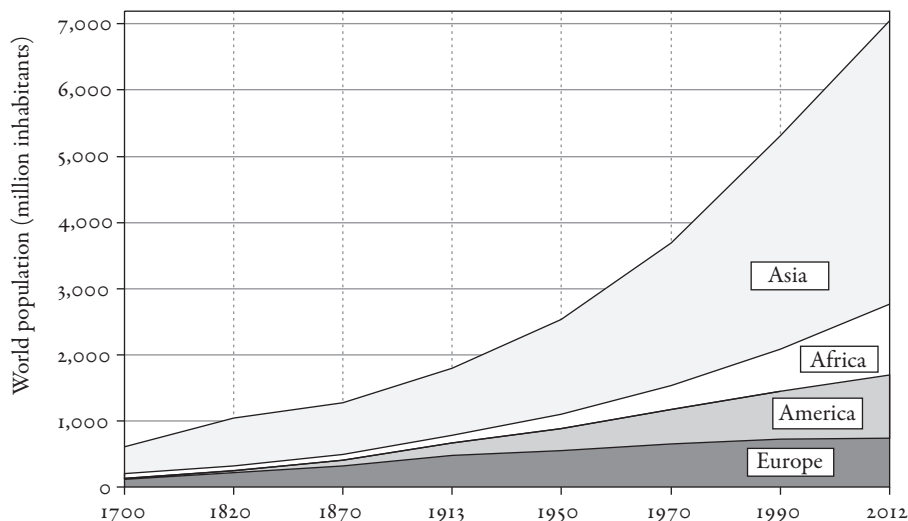


FIGURE 2.1. The growth of world population, 1700–2012

World population rose from 600 million inhabitants in 1700 to 7 billion in 2012.

Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

than 1–1.5 percent a year cannot be sustained indefinitely without generating vertiginous population increases.

We see clearly how different choices of time frame lead to contradictory perceptions of the growth process. Over a period of one year, 1 percent growth seems very low, almost imperceptible. People living at the time might not notice any change at all. To them, such growth might seem like complete stagnation, in which each year is virtually identical to the previous one. Growth might therefore seem like a fairly abstract notion, a purely mathematical and statistical construct. But if we expand the time frame to that of a generation, that is, about thirty years, which is the most relevant time scale for evaluating change in the society we live in, the same growth rate results in an increase of about a third, which represents a transformation of quite substantial magnitude. Although this is less impressive than growth of 2–2.5 percent per year, which leads to a doubling in every generation, it is still enough to alter society regularly and profoundly and in the very long run to transform it radically.

The law of cumulative growth is essentially identical to the law of cumulative returns, which says that an annual rate of return of a few percent, compounded over several decades, automatically results in a very large increase of

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TABLE 2.2.

*The law of cumulated growth.*

An annual growth rate equal to ...	... is equivalent to a generational growth rate (30 years) of ...	... i.e., a multiplication by a coefficient equal to ...	... and a multiplication after 100 years by a coefficient equal to ...	... and a multiplication after 1,000 years by a coefficient equal to ...
0.1%	3%	1.03	1.11	2.72
0.2%	6%	1.06	1.22	7.37
0.5%	16%	1.16	1.65	147
1.0%	35%	1.35	2.70	20,959
1.5%	56%	1.56	4.43	2,924,437
2.0%	81%	1.81	7.24	398,264,652
2.5%	110%	2.10	11.8	52,949,930,179
3.5%	181%	2.81	31.2	...
5.0%	332%	4.32	131.5	...

*Note:* An annual growth rate of 1% is equivalent to a cumulative growth rate of 35% per generation (30 years), a multiplication by 2.7 every 100 years, and by over 20,000 every 1,000 years.

the initial capital, provided that the return is constantly reinvested, or at a minimum that only a small portion of it is consumed by the owner of the capital (small in comparison with the growth rate of the society in question).

The central thesis of this book is precisely that an apparently small gap between the return on capital and the rate of growth can in the long run have powerful and destabilizing effects on the structure and dynamics of social inequality. In a sense, everything follows from the laws of cumulative growth and cumulative returns, and that is why the reader will find it useful at this point to become familiar with these notions.

### *The Stages of Demographic Growth*

I return now to the examination of global population growth.

If the rhythm of demographic growth observed between 1700 and 2012 (0.8 percent per year on average) had started in antiquity and continued ever since, the world's population would have been multiplied by nearly 100,000 between 0 and 1700. Given that the population in 1700 is estimated to have been approximately 600 million, we would have to assume a ridiculously small global population at the time of Christ's birth (fewer than ten thousand people). Even a growth rate of 0.2 percent, extended over 1700 years, would imply a global population of only 20 million in year 0, whereas the best available information suggests that the figure was actually greater than 200 million, with 50 million living in the Roman Empire alone. Regardless of any flaws that may exist in the historical sources and global population estimates for these two dates, there is not a shadow of a doubt that the average demographic growth rate between 0 and 1700 was less than 0.2 percent and almost certainly less than 0.1 percent.

Contrary to a widely held belief, this Malthusian regime of very low growth was not one of complete demographic stagnation. The rate of growth was admittedly quite slow, and the cumulative growth of several generations was often wiped out in a few years by epidemic and famine.<sup>2</sup> Still, world population seems to have increased by a quarter between 0 and 1000, then by a half between 1000 and 1500, and by half again between 1500 and 1700, during which the demographic growth rate was close to 0.2 percent. The acceleration of growth was most likely a very gradual process, which proceeded hand in hand with growth in medical knowledge and sanitary improvements, that is to say, extremely slowly.

Demographic growth accelerated considerably after 1700, with average growth rates on the order of 0.4 percent per year in the eighteenth century and 0.6 percent in the nineteenth. Europe (including its American offshoot) experienced its most rapid demographic growth between 1700 and 1913, only to see the process reverse in the twentieth century: the rate of growth of the European population fell by half, to 0.4 percent, in the period 1913–2012, compared with 0.8 percent between 1820 and 1913. Here we see the phenomenon known as the demographic transition: the continual increase in life expectancy is no longer enough to compensate for the falling birth rate, and the pace of population growth slowly reverts to a lower level.

In Asia and Africa, however, the birth rate remained high far longer than in Europe, so that demographic growth in the twentieth century reached vertiginous heights: 1.5–2 percent per year, which translates into a fivefold or more increase in the population over the course of a century. Egypt had a population of slightly more than 10 million at the turn of the twentieth century but now numbers more than 80 million. Nigeria and Pakistan each had scarcely more than 20 million people, but today each has more than 160 million.

It is interesting to note that the growth rates of 1.5–2 percent a year attained by Asia and Africa in the twentieth century are roughly the same as those observed in America in the nineteenth and twentieth centuries (see Table 2.3). The United States thus went from a population of less than 3 million in 1780 to 100 million in 1910 and more than 300 million in 2010, or more than a hundredfold increase in just over two centuries, as mentioned earlier. The crucial difference, obviously, is that the demographic growth of the New World was largely due to immigration from other continents, especially Europe, whereas the 1.5–2 percent growth in Asia and Africa is due entirely to natural increase (the surplus of births over deaths).

As a consequence of this demographic acceleration, global population growth reached the record level of 1.4 percent in the twentieth century, compared with 0.4–0.6 percent in the eighteenth and nineteenth centuries (see Table 2.3).

It is important to understand that we are just emerging from this period of open-ended demographic acceleration. Between 1970 and 1990, global population was still growing 1.8 percent annually, almost as high as the absolute historical record of 1.9 percent achieved in the period 1950–1970. For the

GROWTH: ILLUSIONS AND REALITIES

TABLE 2.3.

*Demographic growth since the Industrial Revolution (average annual growth rate).*

Years	World population (%)	Europe (%)	America (%)	Africa (%)	Asia (%)
0–1700	0.1	0.1	0.0	0.1	0.1
1700–2012	0.8	0.6	1.4	0.9	0.8
1700–1820	0.4	0.5	0.7	0.2	0.5
1820–1913	0.6	0.8	1.9	0.6	0.4
1913–2012	1.4	0.4	1.7	2.2	1.5
<i>Projections</i>	<i>0.7</i>	<i>–0.1</i>	<i>0.6</i>	<i>1.9</i>	<i>0.5</i>
2012–2050					
<i>Projections</i>	<i>0.2</i>	<i>–0.1</i>	<i>0.0</i>	<i>1.0</i>	<i>–0.2</i>
2050–2100					

*Note:* Between 1913 and 2012, the growth rate of world population was 1.4% per year, including 0.4% for Europe, 1.7% for America, etc.

*Sources:* See [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c). Projections for 2012–2100 correspond to the UN central scenario.

period 1990–2012, the average rate is still 1.3 percent, which is extremely high.<sup>3</sup>

According to official forecasts, progress toward the demographic transition at the global level should now accelerate, leading to eventual stabilization of the planet’s population. According to a UN forecast, the demographic growth rate should fall to 0.4 percent by the 2030s and settle around 0.1 percent in the 2070s. If this forecast is correct, the world will return to the very low-growth regime of the years before 1700. The global demographic growth rate would then have followed a gigantic bell curve in the period 1700–2100, with a spectacular peak of close to 2 percent in the period 1950–1990 (see Figure 2.2).

Note, moreover, that the demographic growth anticipated for the second half of the twenty-first century (0.2 percent in the period 2050–2100) is entirely due to the continent of Africa (with annual growth of 1 percent). On the three other continents, the population will probably either stagnate (0.0 percent in America) or decrease (–0.1 percent in Europe and –0.2 percent in Asia). Such a prolonged period of negative demographic growth in peacetime would be unprecedented (see Table 2.3).

INCOME AND CAPITAL

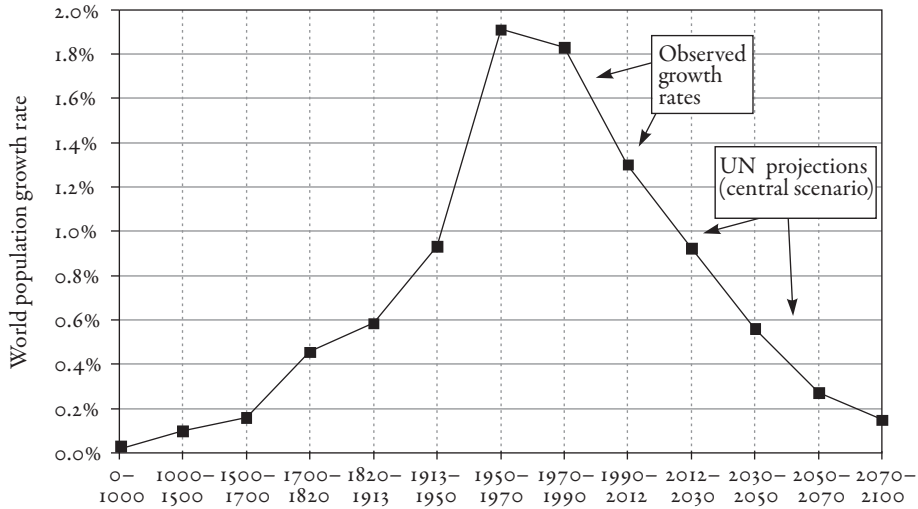


FIGURE 2.2. The growth rate of world population from Antiquity to 2100  
 The growth rate of world population was above 1 percent per year from 1950 to 2012 and should return toward 0 percent by the end of the twenty-first century.  
 Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

*Negative Demographic Growth?*

These forecasts are obviously rather uncertain. They depend first on the evolution of life expectancy (and thus in part on advances in medical science) and second on the decisions that future generations will make in regard to child-bearing. If life expectancy is taken as given, the fertility rate determines the demographic growth rate. The important point to bear in mind is that small variations in the number of children couples decide to have can have significant consequences for society writ large.<sup>4</sup>

What demographic history teaches us is that these childbearing decisions are largely unpredictable. They are influenced by cultural, economic, psychological, and personal factors related to the life goals that individuals choose for themselves. These decisions may also depend on the material conditions that different countries decide to provide, or not provide, for the purpose of making family life compatible with professional life: schools, day care, gender equality, and so on. These issues will undoubtedly play a growing part in twenty-first-century political debate and public policy. Looking beyond the general schema just outlined, we find numerous regional differences and stun-

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ning changes in demographic patterns, many of them linked to specific features of each country's history.<sup>5</sup>

The most spectacular reversal no doubt involves Europe and America. In 1780, when the population of Western Europe was already greater than 100 million and that of North America barely 3 million, no one could have guessed the magnitude of the change that lay ahead. By 2010, the population of Western Europe was just above 410 million, while the North American population had increased to 350 million. According to UN projections, the catch-up process will be complete by 2050, at which time the Western European population will have grown to around 430 million, compared with 450 million for North America. What explains this reversal? Not just the flow of immigrants to the New World but also the markedly higher fertility rate there compared with old Europe. The gap persists to this day, even among groups that came originally from Europe, and the reasons for it remain largely a mystery to demographers. One thing is sure: the higher fertility rate in North America is not due to more generous family policies, since such policies are virtually nonexistent there.

Should the difference be interpreted as reflecting a greater North American faith in the future, a New World optimism, and a greater propensity to think of one's own and one's children's futures in terms of a perpetually growing economy? When it comes to decisions as complex as those related to fertility, no psychological or cultural explanation can be ruled out in advance, and anything is possible. Indeed, US demographic growth has been declining steadily, and current trends could be reversed if immigration into the European Union continues to increase, or fertility increases, or the European life expectancy widens the gap with the United States. United Nations forecasts are not certainties.

We also find spectacular demographic turnarounds within each continent. France was the most populous country in Europe in the eighteenth century (and, as noted, both Young and Malthus saw this as the reason for French rural poverty and even as the cause of the French Revolution). But the demographic transition occurred unusually early in France: a fall in the birth rate led to a virtually stagnant population as early as the nineteenth century. This is generally attributed to de-Christianization, which also came early. Yet an equally unusual leap in the birth rate took place in the twentieth century—a leap often attributed to pronatal policies adopted after the two world wars

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and to the trauma of defeat in 1940. France's wager may well pay off, since UN forecasts predict that the population of France will exceed that of Germany by 2050 or so. It is difficult, however, to distinguish the various causes of this reversal: economic, political, cultural, and psychological factors all play a part.<sup>6</sup>

On a grander scale, everyone knows the consequences of the Chinese policy to allow only one child per family (a decision made in the 1970s, when China feared being condemned to remain an underdeveloped country, and now in the process of being relaxed). The Chinese population, which was roughly 50 percent greater than India's when this radical policy was adopted, is now close to being surpassed by that of its neighbor. According to the United Nations, India will be the most populous country in the world by 2020. Yet here, too, nothing is set in stone: population history invariably combines individual choices, developmental strategies, and national psychologies—private motives and power motives. No one at this point can seriously claim to know what demographic turnarounds may occur in the twenty-first century.

It would therefore be presumptuous to regard the official UN predictions as anything other than a "central scenario." In any case, the United Nations has also published two other sets of predictions, and the gaps between these various scenarios at the 2100 horizon are, unsurprisingly, quite large.<sup>7</sup>

The central scenario is nevertheless the most plausible we have, given the present state of our knowledge. Between 1990 and 2012, the population of Europe was virtually stagnant, and the population of several countries actually decreased. Fertility rates in Germany, Italy, Spain, and Poland fell below 1.5 children per woman in the 2000s, and only an increase in life expectancy coupled with a high level of immigration prevented a rapid decrease of population. In view of these facts, the UN prediction of zero demographic growth in Europe until 2030 and slightly negative rates after that is by no means extravagant. Indeed, it seems to be the most reasonable forecast. The same is true for UN predictions for Asia and other regions: the generations being born now in Japan and China are roughly one-third smaller than the generations born in the 1990s. The demographic transition is largely complete. Changes in individual decisions and government policies may slightly alter these trends: for example, slightly negative rates (such as we see in Japan and Germany) may become slightly positive (as in France and Scandinavia), which

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would be a significant change, but we are unlikely to see anything more than that, at least for the next several decades.

Of course the very long-run forecasts are much more uncertain. Note, however, that if the rate of population growth observed from 1700 to 2012—0.8 percent per year—were to continue for the next three centuries, the world's population would be on the order of 70 billion in 2300. To be sure, this cannot be ruled out: childbearing behavior could change, or technological advances might allow growth with much less pollution than is possible to imagine now, with output consisting of new, almost entirely nonmaterial goods and services produced with renewable energy sources exhibiting a negligible carbon footprint. At this point, however, it is hardly an exaggeration to say that a world population of 70 billion seems neither especially plausible nor particularly desirable. The most likely hypothesis is that the global population growth rate over the next several centuries will be significantly less than 0.8 percent. The official prediction of 0.1–0.2 percent per year over the very long run seems rather plausible a priori.

### *Growth as a Factor for Equalization*

In any case, it is not the purpose of this book to make demographic predictions but rather to acknowledge these various possibilities and analyze their implications for the evolution of the wealth distribution. Beyond the consequences for the development and relative power of nations, demographic growth also has important implications for the structure of inequality. Other things being equal, strong demographic growth tends to play an equalizing role because it decreases the importance of inherited wealth: every generation must in some sense construct itself.

To take an extreme example, in a world in which each couple has ten children, it is clearly better as a general rule not to count too much on inherited wealth, because the family wealth will be divided by ten with each new generation. In such a society, the overall influence of inherited wealth would be strongly diminished, and most people would be more realistic to rely on their own labor and savings.

The same would be true in a society where the population is constantly replenished by immigration from other countries, as was the case in America.



Assuming that most immigrants arrive without much wealth, the amount of wealth passed down from previous generations is inherently fairly limited in comparison with new wealth accumulated through savings. Demographic growth via immigration has other consequences, however, especially in regard to inequality between immigrants and natives as well as within each group. Such a society is thus not globally comparable to a society in which the primary source of population growth is natural increase (that is, from new births).

I will show that the intuition concerning the effects of strong demographic growth can to a certain extent be generalized to societies with very rapid economic (and not just demographic) growth. For example, in a society where output per capita grows tenfold every generation, it is better to count on what one can earn and save from one's own labor: the income of previous generations is so small compared with current income that the wealth accumulated by one's parents and grandparents doesn't amount to much.

Conversely, a stagnant or, worse, decreasing population increases the influence of capital accumulated in previous generations. The same is true of economic stagnation. With low growth, moreover, it is fairly plausible that the rate of return on capital will be substantially higher than the growth rate, a situation that, as I noted in the introduction, is the main factor leading toward very substantial inequality in the distribution of wealth over the long run. Capital-dominated societies in the past, with hierarchies largely determined by inherited wealth (a category that includes both traditional rural societies and the countries of nineteenth-century Europe) can arise and subsist only in low-growth regimes. I will consider the extent to which the probable return to a low-growth regime, if it occurs, will affect the dynamics of capital accumulation and the structure of inequality. In particular, inherited wealth will make a comeback—a long-term phenomenon whose effects are already being felt in Europe and that could extend to other parts of the world as well. That is why it is important for present purposes to become familiar with the history of demographic and economic growth.

There is another mechanism whereby growth can contribute to the reduction of inequality, or at least to a more rapid circulation of elites, which must also be discussed. This mechanism is potentially complementary to the first, although it is less important and more ambiguous. When growth is zero or very low, the various economic and social functions as well as types of profes-

sional activity, are reproduced virtually without change from generation to generation. By contrast, constant growth, even if it is only 0.5 or 1 or 1.5 percent per year, means that new functions are constantly being created and new skills are needed in every generation. Insofar as tastes and capabilities are only partially transmitted from generation to generation (or are transmitted much less automatically and mechanically than capital in land, real estate, or financial assets are transmitted by inheritance), growth can thus increase social mobility for individuals whose parents did not belong to the elite of the previous generation. This increased social mobility need not imply decreased income inequality, but in theory it does limit the reproduction and amplification of inequalities of wealth and therefore over the long run also limits income inequality to a certain extent.

One should be wary, however, of the conventional wisdom that modern economic growth is a marvelous instrument for revealing individual talents and aptitudes. There is some truth in this view, but since the early nineteenth century it has all too often been used to justify inequalities of all sorts, no matter how great their magnitude and no matter what their real causes may be, while at the same time gracing the winners in the new industrial economy with every imaginable virtue. For instance, the liberal economist Charles Dunoyer, who served as a prefect under the July Monarchy, had this to say in his 1845 book *De la liberté du travail* (in which he of course expressed his opposition to any form of labor law on social legislation): “one consequence of the industrial regime is to destroy artificial inequalities, but this only highlights natural inequalities all the more clearly.” For Dunoyer, natural inequalities included differences in physical, intellectual, and moral capabilities, differences that were crucial to the new economy of growth and innovation that he saw wherever he looked. This was his reason for rejecting state intervention of any kind: “superior abilities . . . are the source of everything that is great and useful. . . . Reduce everything to equality and you will bring everything to a standstill.”<sup>8</sup> One sometimes hears the same thought expressed today in the idea that the new information economy will allow the most talented individuals to increase their productivity many times over. The plain fact is that this argument is often used to justify extreme inequalities and to defend the privileges of the winners without much consideration for the losers, much less for the facts, and without any real effort to verify whether this very convenient principle can actually explain the changes we observe. I will come back to this point.

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*The Stages of Economic Growth*

I turn now to the growth of per capita output. As noted, this was of the same order as population growth over the period 1700–2012: 0.8 percent per year on average, which equates to a multiplication of output by a factor of roughly ten over three centuries. Average global per capita income is currently around 760 euros per month; in 1700, it was less than 70 euros per month, roughly equal to income in the poorest countries of Sub-Saharan Africa in 2012.<sup>9</sup>

This comparison is suggestive, but its significance should not be exaggerated. When comparing very different societies and periods, we must avoid trying to sum everything up with a single figure, for example “the standard of living in society A is ten times higher than in society B.” When growth attains levels such as these, the notion of per capita output is far more abstract than that of population, which at least corresponds to a tangible reality (it is much easier to count people than to count goods and services). Economic development begins with the diversification of ways of life and types of goods and services produced and consumed. It is thus a multidimensional process whose very nature makes it impossible to sum up properly with a single monetary index.

Take the wealthy countries as an example. In Western Europe, North America, and Japan, average per capita income increased from barely 100 euros per month in 1700 to more than 2,500 euros per month in 2012, a more than twentyfold increase.<sup>10</sup> The increase in productivity, or output per hour worked, was even greater, because each person’s average working time decreased dramatically: as the developed countries grew wealthier, they decided to work less in order to allow for more free time (the work day grew shorter, vacations grew longer, and so on).<sup>11</sup>

Much of this spectacular growth occurred in the twentieth century. Globally, the average growth of per capita output of 0.8 percent over the period 1700–2012 breaks down as follows: growth of barely 0.1 percent in the eighteenth century, 0.9 percent in the nineteenth century, and 1.6 percent in the twentieth century (see Table 2.1). In Western Europe, average growth of 1.0 percent in the same period breaks down as 0.2 percent in the eighteenth century, 1.1 percent in the nineteenth century, and 1.9 percent in the twentieth century.<sup>12</sup> Average purchasing power in Europe barely increased at all from 1700 to 1820, then more than doubled between 1820 and 1913, and increased more than sixfold between 1913 and 2012. Basically, the eighteenth century suf-

ferred from the same economic stagnation as previous centuries. The nineteenth century witnessed the first sustained growth in per capita output, although large segments of the population derived little benefit from this, at least until the last three decades of the century. It was not until the twentieth century that economic growth became a tangible, unmistakable reality for everyone. Around the turn of the twentieth century, average per capita income in Europe stood at just under 400 euros per month, compared with 2,500 euros in 2010.

But what does it mean for purchasing power to be multiplied by a factor of twenty, ten, or even six? It clearly does not mean that Europeans in 2012 produced and consumed six times more goods and services than they produced and consumed in 1913. For example, average food consumption obviously did not increase sixfold. Basic dietary needs would long since have been satisfied if consumption had increased that much. Not only in Europe but everywhere, improvements in purchasing power and standard of living over the long run depend primarily on a transformation of the structure of consumption: a consumer basket initially filled mainly with foodstuffs gradually gave way to a much more diversified basket of goods, rich in manufactured products and services.

Furthermore, even if Europeans in 2012 wished to consume six times the amount of goods and services they consumed in 1913, they could not: some prices have risen more rapidly than the “average” price, while others have risen more slowly, so that purchasing power has not increased sixfold for all types of goods and services. In the short run, the problem of “relative prices” can be neglected, and it is reasonable to assume that the indices of “average” prices published by government agencies allow us to correctly gauge changes in purchasing power. In the long run, however, relative prices shift dramatically, as does the composition of the typical consumer’s basket of goods, owing largely to the advent of new goods and services, so that average price indices fail to give an accurate picture of the changes that have taken place, no matter how sophisticated the techniques used by the statisticians to process the many thousands of prices they monitor and to correct for improvements in product quality.

### *What Does a Tenfold Increase in Purchasing Power Mean?*

In fact, the only way to accurately gauge the spectacular increase in standards of living since the Industrial Revolution is to look at income levels in today’s currency and compare these to price levels for the various goods and services

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available in different periods. For now, I will simply summarize the main lessons derived from such an exercise.<sup>13</sup>

It is standard to distinguish the following three types of goods and services. For industrial goods, productivity growth has been more rapid than for the economy as a whole, so that prices in this sector have fallen relative to the average of all prices. Foodstuffs is a sector in which productivity has increased continuously and crucially over the very long run (thereby allowing a greatly increased population to be fed by ever fewer hands, liberating a growing portion of the workforce for other tasks), even though the increase in productivity has been less rapid in the agricultural sector than in the industrial sector, so that food prices have evolved at roughly the same rate as the average of all prices. Finally, productivity growth in the service sector has generally been low (or even zero in some cases, which explains why this sector has tended to employ a steadily increasing share of the workforce), so that the price of services has increased more rapidly than the average of all prices.

This general pattern is well known. Although it is broadly speaking correct, it needs to be refined and made more precise. In fact, there is a great deal of diversity within each of these three sectors. The prices of many food items did in fact evolve at the same rate as the average of all prices. For example, in France, the price of a kilogram of carrots evolved at the same rate as the overall price index in the period 1900–2010, so that purchasing power expressed in terms of carrots evolved in the same way as average purchasing power (which increased approximately sixfold). An average worker could afford slightly less than ten kilos of carrots per day at the turn of the twentieth century, while he could afford nearly sixty kilos per day at the turn of the twenty-first century.<sup>14</sup> For other foodstuffs, however, such as milk, butter, eggs, and dairy products in general, major technological advances in processing, manufacturing, conservation, and so on led to relative price decreases and thus to increases in purchasing power greater than sixfold. The same is true for products that benefited from the significant reduction in transport costs over the course of the twentieth century: for example, French purchasing power expressed in terms of oranges increased tenfold, and expressed in terms of bananas, twentyfold. Conversely, purchasing power measured in kilos of bread or meat rose less than fourfold, although there was a sharp increase in the quality and variety of products on offer.

Manufactured goods present an even more mixed picture, primarily because of the introduction of radically new goods and spectacular improvements in performance. The example often cited in recent years is that of electronics and computer technology. Advances in computers and cell phones in the 1990s and of tablets and smartphones in the 2000s and beyond have led to tenfold increases in purchasing power in a very short period of time: prices have fallen by half, while performance has increased by a factor of 5.

It is important to note that equally impressive examples can be found throughout the long history of industrial development. Take the bicycle. In France in the 1880s, the cheapest model listed in catalogs and sales brochures cost the equivalent of six months of the average worker's wage. And this was a relatively rudimentary bicycle, "which had wheels covered with just a strip of solid rubber and only one brake that pressed directly against the front rim." Technological progress made it possible to reduce the price to one month's wages by 1910. Progress continued, and by the 1960s one could buy a quality bicycle (with "detachable wheel, two brakes, chain and mud guards, saddle bags, lights, and reflector") for less than a week's average wage. All in all, and leaving aside the prodigious improvement in the quality and safety of the product, purchasing power in terms of bicycles rose by a factor of 40 between 1890 and 1970.<sup>15</sup>

One could easily multiply examples by comparing the price history of electric light bulbs, household appliances, table settings, clothing, and automobiles to prevailing wages in both developed and emerging economies.

All of these examples show how futile and reductive it is to try to sum up all these change with a single index, as in "the standard of living increased tenfold between date A and date B." When family budgets and lifestyles change so radically and purchasing power varies so much from one good to another, it makes little sense to take averages, because the result depends heavily on the weights and measures of quality one chooses, and these are fairly uncertain, especially when one is attempting comparisons across several centuries.

None of this in any way challenges the reality of growth. Quite the contrary: the material conditions of life have clearly improved dramatically since the Industrial Revolution, allowing people around the world to eat better, dress better, travel, learn, obtain medical care, and so on. It remains interesting to measure growth rates over shorter periods such as a generation or two. Over a period of thirty to sixty years, there are significant differences between a growth rate of 0.1 percent per year (3 percent per generation), 1 percent per

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year (35 percent per generation), or 3 percent per year (143 percent per generation). It is only when growth statistics are compiled over very long periods leading to multiplications by huge factors that the numbers lose a part of their significance and become relatively abstract and arbitrary quantities.

*Growth: A Diversification of Lifestyles*

To conclude this discussion, consider the case of services, where diversity is probably the most extreme. In theory, things are fairly clear: productivity growth in the service sector has been less rapid, so that purchasing power expressed in terms of services has increased much less. As a typical case—a “pure” service benefiting from no major technological innovation over the centuries—one often takes the example of barbers: a haircut takes just as long now as it did a century ago, so that the price of a haircut has increased by the same factor as the barber’s pay, which has itself progressed at the same rate as the average wage and average income (to a first approximation). In other words, an hour’s work of the typical wage-earner in the twenty-first century can buy just as many haircuts as an hour’s work a hundred years ago, so that purchasing power expressed in terms of haircuts has not increased (and may in fact have decreased slightly).<sup>16</sup>

In fact, the diversity of services is so extreme that the very notion of a service sector makes little sense. The decomposition of the economy into three sectors—primary, secondary, and tertiary—was an idea of the mid-twentieth century in societies where each sector included similar, or at any rate comparable, fractions of economic activity and the workforce (see Table 2.4). But once 70–80 percent of the workforce in the developed countries found itself working in the service sector, the category ceased to have the same meaning: it provided little information about the nature of the trades and services produced in a given society.

In order to find our way through this vast aggregate of activities, whose growth accounts for much of the improvement in living conditions since the nineteenth century, it will be useful to distinguish several subsectors. Consider first services in health and education, which by themselves account for more than 20 percent of total employment in the most advanced countries (or as much as all industrial sectors combined). There is every reason to think that this fraction will continue to increase, given the pace of medical progress

GROWTH: ILLUSIONS AND REALITIES

TABLE 2.4.  
*Employment by sector in France and the United States, 1800–2012*  
 (% of total employment).

Year	France			United States		
	Agriculture	Manufacturing	Services	Agriculture	Manufacturing	Services
1800	64	22	14	68	18	13
1900	43	29	28	41	28	31
1950	32	33	35	15	34	50
2012	3	21	76	2	18	80

*Note:* In 2012, agriculture made up 3% of total employment in France v. 21% in manufacturing and 76% in services. Construction—7% of employment in France and the United States in 2012—was included in manufacturing.

*Sources:* See [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

and the steady growth of higher education. The number of jobs in retail; hotels, cafés, and restaurants; and culture and leisure activities also increased rapidly, typically accounting for 20 percent of total employment. Services to firms (consulting, accounting, design, data processing, etc.) combined with real estate and financial services (real estate agencies, banks, insurance, etc.) and transportation add another 20 percent of the job total. If you then add government and security services (general administration, courts, police, armed forces, etc.), which account for nearly 10 percent of total employment in most countries, you reach the 70–80 percent figure given in official statistics.<sup>17</sup>

Note that an important part of these services, especially in health and education, is generally financed by taxes and provided free of charge. The details of financing vary from country to country, as does the exact share financed by taxes, which is higher in Europe, for example, than in the United States or Japan. Still, it is quite high in all developed countries: broadly speaking, at least half of the total cost of health and education services is paid for by taxes, and in a number of European countries it is more than three-quarters. This raises potential new difficulties and uncertainties when it comes to measuring and comparing increases in the standard of living in different countries over the long run. This is not a minor point: not only do these two sectors account for more than 20 percent of GDP and employment in the most advanced countries—a percentage that will no doubt increase in the future—but health and education probably account for the most tangible

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and impressive improvement in standards of living over the past two centuries. Instead of living in societies where the life expectancy was barely forty years and nearly everyone was illiterate, we now live in societies where it is common to reach the age of eighty and everyone has at least minimal access to culture.

In national accounts, the value of public services available to the public for free is always estimated on the basis of the production costs assumed by the government, that is, ultimately, by taxpayers. These costs include the wages paid to health workers and teachers employed by hospitals, schools, and public universities. This method of valuing services has its flaws, but it is logically consistent and clearly more satisfactory than simply excluding free public services from GDP calculations and concentrating solely on commodity production. It would be economically absurd to leave public services out entirely, because doing so would lead in a totally artificial way to an underestimate of the GDP and national income of a country that chose a public system of health and education rather than a private system, even if the available services were strictly identical.

The method used to compute national accounts has the virtue of correcting this bias. Still, it is not perfect. In particular, there is no objective measure of the quality of services rendered (although various correctives for this are under consideration). For example, if a private health insurance system costs more than a public system but does not yield truly superior quality (as a comparison of the United States with Europe suggests), then GDP will be artificially overvalued in countries that rely mainly on private insurance. Note, too, that the convention in national accounting is not to count any remuneration for public capital such as hospital buildings and equipment or schools and universities.<sup>18</sup> The consequence of this is that a country that privatized its health and education services would see its GDP rise artificially, even if the services produced and the wages paid to employees remained exactly the same.<sup>19</sup> It may be that this method of accounting by costs underestimates the fundamental “value” of education and health and therefore the growth achieved during periods of rapid expansion of services in these areas.<sup>20</sup>

Hence there is no doubt that economic growth led to a significant improvement in standard of living over the long run. The best available estimates suggest that global per capita income increased by a factor of more than 10 between 1700 and 2012 (from 70 euros to 760 euros per month) and by a

factor of more than 20 in the wealthiest countries (from 100 to 2,500 euros per month). Given the difficulties of measuring such radical transformations, especially if we try to sum them up with a single index, we must be careful not to make a fetish of the numbers, which should rather be taken as indications of orders of magnitude and nothing more.

### *The End of Growth?*

Now to consider the future. Will the spectacular increase in per capita output I have just described inexorably slow in the twenty-first century? Are we headed toward the end of growth for technological or ecological reasons, or perhaps both at once?

Before trying to answer this question, it is important to recall that past growth, as spectacular as it was, almost always occurred at relatively slow annual rates, generally no more than 1–1.5 percent per year. The only historical examples of noticeably more rapid growth—3–4 percent or more—occurred in countries that were experiencing accelerated catch-up with other countries. This is a process that by definition ends when catch-up is achieved and therefore can only be transitional and time limited. Clearly, moreover, such a catch-up process cannot take place globally.

At the global level, the average rate of growth of per capita output was 0.8 percent per year from 1700 to 2012, or 0.1 percent in the period 1700–1820, 0.9 percent in 1820–1913, and 1.6 percent in 1913–2012. As indicated in Table 2.1, we find the same average growth rate—0.8 percent—when we look at world population 1700–2012.

Table 2.5 shows the economic growth rates for each century and each continent separately. In Europe, per capita output grew at a rate of 1.0 percent 1820–1913 and 1.9 percent 1913–2012. In America, growth reached 1.5 percent 1820–1913 and 1.5 percent again 1913–2012.

The details are unimportant. The key point is that there is no historical example of a country at the world technological frontier whose growth in per capita output exceeded 1.5 percent over a lengthy period of time. If we look at the last few decades, we find even lower growth rates in the wealthiest countries: between 1990 and 2012, per capita output grew at a rate of 1.6 percent in Western Europe, 1.4 percent in North America, and 0.7 percent in Japan.<sup>21</sup> It is important to bear this reality in mind as I proceed, because many people

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TABLE 2.5.  
*Per capita output growth since the Industrial Revolution  
 (average annual growth rate).*

Year	Per capita world output (%)	Europe (%)	America (%)	Africa (%)	Asia (%)
0–1700	0.0	0.0	0.0	0.0	0.0
1700–2012	0.8	1.0	1.1	0.5	0.7
1700–1820	0.1	0.1	0.4	0.0	0.0
1820–1913	0.9	1.0	1.5	0.4	0.2
1913–2012	1.6	1.9	1.5	1.1	2.0
1913–1950	0.9	0.9	1.4	0.9	0.2
1950–1970	2.8	3.8	1.9	2.1	3.5
1970–1990	1.3	1.9	1.6	0.3	2.1
1990–2012	2.1	1.9	1.5	1.4	3.8
1950–1980	2.5	3.4	2.0	1.8	3.2
1980–2012	1.7	1.8	1.3	0.8	3.1

*Note:* Between 1910 and 2012, the growth rate of per capita output was 1.7% per year on average at the world level, including 1.9% in Europe, 1.6% in America, etc.

*Sources:* See [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

think that growth ought to be at least 3 or 4 percent per year. As noted, both history and logic show this to be illusory.

With these preliminaries out of the way, what can we say about future growth rates? Some economists, such as Robert Gordon, believe that the rate of growth of per capita output is destined to slow in the most advanced countries, starting with the United States, and may sink below 0.5 percent per year between 2050 and 2100.<sup>22</sup> Gordon's analysis is based on a comparison of the various waves of innovation that have succeeded one another since the invention of the steam engine and introduction of electricity, and on the finding that the most recent waves—including the revolution in information technology—have a much lower growth potential than earlier waves, because they are less disruptive to modes of production and do less to improve productivity across the economy.

Just as I refrained earlier from predicting demographic growth, I will not attempt now to predict economic growth in the twenty-first century. Rather, I will attempt to draw the consequences of various possible scenarios for the dynamics of the wealth distribution. To my mind, it is as difficult to predict the pace of future innovations as to predict future fertility. The history of the past two centuries makes it highly unlikely that per capita output in the advanced countries will grow at a rate above 1.5 percent per year, but I am unable to predict whether the actual rate will be 0.5 percent, 1 percent, or 1.5 percent. The median scenario I will present here is based on a long-term per capita output growth rate of 1.2 percent in the wealthy countries, which is relatively optimistic compared with Robert Gordon's predictions (which I think are a little too dark). This level of growth cannot be achieved, however, unless new sources of energy are developed to replace hydrocarbons, which are rapidly being depleted.<sup>23</sup> This is only one scenario among many.

### *An Annual Growth of 1 Percent Implies Major Social Change*

In my view, the most important point—more important than the specific growth rate prediction (since, as I have shown, any attempt to reduce long-term growth to a single figure is largely illusory)—is that a per capita output growth rate on the order of 1 percent is in fact extremely rapid, much more rapid than many people think.

The right way to look at the problem is once again in generational terms. Over a period of thirty years, a growth rate of 1 percent per year corresponds to cumulative growth of more than 35 percent. A growth rate of 1.5 percent per year corresponds to cumulative growth of more than 50 percent. In practice, this implies major changes in lifestyle and employment. Concretely, per capita output growth in Europe, North America, and Japan over the past thirty years has ranged between 1 and 1.5 percent, and people's lives have been subjected to major changes. In 1980 there was no Internet or cell phone network, most people did not travel by air, most of the advanced medical technologies in common use today did not yet exist, and only a minority attended college. In the areas of communication, transportation, health, and education, the changes have been profound. These changes have also had a powerful impact on the structure of employment: when output per head increases by 35 to 50 percent in thirty years, that means that a very large fraction—between a

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quarter and a third—of what is produced today, and therefore between a quarter and a third of occupations and jobs, did not exist thirty years ago.

What this means is that today's societies are very different from the societies of the past, when growth was close to zero, or barely 0.1 percent per year, as in the eighteenth century. A society in which growth is 0.1–0.2 percent per year reproduces itself with little or no change from one generation to the next: the occupational structure is the same, as is the property structure. A society that grows at 1 percent per year, as the most advanced societies have done since the turn of the nineteenth century, is a society that undergoes deep and permanent change. This has important consequences for the structure of social inequalities and the dynamics of the wealth distribution. Growth can create new forms of inequality: for example, fortunes can be amassed very quickly in new sectors of economic activity. At the same time, however, growth makes inequalities of wealth inherited from the past less apparent, so that inherited wealth becomes less decisive. To be sure, the transformations entailed by a growth rate of 1 percent are far less sweeping than those required by a rate of 3–4 percent, so that the risk of disillusionment is considerable—a reflection of the hope invested in a more just social order, especially since the Enlightenment. Economic growth is quite simply incapable of satisfying this democratic and meritocratic hope, which must create specific institutions for the purpose and not rely solely on market forces or technological progress.

*The Posterity of the Postwar Period:  
Entangled Transatlantic Destinies*

Continental Europe and especially France have entertained considerable nostalgia for what the French call the Trente Glorieuses, the thirty years from the late 1940s to the late 1970s during which economic growth was unusually rapid. People still do not understand what evil spirit condemned them to such a low rate of growth beginning in the late 1970s. Even today, many people believe that the last thirty (soon to be thirty-five or forty) “pitiful years” will soon come to an end, like a bad dream, and things will once again be as they were before.

In fact, when viewed in historical perspective, the thirty postwar years were the exceptional period, quite simply because Europe had fallen far behind the United States over the period 1914–1945 but rapidly caught up during the

## GROWTH: ILLUSIONS AND REALITIES

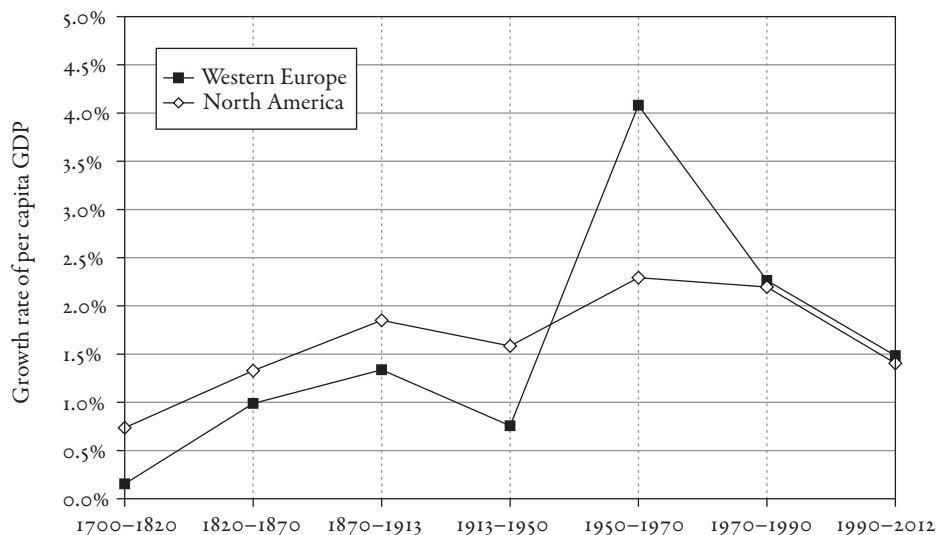


FIGURE 2.3. The growth rate of per capita output since the Industrial Revolution  
The growth rate of per capita output surpassed 4 percent per year in Europe between 1950 and 1970, before returning to American levels.  
Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

Trente Glorieuses. Once this catch-up was complete, Europe and the United States both stood at the global technological frontier and began to grow at the same relatively slow pace, characteristic of economics at the frontier.

A glance at Figure 2.3, which shows the comparative evolution of European and North American growth rates, will make this point clear. In North America, there is no nostalgia for the postwar period, quite simply because the Trente Glorieuses never existed there: per capita output grew at roughly the same rate of 1.5–2 percent per year throughout the period 1820–2012. To be sure, growth slowed a bit between 1930 and 1950 to just over 1.5 percent, then increased again to just over 2 percent between 1950 and 1970, and then slowed to less than 1.5 percent between 1990 and 2012. In Western Europe, which suffered much more from the two world wars, the variations are considerably greater: per capita output stagnated between 1913 and 1950 (with a growth rate of just over 0.5 percent) and then leapt ahead to more than 4 percent from 1950 to 1970, before falling sharply to just slightly above US levels (a little more than 2 percent) in the period 1970–1990 and to barely 1.5 percent between 1990 and 2012.

Western Europe experienced a golden age of growth between 1950 and 1970, only to see its growth rate diminish to one-half or even one-third of its peak level during the decades that followed. Note that Figure 2.3 underestimates the depth of the fall, because I included Britain in Western Europe (as it should be), even though British growth in the twentieth century adhered fairly closely to the North American pattern of quasi stability. If we looked only at continental Europe, we would find an average per capita output growth rate of 5 percent between 1950 and 1970—a level well beyond that achieved in other advanced countries over the past two centuries.

These very different collective experiences of growth in the twentieth century largely explain why public opinion in different countries varies so widely in regard to commercial and financial globalization and indeed to capitalism in general. In continental Europe and especially France, people quite naturally continue to look on the first three postwar decades—a period of strong state intervention in the economy—as a period blessed with rapid growth, and many regard the liberalization of the economy that began around 1980 as the cause of a slowdown.

In Great Britain and the United States, postwar history is interpreted quite differently. Between 1950 and 1980, the gap between the English-speaking countries and the countries that had lost the war closed rapidly. By the late 1970s, US magazine covers often denounced the decline of the United States and the success of German and Japanese industry. In Britain, GDP per capita fell below the level of Germany, France, Japan, and even Italy. It may even be the case that this sense of being rivaled (or even overtaken in the case of Britain) played an important part in the “conservative revolution.” Margaret Thatcher in Britain and Ronald Reagan in the United States promised to “roll back the welfare state” that had allegedly sapped the animal spirits of Anglo-Saxon entrepreneurs and thus to return to pure nineteenth-century capitalism, which would allow the United States and Britain to regain the upper hand. Even today, many people in both countries believe that the conservative revolution was remarkably successful, because their growth rates once again matched continental European and Japanese levels.

In fact, neither the economic liberalization that began around 1980 nor the state interventionism that began in 1945 deserves such praise or blame. France, Germany, and Japan would very likely have caught up with Britain and the United States following their collapse of 1914–1945 regardless of what

policies they had adopted (I say this with only slight exaggeration). The most one can say is that state intervention did no harm. Similarly, once these countries had attained the global technological frontier, it is hardly surprising that they ceased to grow more rapidly than Britain and the United States or that growth rates in all of these wealthy countries more or less equalized, as Figure 2.3 shows (I will come back to this). Broadly speaking, the US and British policies of economic liberalization appear to have had little effect on this simple reality, since they neither increased growth nor decreased it.

### *The Double Bell Curve of Global Growth*

To recapitulate, global growth over the past three centuries can be pictured as a bell curve with a very high peak. In regard to both population growth and per capita output growth, the pace gradually accelerated over the course of the eighteenth and nineteenth centuries, and especially the twentieth, and is now most likely returning to much lower levels for the remainder of the twenty-first century.

There are, however, fairly clear differences between the two bell curves. If we look at the curve for population growth, we see that the rise began much earlier, in the eighteenth century, and the decrease also began much earlier. Here we see the effects of the demographic transition, which has already largely been completed. The rate of global population growth peaked in the period 1950–1970 at nearly 2 percent per year and since then has decreased steadily. Although one can never be sure of anything in this realm, it is likely that this process will continue and that global demographic growth rates will decline to near zero in the second half of the twenty-first century. The shape of the bell curve is quite well defined (see Figure 2.2).

When it comes to the growth rate of per capita output, things are more complicated. It took longer for “economic” growth to take off: it remained close to zero throughout the eighteenth century, began to climb only in the nineteenth, and did not really become a shared reality until the twentieth. Global growth in per capita output exceeded 2 percent between 1950 and 1990, notably thanks to European catch-up, and again between 1990 and 2012, thanks to Asian and especially Chinese catch-up, with growth in China exceeding 9 percent per year in that period, according to official statistics (a level never before observed).<sup>24</sup>

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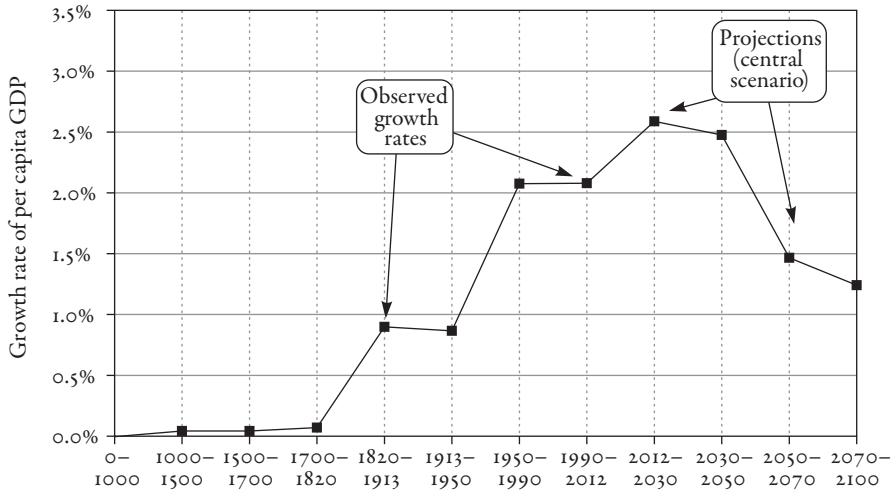


FIGURE 2.4. The growth rate of world per capita output from Antiquity to 2100

The growth rate of per capita output surpassed 2 percent from 1950 to 2012. If the convergence process goes on, it will surpass 2.5 percent from 2012 to 2050, and then will drop below 1.5 percent.

Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

What will happen after 2012? In Figure 2.4 I have indicated a “median” growth prediction. In fact, this is a rather optimistic forecast, since I have assumed that the richest countries (Western Europe, North America, and Japan) will grow at a rate of 1.2 percent from 2012 to 2100 (markedly higher than many other economists predict), while poor and emerging countries will continue the convergence process without stumbling, attaining growth of 5 percent per year from 2012 to 2030 and 4 percent from 2030 to 2050. If this were to occur as predicted, per capita output in China, Eastern Europe, South America, North Africa, and the Middle East would match that of the wealthiest countries by 2050.<sup>25</sup> After that, the distribution of global output described in Chapter 1 would approximate the distribution of the population.<sup>26</sup>

In this optimistic median scenario, global growth of per capita output would slightly exceed 2.5 percent per year between 2012 and 2030 and again between 2030 and 2050, before falling below 1.5 percent initially and then declining to around 1.2 percent in the final third of the century. By comparison with the bell curve followed by the rate of demographic growth (Figure 2.2), this second bell curve has two special features. First, it peaks much later than

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## GROWTH: ILLUSIONS AND REALITIES

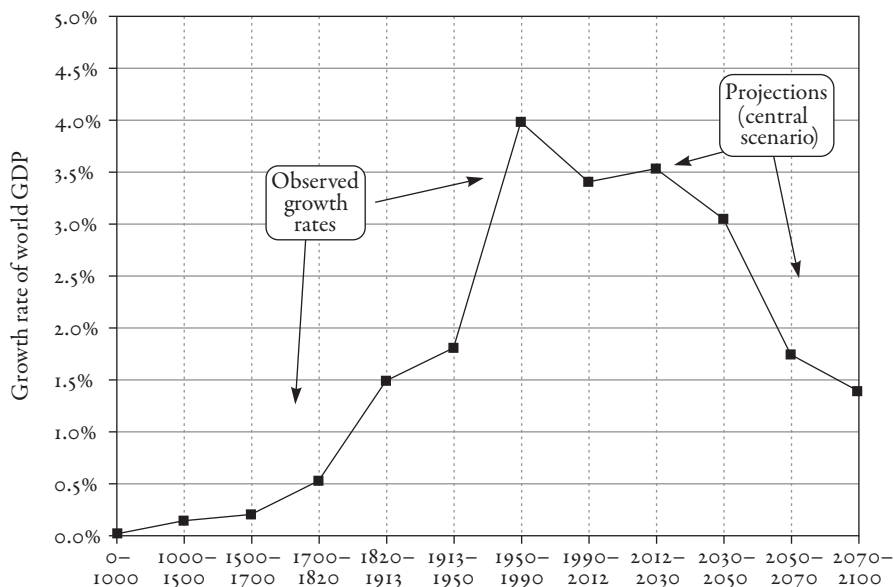


FIGURE 2.5. The growth rate of world output from Antiquity to 2100

The growth rate of world output surpassed 4 percent from 1950 to 1990. If the convergence process goes on, it will drop below 2 percent by 2050.

Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

the first one (almost a century later, in the middle of the twenty-first century rather than the twentieth), and second, it does not decrease to zero or near-zero growth but rather to a level just above 1 percent per year, which is much higher than the growth rate of traditional societies (see Figure 2.4).

By adding these two curves, we can obtain a third curve showing the rate of growth of total global output (Figure 2.5). Until 1950, this had always been less than 2 percent per year, before leaping to 4 percent in the period 1950–1990, an exceptionally high level that reflected both the highest demographic growth rate in history and the highest growth rate in output per head. The rate of growth of global output then began to fall, dropping below 3.5 percent in the period 1990–2012, despite extremely high growth rates in emerging countries, most notably China. According to my median scenario, this rate will continue through 2030 before dropping to 3 percent in 2030–2050 and then to roughly 1.5 percent during the second half of the twenty-first century.

I have already conceded that these “median” forecasts are highly hypothetical. The key point is that regardless of the exact dates and growth rates (details that are obviously important), the two bell curves of global growth are in large part already determined. The median forecast shown on Figures 2.2–5 is optimistic in two respects: first, because it assumes that productivity growth in the wealthy countries will continue at a rate of more than 1 percent per year (which assumes significant technological progress, especially in the area of clean energy), and second, perhaps more important, because it assumes that emerging economies will continue to converge with the rich economies, without major political or military impediments, until the process is complete, around 2050, which is very rapid. It is easy to imagine less optimistic scenarios, in which case the bell curve of global growth could fall faster to levels lower than those indicated on these graphs.

### *The Question of Inflation*

The foregoing overview of growth since the Industrial Revolution would be woefully incomplete if I did not discuss the question of inflation. Some would say that inflation is a purely monetary phenomenon with which we do not need to concern ourselves. In fact, all the growth rates I have discussed thus far are so-called real growth rates, which are obtained by subtracting the rate of inflation (derived from the consumer price index) from the so-called nominal growth rate (measured in terms of consumer prices).

In reality, inflation plays a key role in this investigation. As noted, the use of a price index based on “averages” poses a problem, because growth always bring forth new goods and services and leads to enormous shifts in relative prices, which are difficult to summarize in a single index. As a result, the concepts of inflation and growth are not always very well defined. The decomposition of nominal growth (the only kind that can be observed with the naked eye, as it were) into a real component and an inflation component is in part arbitrary and has been the source of numerous controversies.

For example, if the nominal growth rate is 3 percent per year and prices increase by 2 percent, then we say that the real growth rate is 1 percent. But if we revise the inflation estimate downward because, for example, we believe that the real price of smartphones and tablets has decreased much more than

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we thought previously (given the considerable increase in their quality and performance, which statisticians try to measure carefully—no mean feat), so that we now think that prices rose by only 1.5 percent, then we conclude that the real growth rate is 1.5 percent. In fact, when differences are this small, it is difficult to be certain about the correct figure, and each estimate captures part of the truth: growth was no doubt closer to 1.5 percent for aficionados of smartphones and tablets and closer to 1 percent for others.

Relative price movements can play an even more decisive role in Ricardo's theory based on the principle of scarcity: if certain prices, such as those for land, buildings, or gasoline, rise to very high levels for a prolonged period of time, this can permanently alter the distribution of wealth in favor of those who happen to be the initial owners of those scarce resources.

In addition to the question of relative prices, I will show that inflation per se—that is, a generalized increase of all prices—can also play a fundamental role in the dynamics of the wealth distribution. Indeed, it was essentially inflation that allowed the wealthy countries to get rid of the public debt they owed at the end of World War II. Inflation also led to various redistributions among social groups over the course of the twentieth century, often in a chaotic, uncontrolled manner. Conversely, the wealth-based society that flourished in the eighteenth and nineteenth centuries was inextricably linked to the very stable monetary conditions that persisted over this very long period.

### *The Great Monetary Stability of the Eighteenth and Nineteenth Centuries*

To back up a bit: the first crucial fact to bear in mind is that inflation is largely a twentieth-century phenomenon. Before that, up to World War I, inflation was zero or close to it. Prices sometimes rose or fell sharply for a period of several years or even decades, but these price movements generally balanced out in the end. This was the case in all countries for which we possess long-run price series.

More precisely, if we look at average price increases over the periods 1700–1820 and 1820–1913, we find that inflation was insignificant in France, Britain, the United States, and Germany: at most 0.2–0.3 percent per year. We even find periods of slightly negative price movements: for example, Britain

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and the United States in the nineteenth century ( $-0.2$  percent per year if we average the two cases between 1820 and 1913).

To be sure, there were a few exceptions to the general rule of monetary stability, but each of them was short-lived, and the return to normal came quickly, as though it were inevitable. One particularly emblematic case was that of the French Revolution. Late in 1789, the revolutionary government issued its famous assignats, which became a true circulating currency and medium of exchange by 1790 or 1791. It was one of the first historical examples of paper money. This gave rise to high inflation (measured in assignats) until 1794 or 1795. The important point, however, is that the return to metal coinage, after creation of the franc germinal, took place at the same parity as the currency of the Ancien Régime. The law of 18 germinal, Year III (April 7, 1795), did away with the old livre tournois (which reminded people too much of the monarchy) and replaced it with the franc, which became the country's new official monetary unit. It had the same metal content as its predecessor. A 1-franc coin was supposed to contain exactly 4.5 grams of fine silver (as the livre tournois had done since 1726). This was confirmed by the law of 1796 and again by the law of 1803, which permanently established bimetallism in France (based on gold and silver).<sup>27</sup>

Ultimately, prices measured in francs in the period 1800–1810 were roughly the same as prices expressed in livres tournois in the period 1770–1780, so that the change of monetary unit during the Revolution did not alter the purchasing power of money in any way. The novelists of the early nineteenth century, starting with Balzac, moved constantly from one unit to another when characterizing income and wealth: for contemporary readers, the franc germinal (or “franc-or”) and livre tournois were one and the same. For Père Goriot, “a thousand two hundred livres” of rent was perfectly equivalent to “twelve hundred francs,” and no further specification was needed.

The gold value of the franc set in 1803 was not officially changed until June 25, 1928, when a new monetary law was adopted. In fact, the Banque de France had been relieved of the obligation to exchange its notes for gold or silver since August 1914, so that the “franc-or” had already become a “paper franc” and remained such until the monetary stabilization of 1926–1928. Nevertheless, the same parity with metal remained in effect from 1726 to 1914—a not insignificant period of time.

We find the same degree of monetary stability in the British pound sterling. Despite slight adjustments, the conversion rate between French and British currencies remained quite stable for two centuries: the pound sterling continued to be worth 20–25 livres tournois or francs germinal from the eighteenth century until 1914.<sup>28</sup> For British novelists of the time, the pound sterling and its strange offspring, such as shillings and guineas, seemed as solid as marble, just as the livre tournois and franc-or did to French novelists.<sup>29</sup> Each of these units seemed to measure quantities that did not vary with time, thus laying down markers that bestowed an aura of eternity on monetary magnitudes and a kind of permanence to social distinctions.

The same was true in other countries: the only major changes concerned the definition of new units of currency or the creation of new currencies, such as the US dollar in 1775 and the gold mark in 1873. But once the parities with metal were set, nothing changed: in the nineteenth and early twentieth centuries, everyone knew that a pound sterling was worth about 5 dollars, 20 marks, and 25 francs. The value of money had not changed for decades, and no one saw any reason to think it would be different in the future.

### *The Meaning of Money in Literary Classics*

In eighteenth- and nineteenth-century novels, money was everywhere, not only as an abstract force but above all as a palpable, concrete magnitude. Writers frequently described the income and wealth of their characters in francs or pounds, not to overwhelm us with numbers but because these quantities established a character's social status in the mind of the reader. Everyone knew what standard of living these numbers represented.

These monetary markers were stable, moreover, because growth was relatively slow, so that the amounts in question changed only very gradually, over many decades. In the eighteenth century, per capita income grew very slowly. In Great Britain, the average income was on the order of 30 pounds a year in the early 1800s, when Jane Austen wrote her novels.<sup>30</sup> The same average income could have been observed in 1720 or 1770. Hence these were very stable reference points, with which Austen had grown up. She knew that to live comfortably and elegantly, secure proper transportation and clothing, eat well, and find amusement and a necessary minimum of domestic servants, one needed—by her lights—at least twenty to thirty times that much. The

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characters in her novels consider themselves free from need only if they dispose of incomes of 500 to 1,000 pounds a year.

I will have a lot more to say about the structure of inequality and standards of living that underlies these realities and perceptions, and in particular about the distribution of wealth and income that flowed from them. At this stage, the important point is that absent inflation and in view of very low growth, these sums reflect very concrete and stable realities. Indeed, a half century later, in the 1850s, the average income was barely 40–50 pounds a year. Readers probably found the amounts mentioned by Jane Austen somewhat too small to live comfortably but were not totally confused by them. By the turn of the twentieth century, the average income in Great Britain had risen to 80–90 pounds a year. The increase was noticeable, but annual incomes of 1,000 pounds or more—the kind that Austen talked about—still marked a significant divide.

We find the same stability of monetary references in the French novel. In France, the average income was roughly 400–500 francs per year in the period 1810–1820, in which Balzac set *Père Goriot*. Expressed in livres tournois, the average income was just slightly lower in the Ancien Régime. Balzac, like Austen, described a world in which it took twenty to thirty times that much to live decently: with an income of less than 10–20,000 francs, a Balzacian hero would feel that he lived in misery. Again, these orders of magnitude would change only very gradually over the course of the nineteenth century and into the Belle Époque: they would long seem familiar to readers.<sup>31</sup> These amounts allowed the writer to economically set the scene, hint at a way of life, evoke rivalries, and, in a word, describe a civilization.

One could easily multiply examples by drawing on American, German, and Italian novels, as well as on the literature of all the other countries that experienced this long period of monetary stability. Until World War I, money had meaning, and novelists did not fail to exploit it, explore it, and turn it into a literary subject.

### *The Loss of Monetary Bearings in the Twentieth Century*

This world collapsed for good with World War I. To pay for this war of extraordinary violence and intensity, to pay for soldiers and for the ever more costly and sophisticated weapons they used, governments went deeply into debt. As early as August 1914, the principal belligerents ended the convert-

ibility of their currency into gold. After the war, all countries resorted to one degree or another to the printing press to deal with their enormous public debts. Attempts to reintroduce the gold standard in the 1920s did not survive the crisis of the 1930s: Britain abandoned the gold standard in 1931, the United States in 1933, France in 1936. The post–World War II gold standard would prove to be barely more robust: established in 1946, it ended in 1971 when the dollar ceased to be convertible into gold.

Between 1913 and 1950, inflation in France exceeded 13 percent per year (so that prices rose by a factor of 100), and inflation in Germany was 17 percent per year (so that prices rose by a factor of more than 300). In Britain and the United States, which suffered less damage and less political destabilization from the two wars, the rate of inflation was significantly lower: barely 3 percent per year in the period 1913–1950. Yet this still means that prices were multiplied by three, following two centuries in which prices had barely moved at all.

In all countries the shocks of the period 1914–1945 disrupted the monetary certitudes of the prewar world, not least because the inflationary process unleashed by war has never really ended.

We see this very clearly in Figure 2.6, which shows the evolution of inflation by subperiod for four countries in the period 1700–2012. Note that inflation ranged between 2 and 6 percent per year on average from 1950 to 1970, before rising sharply in the 1970s to the point where average inflation reached 10 percent in Britain and 8 percent in France in the period 1970–1990, despite the beginnings of significant disinflation nearly everywhere after 1980. If we compare this behavior of inflation with that of the previous decades, it is tempting to think that the period 1990–2012, with average inflation of around 2 percent in the four countries (a little less in Germany and France, a little more in Britain and the United States), signified a return to the zero inflation of the pre–World War I years.

To make this inference, however, one would have to forget that inflation of 2 percent per year is quite different from zero inflation. If we add annual inflation of 2 percent to real growth of 1–2 percent, then all of our key amounts—output, income, wages—must be increasing 3–4 percent a year, so that after ten or twenty years, the sums we are dealing with will bear no relation to present quantities. Who remembers the prevailing wages of the late 1980s or early 1990s? Furthermore, it is perfectly possible that this inflation of

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## INCOME AND CAPITAL

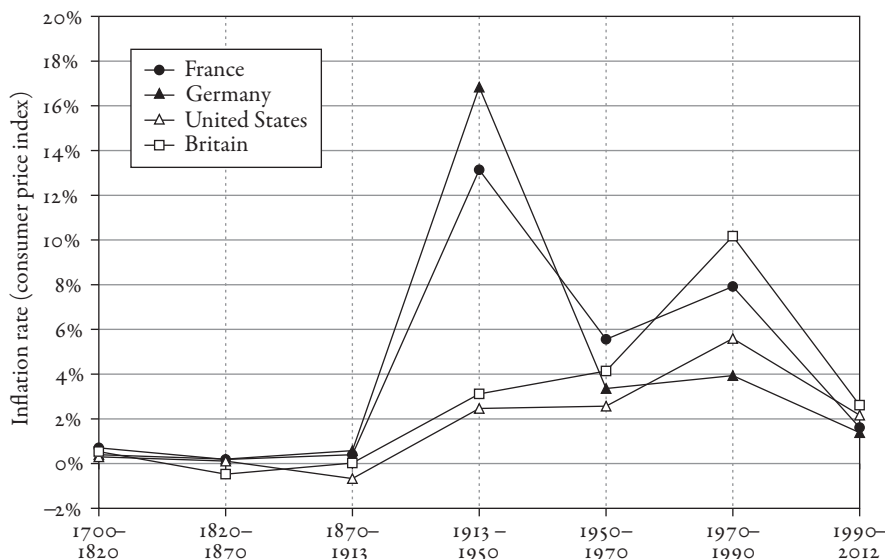


FIGURE 2.6. Inflation since the Industrial Revolution

Inflation in the rich countries was zero in the eighteenth and nineteenth centuries, high in the twentieth century, and roughly 2 percent a year since 1990.

Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

2 percent per year will rise somewhat in the coming years, in view of the changes in monetary policy that have taken place since 2007–2008, especially in Britain and the United States. The monetary regime today differs significantly from the monetary regime in force a century ago. It is also interesting to note that Germany and France, the two countries that resorted most to inflation in the twentieth century, and more specifically between 1913 and 1950, today seem to be the most hesitant when it comes to using inflationary policy. What is more, they built a monetary zone, the Eurozone, that is based almost entirely on the principle of combating inflation.

I will have more to say later about the role played by inflation in the dynamics of wealth distribution, and in particular about the accumulation and distribution of fortunes, in various periods of time.

At this stage, I merely want to stress the fact that the loss of stable monetary reference points in the twentieth century marks a significant rupture with previous centuries, not only in the realms of economics and politics but also in regard to social, cultural, and literary matters. It is surely no accident

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## GROWTH: ILLUSIONS AND REALITIES

that money—at least in the form of specific amounts—virtually disappeared from literature after the shocks of 1914–1945. Specific references to wealth and income were omnipresent in the literature of all countries before 1914; these references gradually dropped out of sight between 1914 and 1945 and never truly reemerged. This is true not only of European and American novels but also of the literature of other continents. The novels of Naguib Mahfouz, or at any rate those that unfold in Cairo between the two world wars, before prices were distorted by inflation, lavish attention on income and wealth as a way of situating characters and explaining their anxieties. We are not far from the world of Balzac and Austen. Obviously, the social structures are very different, but it is still possible to orient perceptions, expectations, and hierarchies in relation to monetary references. The novels of Orhan Pamuk, set in Istanbul in the 1970s, that is, in a period during which inflation had long since rendered the meaning of money ambiguous, omit mention of any specific sums. In *Snow*, Pamuk even has his hero, a novelist like himself, say that there is nothing more tiresome for a novelist than to speak about money or discuss last year's prices and incomes. The world has clearly changed a great deal since the nineteenth century.