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THE SPREAD OF ECONOMIC PROSPERITY

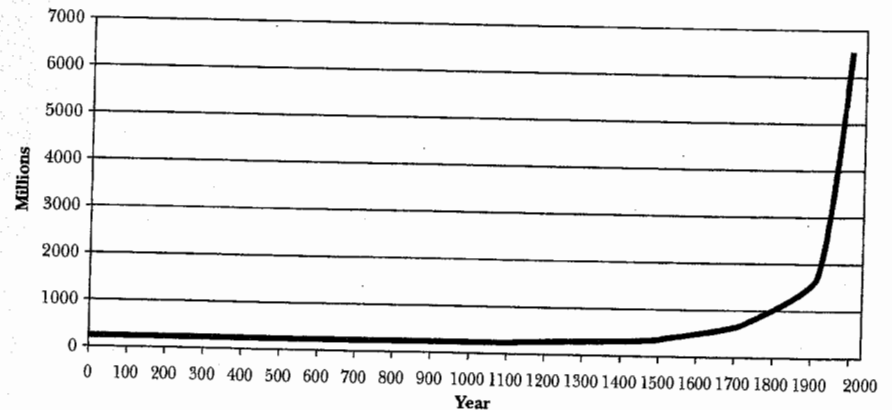
The move from universal poverty to varying degrees of prosperity has happened rapidly in the span of human history. Two hundred years ago the idea that we could potentially achieve the end of extreme poverty would have been unimaginable. Just about everybody was poor, with the exception of a very small minority of rulers and large landowners. Life was as difficult in much of Europe as it was in India or China. Our great-great-grandparents were, with very few exceptions, most likely poor and living on a farm. One leading economic historian, Angus Maddison, puts the average income per person in Western Europe in 1820 at around 90 percent of the average income of Africa today. Life expectancy in Western Europe and Japan as of 1800 was about forty years.

A few centuries ago, vast divides in wealth and poverty around the world did not exist. China, India, Europe, and Japan all had similar income levels at the time of European discoveries of the sea routes to Asia, Africa, and the Americas. Marco Polo marveled at the sumptuous wonders of China, not at its poverty. Cortés and his conquistadores expressed astonishment at the riches of Tenochtitlán, the capital of the Aztecs. The early Portuguese explorers were impressed with the well-ordered towns of West Africa.

THE NOVELTY OF MODERN ECONOMIC GROWTH

If we are to understand why a vast gap between rich and poor exists today, we must return to the very recent period of human history when this divide emerged. The past two centuries, since around 1800, constitute a unique era in economic history, a period the great economic historian Simon Kuznets famously termed the period of modern economic growth. Before then, indeed for thousands of years, there had been virtually no sustained economic growth in the world, and only gradual increases in the human population. The world population had risen gradually from around 230 million people at the start of the first millennium in A.D. 1, to perhaps 270 million by A.D. 1000, and 900 million people by A.D. 1800. Real living standards were even slower to change. According to Maddison, there was no discernible rise in living standards on a global scale during the first millennium, and perhaps a 50 percent

Figure 1: World Population



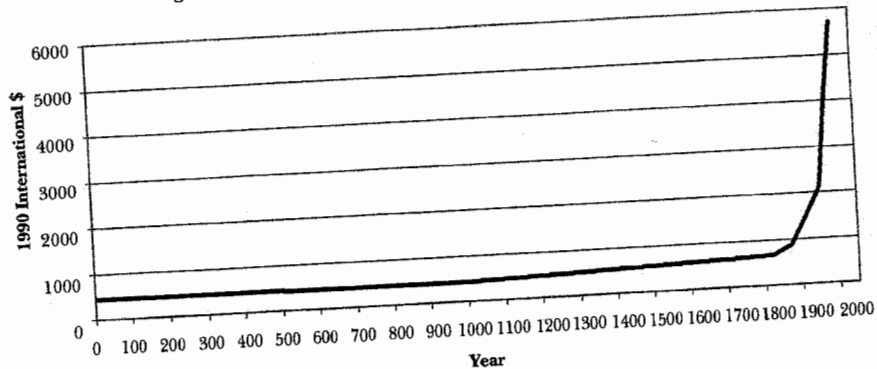
Source: Data from Maddison (2001).

increase in per capita income in the eight-hundred-year period from A.D. 1000 to A.D. 1800.

In the period of modern economic growth, however, both population and per capita income came unstuck, soaring at rates never before seen or even imagined. As shown on figure 1, the global population rose more than sixfold in just two centuries, reaching an astounding 6.1 bil-

lion people at the start of the third millennium, with plenty of momentum for rapid population growth still ahead. The world's average per capita income rose even faster, shown in figure 2, increasing by around nine times between 1820 and 2000. In today's rich countries, the economic growth was even more astounding. The U.S. per capita income increased almost twenty-five-fold during this period, and Western Europe's increased fifteen-fold. Total worldwide food production more than kept up with the booming world population (though large numbers of chronically hungry people remain until today). Vastly improved farm yields were achieved on the basis of technological advances. If we combine the increases in world population and world output per person, we find that total economic activity in the world (the gross world product, or GWP) rose an astounding forty-nine times during the past 180 years.

Figure 2: World Average per Capita Income

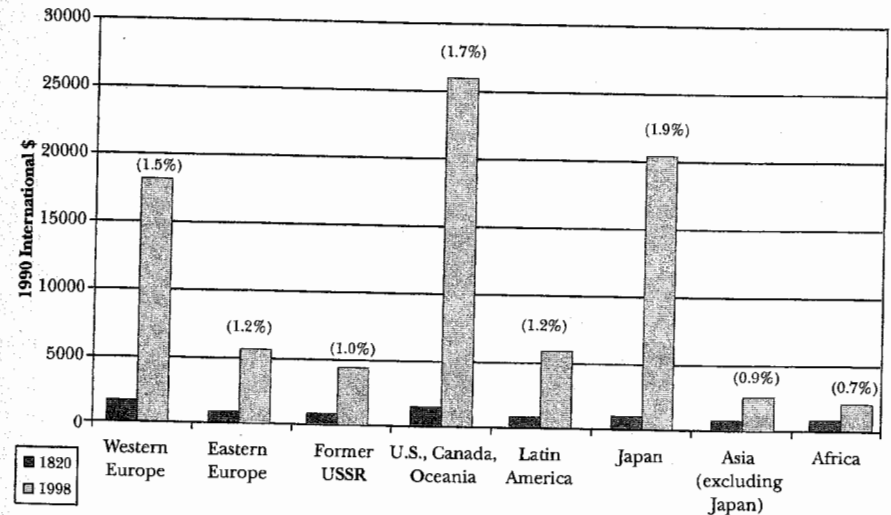


Source: Data from Maddison (2001).

The gulf between today's rich and poor countries is therefore a new phenomenon, a yawning gap that opened during the period of modern economic growth. As of 1820, the biggest gap between the rich and poor—specifically, between the world's leading economy of the day, the United Kingdom, and the world's poorest region, Africa—was a ratio of four to one in per capita income (even after adjusting for differences in purchasing power). By 1998, the gap between the richest economy, the United States, and the poorest region, Africa, had widened to twenty

to one. Since all parts of the world had a roughly comparable starting point in 1820 (all very poor by current standards), today's vast inequalities reflect the fact that some parts of the world achieved modern economic growth while others did not. Today's vast income inequalities illuminate two centuries of highly uneven patterns of economic growth.

Figure 3: GDP per Capita by Region in 1820 and 1998



Source: Data from Maddison (2001); average annual growth rate in parentheses.

This inequality is evident in the bar chart in figure 3. The height of the first bar indicates the level of per capita income in 1820, and the second in 1998, using Maddison's estimates. The number in parentheses at the top of the second bar is the average annual growth rate of the region (between 1820 and 1998). Three main points stand out:

- All regions were poor in 1820
- All regions experienced economic progress
- Today's rich regions experienced by far the greatest economic progress

What do I mean by “highly uneven” economic growth across regions between 1820 and 1998? Even small differences in annual economic growth rates, if sustained for decades or centuries, eventually lead to huge differences in the levels of economic well-being (as measured here by the average per capita income in a society). The per capita gross national product of the United States, for example, grew at an annual rate of around 1.7 percent per year during the period 1820 to 1998. This led to a twenty-five-fold increase in living standards, with per capita incomes rising from around \$1,200 per person in 1820 to around \$30,000 today (in 1990 dollars). The key for the United States to become the world’s richest major economy was not spectacularly fast growth, such as China’s recent achievement of 8 percent growth per year, but rather steady growth at a much more modest 1.7 percent per year. The key was consistency, the fact that the United States maintained that income growth rate for almost two centuries.

By contrast, the economies of Africa have grown at an average of 0.7 percent per year. This difference may not seem like much compared with 1.7 percent per year in the United States, but over a period of 180 years a small difference in annual growth leads to huge differences in income levels. With growth of 0.7 percent per annum, Africa’s initial income (roughly \$400 per capita) increased by little more than three-fold, to roughly \$1,300 per capita as of the year 1998, compared with an almost twenty-five-fold increase in the United States. Today’s twenty-fold gap in income between the United States and Africa, therefore, results from a three-fold gap as of 1820, which was magnified seven times by the difference in annual growth rates of 1.7 percent in the United States versus 0.7 percent in Africa.

The crucial puzzle for understanding today’s vast inequalities, therefore, is to understand why different regions of the world have grown at different rates during the period of modern economic growth. Every region began the period in extreme poverty. Only one sixth of the world’s population achieved high-income status through consistent economic growth. Another two thirds have risen to middle-income status with more modest rates of economic growth. One sixth of humanity is stuck in extreme poverty, with very low rates of economic growth during the whole period. First we must understand why growth rates differ over long periods of time so that we can identify the key ways to raise economic growth in today’s lagging regions.

Let me dispose of one idea right from the start. Many people assume that the rich have gotten rich *because* the poor have gotten poor. In other words, they assume that Europe and the United States used military force and political strength during and after the era of colonialism to extract wealth from the poorest regions, and thereby to grow rich. This interpretation of events would be plausible if gross world product had remained roughly constant, with a rising share going to the powerful regions and a declining share going to the poorer regions. However, that is not at all what happened. Gross world product rose nearly fifty-fold. Every region of the world experienced some economic growth (both in terms of the overall size of the economy, and even when measured per person), but some regions experienced much more growth than others. The key fact of modern times is not the *transfer* of income from one region to another, by force or otherwise, but rather the overall *increase* in world income, but at a different rate in different regions.

This is not to say that the rich are innocent of the charge of having exploited the poor. They surely have, and the poor countries continue to suffer as a result in countless ways, including chronic problems of political instability. However, the real story of modern economic growth has been the ability of some regions to achieve unprecedented long-term increases in total production to levels never before seen in the world, while other regions stagnated, at least by comparison. Technology has been the main force behind the long-term increases in income in the rich world, not exploitation of the poor. That news is very good indeed because it suggests that all of the world, including today’s laggard regions, has a reasonable hope of reaping the benefits of technological advance. Economic development is not a zero-sum game in which the winnings of some are inevitably mirrored by the losses of others. This game is one that everybody can win.

On the Eve of Takeoff

Until the mid-1700s, the world was remarkably poor by any of today’s standards. Life expectancy was extremely low; children died in vast numbers in the now rich countries as well as the poor countries. Many waves of disease and epidemics, from the black death of Europe to smallpox and measles, regularly washed through society and killed mass numbers of people. Episodes of hunger and extreme weather and cli-

mate fluctuations sent societies crashing. The rise and fall of the Roman Empire, for famed twentieth-century historian Arnold Toynbee, was much like the rise and decline of all other civilizations before and since. Economic history had long been one of ups and downs, with growth followed by decline rather than sustained economic progress.

John Maynard Keynes wrote about this virtual stagnation of human economic progress in his 1930 essay on the *Economic Possibilities for Our Grandchildren*:

From the earliest times from which we have record, that, say, the two thousand years before Christ, down to the beginning of the eighteenth century, there was no really great change in the standard of living of the average man living in the civilized centers of the earth. Ups and downs, certainly visitations of plague, famine and war, golden intervals, but no progressive violent change. Some periods perhaps fifty percent better than others, at the utmost a hundred percent better in the four thousand years that ended, say, in A.D. 1700.

He also pinpointed technology as the reason for this long-term stasis:

The absence of important technological inventions between the prehistoric age and comparatively modern times is truly remarkable. Almost everything which really matters, and which the world possessed at the commencement of the modern age, was already known to man at the dawn of history: language, fire, the same domestic animals which we have today, wheat, barley, the vine and the olive, the plow and the wheel, the oar, the sail, leather, linen and cloth, bricks and pots, gold and silver, copper, tin, and lead—and iron was added to the list before one thousand B.C.—banking, statecraft, mathematics, astronomy, and religion. There is no record when we first possessed these . . .

What changed was the onset of the Industrial Revolution, supported by a rise in agricultural productivity in northwestern Europe. Food yields rose with systematic improvements in agronomic practice, including the management of soil nutrients through improved crop rotations. The dramatic breakthrough came in England around 1750, when Britain's nascent industry first mobilized new forms of energy for production at

scales that had never before been achieved. The steam engine marked the decisive turning point of modern history. By mobilizing a vast store of primary energy, fossil fuels, the steam engine unlocked the mass production of goods and services on a scale beyond the wildest dreams of the preindustrial era. Modern energy fueled every aspect of the economic takeoff. Food production soared as fossil fuel energy was used to produce chemical fertilizers; industrial production skyrocketed as vast inputs of fossil fuel energy created equally vast powerhouses of steel, transport equipment, chemicals and pharmaceuticals, textile and apparels, and every other modern manufacturing sector. By the early twentieth century, the service industries, including modern information and communications technologies, were powered by electrification, itself a breakthrough of the fossil-fuel age.

As coal fueled industry, so, too, industry fueled political power. The British Empire became the global political manifestation of the Industrial Revolution. Britain's industrial breakthrough, unique in the world as of the early nineteenth century, created a huge military and financial advantage that allowed Britain to expand its control over one sixth of humanity at the peak of the empire during the Victorian era.

Why was Britain first? Why not China, which was the world's technological leader for about a thousand years, between A.D. 500 and A.D. 1500? Why not other centers of power on the European continent or in Asia? This question is much debated among economic historians, but a few good answers are evident, and they provide clues to the deeper underpinnings of the Industrial Revolution.

First, British society was relatively open, with more scope for individual initiative and social mobility than most other societies of the world. The fixed social orders of the feudal era had weakened enormously or disappeared entirely by 1500, at a time when serfdom was still the rule through much of Europe. Even more rigid social hierarchies, such as India's caste system, were common in other parts of the world.

Second, Britain had strengthening institutions of political liberty. Britain's parliament and its traditions of free speech and open debate were powerful contributors to the uptake of new ideas. They were also increasingly powerful protectors of private property rights, which in turn underpinned individual initiative.

Third, and critically, Britain became one of the leading centers of Europe's scientific revolution. After centuries in which Europe was mainly the importer of scientific ideas from Asia, European science

made pivotal advances beginning in the Renaissance. Modern physics emerged from the astronomical discoveries of Copernicus, Brahe, Kepler, and Galileo. With Britain's political openness, speculative scientific thinking was given opportunity to thrive, and the scientific advances on the Continent stimulated an explosion of scientific discovery in England. The decisive breakthrough came with Isaac Newton's *Principia Mathematica* in 1687, one of the most important books ever written. By showing that physical phenomena could be described by mathematical laws, and by providing the tools of calculus to discover those laws, Newton set the stage for hundreds of years of scientific and technological discovery, and for the Industrial Revolution that would follow the scientific revolution.

Fourth, Britain had several crucial geographical advantages. First, as an island economy close to continental Europe, Britain enjoyed low-cost sea-based trade with all parts of Europe. Britain also had extensive navigable river ways for internal trade and enjoyed a highly favorable environment for agriculture, with a combination of plentiful rainfall, an ample growing season, and good soils. Another crucial geographical advantage was Britain's proximity to North America. The new settlements in North America provided vast new territories for food production and raw materials such as cotton for British industry, and they were the safety valve that facilitated the exodus of impoverished people from the British countryside. As England's own agricultural productivity grew, with more food produced by fewer people, millions of landless poor went to North America.

In his seminal 1776 work, *The Wealth of Nations*, Adam Smith referred to Britain's natural advantages:

England, on account of the natural fertility of the soil, of the great extent of the sea-coast in proportion to that of the whole country, and of the many navigable rivers which run through it and afford the conveniency of water carriage to some of the most inland parts of it, is perhaps as well fitted by nature as any large country in Europe to be the seat of foreign commerce, of manufactures for distant sale and of all the improvements which these can occasion.

Fifth, Britain remained sovereign and faced lesser risk of invasion than its neighbors. Being an island helped considerably, much the same way that Japan's insular geography allowed it to escape invasion despite numerous

attempts from the Asian mainland. Indeed, with a one-century lag, Japan was to play a role similar to Britain's as the leader of Asia's takeoff to modern economic growth on the other side of the Eurasian land mass.

Sixth, Britain had coal, and with the invention of the steam engine, coal freed society from energy constraints that had limited the scale of economic production throughout human history. Before coal, economic production was limited by energy inputs, almost all of which depended on the production of biomass: food for humans and farm animals and fuel wood for heating and certain industrial processes. Wind power could also be harnessed for sea transport, and wind and water power could be harnessed for some industrial processes. None of these energy sources, however, could unleash the potential for mass production that coal did.

Britain's advantages, in summary, were marked by a combination of social, political, and geographical factors. British society was relatively free and politically stable. Scientific thinking was dynamic. Geography enabled Britain to benefit from trade, productive agriculture, and energy resources in vast stocks of coal. Other parts of the world were not as fortunate to have this confluence of favorable factors. Their entry into modern economic growth would be delayed. In the most disadvantaged environments, modern economic growth has been delayed until today.

The Great Transformation

The combination of new industrial technologies, coal power, and market forces created the Industrial Revolution. The Industrial Revolution, in turn, led to the most revolutionary economic events in human history since the start of agriculture ten thousand years earlier. Suddenly, economies could grow beyond long-accustomed bounds without hitting the biological constraints of food and timber production. Industrial production grew rapidly, and the power of economic growth spilled out from Great Britain to all parts of the world. Societies the world over were fundamentally changed, often tumultuously.

The Industrial Revolution, and the modern economic growth that followed, has changed the way people live in every fundamental sense: where and how they live, what kind of work or economic activity they perform, how they form families. In Britain first, and then elsewhere, industrialization meant a shift of people from overwhelmingly agrarian activities to industrial activities, giving rise to urbanization, social mobil-

ity, new gender and family roles, a demographic transition, and specialization in labor.

Modern economic growth is accompanied first and foremost by *urbanization*, that is, by a rising share of a nation's population living in urban areas. There are two basic reasons why economic growth and urbanization go hand in hand. The first is rising agricultural productivity. As food production per farmer rises, an economy needs fewer and fewer farmers to feed the overall population. As food production per farmer rises, food prices fall, inducing farmers and especially their children to seek employment in nonfarm activities. The second is the advantage of high-density urban life for most nonfarm economic activities, especially the face-to-face demands of commerce and other parts of the service sector. Sparsely populated rural areas make good economic sense when each household needs a lot of land for farm production. But they make little sense when people are engaged mainly in manufacturing, finance, commerce, and the like. Once the labor force is no longer engaged mainly in food production, it is natural that the bulk of the population will relocate to cities, drawn by higher wages that in turn reflect the higher productivity of work in densely settled urban areas.

Modern economic growth has also produced a revolution in *social mobility*. Established social rankings—such as the fixed hierarchical divisions between peasants and gentry, or within the Indian caste structure, or in the social orders of nobility, priests, merchants, and farmers that characterized many traditional Asian societies—all unravel under the forces of market-based modern economic growth. Fixed social orders depend on a static and largely agrarian economic setting where little changes in living standards or technologies from one generation to the next. They cannot withstand the sudden and dramatic bursts of technological change that occur during modern economic growth, in which occupations and social roles shift dramatically from one generation to the next, rather than being inherited by sons from fathers and daughters from mothers.

One aspect of changing social mobility requires special note, the change in *gender roles*. Traditional societies tend to be strongly differentiated in gender roles, with women almost always getting the short end of the deal. In settings where the total fertility rate—the average number of children per woman—is typically at least five, and often much higher, women spend most of their adult lives rearing children. Traditionally

homebound, women live lives of back-breaking labor on the farm, endless walking to collect fuel wood and water, and child rearing. With modern economic growth, this dynamic changes. Women can avail themselves of urban-based employment, as in the case of the young women in the apparel factories of Dhaka, leading them ultimately toward social and political empowerment.

The changes in living conditions and economic activities lead to new realities in *family structure* as well. The age of marriage is typically delayed, and sexual relations are transformed, with greater sexual freedom much less directly linked to child rearing. Fewer generations of family members live under one roof. And crucially, the desired number of children changes remarkably as families move from rural to urban settings. In rural societies, large families are almost always the norm. In urban societies, families choose to have fewer children. This is the crux of the demographic transition, one of the most fundamental of all social changes during the era of modern economic growth.

One more crucial element occurs with deep structural change: the *division of labor* increases, as people become more and more specialized in their skills. The talents of a poor rural farmer in Africa today, or in Scotland at the time of Adam Smith, are truly marvelous. These farmers typically know how to build their own houses, grow and cook food, tend to animals, and make their own clothing. They are, therefore, construction workers, veterinarians and agronomists, and apparel manufacturers. They do it all, and their abilities are deeply impressive.

They are also deeply inefficient. Adam Smith pointed out that specialization, where each of us learns just one of those skills, leads to a general improvement of everybody's well-being. The idea is simple and powerful. By specializing in just one activity—such as food raising, clothing production, or home construction—each worker gains mastery over the particular activity. Specialization makes sense, however, only if the specialist can subsequently trade his or her output with the output of specialists in other lines of activity. It would make no sense to produce more food than a household needs unless there is a market outlet to trade that excess food for clothing, shelter, and so forth. At the same time, without the ability to buy food on the market, it would not be possible to be a specialist home builder or clothing maker, since it would be necessary to farm for one's own survival. Thus Smith realized that the division of labor is limited by the extent of the market (that is,

by the ability to trade), whereas the extent of the market is determined by the degree of specialization (and hence, productivity).

THE SPREAD OF MODERN ECONOMIC GROWTH

Modern economic growth first emerged in England because of the confluence of favorable conditions. However, these conditions were not unique to England, and once the Industrial Revolution was under way, the same combination of modern technologies and social organization could spread to other parts of the world. What started in one corner of Northern Europe would eventually reach almost the entire planet. In doing so, the forces of modern economic growth propelled a general increase in global production of unprecedented dimensions.

On paper, the transition to modern economic growth might appear to be an unambiguous and straightforward benefit for the world. After all, new technologies enabled society to harness energy and ideas that raised labor productivity (economic output per person) to levels never before imagined. This productivity brought about a rise in living standards of unprecedented scale. Yet the transition was more tumultuous than not, involving vast social struggles and often war. Before turning to the historical record, it is worth considering for a moment why the transition was so difficult in so many places.

Most important, modern economic growth was not only a question of “more” (output per person) but also “change.” The transition to modern economic growth involved urbanization, changing gender roles, increased social mobility, changing family structure, and increasing specialization. These were difficult transitions, involving multiple upheavals in social organization and in cultural beliefs. In addition, the spread of modern economic growth was also marked by a systematic and repeated confrontation between the world’s newly rich countries and the world’s still poor countries. Since modern economic growth occurred at such different rates in different places, it created an extent of inequality of global wealth and power that was unique in human history. Britain’s industrial dominance—the result of Britain’s lead in industrialization—gave it a unique military dominance as well, which it in turn converted to empire. More generally, Europe’s early industrialization in

the nineteenth century ended up fueling a vast European empire throughout Asia, Africa, and the Americas.

Finally, the vast differences in power contributed to faulty social theories of these differences that are still with us today. When a society is economically dominant, it is easy for its members to assume that such dominance reflects a deeper superiority—whether religious, racial, genetic, cultural, or institutional—rather than an accident of timing or geography. Thus the inequality of power and economics of the nineteenth century in favor of Europe was accompanied by the spread of new forms of racism and “culturism,” which offered pseudoscientific justifications for the vast inequalities that had opened. These theories in turn justified brutal forms of exploitation of the poor through colonial rule, dispossession of the properties and lands of the poor by the rich, and even slavery.

Still, despite these difficulties, the basic underlying forces that propelled the Industrial Revolution could be and were replicated elsewhere. As they were replicated, multiple sites of industrialization and economic growth took hold. Like a chain reaction, the more places that were undergoing this change, the more they interacted with each other and thereby created the bases for yet more innovations, more economic growth, and more technological activity. Britain’s industrialization spread to other markets in several ways: by stimulating the demand for exports from Britain’s trading partners, by supplying those trading partners with British capital to make investments in infrastructure (for example, ports and railroads), and by spreading technologies first pioneered in Britain.

This diffusion of modern economic growth occurred in three main forms. The first, and in some ways, most direct spread of the Industrial Revolution was from Britain to its colonies in North America, Australia, and New Zealand. All three regions are in temperate zones with conditions for farming and other economic activities similar in many ways to those of Britain. It was therefore relatively straightforward to transplant British technologies, food crops, and even legal institutions into these new settings. These new homes of modern economic growth were literally a “New England,” in the case of the North American seacoast, or a “Western offshoots” in the phrase of Angus Maddison. Ideologically, the imperial powers and colonizers considered North America and Oceania to be empty places, despite the presence of native inhabitants in both regions. By slaughtering, cornering, or removing these native inhabitants

from their lands, England's new colonizers fueled a huge expansion of population and subsequent economic growth of North America and Oceania.

A second form of diffusion took place within Europe itself, broadly in a process that ran from Western Europe to Eastern Europe and from Northern Europe to Southern Europe during the nineteenth century. Northwestern Europe started with certain advantages over Eastern and Southern Europe. First, northwestern Europe is on the Atlantic side of the continent, and therefore had benefited more than Eastern Europe from the great explosion of ocean-based trade with the Americas and Asia. Second, northwestern Europe generally had more favorable natural resources, including coal, timber, rivers (for water-powered mills), and rainfall. Third, northwestern Europe generally benefited from a more benign disease environment, less vulnerable to tropical and subtropical diseases like malaria. Fourth, for a host of reasons, some understood and others much debated, the political and social conditions were more favorable. Serfdom had essentially disappeared in much of northwestern Europe by the seventeenth century, whereas serfdom and other social rigidities were far more intact in the south and east. Germany and Italy were still not nation states by the start of the Industrial Revolution, and they suffered from extremely high barriers to trade among competing principalities.

When the Industrial Revolution began, and especially when it began to spread in the midst of and after the Napoleonic Wars, the obstacles to development in Southern and Eastern Europe began to diminish. Serfdom was abolished, fitfully, often violently, across Europe. Constitutional governance was introduced. Railways were established to link European regions. Ideas and technologies flowed with ever greater speed and were backed by ever larger amounts of financial capital. By the end of the nineteenth century, industrialization was making itself felt throughout all of Europe.

The third diffusion involved the spread of modern economic growth from Europe to Latin America, Africa, and Asia. The process was tumultuous everywhere, involving the confrontation of an increasingly industrialized and rich Europe with nonindustrialized, largely rural, and militarily weak societies in other parts of the world. Some were ancient civilizations with grand traditions, like China or Japan; some were sparsely populated regions like those in much of tropical Africa. But the great drama that ensued almost everywhere was the turmoil of

confrontation between these different societies, economies, and cultures. Even when it raised living standards, modern economic growth brought fundamental change to social organization and painful clashes with the more powerful Europeans.

The confrontation between rich and poor was very stark because the gap of wealth also meant the gap of power, and power could be used for exploitation. Europe's superior power was used repeatedly to compel actions by the weaker societies on behalf of the richer overlords. European imperial powers forced Africans to grow cash crops they chose. Colonial authorities imposed head taxes, compelling Africans to work in mines and on plantations, often hundreds of miles from their families and homes. European investors and governments commandeered natural resources, including mineral wealth and vast woodlands in Africa and Asia. Private European companies maintained private armies in the colonies to ensure compliance with company "law," knowing as well that their national governments would back them up with military force in extremis.

The Cascade of Technological Change

Living standards began to rise in many parts of the world, even with all this brutality and suffering in places that had succumbed to colonial rule, and even in places where colonial masters, rather than the local populations, grabbed much of the increased economic output. Often the climb out of extreme poverty was very gradual and fitful, set back by war and famine. Occasionally it was rapid, such as Japan's economic takeoff and industrialization in the last quarter of the nineteenth century.

I believe that the single most important reason why prosperity spread, and why it continues to spread, is the transmission of technologies and the ideas underlying them. Even more important than having specific resources in the ground, such as coal, was the ability to use modern, science-based ideas to organize production. The beauty of ideas is that they can be used over and over again, without ever being depleted. Economists call ideas nonrival in the sense that one person's use of an idea does not diminish the ability of others to use it as well. This is why we can envision a world in which everybody achieves prosperity. The essence of the first Industrial Revolution was not the coal; it was how to use the coal. Even more generally, it was about how to use a new form of energy. The lessons of coal eventually became the basis for many other

energy systems as well, from hydropower, oil and gas, and nuclear power to new forms of renewable energy such as wind and solar power converted to electricity. These lessons are available to all of humanity, not just for the first individuals who discovered them.

The first wave of the Industrial Revolution was the development of the steam engine and related technologies, including the organization of large-scale factory production, new machinery in the textile and apparel sector, and new techniques to produce steel. A second wave of technological breakthroughs came in the middle of the nineteenth century with the rail, and even more notably the telegraph, which offered the first instantaneous telecommunications around the world, a phenomenal breakthrough in the ability to diffuse information on a large scale.

The second technological wave also included ocean steamers, global-scale trade, and two huge infrastructure projects: the Suez Canal, completed in 1869, which significantly shortened the trade time between Europe and Asia, and the Panama Canal, completed in 1914, which dramatically reduced the trade time between the U.S. eastern seaboard and destinations in the western United States, much of Latin America, and East Asia. Epidemics of yellow fever and malaria that killed thousands of workers delayed the first attempt to build the canal in the 1880s. Once scientists understood that mosquitoes were transmitting those killer diseases, the canal builders made a full-fledged effort to control the mosquito breeding alongside the construction of the canal and thereby completed the project in 1914.

The third wave of technological advance involved electrification of industry and urban society at the end of the nineteenth century, including Edison's invention of the incandescent bulb and other electronic appliances. Edison, Westinghouse, and others championed large power plants that could bring electricity into homes, office buildings, and factories by wire, which was the defining new infrastructure of the early twentieth century. The development of the internal combustion engine was also critical, as was the pivotal advance in the chemical industry, mainly in Germany, with the new process for taking atmospheric nitrogen and converting it into ammonia for fertilizer (the Haber-Bosch process). This use of fossil fuel energy to create nitrogen-based fertilizers was the breakthrough advance in raising food production in the twentieth century, enabling a great proportion of humanity, though still not all of it, to overcome chronic hunger and the risks of famine that had forever plagued humankind.

These waves of technological advance diffused around the world through the spread of trade and foreign investment; with it, economic prosperity spread to other parts of the world as well. But so, too, did the global system of European political domination. This domination reflected the vast inequality of power that grew out of Europe's head start in industrialization, a head start that we have seen is rooted in an advantageous confluence of politics, geography, and resource base.

By the early twentieth century, Europe largely dominated the world. European empires controlled essentially all of Africa and large parts of Asia, and loomed large in financing and organizing Latin America's trade as well. This was the first age of globalization, an era of global trade, an era of global communications over telegraph lines, an era of mass production and industrialization—in short, what would seem to be an era of inevitable progress. And it was globalization under European domination. It was viewed as not only economically unstoppable, but also as the natural order of things. This imagined natural order gave rise to the infamous “white man's burden,” the right and obligation of European and European-descended whites to rule the lives of others around the world, which they blithely did with a contradictory mix of naïveté, compassion, and brutality.

The Great Rupture

At the beginning of the twentieth century, globalization was viewed as so inevitable that some thought war itself was probably passé, and certainly so irrational that no right-thinking leader in Europe would ever take his country to war. In 1910, a leading British pundit, Norman Angell, wrote *The Great Illusion*, which rightly argued that national economies had become so interdependent, so much part of a global division of labor, that war among the economic leaders had become unimaginably destructive. War, Angell warned, would so undermine the network of international trade that no military venture by a European power against another could conceivably lead to economic benefits for the aggressor. He surmised that war itself would cease once the costs and benefits of war were more clearly understood.

Angell tremendously underestimated the irrationalities and social processes that lead to devastating outcomes, even when they make no sense. Angell was therefore half right: war had become much too dangerous to use for economic gain. But it didn't stop war from happening.

The year 1914 began the great rupture of the twentieth century, even more dramatic a rupture than World War II would prove to be.

Why was World War I so dramatic and so traumatic? It ended the era of European-led globalization. Its death toll was staggering, and it led to several cataclysmic events that cast their shadow over the rest of the century. The first side effect was that it destabilized the Russian czarist regime, unleashing the Bolshevik revolution. A relatively backward Russia, which had been the last country in Europe to come out of serfdom, fell into turmoil under the fiscal and human burdens of war. Vladimir Lenin and a small group of conspirators were able to seize power with very little popular support and institute a revolutionary doctrine that sent Russia on a seventy-five-year detour of enormous brutality and economic waste. At their maximum extent, the communist doctrines that Lenin and Joseph Stalin instituted in Russia ensnared roughly a third of the world's population, including the former Soviet Union, China, the Eastern European states under Soviet domination, Cuba, North Korea, and other self-styled revolutionary states aligned with the Soviet Union.

Another great consequence of World War I was the prolonged financial instability it created in Europe after the war. The war created a morass of interlocking financial and economic problems, including the mountain of debt incurred by combatant countries; the destruction and dismembering of the Ottoman and Hapsburg empires and their replacement by small, unstable, and feuding successor states; and the Allied claims for reparation payments from Germany, which embittered the next generation of Germans and was one of the rallying points for Hitler's rise to power.

John Maynard Keynes understood that the world as he knew it had been brought to an end after World War I. In his famous essay on *The Economic Consequences of the Peace*, Keynes masterfully captured all that had been lost:

What an extraordinary episode in the economic progress of man that age was which came to an end in August 1914! The greater part of the population, it is true, worked hard and lived at a low standard of comfort, yet were, to all appearances, reasonably contented with this lot. But escape was possible, for any man of capacity or character at all exceeding the average, into the middle and upper classes, for whom life offered, at a low cost and with the least trouble, conveniences, comforts, and amenities beyond the compass of the rich-

est and most powerful monarchs of other ages. The inhabitant of London could order by telephone, sipping his morning tea in bed, the various products of the whole earth, in such quantity as he might see fit, and reasonably expect their early delivery upon his doorstep; he could at the same moment and by the same means adventure his wealth in the natural resources and new enterprises of any quarter of the world, and share, without exertion or even trouble, in their prospective fruits and advantages; or he could decide to couple the security of his fortunes with the good faith of the townspeople of any substantial municipality in any continent that fancy or information might recommend. He could secure forthwith, if he wished it, cheap and comfortable means of transit to any country or climate without passport or other formality, could despatch his servant to the neighbouring office of a bank for such supply of the precious metals as might seem convenient, and could then proceed abroad to foreign quarters, without knowledge of their religion, language, or customs, bearing coined wealth upon his person, and would consider himself greatly aggrieved and much surprised at the least interference. But, most important of all, he regarded this state of affairs as normal, certain, and permanent, except in the direction of further improvement, and any deviation from it as aberrant, scandalous, and avoidable.

As Keynes stressed, in a message for our time, the end of this era was simply unimaginable:

The projects and politics of militarism and imperialism, of racial and cultural rivalries, of monopolies, restrictions, and exclusion, which were to play the serpent to this paradise, were little more than the amusements of his daily newspaper, and appeared to exercise almost no influence at all on the ordinary course of social and economic life, the internationalisation of which was nearly complete in practice.

The economic instability that followed World War I led to the Great Depression of the 1930s and then to World War II. The linkages are subtle and debated in detail, but undeniable in basic fact. The overhang of bad debts, shrunken trade within Europe, and overstretched budgets of the European powers meant that inflation, stabilization, and austerity were

the orders of the day throughout the 1920s. The European countries duly climbed one by one back to the gold standard, viewed at the time as the guarantor of long-term financial stability. Alas, the return to the gold standard did little more than exacerbate the conditions that had prevailed in the 1920s. Most important, the gold standard and its “rules of the game” for monetary management made it difficult if not impossible for the major economies to escape from a slide into deep depression in the early 1930s. The Great Depression, in turn, triggered a calamitous spread of trade protectionism and the rise of Nazism in Germany and military rule in Japan.

By the end of World War II, the pre-1914 global system had gone to pieces. International trade was moribund. National currencies were not convertible one to another, so even the basic payments mechanisms for international commerce had broken down. Mercifully, the age of European imperialism was also coming to an end, although it would take decades longer, and many wars, for it to end decisively. Still, standing on the ruins of World War II, the benefits of a global marketplace—with a global division of labor, a peaceful spread of technology, and open international trade—looked long gone, buried under the rubble of two world wars and a great depression.

RECONSTRUCTING A GLOBAL ECONOMY

Much work between the end of World War II in 1945 and the end of the Soviet Union in 1991 went into reconstructing a new global economic system. The immediate struggle was physical reconstruction: to repair or rebuild the roads, bridges, power stations, and ports that underpinned national economic production and international trade. Yet the “plumbing” of the international economy also needed to be reconstructed, with currency arrangements and rules for international trade that would permit the market-based flow of goods and services, and the productivity gains that would emerge from a renewed global division of labor. This reconstruction effort took place in three steps.

First, the countries already industrialized as of 1945—Europe, the United States, Japan—reconstructed a new international trading system under U.S. political leadership. Step by step, these countries reestablished currency convertibility (in which businesses and individuals could buy and sell foreign exchange at market rate) in order to create a pay-

ments system for international trade. The European currencies became convertible again in 1958. The yen became convertible again in 1964. At the same time, these countries agreed to reduce the trade barriers, including high tariffs and quotas, which they had put in place in the chaos of the Great Depression. The trade barriers came down in several rounds of international trade negotiations handled under the auspices of the General Agreement on Tariffs and Trade (GATT), a set of rules that constituted the forerunner to today’s World Trade Organization. The rich world, soon called the first world, succeeded in reconstructing a market-based trading system. With it came a burst of rapid economic growth, a powerful recovery after decades of war, blocked trade, and financial instability.

The restoration of trade in the first world did not, however, mean the restoration of a global economy. The divisions in the world economy after 1945 went deeper than currency inconvertibility and trade barriers. By the end of the World War II, the world had become starkly divided in political terms that mirrored the economic ruptures. These divisions would last for decades and are only now being healed.

The second world was the socialist world, the world first forged by Lenin and Stalin in the wake of World War I. The second world remained cut off economically from the first world until the fall of the Berlin Wall in 1989 and the end of the Soviet Union in 1991. At its peak, the second world included around thirty countries (depending on the criteria for inclusion), and included about a third of humanity. The overriding characteristics of the second world were state ownership of the means of production, central planning of production, one-party rule by communist parties, and economic integration within the socialist world (through barter trade) combined with economic separation from the first world.

The third world included the rapidly rising number of postcolonial countries. Today we use the term *third world* simply to mean poor. Earlier on, the third world had a more vivid connotation as a group of countries emerging from imperial domination that chose neither to be part of the capitalist first world nor the socialist second world. These were the true third-way countries. The ideas at the core of the third world were: “We will develop on our own. We will nurture industry, sometimes through state ownership, sometimes by giving subsidies and protection to private business, but we will do it without foreign multinationals. We will do it without open international trade. We do not

trust the outside world. We want to stay nonaligned. The first world countries are not our heroes; they were our former colonial powers. The second world leaders are not to be trusted either. We do not want the Soviet Union to swallow us. Therefore, politically we are nonaligned, and economically we are self-sufficient."

Thus, the post-World War II world evolved on three tracks. The fundamental problem, however, was that the second world and third world approaches did not make economic sense, and they both collapsed under a pile of foreign debt. Second world central planning was a bad idea, and so, too, was third world autarky, in both cases for reasons that Adam Smith had explained. By closing their economies, both the second world and third world countries also closed themselves off from global economic progress and the advance of technology. They created high-cost local industries that could not compete internationally even when they chose to try. The closed nature of these societies, in which domestic businesses were sheltered from competition, fostered a great deal of corruption. The nonaligned third world countries lost the chance to participate in the technological advance of the first world mainly because they did not trust the first world. They were understandably intent on protecting their hard-won sovereignty, even when that sovereignty was not really at risk.

My own work as an economist began at a time when the second world and the third world economies were already economically moribund, and were falling into a deepening spiral of economic chaos. The early manifestations of that crisis, typically, were rising levels of foreign debt and increasing rates of inflation. My early work centered on macroeconomic stabilization—the end of high inflation—and this work brought me into contact with countries that were isolated from first world markets and technology. This early work involved technical monetary economics, but it brought me face to face with the more basic and fundamental choices of how countries should relate economically to the broader world.

By the early 1990s, the overwhelming majority of countries of the second world and third world were saying, "We need to be part of the global economy once again. We want our sovereignty; we want our self-determination, but we will abandon Leninist-Stalinist central planning because it doesn't work. And we will abandon the idea of self-imposed autarky, because economic isolation makes no more sense for a country

than it does for an individual." In essence, one of my roles from the mid-1980s onward was to help countries to become sovereign members of a new international system. I repeatedly dealt with three big questions: What is the best way back to international trade? How do we escape from the barnacles of bad debts and inefficient industry? How do we negotiate new rules of the game to ensure that the emerging global economy would truly serve the needs of all of the countries of the world, not only the richest and most powerful?

TWO HUNDRED YEARS OF MODERN ECONOMIC GROWTH

I have touched lightly and briefly on two hundred years of modern economic growth—complete with change, turmoil, conflict, and ideology. What has this era of modern economic growth brought the world? Higher living standards than were imaginable two centuries ago, a spread of modern technology to most parts of the world, and a scientific and technological revolution that still gains strength. Living standards are much higher in almost all places than they were at the start of the process, the major exception being the disease-ravaged parts of Africa.

But modern economic growth has also brought phenomenal gaps between the richest and poorest, gaps that were simply impossible when poverty gripped all of the world. The era of modern economic growth has bequeathed us an economic picture of the world as seen in map 2, where each country is shaded according to its per capita GDP (measured in purchasing-power adjusted prices) as of 2002. The rich world (above \$20,000 in per capita income) is shaded green, and includes the United States, Canada, Western Europe, Japan, Australia, and New Zealand. The countries in the middle-income range (between \$4,000 and \$20,000) are shaded in yellow, and include most of East Asia (such as Korea and Singapore), Central Europe, the former Soviet Union, and Latin America. Countries within the upper end of the low-income range (between \$2,000 and \$4,000) are shaded in orange, and include parts of South America, South Asia, and East Asia. The poorest countries (below \$2,000) are shaded in red, and are concentrated in sub-Saharan Africa and South Asia. There is, of course, a striking similarity between this map of average GNP per person and the map showing the

proportion of households in poverty (map 1): the low-income countries are, notably, the countries with high proportions of moderate and extreme poverty.

So why does a vast gulf divide one sixth of humanity today in the richest countries from the one sixth of the world barely able to sustain life? The richest countries were able to achieve two centuries of modern economic growth. The poorest did not even begin their economic growth until decades later, and then often under tremendous obstacles. In some cases, they faced the brutal exploitation of dominant colonial powers. They faced geographical barriers (related to climate, food production, disease, energy resources, topography, proximity to world markets) that had not burdened the early industrial economies like Great Britain and the United States. And they made disastrous choices in their own national policies, often until the past decade. All of this left them without the good fortune of two centuries of rapid economic growth, instead growing only sporadically during a few years.

The key point for these countries is that there are practical solutions to almost all of their problems. Bad policies of the past can be corrected. The colonial era is truly finished. Even the geographical obstacles can be overcome with new technologies, such as those that control malaria or allow for large crop yields in marginal production areas. But as there is no single explanation for why certain parts of the world remain poor, there is also no single remedy. As I shall stress repeatedly in the pages ahead, a good plan of action starts with a good differential diagnosis of the specific factors that have shaped the economic conditions of a nation.

Three

WHY SOME COUNTRIES FAIL TO THRIVE

Of the world's population of 6.3 billion, roughly 5 billion people have reached at least the first rung of economic development. Five sixths of the world's population is at least one step above extreme poverty. Moreover, approximately 4.9 billion people live in countries where average income—measured by GDP per person—increased between 1980 and 2000. An even larger number, roughly 5.7 billion people, live in countries where life expectancy increased. Economic development is real and widespread. The extent of extreme poverty is shrinking, both in absolute numbers and as a proportion of the world's population. That fact is why we can realistically envision a world without extreme poverty as soon as 2025.

Precisely because economic development can and does work in so many parts of the world, it is all the more important to understand and solve the problems of the places where economic development is not working, where people are still off the ladder of development, or are stuck on its lowest rungs. To understand why economic growth succeeds or fails, we first need a conceptual framework that can account for changes over time in GDP per person. I have already discussed some of the factors that promote long-term development, but here I address them more systematically, including a discussion of why the process of economic development breaks down in many places, especially the poorest places. Perhaps it would be clearest to begin with a very specific case: a single farm household.