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THE CAPITALIST REVOLUTION



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HOW CAPITALISM REVOLUTIONISED THE WAY WE LIVE, AND HOW ECONOMICS ATTEMPTS TO UNDERSTAND THIS AND OTHER ECONOMIC SYSTEMS

- There have been dramatic changes in living standards in different countries in the last 1,000 years
- In many countries these living standards began to rise rapidly at the time of the capitalist revolution
- Advances in technology and a distinctive economic system contributed to this revolution
- Economics is the study of how people interact with each other, and with the natural environment, in producing their livelihoods
- Capitalism is an economic system in which private property, markets and firms play a major role
- The rise in living standards has been accompanied by changes in population and the way people live, by environmental impacts, and by changes in inequality between countries and within countries
- There is great variation across countries in their success in raising incomes, and in the degree of inequality in living standards within them

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In the 14th century the Moroccan scholar Ib'n Battuta (see box) described Bengal in India as “a country of great extent, and one in which rice is extremely abundant. Indeed, I have seen no region of the earth in which provisions are so plentiful.” And he had seen much of the world, having travelled to China, west Africa, the Middle East and Europe. Three centuries later, the same sentiment was expressed by the 17th century French diamond merchant Jean Baptiste Tavernier who wrote of the country:

“Even in the smallest villages, rice, flour, butter, milk, beans and other vegetables, sugar and sweetmeats, dry and liquid, can be procured in abundance...”

– Jean Baptiste Tavernier, *Travels in India* (1676)

At the time of Ib'n Battuta's travels India was not richer than the other parts of the world. But India was not much poorer, either. An observer at the time would have noticed that people, on average, were better off in Italy, China and England than in Japan or India. But the vast differences between the rich and the poor, which the traveller would have noted wherever he went, were much more striking than these differences across regions. Rich and poor would often have different titles: in some places they would be feudal lords and serfs, in others royalty and their subjects, slave owners and slaves, or merchants and the sailors who transported their goods. Then—as now—your prospects depended on where your parents were on the economic ladder and whether you were male or female. The difference in the 14th century, compared with today, was that then it mattered much less in which part of the world you were born.

Fast forward to today. The people of India are far better off than they were seven centuries ago if we think about their access to food, medical care, shelter and the necessities of life; but by world standards today most are poor.

Figure 1.1a tells some of the story (you can follow links from the figure to the sources of the data). The height of each line is an estimate of average living standards—using a measure called *gross domestic product per capita*, which we will explain in the next section—at the date on the horizontal axis.

IB'N BATTUTA



IB'N BATTUTA

Ib'n Battuta (1304-1368) was a Moroccan traveller and merchant whose travels were published in his book *Rihla* (The Journey). His travels, lasting 30 years, took him across north and west Africa, eastern Europe, the Middle East, south and central Asia and China. He travelled more than 70,000 miles (113,000km); much further than the distance covered by his better-known contemporary, Marco Polo (1254-1324).

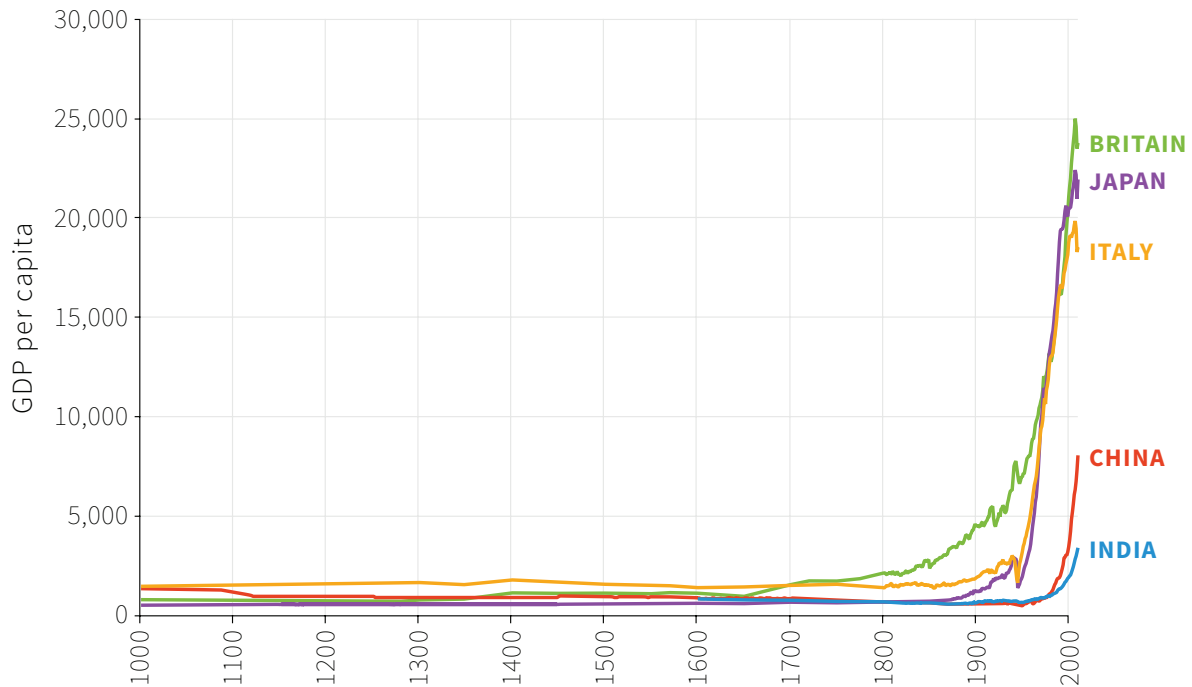


Figure 1.1a History's hockey stick: Gross domestic product per capita in five countries (1000-2013).

Source: Bolt, Jutta, and Jan Juiten van Zanden. 2013. 'The First Update of the Maddison Project Re-Estimating Growth Before 1820.' *Maddison-Project Working Paper WP-4*. Broadberry, Stephen. 2013. 'Accounting for the Great Divergence.' *London School of Economics and Political Science*. November 1.

On average people in the UK are six times better off than in India by this measure. Japanese people are as rich as the British, just as they were in the 14th century, but now Americans are even better off than the Japanese, and Norwegians are better off still.

We can draw the graph in Figure 1.1a because of the work of Angus Maddison who dedicated his working life to finding the scarce data to make useful comparisons of how people lived across more than 1,000 years (his work is continuing in the Maddison Project). In this course you will see that data like this about regions of the world, and the people in it, is the starting point of all economics: in this video, Nobel laureate James Heckman and Thomas Piketty explain how collecting data has been fundamental to their work on inequality and the policies to reduce it. We will study their work in Unit 19.

So 1,000 years ago the world was flat, economically speaking. There were differences in income between the regions of the world; but as you can see from Figure 1.1a, the differences were small compared to what was to follow.

1.1 HISTORY'S HOCKEY STICK: GROWTH IN INCOME

A different way of looking at the same data in Figure 1.1a is to use a scale that shows GDP per capita doubling as we move up the vertical axis (from \$250 per capita per year to \$500, then to \$1,000, and so on). This is called a *ratio scale* and is shown in Figure 1.1b. The ordinary scale is useful for comparing the levels of GDP per capita across countries, but the ratio scale is best for comparing growth rates across countries.

By the *growth rate* of GDP or of any other quantity like population, we mean the rate of change:

$$\text{growth rate} = \frac{\text{change in GDP}}{\text{original level of GDP}}$$

If the level of GDP per capita in the year 2000 is \$21,046, as it was in Britain in the data shown in Figure 1.1a, and \$21,567 in 2001, then we can calculate the growth rate:

$$\begin{aligned} \text{growth rate} &= \frac{\text{change in GDP}}{\text{original level of GDP}} \\ &= \frac{Y_{2001} - Y_{2000}}{Y_{2000}} \\ &= \frac{21,157 - 21,406}{21,406} \\ &= 0.025 \\ &= 2.5\% \end{aligned}$$

Whether we want to compare levels or growth rates depends on the question we are asking. Figure 1.1a makes it easy to compare the levels of GDP per capita across countries, and at different times in history. Figure 1.1b uses a ratio scale, which makes it possible to compare growth rates across countries and at different periods. When a ratio scale is used, a series that grows at a constant rate looks like a straight line. This is because the percentage (or proportional growth rate) is constant. A steeper line in the ratio scale chart means a faster growth rate.

To see this, think of a growth rate of 100%: that means the level doubles. In Figure 1.1b, with the ratio scale, you can check that if GDP per capita doubled over 100 years from a level of \$500 to \$1,000, the line would have the same slope as a doubling from \$2,000 to \$4,000 dollars, or from \$16,000 to \$32,000 over 100 years. If, instead of doubling, the level quadrupled (from say, \$500 to \$2,000 over 100 years), the line would be twice as steep, reflecting a growth rate that was twice as high.

Interact

Follow figures click-by-click in the full interactive version at www.core-econ.org.

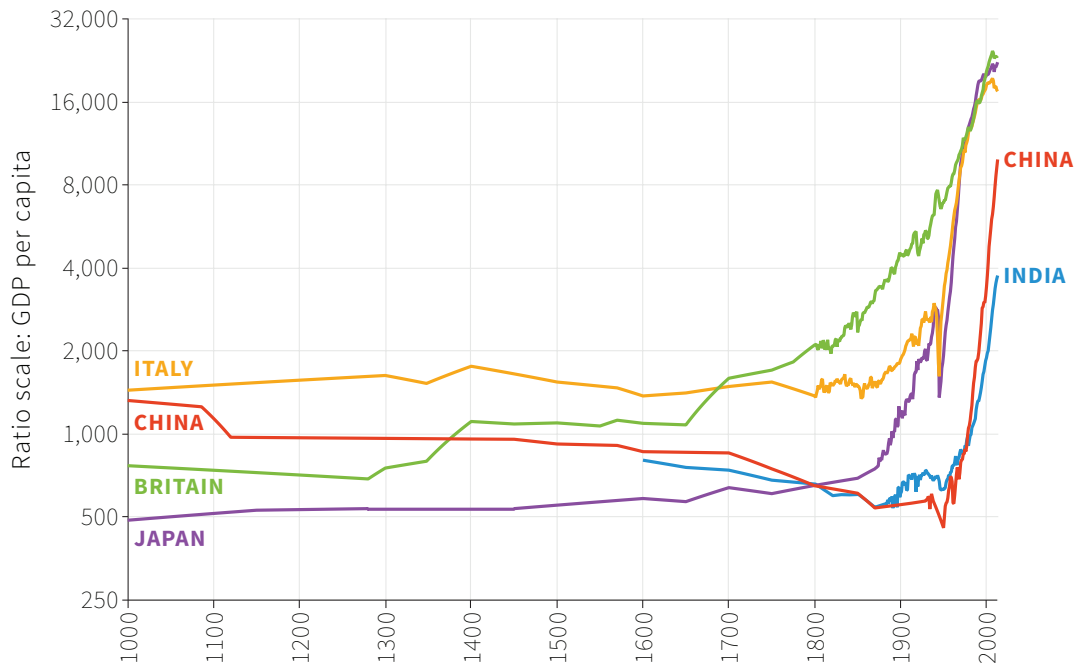


Figure 1.1b History's hockey stick: Living standards in five countries (1000-2013) using the ratio scale.

Source: Bolt, Jutta, and Jan Juiten van Zanden. 2013. 'The First Update of the Maddison Project Re-Estimating Growth Before 1820.' *Maddison-Project Working Paper WP-4*. Broadberry, Stephen. 2013. 'Accounting for the Great Divergence.' *London School of Economics and Political Science*. November 1.

History's hockey stick

There were cultural changes and scientific advances in many parts of the world over the entire period shown in the figure, but living standards began to rise in a sustained way only from the 18th century. The figure looks like a hockey stick, and our eyes are drawn to the kink. The hockey-stick kink is less abrupt in Britain, where growth began around 1650. In Japan the kink is more defined, occurring around 1870. The kink in China did not happen until around 1980, and in India even more recently. GDP per capita actually fell in India during British colonial rule. You can see that this is also true of China during the same period, when European nations dominated China's politics and economics. The ratio scale makes it possible to see that recent growth rates in Japan and China were higher than elsewhere.

If you have never have seen an ice-hockey stick (or ice hockey), this is why we call these figures *hockey stick curves*:



In some economies, substantial improvements in people's living standards did not occur until they gained independence from colonial rule or interference by European nations:

- When 300 years of British rule of India ended in 1947, according to Angus Deaton, an economist: "It is possible that the deprivation in childhood of Indians... was as severe as that of any large group in history". In the closing years of British rule, a child born in India could expect to live for 27 years. Fifty years on, life expectancy at birth in India had risen to 65 years.
- China had once been richer than Britain, but by the middle of the 20th century GDP per capita in China was one-fifteenth that of Britain.
- Neither Spanish rule of Latin America, nor its aftermath following the independence of most Latin American nations early in the 19th century saw anything resembling the hockey-stick upturn in living standards experienced by the countries in Figures 1.1a and 1.1b.

We learn two things from Figures 1.1a and 1.1b:

- For a very long time living standards did not grow in any sustained way.
- When sustained growth occurred it happened at different times in different countries, leading to vast differences between living standards around the world.

Understanding how this occurred has been among the most important questions that economists have asked, starting with the founder of the field, Adam Smith, who gave his most important book the title *An Inquiry into the Nature and Causes of the Wealth of Nations*.

GREAT ECONOMISTS

ADAM SMITH

Adam Smith (1723-1790), considered by many to be the father of economics, was raised by his widowed mother in Scotland. He studied philosophy at the University of Glasgow and later at Oxford, where he wrote: “the greater part of the... professors have... given up altogether even the pretence of teaching.”

He travelled throughout Europe, visiting Toulouse, France where because he had “very little to do”, he said, he had “begun to write a book in order to pass away the time.” It became the most famous book in economics.



In *An Inquiry into the Nature and Causes of the Wealth of Nations*, published in 1776, Smith asked: how can society coordinate the independent activities of large numbers of economic actors—producers, transporters, sellers, consumers—often unknown to each other and widely scattered across the world? His radical claim was that coordination among all of these actors might spontaneously arise, without any person or institution consciously attempting to create or maintain it. This challenged previous notions of political and economic organisation, in which rulers imposed order on their subjects.

Even more radical was his idea that this could take place as a result of individuals pursuing their self interest: “It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest,” he wrote, adding that each would be “led by an invisible hand to promote an end which was no part of his intention.”

Since then this “invisible hand” has been a metaphor for how markets can coordinate the self-interested pursuits of people to produce a socially desirable outcome.

Smith did not think that people were guided entirely by self-interest, and he wrote a book about ethical behaviour called *The Theory of Moral Sentiments*, published in 1759.

He also understood that the market system had some failings, especially if sellers on markets banded together so as to avoid competing with each other. “People in the same trade seldom meet together,” he wrote, “even for merriment and diversion, but the conversation ends in a conspiracy against the public; or in some contrivance to raise prices.”

He specifically targeted monopolies that were protected by governments, such as the British East India Company that not only controlled trade between India and Britain, but also administered much of the British colony there.

He agreed with his contemporaries that government should protect the nation from external enemies and ensure justice through the police and the court system—he also advocated government investment in education, and in public works such as bridges, roads, and canals.

DISCUSS 1.1: THE ADVANTAGES OF CONVENTIONAL AND RATIO SCALES

Figure 1.1a used a conventional scale for the vertical axis, and Figure 1.1b used a ratio scale.

1. Choose any two of the countries shown in these figures and compare their growth from 1400 to the present, using the information in the figures.
2. Which figure is more helpful for this comparison and why?

1.2 MEASURING INCOME AND LIVING STANDARDS

The estimate of living standards, *GDP per capita*, that we used in Figures 1.1a and 1.1b is a measure of total income (and output) in a country (called *gross domestic product*, or *GDP*), which is then divided by the country's population.

GDP is a measure of the total output of the economy in a given period, such as a year: Diane Coyle, an economist, says it “adds up everything from nails to toothbrushes, tractors, shoes, haircuts, management consultancy, street cleaning, yoga teaching, plates, bandages, books, and the millions of other services and products in the economy”.

Adding up these millions of services and products requires finding some measure of how much a yoga class is worth compared to a toothbrush. Economists must first decide what should be included, but also how to give a value to each of these things. In practice, the easiest way to do this is by using their prices.

Three important points to remember about measuring average living standards in a country:

- GDP is a measure of total income in a country; to get an average measure, GDP is divided by population, giving GDP per capita.
- GDP per capita is not the same as the *disposable income* of a typical person.
- A person's disposable income is a measure of his or her living standards, but it omits important aspects of wellbeing.

What do the second and third points mean? A person's living standard refers to how well off the person is. This is sometimes measured by an individual's disposable income. This is the amount of wages or salaries, profit, rent, interest and transfer payments from the government (such as unemployment or disability benefit) or from others (for example, gifts) received over a given period such as a year, minus any transfers the individual made to others including taxes paid to the government. Disposable income is thought to be a good measure of living standards because it is the maximum amount of food, housing, clothing and other goods and services that the person can buy without having to borrow—that is, without going into debt or selling possessions. But, if your disposable income was used to represent your living standard, you might question this for two reasons:

- Is our disposable income a good measure of our wellbeing?
- When we're part of a group of people (a nation for example, or an ethnic group) is the average disposable income a good measure of how well off the group is?

Disposable income and wellbeing

Income is a major influence on wellbeing because it allows us to buy the goods and services that we need or enjoy. But it is insufficient, because many aspects of our wellbeing are not related to what we can buy. For example, disposable income leaves out:

- The quality of our social and physical environment such as friendships and clean air.
- Goods and services that we do not buy, such as healthcare and education if they are provided by a government.
- Goods and services that are produced within the household, such as meals or childcare (predominantly provided by women).

Average disposable income and average wellbeing

Consider a group of people in which each person initially has a disposable income of \$5,000 a month, and imagine that, with no change in prices, income has risen for every individual in the group. Then we would say that average or typical wellbeing had risen.

But now think about a different comparison. In a second group, the monthly disposable income of half the people is \$10,000. The other half has just \$500 to spend every month. The average income in the second group (\$5,250) is higher than in the first (which was \$5,000 before incomes rose). But would we say that the second group's wellbeing is greater than that of the first group, where everyone has \$5,000 a month? The additional income in the second group is unlikely to matter much to the rich people, but the poor half would think their poverty was a serious deprivation.

Absolute income matters for wellbeing, but we also know from research that people care about their relative position in the income distribution. They report lower wellbeing if they find they earn less than others in their group.

Since income distribution affects wellbeing, and because the same average income may result from very different distributions of income between rich and poor within a group, average income may fail to reflect how well off a group of people is by comparison to some other group.

Valuing government goods and services

GDP includes the goods and services produced by the government, such as schooling, national defence, and law enforcement. They contribute to wellbeing but are not included in disposable income. In this respect, GDP per capita is a better measure of living standards than disposable income.

But government services are difficult to value, even more difficult to value than services such as haircuts and yoga lessons. For goods and services that people buy we take their price as a rough measure of their value (if you valued the haircut less than its price, you would have just let your hair grow). But the goods and services produced by government are typically not sold, and the only measure of their value to us is how much it cost to produce them.

The gaps between what we mean by wellbeing, and what GDP per capita measures, should make us cautious about the literal use of GDP per capita to measure how well off people are. But when the changes over time or differences among countries in this indicator are as great as those in Figures 1.1a and 1.1b (and in Figures 1.9 and 1.10 later in this unit), GDP per capita is undoubtedly telling us *something* about the differences in the availability of goods and services.

We look in more detail at how GDP is calculated so that we can compare it through time, and make comparisons between countries, in this unit's Einstein section (many of the units have Einstein sections: they will show you how to calculate many

of the statistics that we use). Using these methods, we can use GDP per capita to unambiguously communicate such ideas as “people today in Japan are on average a lot richer than they were 200 years ago, and a lot richer than the people of India today.”

Looking at the two parts of Figure 1.1, the obvious next question is: what changed so dramatically in the past 300 years?

DISCUSS 1.2: WHAT SHOULD WE MEASURE?

While campaigning for the US presidency on 18 March 1968, Senator Robert Kennedy gave a famous speech questioning “the mere accumulation of material things” in American society, and why, among other things, air pollution, cigarette advertising and jails were counted when the US measured its living standards, but health, education or devotion to your country were not. He argued that: “It measures everything, in short, except that which makes life worthwhile.”

Read his speech in full, or listen to a sound recording of it.

3. In the full text, which goods does he list as being included in a measure of GDP?
4. Do you think these should be included in such a measure, and why?
5. Which goods does he list in the full text as missing from the measure?
6. Do you think they should be included, and why?

1.3 THE PERMANENT TECHNOLOGICAL REVOLUTION

Remarkable scientific and technological advances occurred more or less at the same time as the upward kink in the hockey stick in Britain in the middle of the 18th century. Important new technologies were introduced in textiles, energy and transportation. Its cumulative character led to it being called the *Industrial Revolution*.

As late as 1800, traditional craft-based techniques, using skills that had been handed down from one generation to the next, were still used in most production processes. The new era brought new ideas, new discoveries, new methods and new machines, making old ideas and old tools obsolete. These new ways were, in turn, made obsolete by even newer ones.

Although in everyday usage, *technology* refers to machinery, equipment and devices developed using scientific knowledge, in economics, technology is a process that takes a set of materials and other inputs—including the work of people and machines—and creates an output. For example, a technology for making a cake can be described by the recipe that specifies the combination of inputs (ingredients such as flour, and labour activities such as stirring) needed to create the output (the cake). Another technology for making cakes uses large-scale machinery, ingredients and labour (machine operators).

Until the Industrial Revolution, the economy's technology, like the skills needed to follow its recipes, was updated only slowly and passed from generation to generation. As *technological progress* revolutionised production, the time required to make a pair of shoes fell by half in only a few decades; the same was true of spinning and weaving, and of making cakes in a factory. This marked the beginning of a permanent technological revolution because the amount of time required for producing most products fell generation after generation.

Technological change in lighting

To get some idea of the unprecedented pace of change, consider the way we produce light. For most of human history technological progress in lighting was slow. Our distant ancestors typically had nothing brighter than a campfire at night. The recipe for producing light (had it existed) would have said: gather lots of firewood, borrow a lighting stick from some other place where a fire is maintained, and start and maintain a fire.

The first great technological breakthrough in lighting came 40,000 years ago, with the use of lamps that burned animal or vegetable oils. We measure technological progress in lighting by how many units of brightness called *lumens* could be generated by an hour of work. One lumen is approximately the amount of brightness in a square metre of moonlight. One lumen-hour (lm-hr) is this amount of brightness lasting an hour. For example, creating light by a campfire took about 1 hour of labour to produce 17 lm-hr, but animal fat lamps produced 20 lm-hr for the same amount of work. In Babylonian times (1750 BC) the invention of an improved lamp using sesame oil meant that an hour of labour produced 24 lm-hr. Technological progress was slow: this modest improvement took 7,000 years.

Three millennia later, in the early 1800s, the most efficient forms of lighting (using tallow candles) provided about nine times as much light for an hour of labour as had the animal fat lamps of the past. Since then lighting has become more and more efficient with the development of town gas lamps, kerosene lamps, filament bulbs,

fluorescent bulbs and other forms of lighting. Compact fluorescent bulbs introduced in 1992 are about 45,000 times more efficient, in terms of labour time expended, than lights were 200 years ago. Today the productivity of labour in producing light is half a million times greater than it was among our ancestors around their campfire.

Figure 1.2, below, charts this remarkable hockey-stick growth in efficiency in lighting using the ratio scale we introduced in Figure 1.1b.

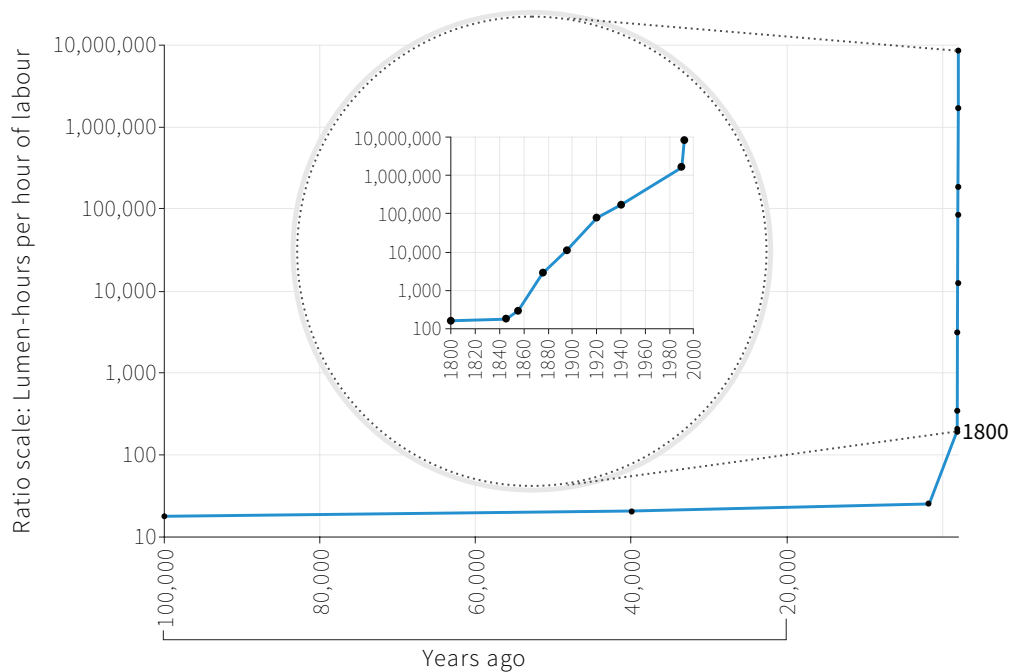


Figure 1.2 The productivity of labour in producing light: Lumen-hours per hour of labour (100,000 years ago to the present).

Source: Nordhaus, William. 1998. 'Do Real Output and Real Wage Measures Capture Reality? The History of Lighting Suggests Not.' Cowles Foundation For Research in Economics Paper 957.

The process of innovation did not end with the Industrial Revolution as the case of labour productivity in lighting shows. It has continued with the application of new technologies in many industries, such as the steam engine, electricity, transportation (canals, railroads, automobiles), and most recently, the revolution in information processing and communication. These broadly applicable technological innovations give a particularly strong impetus to growth in living standards because they change the way large parts of the economy work.

By reducing the amount of work time it takes to produce the things we need, technological changes allowed significant increases in living standards. David Landes, an economic historian, wrote that the Industrial Revolution was “an interrelated succession of technological changes” that transformed the societies in which these changes took place. This process continues today: Hans Rosling, a statistician, claims, in this video of a TED lecture, that we should say “thank you

industrialisation” for creating the washing machine, a labour-saving device that had a far-reaching effect on the wellbeing of millions of women, including his own mother.

1.4 A CONNECTED WORLD

In July 2012 the Korean hit Gangnam Style was released. By the end of 2012 it had been the best-selling song in 33 countries, including Australia, Russia, Canada, France, Spain and the UK. With 2 billion views by the middle of 2014, Gangnam Style also became the most watched video on YouTube. The permanent technological revolution has produced a connected world.



Gangnam Style

Everyone is part of it. The materials making up this introduction to economics were written by teams of economists, designers, programmers and editors, working together—often simultaneously—at computers in the UK, India, the US, Russia, Colombia, South Africa, Chile, Turkey, France and many other countries. If you are online, some of the transmission of information occurs at close to the speed of light. While most of the commodities traded around the globe still move at the pace of an ocean freighter, about 21 miles (33km) per hour, international financial transactions are implemented in less time than it took you to read this sentence.

The speed at which information travels provides more evidence of the novelty of the permanent technological revolution. By comparing the known date of a historical event with the date at which the event was first noted in other locations (in diaries, journals or newspapers) we can determine the speed at which news travelled. When Abraham Lincoln was elected US President in 1860, for example, the word was spread by telegraph from Washington to Fort Kearny, which was at the western end of the telegraph line. From there the news was carried by a relay of riders on horseback called the Pony Express, covering 1,260 miles (2,030km) to Fort Churchill in Nevada, from where it was transmitted to California by telegraph. The process took seven days and 17 hours. Over the Pony Express segment of the route, the news travelled at 7 miles (11km) per hour. A half-ounce (14 gram) letter carried over this route cost \$5, or the equivalent of five days’ wages.

From similar calculations we know that news travelled between ancient Rome and Egypt at about 1 mile (1.6km) per hour, and 1,500 years later between Venice and other cities around the Mediterranean it was, if anything, slightly slower. But, a few

centuries later, as Figure 1.3 shows, the pace began to quicken. It took “only” 46 days for the news of a mutiny of Indian troops against British rule in 1857 to reach London, and readers of the *Times* of London knew of Lincoln’s assassination only 13 days after the event. One year after Lincoln’s death a transatlantic cable cut the time for news to travel between New York and London to a matter of minutes.

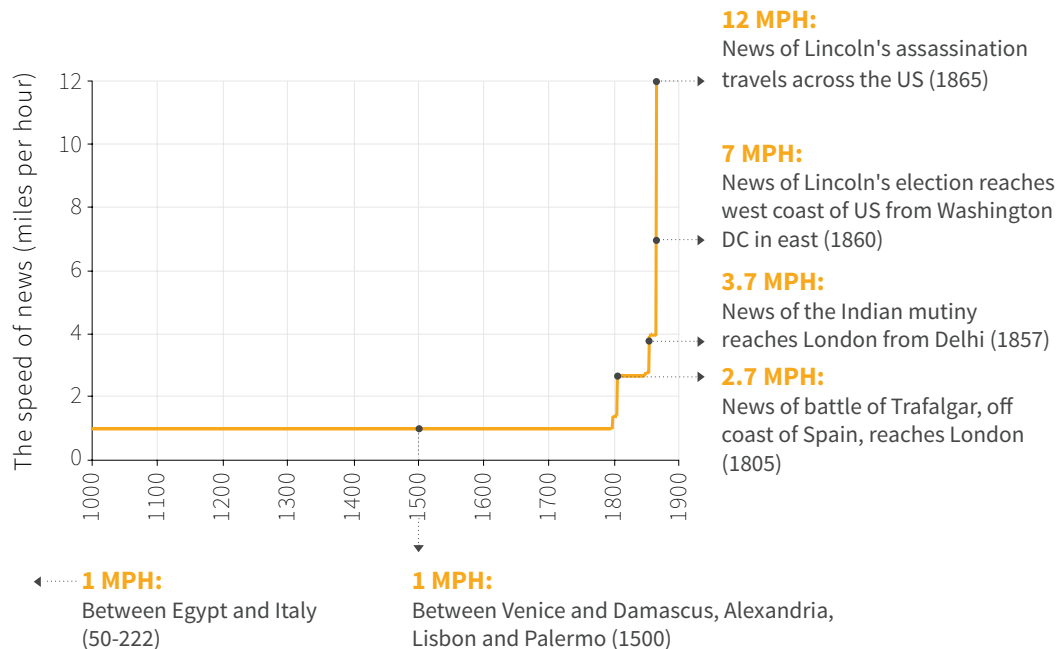


Figure 1.3 *The speed at which information travelled (1000 to 1865).*

Source: Tables 15.2 and 15.3 from Clark, Gregory. 2007. *A Farewell to Alms: A Brief Economic History of the World*. Princeton, NJ: Princeton University Press.

1.5 THE GROWTH OF POPULATION AND CITIES

Alongside technological progress and a rising standard of living, population has grown rapidly. For most of the last 12,000 years the population of the world grew slowly, if at all, with increases in good years followed by declines in response to climatic adversity and other disasters.

Figure 1.4 shows the evolution of world population from the year 1000 onwards. In a few countries, population started to grow rapidly 200 years ago, but the world’s population took off in the 20th century with the development and spread of improved sewerage, clean water, and other public health measures. While the number of people in the world continues to grow, as shown in Figure 1.4, the pace of growth is slowing from its peak in the 1970s (see Figure 1.5). The *demographic*

transition refers to the slowdown in population growth as the fall in death rates is balanced by a fall in birth rates associated with the desire for fewer children, combined with public policies discouraging larger families, as in China.

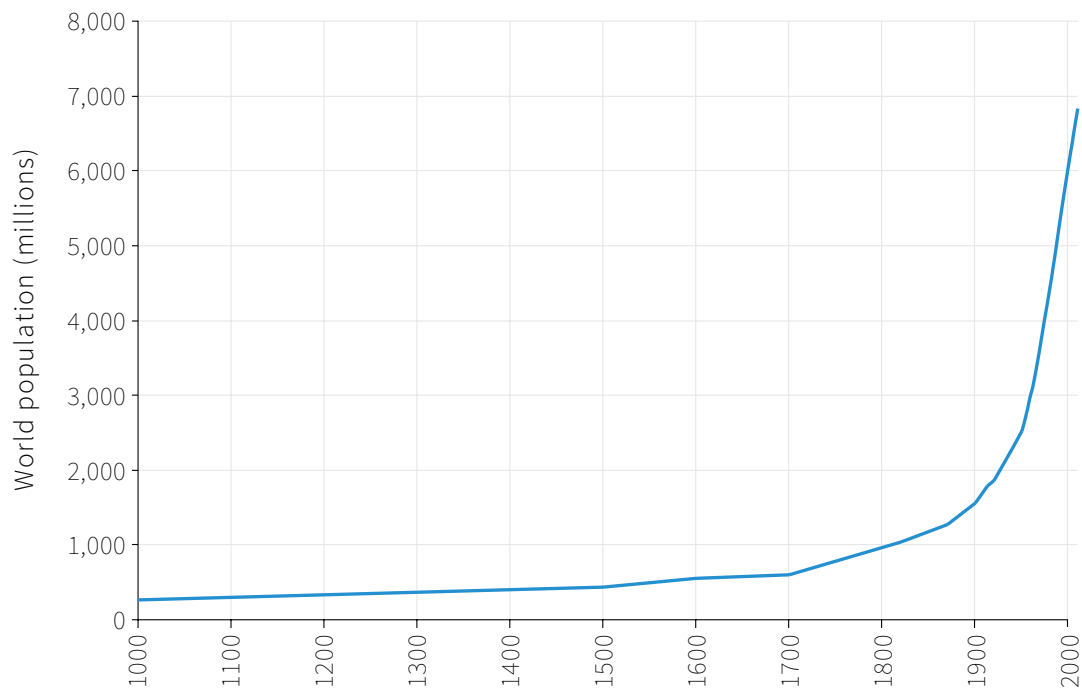


Figure 1.4 World population (1000-2010).

Source: Maddison, Angus. 2015. 'Statistics on World Population, GDP and Per Capita GDP, 1-2008 AD.' Accessed June 2015, and US Census Bureau. 2015. 'International Programs, International Data Base.' Accessed June 2015.

With the increased productivity of labour in agriculture, fewer farmers were required to feed the nonfarming population. Higher labour productivity means that on a given piece of land, more output could be produced by each farmer. People left farming to pursue other occupations, resulting in another change: the growth of cities. Three hundred years ago, the vast majority of people lived in the countryside interacting with just a handful of people, mostly family and neighbours. In the last few centuries, however, people have been drawn—or, in some cases, pushed—into cities.

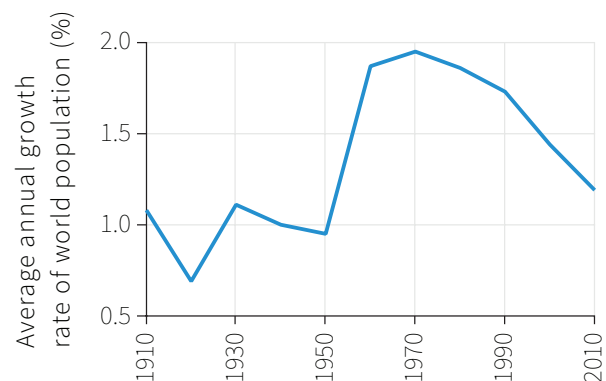


Figure 1.5 How the world's population growth in the 20th century rose and fell.

Source: Angus Maddison historical statistics. US Census: World population growth rate.

DISCUSS 1.3: WORLD POPULATION DATA

Click on the source of Figure 1.4 and then on the link called “statistics on world population”. This will automatically download an Excel file to your computer with, among other data, the data used to plot Figure 1.4 (this is the second worksheet in the Excel file).

Scroll down to the rows showing China and India and add up these numbers to show a total population for China and India for each year.

1. Plot this total population in a graph similar to Figure 1.4. Now insert the total population for the 30 Western European countries into the same graph. What can you say about population growth in these two groups of countries over time?
2. Finally, use this data to plot the ratio scale version of this graph (refer to the description of a ratio scale in Section 1.1). Compare the population growth rate of these two groups of countries using your new graph. Can you explain the differences in the growth rates?
3. What are the implications of the differences in (2)?

City living is a drastic change, as everyday life is populated by dozens or even hundreds of strangers. This of course changes how we interact with others—many of whom we will never see again—in some cases challenging people’s personal security and requiring new ways of maintaining social order. Police forces are a relatively new feature of human society, dating from the emergence of large urban areas.

In 1850 there were only three cities with populations exceeding 1 million people—London, Paris, and Beijing—but, as Figure 1.6 demonstrates, by 2013 there were more than 500 cities of this size.

Tokyo, the world’s biggest urban area, is home to 34 million people. That’s four times as many people living in one city today as archaeologists think existed in the entire world 11,000 years ago, at the time humans first took up farming. In 1900, nine of the 10 largest cities in the world were in Europe or North America—Tokyo was the exception. Today nine of the 10 are in Asia or Latin America, with New York the odd one out.



Tokyo: Birds-eye view

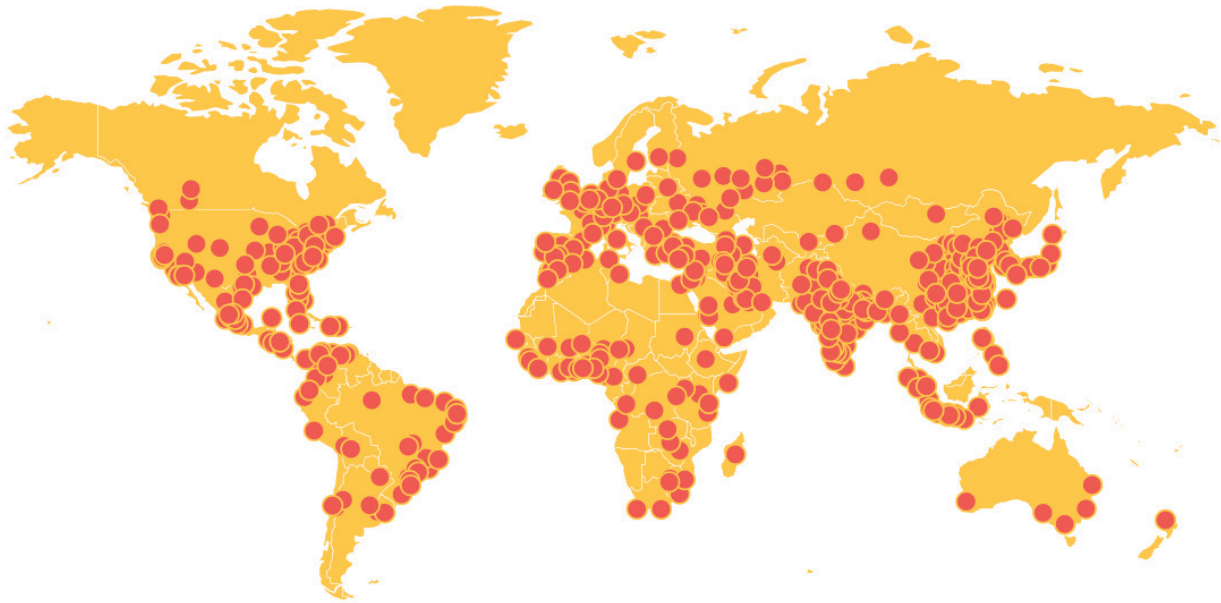


Figure 1.6 *Cities with more than 1 million inhabitants (2013).*

Source: 'Major Agglomerations of the World - Population Statistics and Maps.' 2015. Accessed June 2015. Data is for agglomerations (a central city and neighbouring towns (suburbs) forming a connected region of dense, predominately urban population with more than 1 million inhabitants).

1.6 IMPACTS ON THE ENVIRONMENT

As production has soared (Figures 1.1a and 1.1b, and also Figure 1.2), so too have both the use of our natural resources and degradation of our natural environment. Elements of the ecological system such as air, water, soil, and weather have been altered by humans more radically than at any time in human history.

One example is climate change. Figures 1.7a and 1.7b present evidence that our use of fossil fuels—coal, oil, and gasoline—have profoundly affected the natural environment. After having remained relatively unchanged for many centuries, increasing emissions of carbon dioxide (CO_2) into the air during the 20th century have resulted in measurably larger amounts of CO_2 in the earth's atmosphere (Figure 1.7a) and brought about perceptible increases in the northern hemisphere's average temperatures (Figure 1.7b). Figure 1.7a also shows that CO_2 emissions from fossil fuel consumption have risen dramatically over the past 250 years.

DISCUSS 1.4: THE ENVIRONMENTAL KUZNETS CURVE

Many researchers think that there is a hump-shaped relationship between a country's income and environmental degradation. This relationship is often referred to as the *Environmental Kuznets Curve (EKC)*.

1. Read [this description of the EKC](#) and, in your own words, explain why such a relationship might be observed.
2. How might this relationship change when we define income as GDP versus GDP per capita?

Figure 1.7b shows that the average temperature of the earth fluctuates from decade to decade. Many factors cause these fluctuations, including volcanic events such as the Mount Tambora eruption in Indonesia, in 1815. Mount Tambora spewed so much ash that the Earth's temperature was reduced, and 1816 became known as the "year without a summer".

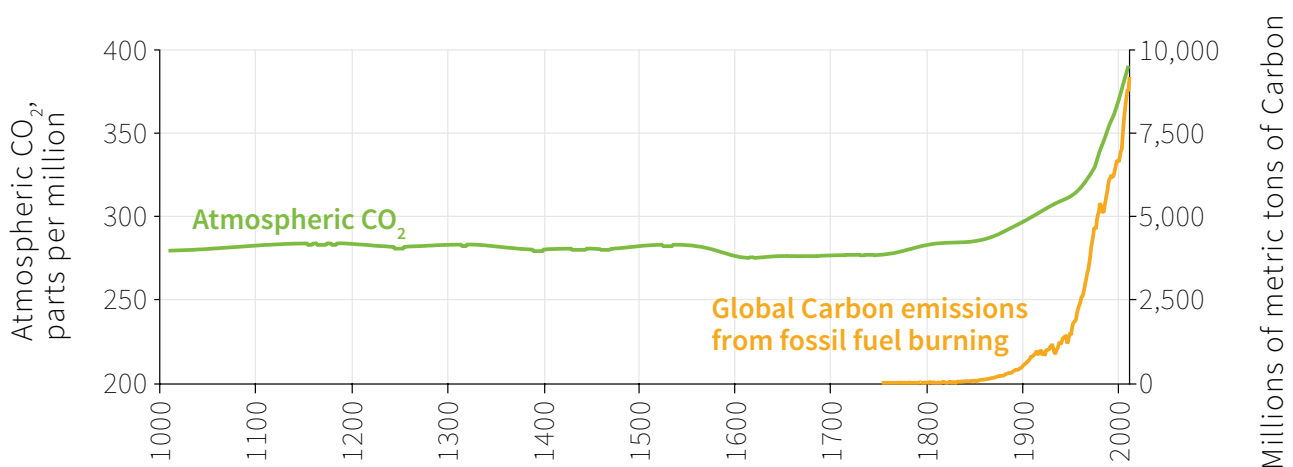


Figure 1.7a Carbon dioxide in the atmosphere (1010-2010) and global carbon emissions from burning fossil fuel (1750-2010).

Source: Years 1010-1975: Etheridge, D. E., L. P. Steele, R. J. Francey, and R. L. Langenfelds. 2012. 'Historical Record from the Law Dome DE08, DE08-2, and DSS Ice Cores.' Division of Atmospheric Research, CSIRO, Aspendale, Victoria, Australia. Years 1976-2010: Data from Mauna Loa observatory. Boden, T. A., G. Marland, and R. J. Andres. 2010. 'Global, Regional and National Fossil-Fuel CO₂ Emissions.' Carbon Dioxide Information Analysis Center (CDIAC) Datasets.

In the last century, average temperatures have risen in response to increasingly high levels of greenhouse gas concentrations. These have resulted from the CO₂ emissions associated with the burning of fossil fuels. The likely consequences of global warming are far-reaching: melting of the polar ice caps, rising sea levels that may put large coastal areas under water, and potential changes in climate and rain patterns that may destroy the world's food-growing areas.

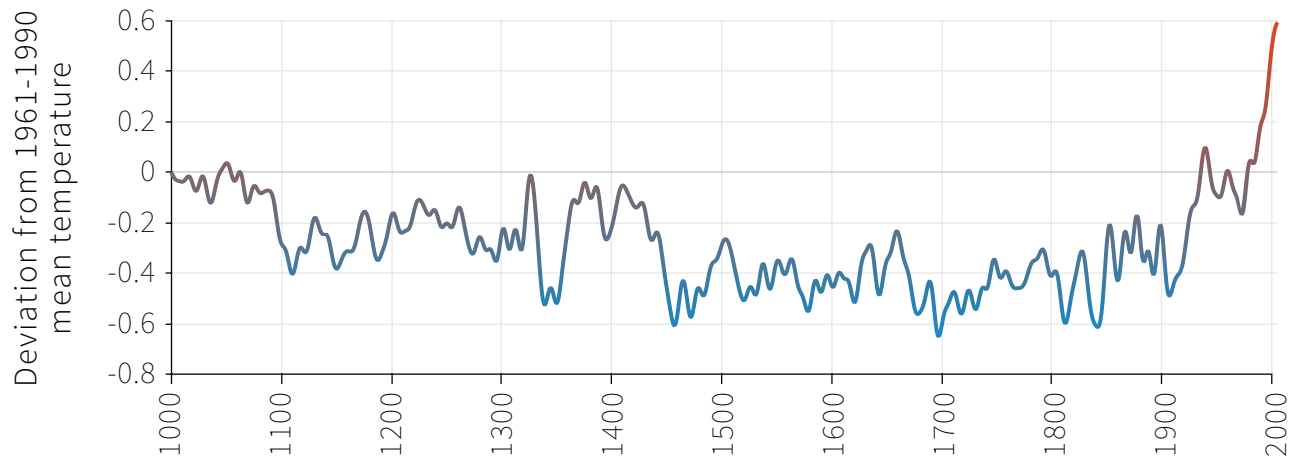


Figure 1.7b Northern hemisphere temperature over the long run (1000-2006).

Source: Mann, M. E., Z. Zhang, M. K. Hughes, R. S. Bradley, S. K. Miller, S. Rutherford, and F. Ni. 2008. 'Proxy-Based Reconstructions of Hemispheric and Global Surface Temperature Variations over the Past Two Millennia.' *Proceedings of the National Academy of Sciences* 105 (36): 13252–57.

Climate change is a global development. But many environmental impacts are local, as residents of cities suffer respiratory and other illnesses as a result of high levels of harmful emissions from power plants, vehicles, and other sources. Rural communities, too, are impacted by deforestation and the depletion of the supply of clean water and fishing stocks.

These examples of the way that people affect and are affected by both local and global ecologies motivate the way that we use the word “economy”. When we named our ebook *The Economy* we were thinking about the way that people interact with each other, and also with nature, in producing their livelihood.

Figure 1.8 shows one way of thinking about the economy: the economy is part of a larger social system, which is itself part of the biosphere, which is the collection of all forms of life on earth.

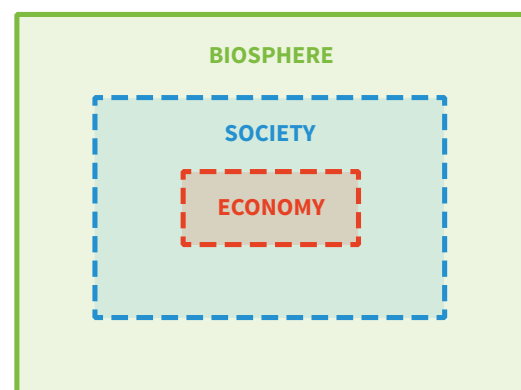


Figure 1.8 The economy is part of society, which is part of the biosphere.

From global climate change to local resource exhaustion, these effects are results of both the expansion of the economy (illustrated by the growth in total output) and the way the economy is organised (what kinds of things are valued and conserved, for example).

There is no doubt that the permanent technological revolution—which brought about dependence on fossil fuels—is part of today’s environmental problem. But it is also part of the solution.

Look back at Figure 1.2, which showed the productivity of labour in producing light. The vast increases shown over the course of history and especially since the mid 19th century occurred in large part because the amount of light produced per unit of heat (for example from a campfire, candle, or light bulb) increased dramatically.

In lighting, the permanent technological revolution brought us more light for less heat, which conserved natural resources—from firewood to fossil fuels—used in generating the heat. Advances in technology today may allow greater reliance on wind, solar and other renewable sources of energy.

CLIMATE CHANGE

The human causes, and the reality, of climate change are no longer widely disputed in the scientific community.

The Intergovernmental Panel on Climate Change is the authoritative source for research and data. The likely consequences of global warming are far-reaching: melting of the polar ice caps, rising sea levels that may put large coastal areas under water, and potential changes in climate and rain patterns that may destroy the world’s food-growing areas. The long-term physical and economic consequences of these changes, and the appropriate policies that governments could adopt as a result, are discussed in detail in Unit 18.

1.7 CAPITALISM DEFINED

Looking back over the data in Figures 1.1 to 1.7 we see an upward turn, like the kink in our hockey stick, repeated for:

- Gross domestic product per capita
- Productivity of labour (light per hour of work)
- Connectivity of the various parts of the world (the speed at which news travels)
- World population
- Impact of the economy on the global environment (Carbon emissions, atmospheric CO₂ and climate change)

How can we explain the change from a world in which living conditions fluctuated if there was an epidemic or a war, to a situation in which most of the time each generation is noticeably, and predictably, better off than the previous one?

The answer that makes most sense both factually and logically is what we call the capitalist revolution, which introduced a new *economic system* called *capitalism* characterised by a new combination of *institutions*. An economic system is a way of organising the production and distribution of goods and services in an entire economy. And by institutions, we mean the different sets of laws and social customs regulating production and distribution in different ways in families, private businesses, and government bodies.

CAPITALISM

An economic system in which three key institutions play an important role:

- Private property
- Markets
- Firms

In some economies in the past the key economic institutions were private property, markets and families, because production usually took place in families rather than firms. Think about a farm owned by a family: who does the work? Who consumes the produce? This has historically been determined by the older generation of the family (in most societies, the older men), and by social custom.

In other societies the government has been the institution governing production, distribution and the process of change. In this case,

most production has taken place in government-owned establishments, and the government has decided how the goods that were produced were used, including who gets what. This is called a *centrally planned* economic system. It existed, for example, in the Soviet Union, East Germany and many other eastern European countries prior to the end of Communist Party rule in the early 1990s.

Though governments and families are essential parts of the workings of every economy, most economies today are capitalist. Since most of us live in capitalist economies, it is easy to overlook the importance of institutions that are fundamental for capitalism to work well: they are so familiar, we hardly ever notice them. Before seeing how private property, markets and firms combine in the capitalist economic system, we need to define them.

1.8 PRIVATE PROPERTY, MARKETS AND FIRMS

PRIVATE PROPERTY

Private property means that you can:

- Enjoy your possessions in a way that you choose
- Exclude others from their use if you wish
- Dispose of them by gift or sale to someone else...
- ... who becomes their owner

Over the course of human history the extent of private property has varied. In some societies, such as the hunters and gatherers who are our distant ancestors, almost nothing except personal ornaments and clothing was owned by individuals. In others, crops and animals were private property, but land was not. The right to use the land was granted to families by consensus among members of a group, or by a chief, without allowing the family to sell the plot.

In other economic systems other human beings—slaves—were private property.

In a capitalist economy, an important form of private property is made up of the equipment, buildings, raw materials, patents and other intellectual property, and other inputs used in producing goods and services. These are called *capital goods*.

In a capitalist economy, private property does not include some essentials such as the air we breathe and most of the knowledge we use (such as our skills, our knowledge of how to produce things, and our capacities to solve problems that arise in production). Private property may be owned by an individual, a family, a business, or some entity other than the government.

Think of all the ways that goods and services may be transferred from one person to another: as a gift, by theft, by a government order.

Markets differ from these, and other ways that goods or services may be transferred from one person to another, in two respects:

- *They are reciprocated*: First, unlike gifts and theft, in a market one person's transfer of a good or service to another is directly

MARKETS

Markets are:

- A way of connecting people who mutually benefit
- By exchanging goods and services
- Through a process of buying and selling

reciprocated by a transfer in the other direction (either of another good or service as takes place in barter exchange, or money, or a promise for a later transfer when one buys on credit).

- *They are voluntary:* Both transfers—by the buyer and the seller—are voluntary because the things being exchanged are private property. So the exchange must be beneficial in the opinion of both parties. In this, markets differ from theft, and also from the transfers of goods and services in a centrally planned economy.

DISCUSS 1.5: THE POOREST MAN'S COTTAGE

“The poorest man may in his cottage bid defiance to all the forces of the Crown. It may be frail, its roof may shake; the wind may blow through it; the storms may enter, the rain may enter—but the King of England cannot enter; all his forces dare not cross the threshold of the ruined tenement.”

William Pitt, 1st Earl of Chatham, *speech in the British Parliament* (1763)

1. What does this tell us about the meaning of private property?
2. Does it apply to people's homes in your country?

DISCUSS 1.6: MARKETS AND SOCIAL NETWORKS

Think about a social networking site that you use, for example Facebook. Now look at our definition of a market.

What are the similarities and differences between the social networking site and a market?

But private property and markets alone do not define capitalism. In many places they had been important institutions long before capitalism. The most recent of the three components making up the capitalist economy is the *firm*.

The kinds of firms that make up a capitalist economy include restaurants, banks, large farms that pay others to work there, industrial establishments, supermarkets, internet service providers, and many more. Other productive organisations that are not firms and which play a lesser role in a capitalist economy include family

businesses, in which most or all of the people working are family members, non-profit organisations, employee-owned cooperatives, and government-owned entities (such as railways and power or water companies). These are not firms, either because they do not make a profit, or because the owners are not private individuals who own the assets of the firm and employ others to work there. Note: a firm pays wages or salaries to employees; but if it takes on unpaid student interns, it is still a firm.

Firms existed, playing a minor role, in many economies long before they became the predominant organisations for the production of goods and services, as they are in a capitalist economy. This created a boom in another kind of market that had played a limited role in earlier economic systems: the *labour market*. The owners of the firms as employers (or their managers) offer jobs at wages or salaries that are high enough to attract people who are looking for work.

In economic language, the employers are the *demand side* of the labour market (they “demand” employees), while the workers are the *supply side*, offering to work under the direction of the owners and managers who hire them.

A striking characteristic of firms, that distinguishes them from families and governments, is how quickly they can be born, expand, contract and die. A successful firm can grow from just a few employees to a global company with hundreds of thousands of customers, employing thousands of people, in a few years. Firms can do this because they are able to hire additional employees on the labour market, and attract funds to finance the purchase of the capital goods they need to expand production.

Firms can die in a few years too. This is because a firm that does not make profits will not have enough money (and will not be able to borrow money) to continue employing and producing. The firm shrinks, and some of the people who work there lose their jobs.

FIRM

A *firm* is a way of organising production with the following characteristics:

- One or more individuals own a set of capital goods that are used in production
- They pay wages and salaries to employees
- They direct the employees (through the managers they also employ) in the production of goods and services
- The goods and services are the property of the owners
- Who sell them on markets with the intention of making a profit

Contrast this with a successful family farm. The family will be better off than its neighbours; but unless it turns the family farm into a firm, and employs other people to work on it, expansion will be limited. If, instead, the family is not very good at farming, then it will simply be less well off than its neighbours. The family head cannot make his children redundant. As long as the family can feed itself there is no equivalent mechanism to a firm's failure that will automatically put it out of business.

Government bodies tend to be more limited in their capacity to expand if successful, and are usually protected from failure if they perform poorly.

Markets and private property are essential parts of how firms function for two reasons:

- *Inputs and outputs are private property*: The firm's buildings, equipment, patents, and other inputs into production, as well as the resulting outputs, belong to the owners.
- *Firms use markets to sell outputs*: The owners' profits depend on markets in which customers may willingly purchase the products at a price that will more than cover their costs.

One way to remember the distinctiveness of the *capitalist* economic system is that unlike other economic systems, one of its hallmarks is the private ownership of *capital goods* that are organised for use in firms. Other economic systems are distinctive because of the importance of privately owned land, the presence of slaves, because the government owns capital goods, or because of the limited role of firms. Capitalist economies differ, too, from earlier economies in the magnitude of the capital goods used in production. Massive power looms have replaced spinning wheels; a tractor now pulls a plough to do a job once done by a farmer using a hoe.

1.9 CAPITALISM AS AN ECONOMIC SYSTEM

Figure 1.9 shows that the three parts of the definition of a capitalist economic system are nested concepts. Private property is an essential condition for the operation of markets, and the firm, in turn, presupposes markets and private property. The left-hand circle describes an economy of isolated families who own their capital goods and the goods they produce, but have little or no exchange with others.

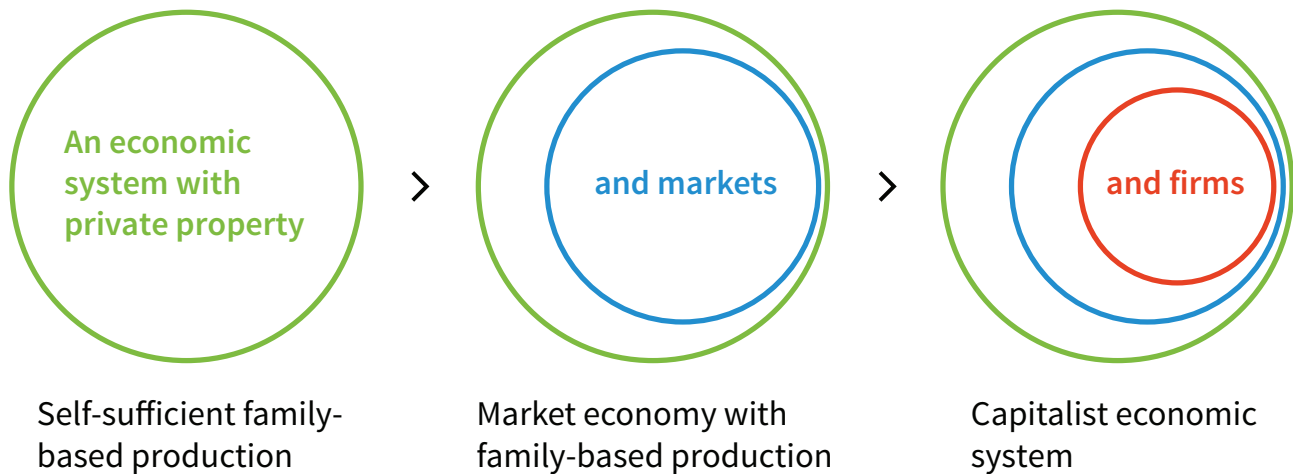


Figure 1.9 *Capitalism: Private property, markets and firms.*

Historically, economies like the left-hand circle have existed, but have been much less important than a system in which markets and private property are combined (the middle circle). In the middle circle most production takes place either by individuals (shoemakers or blacksmiths, for example) or in families (in our example, this was on a farm). Prior to 1600 a great many of the economies of the world were like this.

Capitalism is an economic system that combines decentralisation with centralisation:

- *Capitalism decentralises*: It limits the powers of governments and of other individuals in the process of owning, buying and selling.
- *Capitalism centralises*: It concentrates power in the hands of owners and managers of firms who are then able to secure the cooperation of large numbers of employees in the production process.

An easy way to remember this contrast is that when the owner of a firm interacts with an employee, he or she is “the boss”. When the same owner interacts with a potential customer he or she is simply another person trying to make a sale, in competition with other firms. It is this unusual combination of competition among firms, and concentration of power and cooperation within them, that accounts for capitalism’s success as an economic system.

How the institutions of capitalism—private property, markets, and firms—combine with each other and with families, governments, and other institutions differs greatly across countries. Just as ice and steam are both water, China and the US are both capitalist economies. But they differ in the extent to which the government influences economic affairs, and in many other ways. As this demonstrates, definitions in the social sciences often cannot be as precise as they are in the natural sciences.

Learning a new language

We hope you will not only learn about the economy in this course but also learn to *do* economics, and this means learning to speak a new language. Using the terms of economics helps us to communicate complicated ideas with others who have learned the language. This is why we stress definitions.

Being able to explain how economists use words is also crucial to communicating with other people about economics. For this reason, and because by now you have seen a number of definitions, think about what a definition does for us.

Water, for example, is defined chemically as a compound of two hydrogen atoms bonded with one oxygen atom, which takes the liquid form but also a solid form (ice) and a gaseous form (steam), not to mention other forms (snow or fog). Some people might say that “ice is not *really* water”, and object that the definition is not the “true meaning” of the word.

But debates about “true” meaning (especially referring to complex ideas like capitalism, or democracy) misunderstand why definitions are valuable. Think of the definition of water, or of capitalism, not as capturing some true meaning—but rather as a device that is valuable because it makes it easier to communicate.

The word “capitalism”, like “water”, refers not to a single thing, but to a class of things sharing common characteristics. And, like the definition of water (which requires that we know how to use the words oxygen and hydrogen precisely), we needed to define the three institutions making up the capitalist economic system before we could define capitalism itself.

But unlike water, we cannot identify a capitalist economic system using easy-to-see physical characteristics.

Britain was definitely capitalist in 1800 and definitely not capitalist in 1500, but it would be pointless to try to find a precise date at which a switch occurred. For much of the period of transition we would say that the economy was a mixed economic system with both capitalist and non-capitalist elements.

China was a centrally planned economy from 1953 until economic reforms began in 1978. Afterwards it adopted new institutions so that markets, private property and firms became important. Today it is a capitalist economy. But in which year, exactly, did the definition come to be justified?

Major distinctions are important—the difference between a centrally planned and a capitalist economy, for example—but we can admit that the boundary between one and the other is rarely precise in real life, and so the way we describe a system will always be subjective. Even today, although capitalism is dominant in China, there is still a centrally organised Five Year Plan.

DISCUSS 1.7: FIRM OR NOT?

Using our definition, explain whether each of the following entities is a firm by stating whether it *satisfies the characteristics that define a firm*. Research the entity online if you are stuck.

1. John Lewis (UK)
2. A family farm in Vietnam
3. Your current family doctor's office or practice
4. Walmart (US)
5. An 18th century pirate ship (see our description of *The Rover* in Unit 5)
6. Google (US)
7. Manchester United plc (UK)
8. Wikipedia

1.10 CAPITALISM, CAUSATION AND HISTORY'S HOCKEY STICK

There are both historical and logical reasons for thinking that the emergence of capitalism as an economic system is one of the causes of the upward kink in the hockey sticks we have seen.

But we should be sceptical when anyone claims that something complex (capitalism) “causes” increased living standards (or technological improvement, population growth, a networked world, or environmental challenges).

In science, we support the statement that X causes Y by:

- *Understanding the relationship between cause (X) and effect (Y)*
- *Performing experiments to gather evidence by measuring X and Y*

In physics, we have a good understanding of how heat changes the state of water (transforming some of it to steam, for example), and we can easily do an experiment to see what happens when we raise its temperature to 100C (you repeat this experiment whenever you boil water). Therefore we can make a convincing causal statement about what will happen when we raise the temperature of water.

Equivalent causal statements are essential in economics. We would often like to devise ways of changing something so that the economy works better, and this means making a causal statement that policy X is likely to cause change Y. For example, an economist might claim that: “If the central bank lowers the interest rate, more people will buy homes and cars.”

But economics isn't physics. We don't fully understand the detailed causal processes, and we often can't do experiments (though in Unit 4 we will give examples of the use of conventional experiments in one area of economics). So how can economists do science? This example shows how the things we observe in the world can help us investigate causes and effects.

HOW ECONOMISTS LEARN FROM FACTS

DO INSTITUTIONS MATTER FOR GROWTH IN INCOME?

We can observe that capitalism emerged at the same time as, or just before, both the Industrial Revolution and the upward turn in our hockey sticks. This would be consistent with the hypothesis that capitalist institutions were among the causes of the era of continuous productivity growth. But the emergence of a free-thinking cultural environment known as the Enlightenment also predated or coincided with the upturn in the hockey sticks. So was it institutions, or culture, both, or some other set of causes? Economists and historians disagree, as you will see in Unit 2, when we ask “What were the causes of the Industrial Revolution?”

Scholars in all fields try to narrow the range of things on which they disagree by using facts. For complicated economic questions, like “Do institutions matter economically?”, facts may provide enough information to reach a conclusion.

A method for doing this is called a *natural experiment*. It is a situation in which there are differences in something of interest—a change in institutions for example—that are not associated with differences in other possible causes. Because we cannot change the past, even if it were practical to conduct controlled experiments on entire populations, we rely on natural experiments, as Jared Diamond, a biologist, and James Robinson, a professor of government, explain.

The division of Germany at the end of the second world war into two separate economic systems—one centrally planned in the east, the other capitalist in the west—provides a natural experiment. The so-called Iron Curtain that divided them separated two populations sharing the same language, culture, and recent history as capitalist economies.

Before the second world war, living standards in what later became East and West Germany were the same. This is a suitable setting for using the natural experiment method. Before the war, firms in Saxony and Thuringia were world leaders in

automobile and aircraft production, chemicals, optical equipment and precision engineering.

With the introduction of centralised planning in East Germany, private property, markets and firms virtually disappeared. Decisions about what to produce, how much and in which plants, offices, mines and farms were taken not by private individuals, but by government officials. The state officials managing these economic organisations did not need to follow the principle of capitalism and produce goods and services that customers would buy at a price above their cost.

West Germany remained a capitalist economy.

The East German Communist Party forecast in 1958 that material wellbeing would exceed the level of West Germany by 1961. The failure of this prediction was one of the reasons the Berlin Wall separating East from West Germany was built in 1961. By the time the Berlin Wall fell in 1989, and East Germany abandoned central planning, its GDP per capita was less than half of that of capitalist West Germany. Figure 1.10 shows the different paths taken by these and two other economies from 1950. It uses the ratio scale.

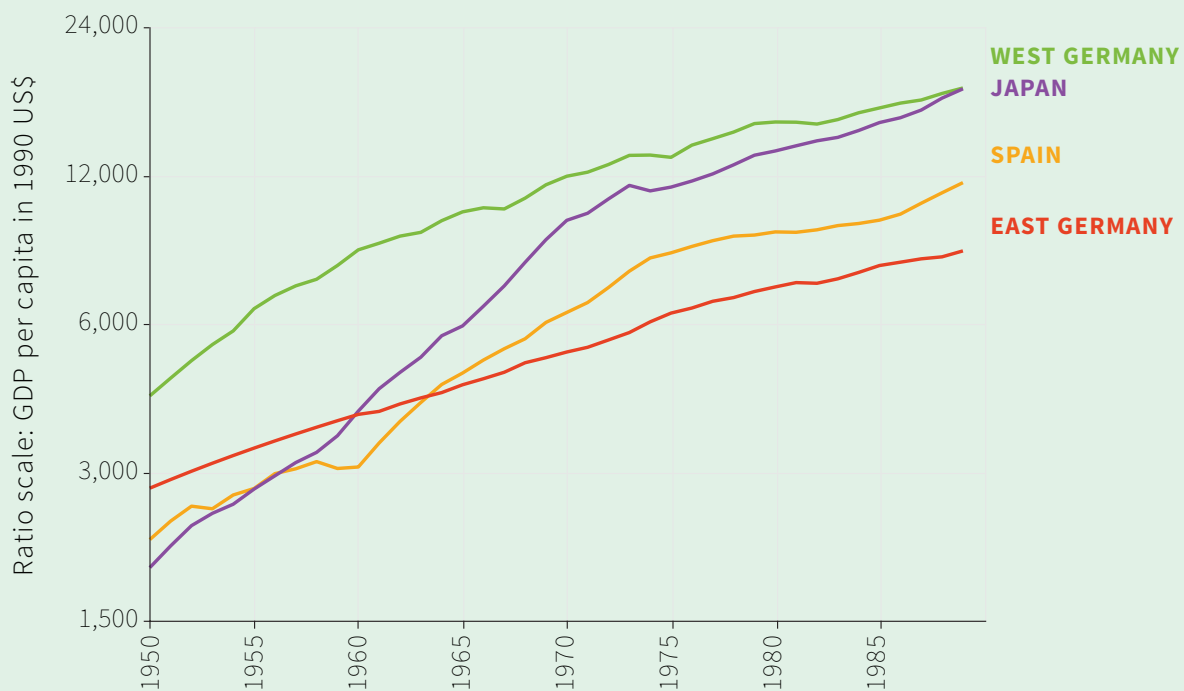


Figure 1.10 *The two Germanies: Planning and capitalism (1950-89).*

Source: *The Conference Board*. 2015. 'Total Economy Database.' Accessed June 2015. Maddison, Angus. 2001. 'The World Economy: A Millennial Perspective.' Development Centre Studies. Paris: OECD.

Notice from Figure 1.10 that East Germany had a less good starting position than West Germany in 1950. This was not mainly because of differences in the amount of capital equipment or skills available per head of the population, but because the structure of industries in East Germany was more disrupted by splitting the country than was the case in West Germany.

Unlike some capitalist economies that had lower per capita incomes in 1950, East Germany did not catch up to the world leaders, which included West Germany. By 1989, the Japanese economy (which had also suffered war damage) had, with its own particular combination of private property, markets and firms along with a strong government coordinating role, caught up to West Germany, and Spain had closed part of the gap.

We cannot conclude from the German natural experiment that capitalism always promotes rapid economic growth while central planning is a recipe for stagnation. Instead what we can infer is more limited: during the second half of the 20th century, the divergence of economic institutions mattered for the livelihoods of the German people.

When is capitalism dynamic?

Two sets of conditions contribute to the dynamism of the capitalist economic system. One set is economic; the other is political, and it concerns the government and the way it functions.

Economic conditions

The impact of economic conditions is summarised by the contrast between the second and third columns in Figure 1.11. Capitalism is less dynamic when property rights are insecure, there is limited competition in markets, and when the leadership of firms is in the hands of those who have not been tested by competition, but who instead have acquired their position via inheritance from parents or a political connection.

CHARACTERISTICS OF	WHEN CAPITALISM IS DYNAMIC	... AND WHEN IT ISN'T
PRIVATE PROPERTY	Secure	Insecure
MARKETS	Competitive (the losers lose)	Monopolised (the losers survive)
FIRMS	Leadership acquired by merit	Leadership from connections or inheritance

Figure 1.11 *Economic institutions that make capitalism dynamic.*

When these institutions are functioning well so that private property is secure, markets are competitive and firms led by people who have proven their merit, capitalism is unique. It is the first economic system in human history in which membership of the elite depends on a high level of economic performance.

As a firm owner, if you fail, you are no longer part of the club. Nobody kicks you out, because that is not necessary: you simply go bankrupt. An important feature of the discipline of the market—produce good products cheap or fail—is that it where it works well it is automatic; having a friend in power somewhere is no guarantee that you could remain in business. The same discipline applies to firms and to individuals in firms: losers lose. Market competition provides a mechanism for weeding out those who underperform.

Think of how different this is from other economic systems. A feudal lord who managed his estate poorly was just a shabby lord. But the owner of a firm that could not produce goods that people would buy, at prices that more than covered the cost, as we have seen is bankrupt—and a bankrupt owner is an ex-owner.

Of course, if they are initially very wealthy or very well connected politically, owners and managers of capitalist firms survive, and firms too stay in business despite their failures, sometimes for long periods or even over generations. Losers sometimes survive. But there are no guarantees: staying ahead of the competition means constantly innovating.

Political conditions

Government is also important. The policies it adopts often determine whether private property is secure, markets competitive, and firm leadership is based on merit. And these conditions determine how the carrots and sticks of the competitive process work.

For innovators to take the risk of introducing a new product or production process, their ownership of the resulting profits must be protected from theft by a well-functioning legal system. Governments also adjudicate disputes over ownership and enforce the property rights necessary for markets to work.

But, as Adam Smith warned, by creating monopolies such as the East India Company, governments may also take the teeth out of competition. If a large firm is able to establish a monopoly by excluding all competitors or a group of firms is able to collude to keep the price high, the incentives for innovation and the discipline of prospective failure will be dulled. The same is true in modern economies when some banks or other firms are considered to be *too big to fail* and instead are bailed out by governments when they might otherwise have failed.

In addition to providing an environment that supports the institutions of the capitalist economic system, the government provides essential goods and services such as physical infrastructure, education and national defence.

In a nutshell, capitalism can be a dynamic economic system when it combines:

- *Private incentives* for cost reducing innovation deriving from market competition and *secure private property*.
- Firms led by *those with proven ability* to produce goods at low cost.
- *Public policy* supporting these conditions, and supplying other essential goods and services.

These are the three conditions that together make up what we term the *capitalist revolution* that, first in Britain and then in some other economies, transformed the way that people interact with each other and with nature in producing their livelihoods.

1.11 VARIETIES OF CAPITALISM: DIVERGENCE AMONG LATECOMERS

Not every capitalist country is the kind of economic success story exemplified in Figure 1.1a by Britain, later Japan, and the other countries that caught up. Figure 1.12 tracks the fortunes of a selection of countries across the world during the 20th century. It shows for example that in Africa the success of Botswana in achieving sustained growth contrasts sharply with Nigeria's relative failure. Both are rich in natural resources (diamonds in Botswana, oil in Nigeria) and differences in the quality of their institutions—the extent of corruption and misdirection of government funds, for example—may help explain their contrasting trajectories.

The star performer in Figure 1.12 is South Korea. In 1950 its GDP per capita was the same as Nigeria's; in 2013 it was 10 times richer by this measure. South Korea's takeoff occurred under institutions and policies sharply different from those prevailing in Britain in the 18th and 19th centuries. The most important difference is that the government of South Korea (along with a few very large corporations) played a leading role in directing the process of development, explicitly promoting some industries, requiring firms to compete in foreign markets and also providing high quality education for its workforce. The term *developmental state* has been applied to the leading role of the South Korean government in its economic takeoff and now refers to any government playing this part in the economy. Japan and China are other examples of developmental states.

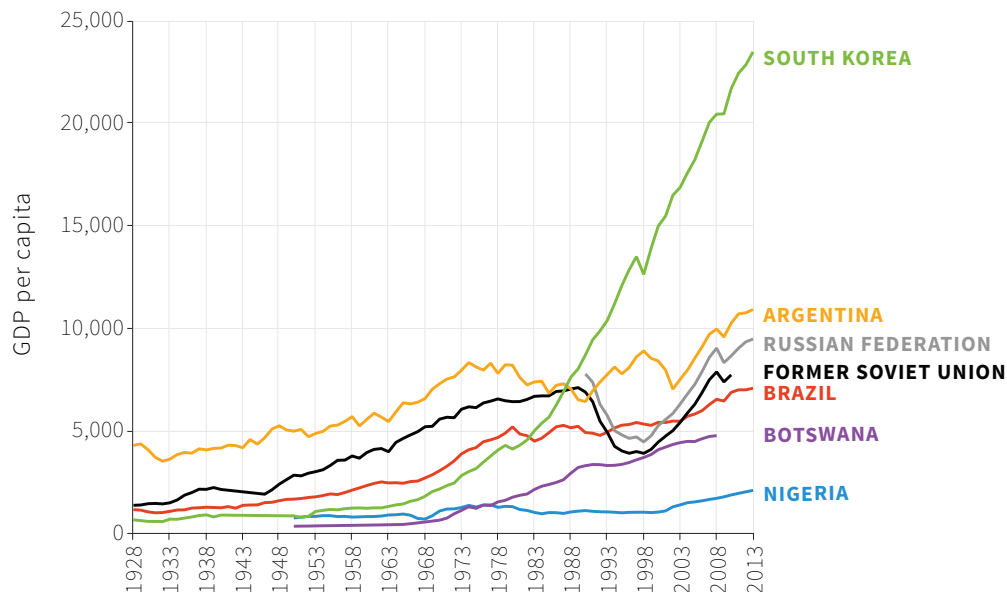


Figure 1.12 Divergence of GDP per capita among latecomers to the capitalist revolution (1928-2013).

Source: Bolt, Jutta, and Jan Juiten van Zanden. 2013. 'The First Update of the Maddison Project Re-Estimating Growth Before 1820.' Maddison-Project Working Paper WP-4, January.

From Figure 1.12 we also see that in 1928, when the Soviet Union's first five-year economic plan was introduced, GDP per capita was one-tenth of the level in Argentina, similar to Brazil, and considerably higher than in South Korea. Central planning in the Soviet Union produced steady but unspectacular growth for nearly 50 years. GDP per capita in the Soviet Union outstripped Brazil by a wide margin and even overtook Argentina briefly just before Communist party rule there ended in 1990.

The contrast between West and East Germany demonstrates that one reason central planning was abandoned as an economic system was its failure, in the last quarter of the 20th century, to deliver the improvements in living standards achieved by some capitalist economies. Yet the varieties of capitalism that replaced central planning in the countries that had once made up the Soviet Union did not work so well either. This is evident from the pronounced dip in GDP per capita for the ex-Soviet Union after 1990, shown in Figure 1.12.

The lagging performances of some capitalist economies, including the ones in Figure 1.12 in which growth was slow or uneven, highlight the following problems from the right-hand column of Figure 1.11:

- *Private property may not be secure* as a result of weak enforcement of the rule of law and of contracts, or expropriation either by criminal elements or by government bodies.
- *Markets may not be competitive* and may fail to offer the carrots and wield the sticks that make a capitalist economy dynamic.

- Partly as a result of these failures, *firms may be owned and managed by people who survive because of their connections to government or their privileged birth rather than their aptitude for delivering high quality goods and services at a competitive price.*

Combinations of failures of the three basic institutions of capitalism mean that individuals and groups often have more to gain by spending time and resources in lobbying, criminal activity, and other ways of seeking to shift the distribution of income in their favour, and less in the creation of wealth.

1.12 VARIETIES OF CAPITALISM: GOVERNMENT AND THE ECONOMY

We have seen that in some economies—South Korea for example—governments have played a leading role in the capitalist revolution. But even where government's role is more limited, as in Britain at the time of its takeoff, governments establish, enforce and change the laws and regulations that influence how the economy works. For example, markets, private property and firms are all regulated by laws and policies. Moreover, in virtually every modern capitalist economy, governments are a large part of the economy, accounting in some for more than half of the economy's GDP.

In subsequent units we investigate why government policies in such areas as sustaining competition, taxing and subsidising to protect the environment, influencing the distribution of income, the creation of wealth, and the level of employment and inflation may make good economic sense.

One of the reasons why capitalism comes in so many forms is that over the course of history and today, capitalist economies have coexisted with many political systems. A *political system* such as *democracy* determines how governments will be selected, and how those governments will make and implement decisions that affect the population.

Capitalism emerged in Britain, the Netherlands, and in most of today's high-income countries long before democracy. In no country were most adults eligible to vote prior to the end of the 19th century (New Zealand was the first). Even in the recent past, capitalism has coexisted with undemocratic forms of rule, as in Chile from 1973-90, in Brazil from 1964-85, and in Japan until 1945. Contemporary China has a variant of the capitalist economic system, but its system of government is not a democracy by our definition. In most countries today, however, capitalism and democracy coexist, each system influencing how the other works.

Like capitalism, democracy comes in many forms. In some, the head of state is elected directly by the voters; in others it is an elected body, such as a parliament, that elects the head of state. In some democracies there are strict limits on the ways in which individuals can influence elections or public policy through their financial contributions; in others private money has great influence through contributions to electoral campaigns, lobbying, and even illicit contributions, such as bribery.

These differences even among democracies are part of the explanation of why the government's importance in the capitalist economy differs so much among nations. In Figure 1.13 we show one measure of the size of government relative to the entire economy: the total amount of taxes collected by government (both local and national) as a fraction of GDP. Even among economies at about the same level of GDP per capita, the size of government by this measure varies. In the US it is one-third; in six rich countries in northern Europe, it is more than a half.

DEMOCRACY

Democracy is one among many political systems, defined by:

- Individual rights including freedom of speech, assembly, and the press
- Fair elections in which virtually all adults are eligible to vote
- ... and in which the loser leaves office

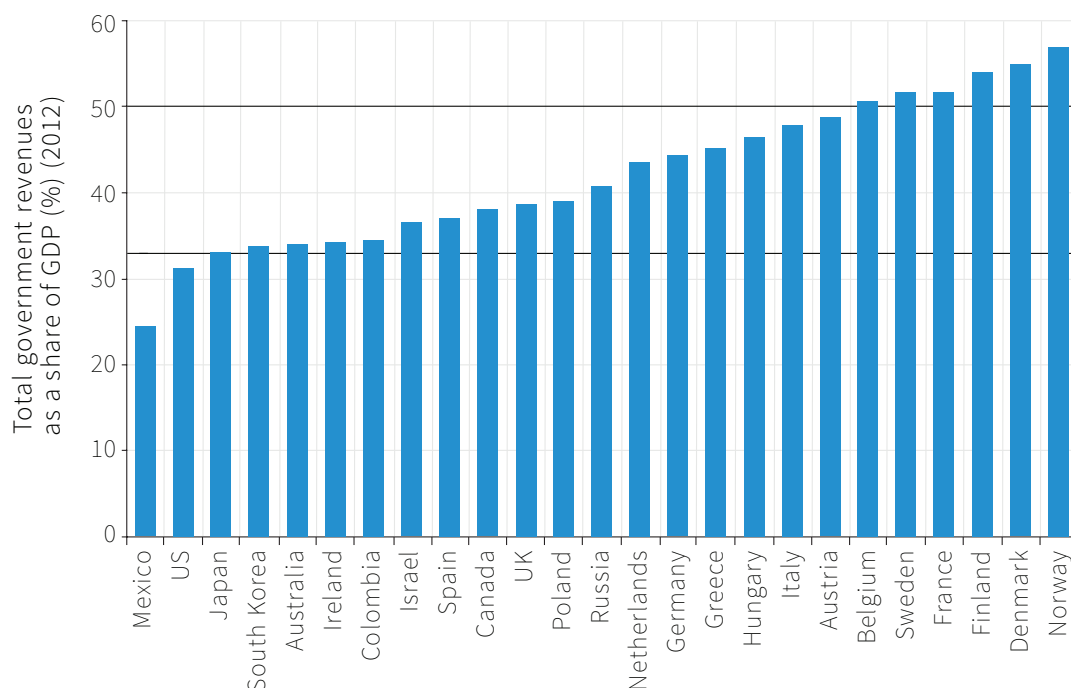


Figure 1.13 The size of government as measured by total tax revenue as a fraction of GDP (2012).

Source: OECD (2015), General government revenue indicator.

Notice that by this measure the developmental state South Korea resembles the US, although in the US the government takes a much less active role in directing the economy. Government revenues are limited in Japan, too. But the governments of Japan and South Korea play an important role in setting the direction of their economies, just as important as the role of governments of Sweden and Denmark that spend a far greater fraction of the total income of the country.

The big difference between South Korea and Japan on the one hand, and Sweden and Denmark on the other, is the extent to which government policies reduce the amount of inequality in disposable income. We will see in the next section that in Sweden and Denmark inequality in disposable income (by one of the most commonly used measures) is just half the level of inequality of income before the payment of taxes and receipt of transfers. In Japan and South Korea, by contrast, government taxes and transfers also reduce inequality in disposable income, but to a far lesser degree.

1.13 MEASURING ECONOMIC INEQUALITY

The measure of inequality that we referred to in the comparison of government policies in Japan, South Korea, Sweden and Denmark is called the *Gini coefficient* after the Italian statistician Corrado Gini (1884-1965). It indicates how much disparity there is in income, or any other measure, across the population. If everyone has the same income, so there is no inequality, the Gini coefficient takes a value of 0. The maximum inequality, a value of 1, means a single individual receives all the income.

When we pointed out that government taxes and transfers in Sweden created a distribution of income that was half as unequal as before taxes and transfers, we were saying that Sweden's Gini coefficient *before taxes and transfers* (the equivalent for the Netherlands is shown in Figure 1.14a below) is 0.47, while the Gini coefficient for disposable income in Sweden is 0.24.

Like GDP per capita, the Gini coefficient measures an important characteristic about the whole economy. And, like GDP per capita, it is worth exploring exactly what the Gini coefficient measures.

The Gini coefficient is based on a statistical construct called the *Lorenz curve* (invented in 1905 by Max Lorenz (1876-1959), an American economist, while he was still a student). We will explain the Lorenz curve before showing how you calculate the Gini coefficient from it.

The Lorenz curve shows the entire population lined up along the horizontal axis from the poorest to the richest. The height of the curve at any point on the horizontal axis indicates the fraction of total income received by the fraction of the population given by that point on the horizontal axis.

Figure 1.14a shows a Lorenz curve in the Netherlands in 2010. It is based on data for market income so it does not take account of taxes and government transfers (we will see what difference they make soon). The curve indicates that the poorest 10% of the population (10 on the horizontal axis) receives only 0.1% of the total income (0.1 on the vertical axis). The other points in the curve convey the same kind of information.

When studying large populations like that of a country or city, as is usually the case, the Gini coefficient is the area between the perfect equality line and the Lorenz curve (denoted A in Figure 1.14a), divided by the entire area under the perfect equality line ($A + B$). The Gini coefficient was introduced by the Italian statistician just seven years after Lorenz came up with his curve. So:

$$Gini = \frac{A}{A+B}$$

From the data we used to construct the Lorenz curve we calculate that the Gini coefficient of market income in the Netherlands in 2010 is 0.47.

As you can see from the slideline, when we draw the Lorenz curve for disposable income, the new shaded area A' is much smaller, and the new Gini correspondingly lower:

$$\begin{aligned} Gini &= \frac{A'}{A'+B'} \\ &= 0.25 \end{aligned}$$

This shows us that in the Netherlands, as in Sweden and Denmark, taxes and transfers substantially reduce disparities in disposable income.

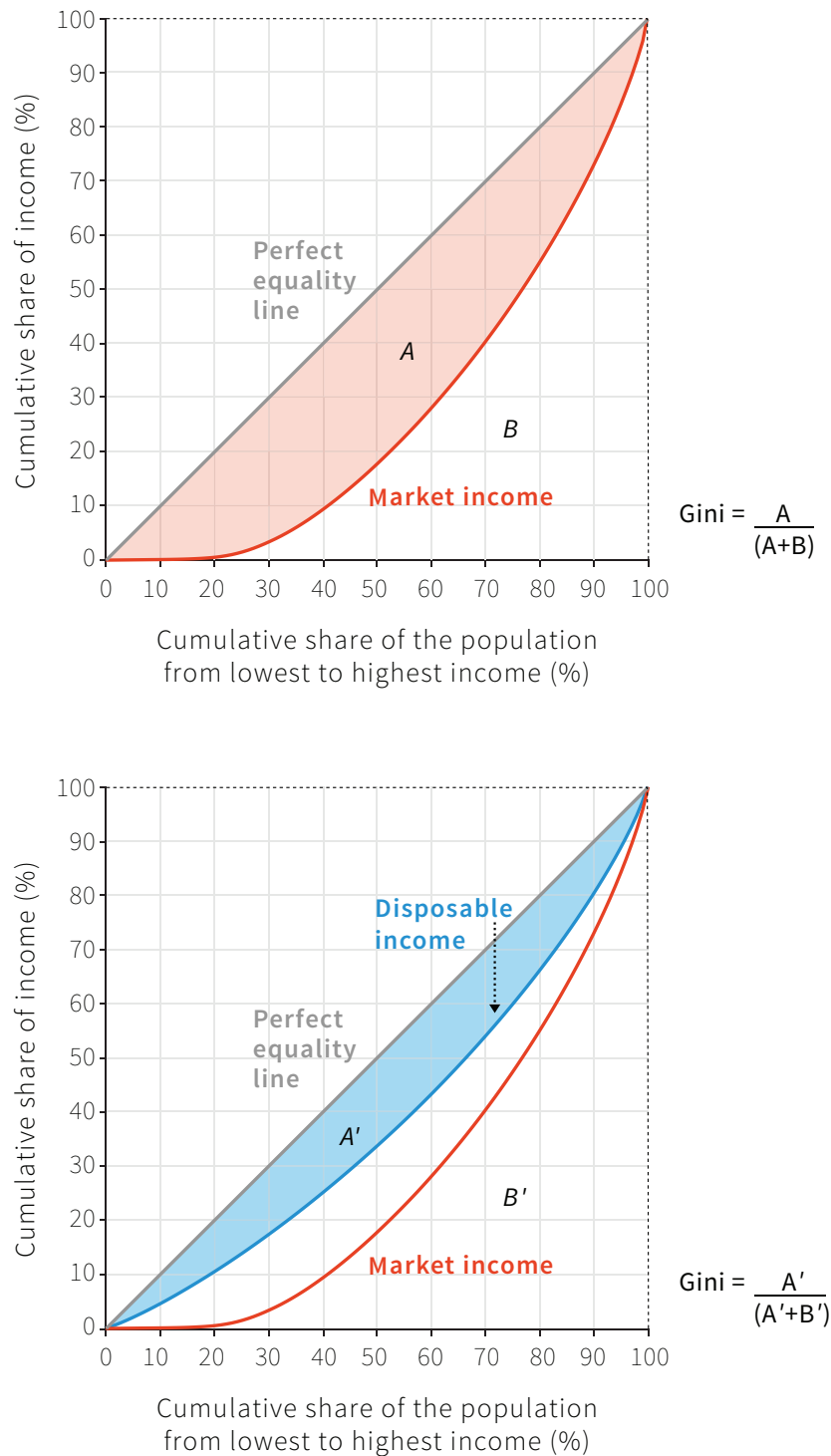


Figure 1.14a Distribution of market and disposable income in the Netherlands (2010).

Source: LIS. 2015. 'Cross National Data Center.' LIS. Accessed June. Calculations were conducted by Stefan Thewissen (University of Oxford) in April 2015. Household market (labour and capital) income and disposable income are equalised and top- and bottom-coded.

Income inequality in the Netherlands

Notice that the Lorenz curve is bowed downwards from the 45-degree line in the figure. This is because there are income inequalities among people in the Netherlands. The 45-degree line is what the Lorenz curve would look like if everyone had the same income. Because it has a slope of 1 the poorest 10% receives 10% of income, and so on. In this case, we would not have to line people up according to their income: they would all be at the front of the queue. The shaded area labelled A shows how far the Lorenz curve is bowed out from the 45-degree line of equality. This is a measure of the extent of income inequality in the Netherlands. Now compare the Lorenz curve for disposable income with the curve for market income. The new shaded area A' between the disposable income curve and the perfect equality line is much smaller. This is because taxes and transfers have reduced inequality in disposable income.

Like GDP per capita, we can also use the Lorenz curve and the Gini coefficient to compare countries. For example Figure 1.14b shows the Lorenz curve for disposable income in the US. Comparing this to the analogous curve for disposable income for the Netherlands we see that the US is much more unequal by this measure: using again the formula for the Gini, we find that the Gini coefficient for disposable income in the US is 0.39.

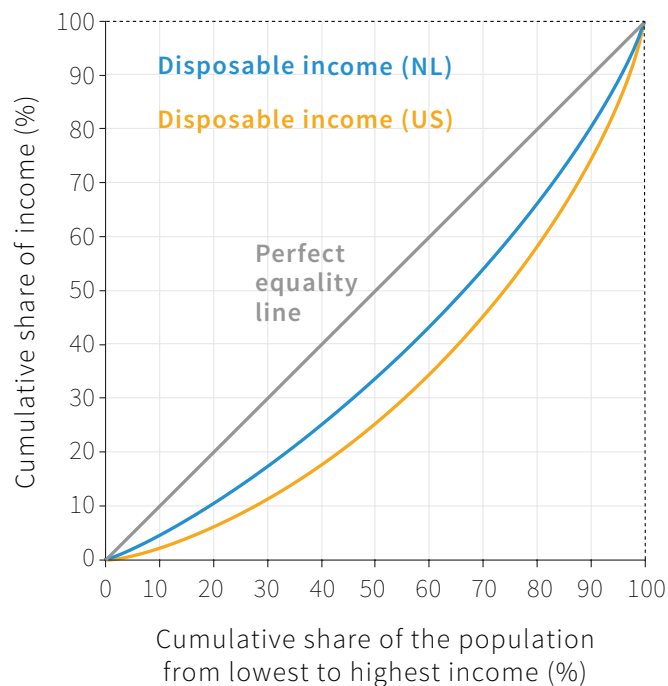


Figure 1.14b Distribution of disposable income in the Netherlands (2010) and the US (2013).

Source: LIS, 2015. 'Cross National Data Center.' LIS. Accessed June.

These just two of many ways to measure inequality. Others you may see include the fraction of all income received by the richest 1% of the population, or the ratio of the income at the 90th percentile of income to the income at the 10th percentile.

1.14 VARIETIES OF CAPITALISM: ECONOMIC INEQUALITY

The Gini coefficient (or alternative measures such as the share of income received by the top income recipients) can, like GDP per capita, be used to track trends in a given country over time.

Gini coefficients for income since the 18th century in the US, Britain and the Netherlands are shown in Figure 1.15. There has been a more or less continuous decline in income inequality in the Netherlands since the middle of the 18th century. In Britain inequality rose during the late 18th century, and then fell until the closing decades of the 20th century, after which it increased again. In the US, inequality rose from the time of the Declaration of Independence in 1776 until the Civil War in 1861, and then declined for the next century, only to rise again in recent years. Inequality of income in the US, as measured by the Gini coefficient, is now slightly higher than it was when slavery existed, on the eve of the American Civil War.

The sharp increase in inequality in Britain and the US in recent years has also occurred in some major economies, such as India and China, but not in others.

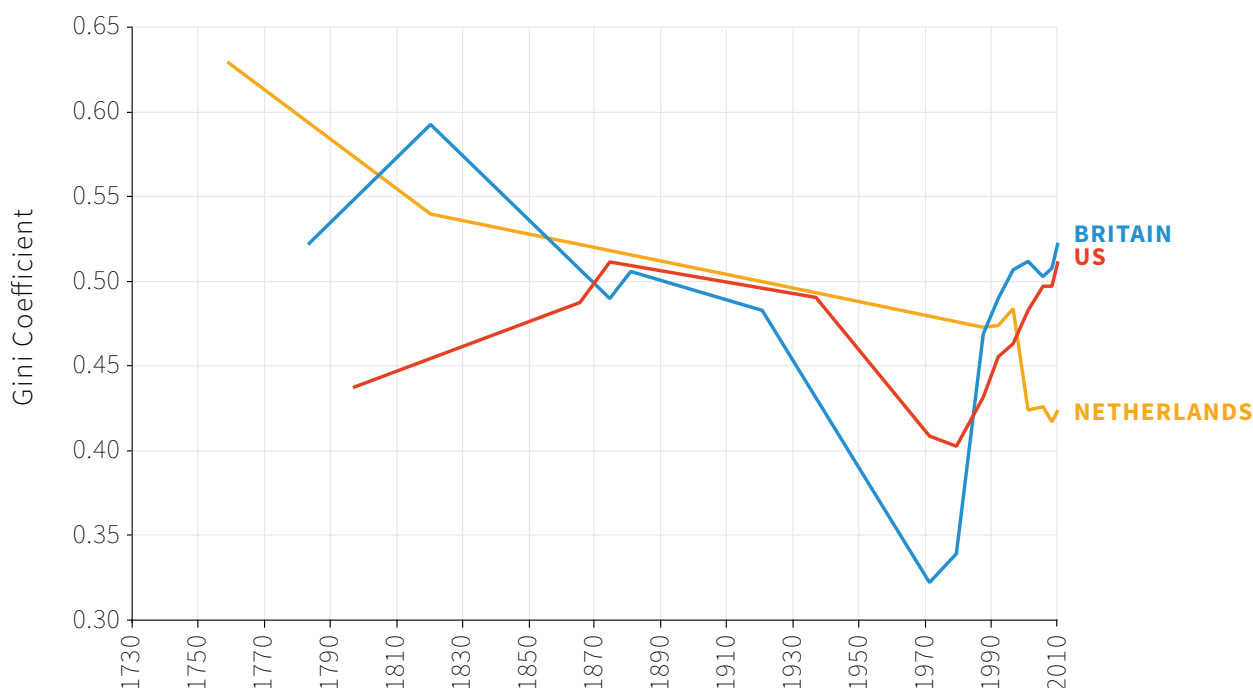


Figure 1.15 *Income Inequality in the US, Britain and the Netherlands (1730-2010).*

Source: Lindert, Peter, and Jeffrey Williamson. 2103. 'Two Centuries of American Growth and Inequality, 1650-1860.' *Stanford Economic History Seminar*, October. The figure measures inequality of market, not disposable income for which data are not available before recent years, so the effects of taxes and transfers are not included. But prior to 1950 these were of limited importance.

Figure 1.15 (and the comparison of the US and the Netherlands in the previous section) illustrate two important points about capitalism and inequality:

- *Change over time:* A capitalist economy may become less unequal over time, or more unequal.
- *Differences between economies:* At a fixed point in time the degree of inequality in disposable income may differ dramatically between different capitalist economies, with some highly unequal and others much less so.

The main reason for the differences between nations in inequality of disposable income is the extent to which governments tax wealthy families and transfer the proceeds to less well off individuals. Figure 1.16 shows inequality of both market and disposable income as measured by the Gini coefficient. The top of the lower part of each bar gives the Gini for disposable income; the top of the upper part of the bar shows the Gini for market income. The countries are ordered from left to right, from the least to the most unequal by the disposable income measure (because this is the preferred measure of inequality in living standards).

Notice that:

- The differences between countries in inequality in disposable incomes (the top of the lower bars) are much greater than inequalities in income before taxes and transfers (the top of the upper bars).
- The US and the UK are among the most unequal of the high-income economies.
- The few poor and middle income countries for which data are available are even more unequal in disposable income than the US.

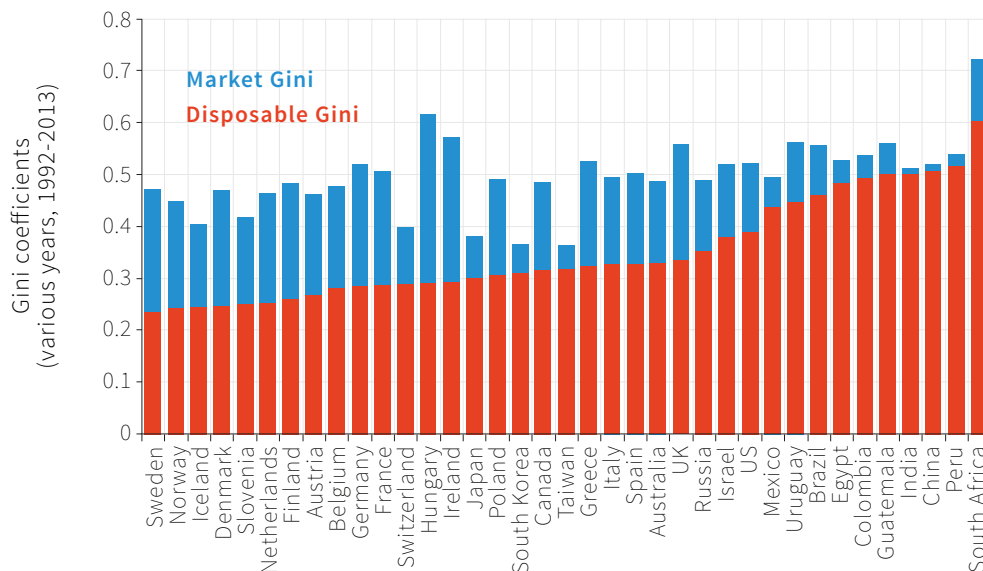


Figure 1.16 *Income inequality in market and disposable income across the world.*

Source: LIS. 2015. 'Cross National Data Center.' LIS. Accessed June. Estimates by Stefan Thewissen (University of Oxford) in April 2015. Household market (labour and capital) income and disposable income are equalised and top- and bottom-coded.

But (with the exception of South Africa) this is mainly the result of the very limited degree of redistribution from rich to poor, not an unusually high degree of inequality in income before taxes and transfers.

Figure 1.17 shows—for the same countries as in Figure 1.16—a measure of the extent to which taxes and transfers distribute income to the less well off. This is the redistribution ratio, namely the length of the blue segment in Figure 1.16 divided by the total height of the bar (top of the blue bar).

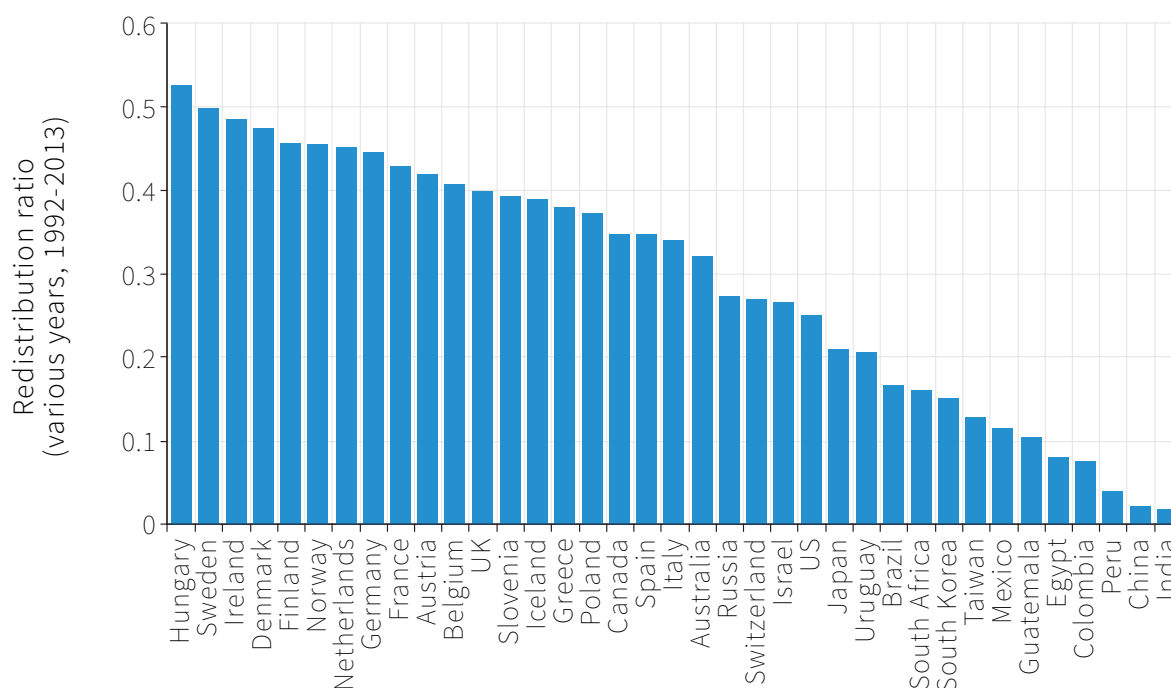


Figure 1.17 *Redistribution ratios across the world.*

Source: LIS. 2015. 'Cross National Data Center.' LIS. Accessed June. Estimates by Stefan Thewissen (University of Oxford) in April 2015. Household market (labour and capital) income and disposable income are equalised and top- and bottom-coded.

DISCUSS 1.8: THE REDISTRIBUTION RATIO

From Figure 1.17, select two countries that have very different redistribution ratios.

Referring to the politics, history and economics of these countries, explain why these ratios might be so different.

1.15 ECONOMICS AND THE ECONOMY

Economics is the study of how people interact with each other and with their natural surroundings in producing their livelihoods, and how this changes over time. Therefore it is about:

- *How we come to acquire the things*—food, clothing, shelter, free time—that make up our livelihood and, in doing this,
- *How we interact with each other* either as buyers and sellers, employees or employers, citizens and public officials, parents, children and other family members.
- *How we interact with our natural environment*, from breathing to extracting raw materials from the earth.
- *How each of these changes over time.*

In Figure 1.8 we showed that the economy is part of society, which in turn is part of the biosphere. Figure 1.18 shows the position of firms and families in the economy, and the flows that occur within the economy and between the economy and the biosphere. Firms combine labour with structures and equipment, and produce goods and services that are used by households and other firms.

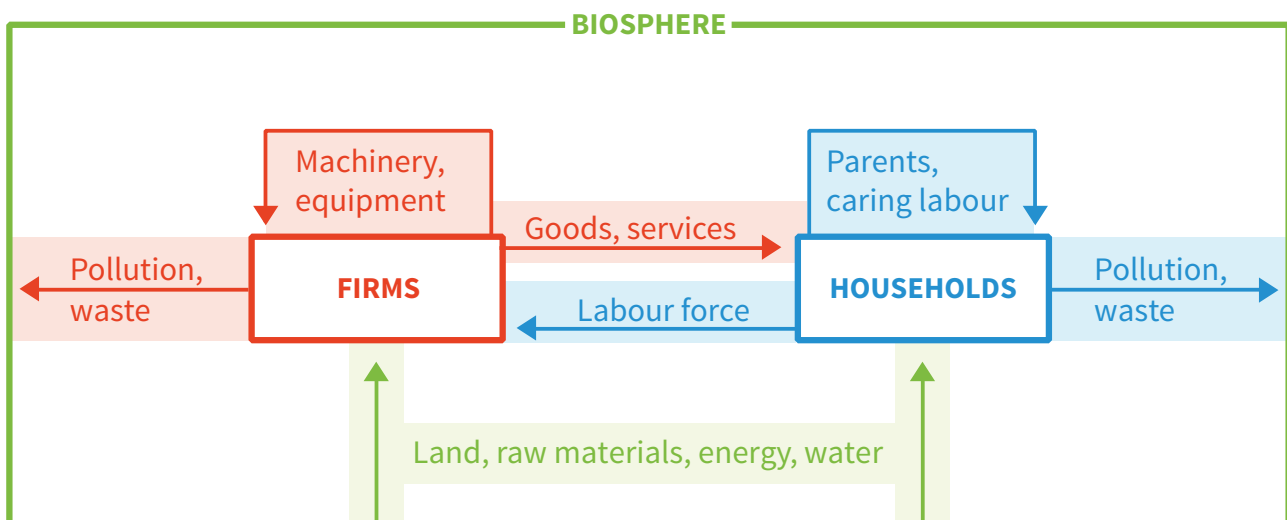


Figure 1.18 A model of the economy: Households and firms.

Production of goods and services also takes place within households although, unlike firms, households may not sell their outputs in the market. In addition to producing goods and services, households are also producing people—the next generation of the labour force. The labour of parents, care givers and others is combined with

structures (for example, your home) and equipment (for example, the oven in that home) to reproduce and raise the future labour force working in firms, and the people who will work and reproduce in the households of the future.

All of this takes place as part of a biological and physical system in which both firms and households make use of our natural surroundings and resources, ranging from fossil fuel based energy to the air we breathe. In the process, households and firms transform nature by using its resources, but also by producing inputs to nature. Currently some of the most important of these inputs are the greenhouse gases, which contribute to the climate change problems that we saw in section 1.6.

1.16 CONCLUSION

Capitalism is the most dynamic economic system the world has ever known. So far, this has been mostly good news: many capitalist economies have brought substantial, sustained increases in access to material goods and to free time for their citizens.

On the other hand, despite the permanent technological revolution, material deprivation and insecurity persist, and many people consider the extent of income disparities among households unfair.

While capitalism's dynamism has the potential to create technologies that will lessen pollution, innovation that is unregulated by environmental policy poses a threat to the natural surroundings on which life depends.

CONCEPTS INTRODUCED IN UNIT 1

Before you move on, review these definitions:

- Economics
- Industrial Revolution
- Technology
- Economic system
- Capitalism
- Institutions
- Private property
- Markets
- Firms
- Capitalist revolution
- Democracy

DISCUSS 1.9: WHERE AND WHEN WOULD YOU CHOOSE TO HAVE BEEN BORN?

Suppose you can choose to be born in any time period in any of the countries in Figure 1.1a, 1.10 or 1.12, but you know that you would be among the poorest 10% in the population.

1. In which country would you choose to be born?
2. Suppose, instead, you know you would be among the poorest 10% in the population, but you can move to the top 10% of the population if you work hard. In which country would you now choose to be born?
3. Finally, suppose that you can only decide on the country and time period of your birth. You cannot be sure if you would be born in the city or the countryside, would be male or female, rich or poor. In which time and country would you choose to be born?
4. For the scenario in (3), in which time and country you would least want to be born?

Use what you have learned from this unit to explain your choices.

Key points in Unit 1

GDP and GDP per capita

Gross domestic product is a measure of the income of a country. GDP per capita is GDP divided by population, and is commonly used as a measure of living standards.

The hockey stick

Throughout most of history GDP per capita was relatively similar around the world, and it changed little from century to century. Since 1700 it has risen rapidly in some countries, led by Britain.

The permanent technological revolution

The period since 1700 has also seen improvements in technology, increases in population, impacts on the environment and differences in income among countries.

Capitalism

Capitalism is an economic system in which firms, private property and markets play a major role.

Impacts of capitalism

Along with the permanent technological revolution this new economic system has revolutionised the way people interact with each other, and with nature, in producing their livelihoods.

Inequality

Inequality among a group of people is measured by the Lorenz curve and the Gini coefficient.

Divergence

Capitalist economies throughout the world, and in the past, differ greatly in the form of governments and public policies, the degree of inequality, and the extent of improvements in living standards.

1.17 EINSTEIN

Comparing income at different times, and across different countries

The United Nations brings together estimates of GDP from statistical agencies around the world. These estimates, with those made by economic historians, allow us to construct charts like Figure 1.1a, comparing living standards across countries and at different time periods, and looking at whether the gap between rich and poor countries has narrowed or widened over time. Before we can make a statement like: “On average, people in Italy are richer than people in China, but the gap between them is narrowing,” statisticians and economists must try to solve three problems:

- We need to separate the thing we want to measure—changes or differences in amounts of goods and services—from things that are not relevant to the comparison, especially changes or differences in the prices of the goods and services.
- When comparing output *in one country at two points in time*, it is necessary to take into account differences in prices between the two points in time.
- When comparing output *between two countries at a point in time*, it is necessary to take into account differences in prices between the two countries.

Notice how similar the last two statements are. Measuring changes in output at different points in time presents the same challenges as we face when we try to compare countries by measuring differences in their output at the same time. The challenge is to find a set of prices to use in this calculation that will allow us to identify changes or differences in outputs, without making the mistake of assuming that if the price of something rises in a country, but not in another, then the amount of output has increased in the country.

The starting point: Nominal GDP

When estimating the market value of output in the economy as a whole for a given period, such as a year, statisticians use the prices at which goods and services are sold in the market. By multiplying the quantities of the vast array of different goods and services by their prices, they can be converted into money, or nominal, terms. With everything in the common unit of nominal (or money) terms, they can be added together. *Nominal GDP* is written like this:

$$\begin{aligned} & (\text{price of a yoga lesson} \times \text{number of yoga lessons}) + (\text{price of a book} \times \text{number of books}) \\ & + \dots + (\text{price} \times \text{quantity}) \text{ for all other goods and services} \end{aligned}$$

In general, we write that:

$$\text{nominal GDP} \equiv \sum_i p_i q_i$$

where p_i is the price of good i , q_i is the quantity of good i , and Σ indicates the sum of price time quantity for all the goods and services that we count.

Taking account of price changes over time: Real GDP

To gauge whether the economy is growing or shrinking, we need a measure of the quantity of goods and services purchased. This is called *real GDP*. If we compare the economy in two different years, and if all the quantities stay the same, but the prices increase by, say, 2% from one year to the next, then nominal GDP rises by 2%, but real GDP is unchanged. The economy has not grown.

Because we cannot add together the number of computers, shoes, restaurant meals, flights, fork-lift trucks and so on, it is not possible to measure real GDP directly. Instead, to get an estimate of real GDP, we have to begin with nominal GDP as defined above.

On the right-hand side of the equation for nominal GDP are the prices of each item of final sales multiplied by the quantity.

To track what is happening to real GDP, we begin by selecting a base year: for example, the year 2010. We then define real GDP using 2010 prices as equal to nominal GDP that year. The following year, nominal GDP for 2011 is calculated as usual using the prices prevailing in 2011. Next, we can see what has happened to real GDP by multiplying the 2011 quantities by the 2010 prices. If, using the base year prices, GDP has gone up, we can infer that real GDP has increased.

If this method produces the result that, when computed using 2010 prices, GDP in 2011 is the same as in 2010, we can infer that although there might have been a change in the composition of output (fewer flights taken but more computers sold, for example), the overall quantity of output of goods and services has not changed. The conclusion would be that real GDP, which is also called GDP at *constant prices*, is unchanged. The growth rate of the economy *in real terms* is zero.

Taking account of price differences among countries: International prices and purchasing power

To compare countries, we need to choose a set of prices and apply that set of prices to both countries.

To begin with, imagine a simple economy which produces only one product. In our example, we choose a regular cappuccino because we can easily find out the price of this standard product in different parts of the world. And we choose two economies that are very different in their level of development: Sweden and Indonesia.

When prices are converted into US dollars using current exchange rates, a regular cappuccino costs \$3.76 in Stockholm and \$2.71 in Jakarta. But simply expressing the two cappuccinos in a common currency is not enough, because the international

current exchange rate that we used to get these numbers is not a very good measure of how much a rupiah will buy in Jakarta and how much a krona will get you in Stockholm.

This is why when comparing living standards across countries we use estimates of GDP per capita in a common set of prices known as *Purchasing Power Parity (PPP)* prices. As the name suggests, the idea is to achieve parity (equality) in the real purchasing power.

Prices are typically higher in richer countries—as in our example. One reason for this is that wages are higher, which translates into higher prices. Because prices of cappuccinos, restaurant meals, haircuts, most types of food, transport, rents and most other goods and services are more expensive in Sweden than in Indonesia, once a common set of prices is applied, the difference between GDP per capita in Sweden and Indonesia measured at PPP is smaller than it is if the comparison is made at current exchange rates.

At current exchange rates, GDP per capita in Indonesia is only 6% the level of Sweden; at PPP where the comparison uses international prices, GDP per capita in Indonesia is 21% the level of Sweden.

What this comparison shows is that the buying power of the Indonesian rupiah compared to the Swedish krona is more than three times greater than would be indicated by the current exchange rate between the two currencies.

We will examine the measurement of GDP (and other measures of the whole economy) in more detail in Unit 12.

1.18 READ MORE

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