LONG-RUN ECONOMIC GROWTH: SOURCES AND POLICIES

Chapter 11

Monika Islam Khan

Chapter Outline

- **11.1** Economic Growth over Time and around the World
- **11.2** What Determines How Fast Economies Grow?
- **11.3** Economic Growth in the United States
- **11.4** Why Isn’t the Whole World Rich?
- **11.5** Growth Policies

Obtaining Economic Growth

- In the previous chapter, we looked at ways to measure economic growth in the long and short terms.
- In this chapter, we will consider the effects of different government policies on long-term economic growth.
- Economic growth, after all, is not inevitable; history has seen long periods of stagnation where no sustained increases in output per capita occurred.
- Why have some countries been able to achieve rapidly increasing real GDP per capita, while other countries have failed to keep pace?

Our goal in this chapter is to develop a *model of economic growth* to help answer questions such as this.

11.1 Economic Growth over Time and around the World

- Economist Bradford DeLong estimates that in 1,000,000 B.C., our ancestors had a GDP per capita of approximately $145 (in 2015 dollars).
- He estimates that GDP per capita in 1300 A.D. was also about $145.
- In other words, no sustained economic growth occurred before the Middle Ages; a peasant on a farm in 1300 A.D. was about as well off his ancestors.

The Industrial Revolution

- Significant economic growth did not really begin until the **Industrial Revolution**, the application of mechanical power to the production of goods and services which began in England around 1750.
- Before this, production of most goods had relied on human or animal power.
- The use of mechanical power allowed England and other countries—like the United States, France, and Germany—to begin to experience *long-run economic growth*.

Figure 11.1 Average Annual Growth Rates for the World Economy (1 of 2)

- The graph shows Bradford DeLong's estimated average annual growth rates for the world economy.
- The Industrial Revolution and its subsequent spread throughout the world resulted in sustained increases in real GDP per capita.

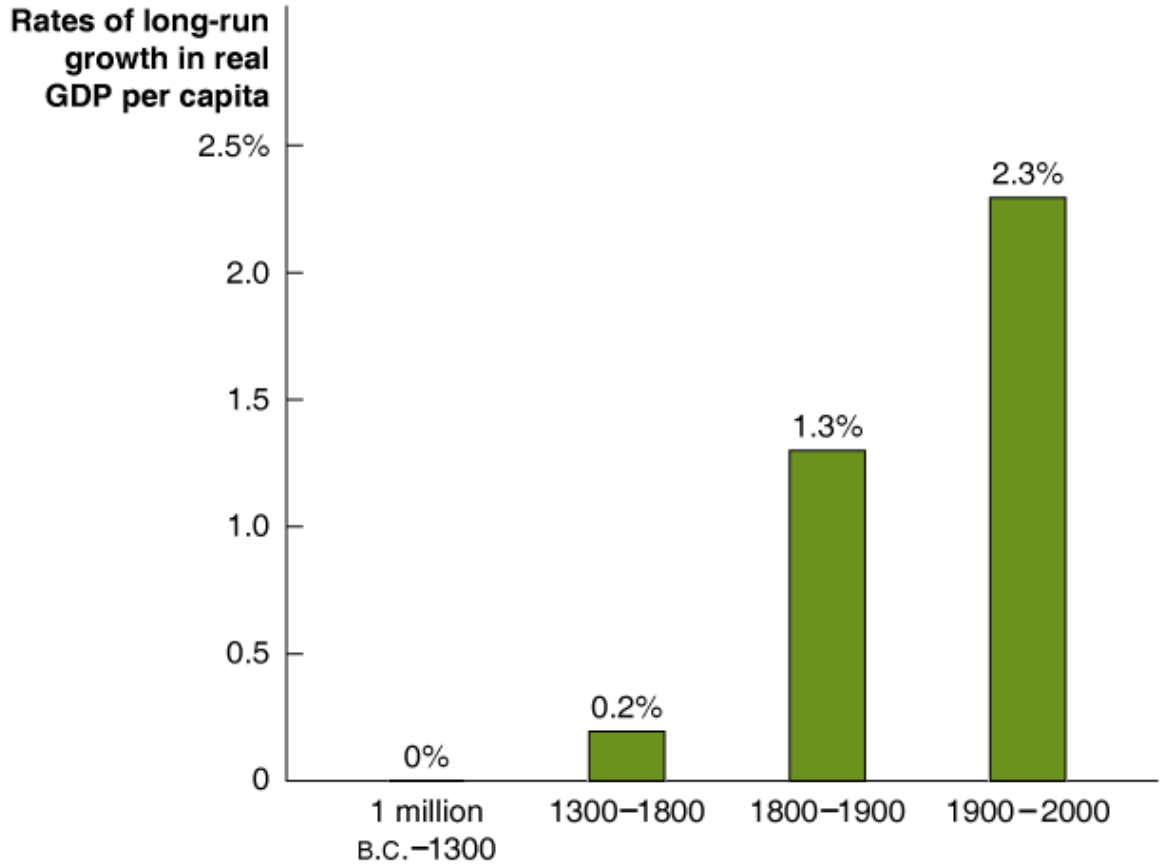
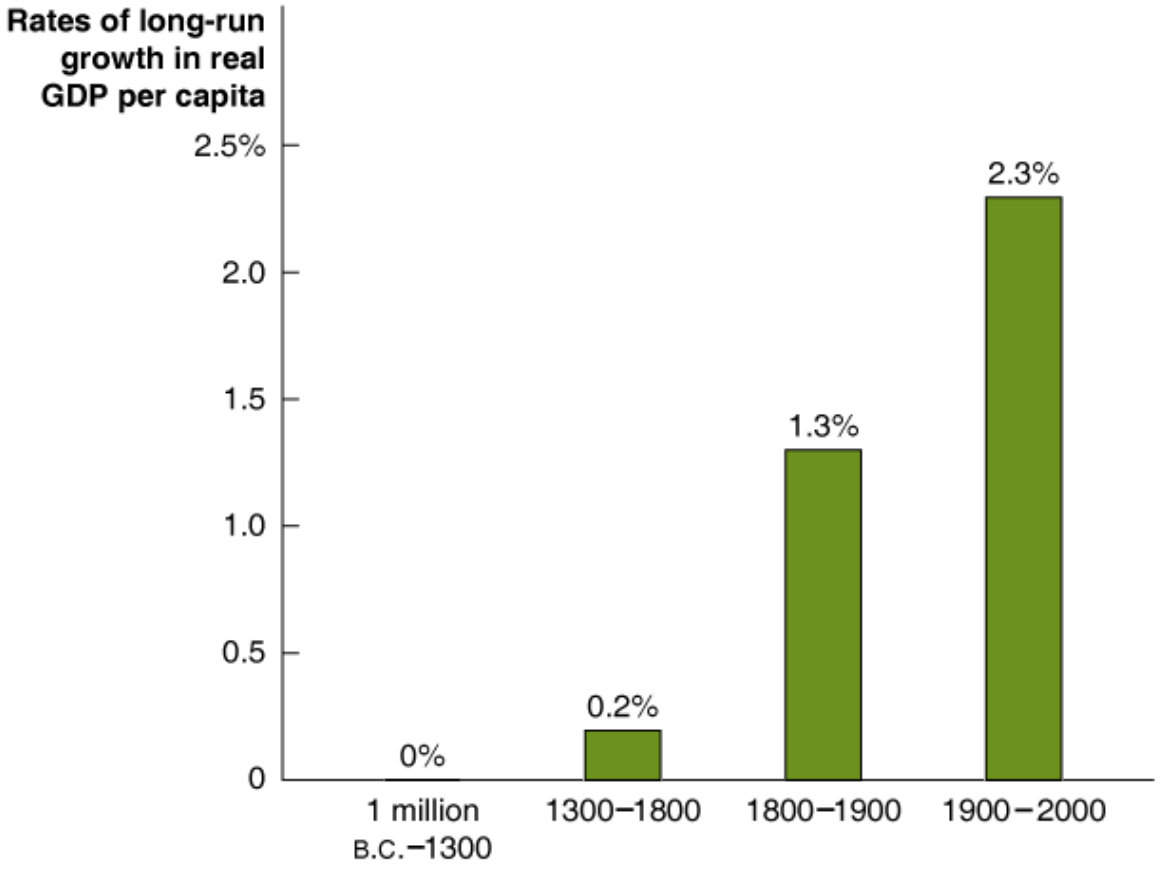


Figure 11.1 Average Annual Growth Rates for the World Economy (2 of 2)

- The difference between 1.3 percent and 2.3 percent may not seem like much but over a long period, it makes a remarkable difference.
- Over 50 years, a 1.3 percent growth rate leads to about a 91 percent increase in real GDP per capita.
- But a 2.3 percent growth rate leads to about a 212 percent increase.
- *In the long run, small differences in economic growth rates result in big differences in living standards.*



Why Do Growth Rates Matter?

- A country that grows too slowly fails to raise living standards.
- This doesn’t just mean iPhones and flat-screen TVs…
- In high-income countries, ~4 out of 1,000 babies die by a year of age.
- In the poorest countries, the rate is more than 100 out of 1,000.
- Poor growth has resulted in previously rich countries like Argentina lagging behind, with higher rates of poverty, lower life expectancy, and higher infant mortality than their prior peers.

Differences in Incomes across Countries

- Economists often refer to the *high-income countries* (or *industrial countries*) of Western Europe, Australia, Canada, Japan, New Zealand, and the United States, in comparison to the poorer *developing countries* of the rest of the world.
- The 1980s and 1990s have seen some countries progress out of the *developing* category, like Singapore, South Korea, and Taiwan; these are often referred to as *newly industrializing countries*.
- Real GDP per capita is markedly different across the world, even after correcting for cost of living differences. In 2014 it ranged from a high of $144,400 in Qatar to a low of $600 in the Central African Republic.
- See Figure 11.2 to see the distribution of GDP per capita (in $US) in 2014 for each of the world's nations, adjusted for differences in the cost of living.

Making the Connection: Is Income All That Matters?

- By concentrating on income differences between countries, are economists missing something important?
- While incomes have not been rising in, for example, sub-Saharan Africa, economist Charles Kenny with the World Bank argues that those countries have made rapid advances in health, education, and civil and political liberties.
- William Easterly, an economist at NYU, confirms that advances in these factors do not necessarily go hand in hand with income increases but are essential to raising living standards.

11.2 What Determines How Fast Economies Grow?

An **economic growth model** seeks to explain growth rates in real GDP per capita over the long run.

As we noted last chapter, the key to this is **labor productivity**: the quantity of goods and services that can be produced by one worker or by one hour of work.

Recall from Chapter 10, two main factors affect labor productivity:

- The *quantity of capital per hour worked* and
- The *level of technology.*

So our model will concentrate on changes in the quantity of capital and **technological change**: change in the quantity of output a firm can produce using a given quantity of inputs.

Three Main Sources of Technological Change

1. *Better machinery and equipment*

- Inventions like the steam engine, machine tools, electric generators, and computers, have allowed faster economic growth.

2. *Increases in human capital*

- **Human capital** is the accumulated knowledge and skills that workers acquire from education and training or from their life experiences.

3. *Better means of organizing and managing production*

- If managers can do a better job of organizing production, then labor productivity can increase. An example of this is the *just-in-time system*, first developed by Toyota; this involves assembling goods from parts that arrive at the factory exactly when they are needed.

Figure 11.3 The Per-Worker Production Function

- Suppose we wanted to describe a **per-worker production function**: the relationship between real GDP per hour worked and capital per hour worked, holding the level of technology constant.
- The first units of capital would be the most effective, allowing output per hour to increase most.
- Subsequent increases would result in *diminishing returns*: smaller incremental increases in output.

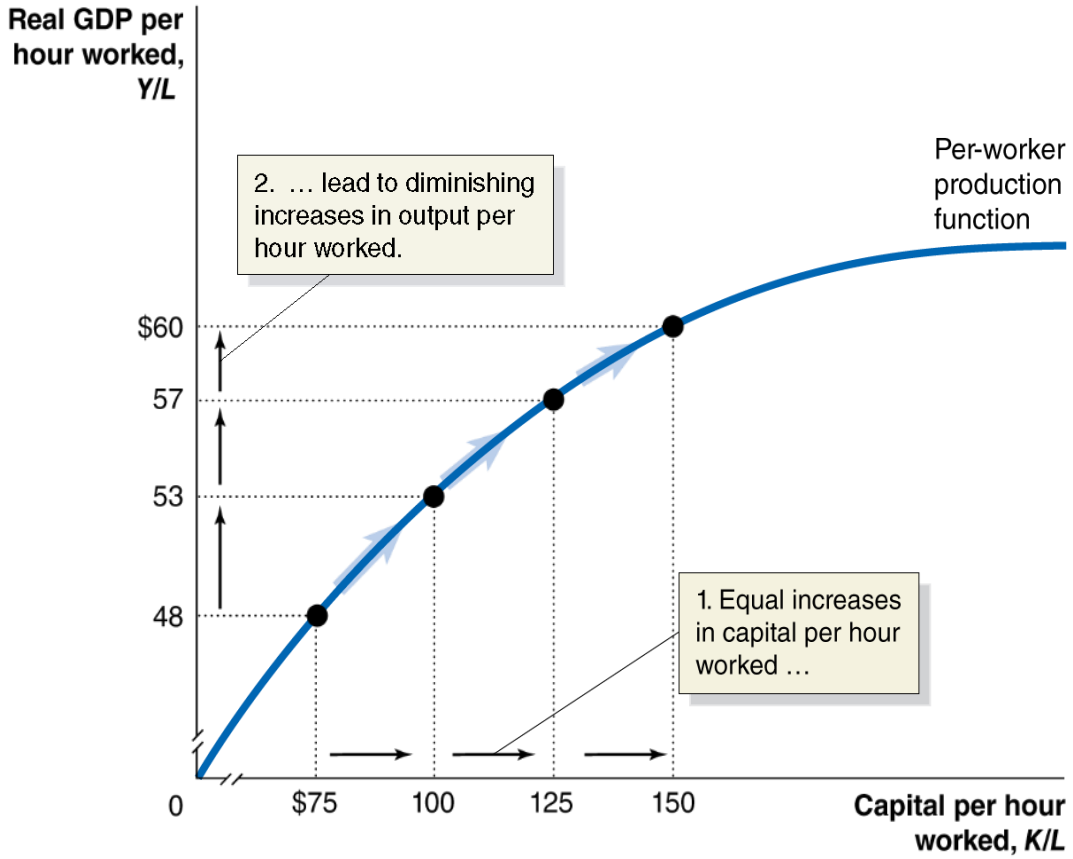
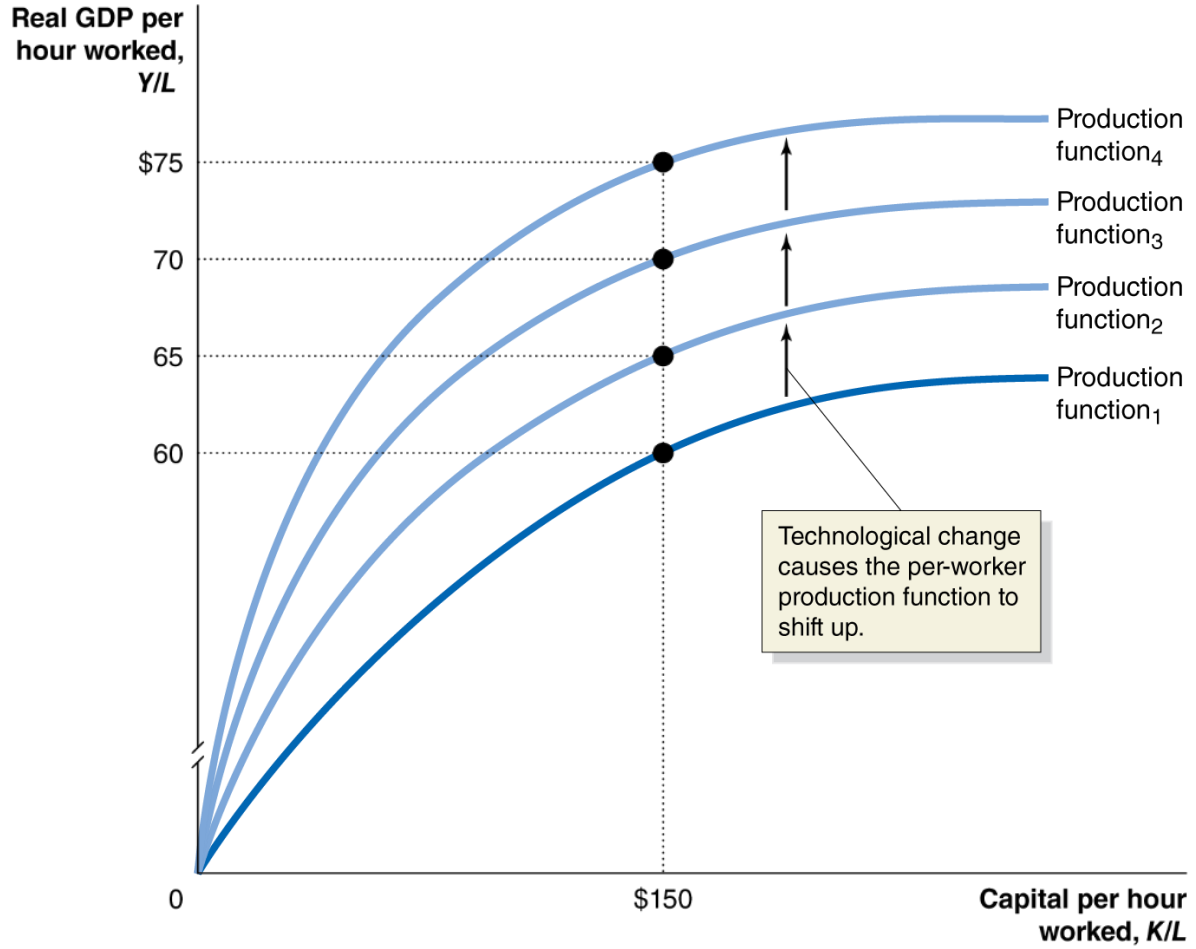


Figure 11.4 Technological Change Increases Output per Hour Worked

- If a country is relatively lacking in capital—like many of the developing countries—increases in capital will be very effective at increasing real GDP per capita.
- In countries where the amount of capital is already relatively high, technological change becomes a more effective way to increase output per hour.



Making the Connection: Explaining the Economic Failure of the Soviet Union

- Under Communism, the Soviet Union was a centrally planned economy, where the government owned nearly every business and made all production and pricing decisions.
- The Soviets concentrated on improving their capital stock, and in the 1950s, their output per hour improved faster than in the United States.

- But Soviet managers had little incentive to develop new ways of doing things, and they did not have to worry about competition. This retarded technological change and resulted in slowing growth rates for output in the Soviet Union.

New Growth Theory

- The model of economic growth we have developed was essentially developed by Nobel Laureate Robert Solow in the 1950s.
- Solow did not seek to *explain* technological change, instead treating it as the result of chance scientific discoveries.
- Paul Romer developed the **new growth theory**, a model of long-run economic growth that emphasizes that technological change is influenced by economic incentives and so is determined by the working of the market system.

New Growth Theory and Knowledge Capital

- Romer argues that the accumulation of *knowledge capital* is a key determinant of economic growth. Increases in knowledge capital result from research and development and other technological advances.
- Physical capital is *rival* and *excludable*—a *private good*—and this results in its diminishing returns.
    - But knowledge capital is nonrival and nonexcludable—a *public good*—and hence results in *increasing returns*—not at the *firm level* but at the *economy level*.

Government's Role in Knowledge Capital Generation

Public goods such as knowledge capital generation result in *free riding*: benefitting from goods and services you do not pay for.

Example: Bell Labs' development of transistor technology resulted in immense profits for other firms.

Because firms do not enjoy the entire benefit of their knowledge capital, they do not produce enough of it.

The public good nature of knowledge capital leads to a role for government policy in:

- Protecting intellectual property with patents and copyrights
- Subsidizing research and development
- Subsidizing education

Protecting Intellectual Property

Governments seek to protect intellectual property through the use of patents and copyrights.

- Allowing firms to benefit from their own research and development increases their incentive to perform it.

Patents are the exclusive right to produce a product for a period of 20 years from the date the patent is applied for. This period of time is designed to balance the chance for a firm to benefit from its invention against the need of society to benefit from it.

Copyrights act similarly for creative works like books and films, granting the exclusive right to use the creation during and 70 years after the creator's lifetime.

Subsidizing R&D and Education

- *Subsidizing research and development*

Governments might perform research directly—like NASA and the National Institutes of Health—or subsidize researchers at institutions like universities.

Similarly, they can provide tax incentives to firms performing R&D.

- *Subsidizing education*

In order to perform research and development, workers need to be technically trained. If firms provide this training, they recoup the cost by paying workers lower wages, decreasing the incentive for workers to take such jobs.

A solution to this is to have the government subsidize education, as it does in all high-income countries.

Joseph Schumpeter and Creative Destruction

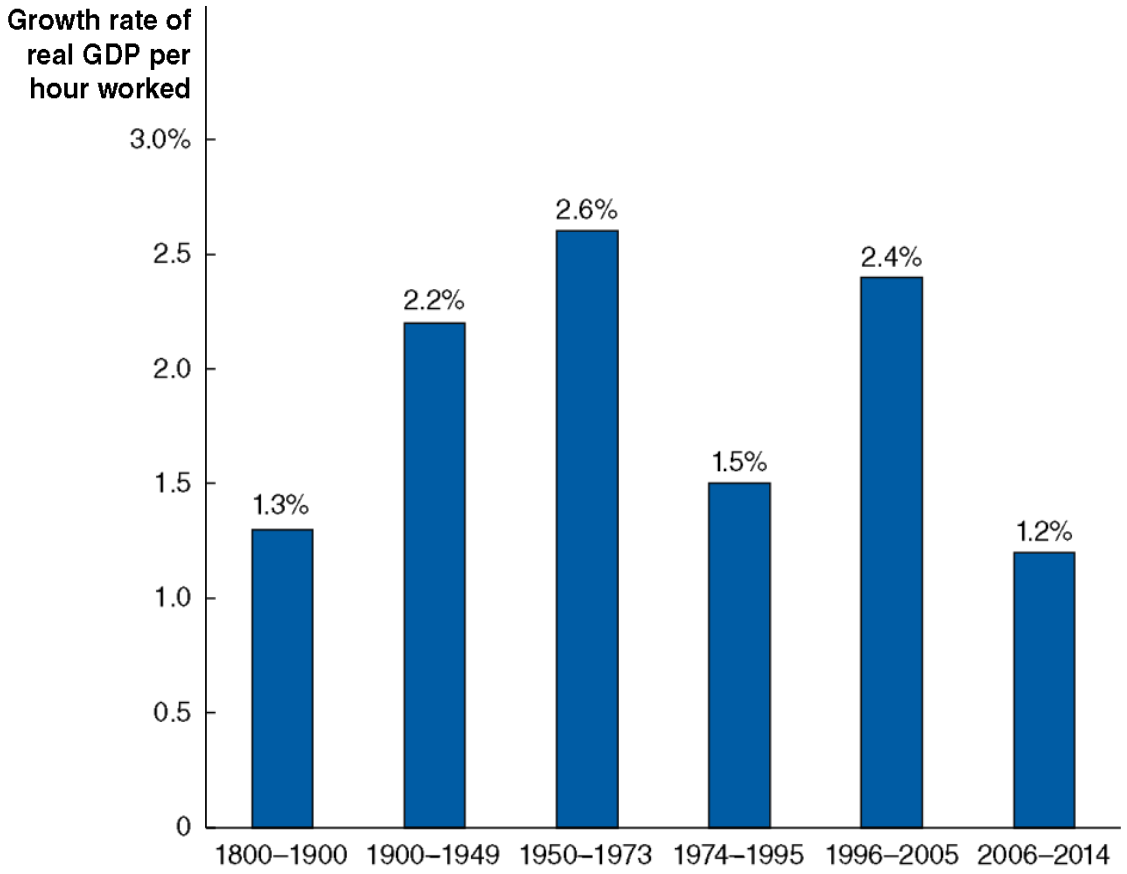
- Joseph Schumpeter was born in Austria in 1883 and grew up there before moving to the United States.
    - Schumpeter developed a model of growth emphasizing his view that new products unleashed a *"gale of creative destruction."*

Example: The automobile replaced the horse-drawn carriage by better serving the needs of consumers. This "creation" "destroyed" carriage makers and associated firms.

- To Schumpeter, the entrepreneur is central to economic growth, and the profits of entrepreneurs provide the incentive for bringing together the factors of production—labor, capital, and natural resources—in new ways.

11.3 Economic Growth in the United States

- The experience of the United States can help us to understand how capital accumulation and technological change help to drive economic growth.
- Growth rates in the United States were relatively modest prior to 1900.
- In the twentieth century, firms and the U.S. government invested heavily in research and development, resulting in increasing growth rates.
- Growth rates remained high until the mid-1970s, when they fell unexpectedly, before picking up again in the mid-1990s.



What Caused the Growth Slowdown of 1974-1995?

Some economists argue that there was not really a slowdown in economic growth—the appearance is a result of how we measure growth.

- From the 1970s, most growth in output came in the form of *services* rather than *goods*. Improvements in services come mostly through quality differences, which are harder to measure for services than for goods.

An alternative argument is that America concentrated more on quality of life issues, like health and safety, environmental regulations, and a change in educational focus.

- Other high-income countries experienced similarly timed slowdowns, suggesting that the United States was not doing something uniquely counterproductive over this time.

Is the U.S. Headed for Another Productivity Slowdown?

- New technology has driven improvements in labor productivity from 1996-2014.

Examples: faster data processing (computers etc.), better communication (cell phones, the internet).

- Some economists argue that changes in quality of services have been particularly important over the last decade and a half.

So GDP growth has understated the actual growth of the economy, but it may be that many of these gains are going to improving consumer products rather than improving labor productivity.

- This casts doubt on the future of economic growth in the U.S.

Secular Stagnation? Or a Return to Faster Growth?

- Recently Harvard economist Larry Summers has argued that growth rates are likely to remain low in coming years:

1. Slowing population growth will reduce the demand for housing
2. Modern I.T. firms require less capital than older firms
3. This price of capital has fallen relative to other goods

- As a consequence of little need for capital, Summers expects rates of investment to stay low.
- Critics of this idea say that investment has just been low because of the severity of the recession of 2007-2009, and it will bounce back soon.

11.4 Why Isn't the Whole World Rich?

The economic growth model predicts that poor countries will grow faster than rich countries.

This is because:

- The effect of additional capital is greater for countries with smaller capital stocks
- There are greater advances in technology immediately available to poorer countries

Figure 11.6 The Catch-up Predicted by the Economic Growth Model

- If poorer countries grow faster than richer ones, they will start to catch up to, or converge to, the richer countries.
- **Catch-up**: the prediction that the level of GDP per capita (or income per capita) in poor countries will grow faster than in rich countries.

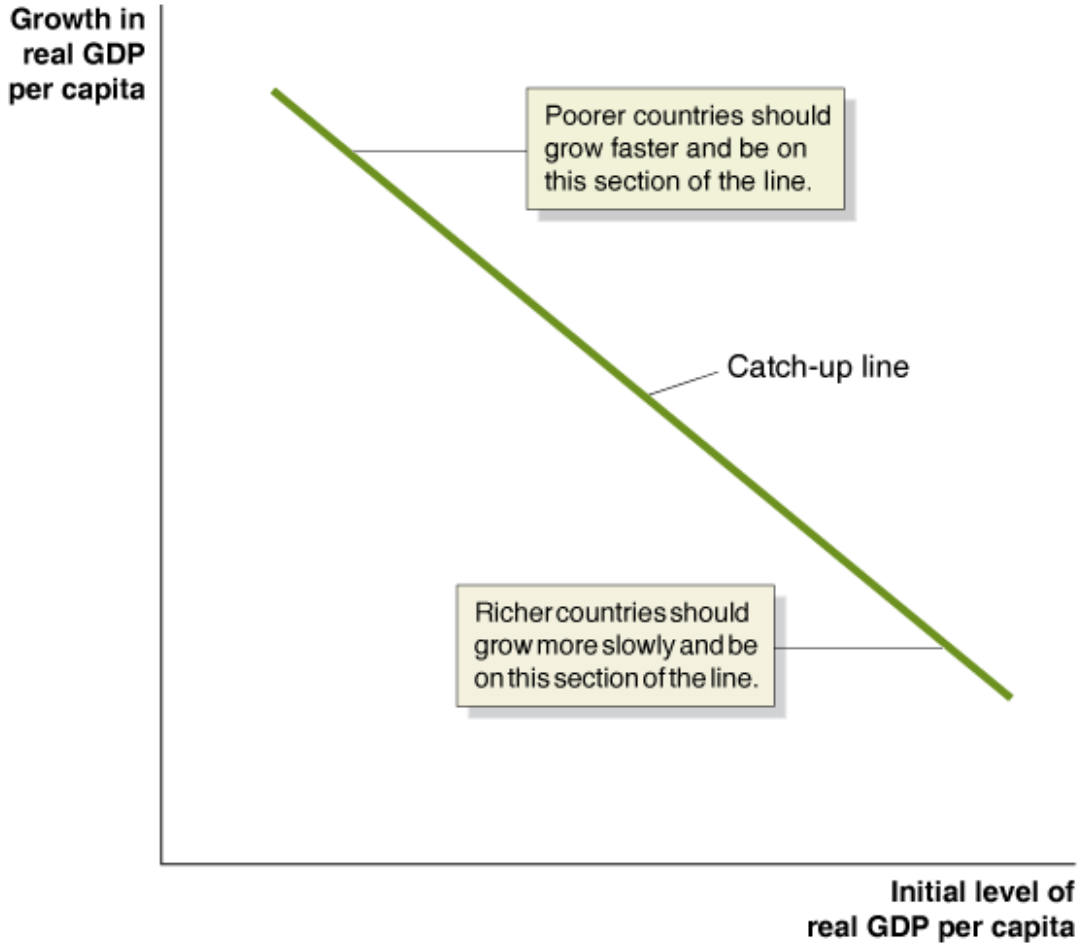


Figure 11.7 There Has Been Catch-up among High-Income Countries

- Examining high-income countries, we appear to see strong evidence of the catch-up hypothesis.
- Countries that were richer in 1960, like the U.S. and Switzerland, experienced lower growth rates over the next decades than countries that were initially poorer, like Ireland, Singapore, and South Korea.

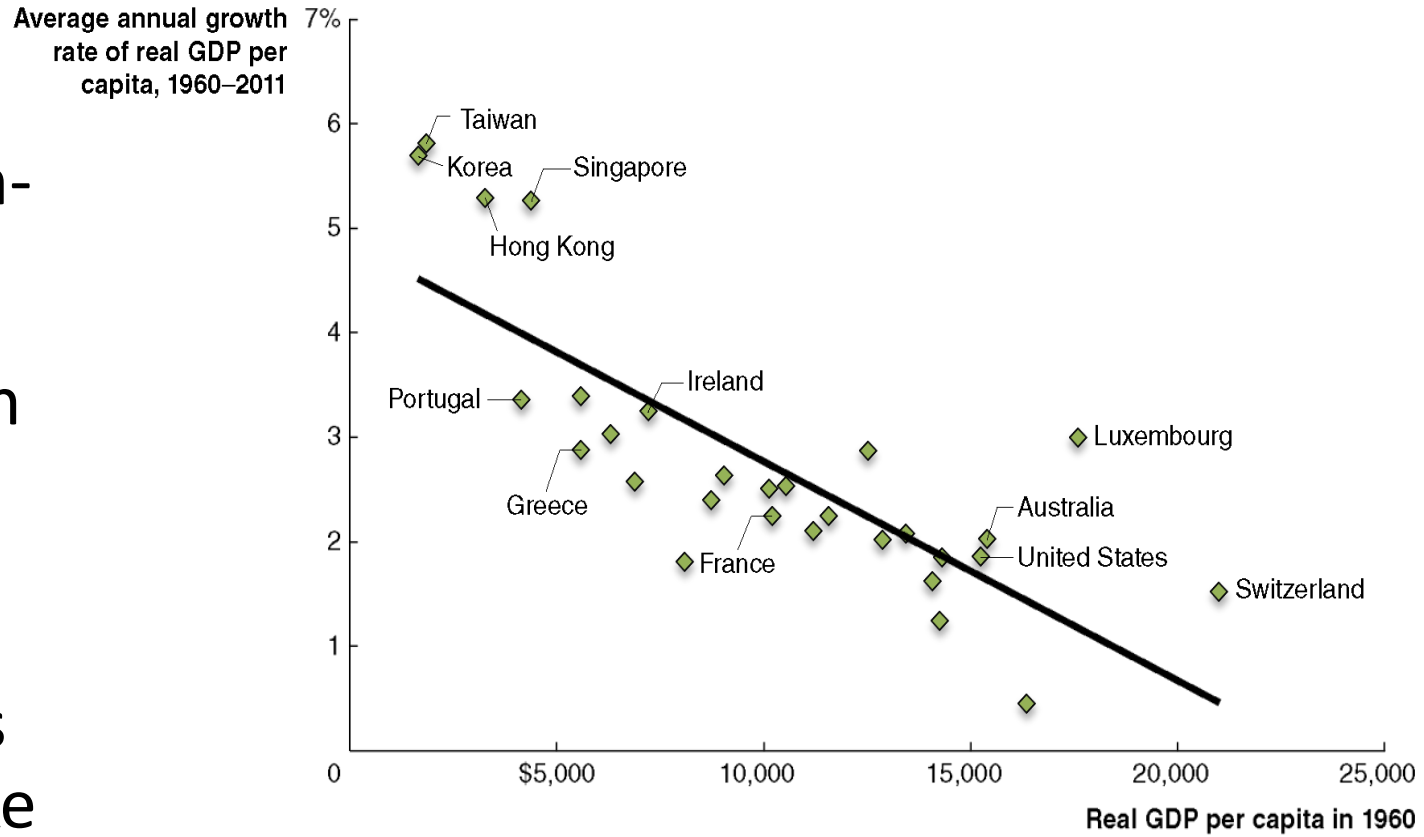
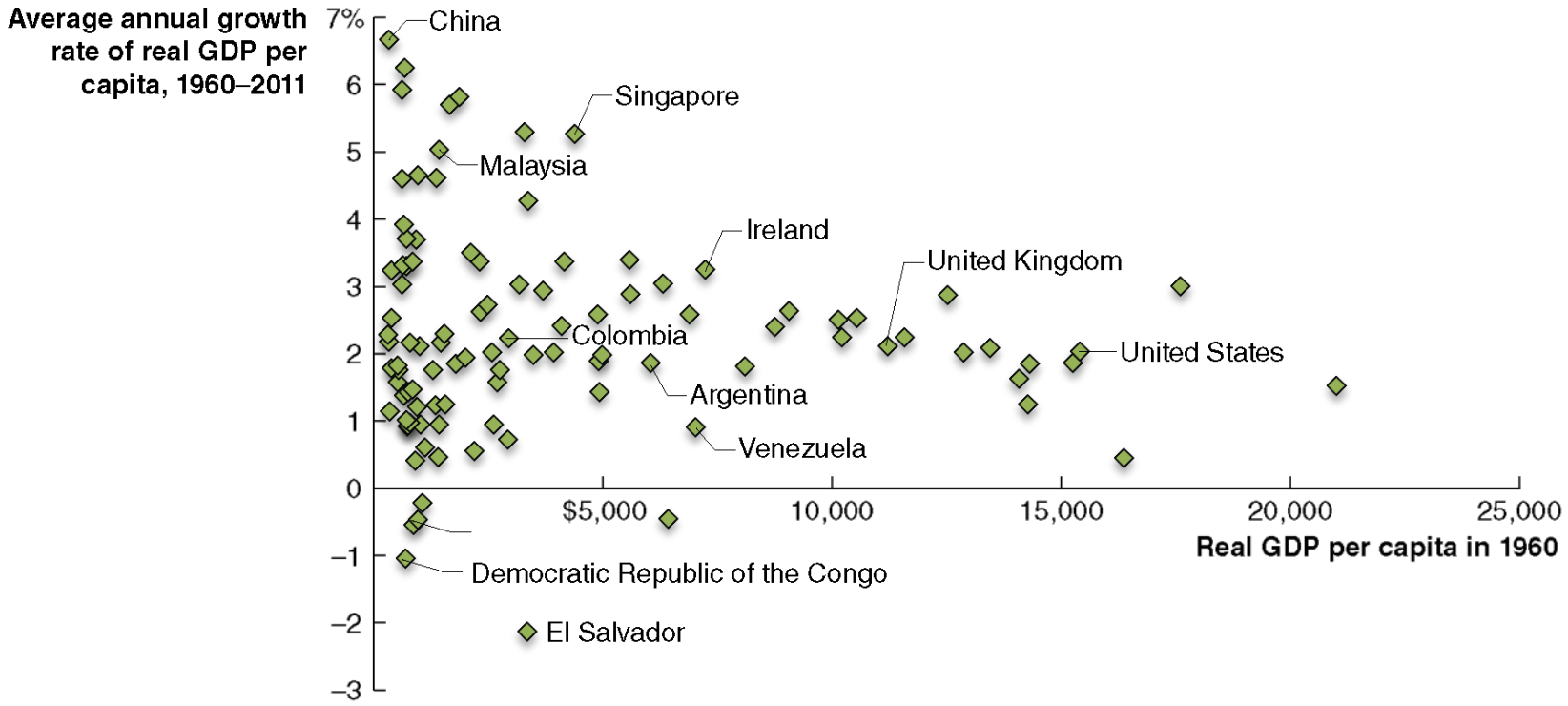
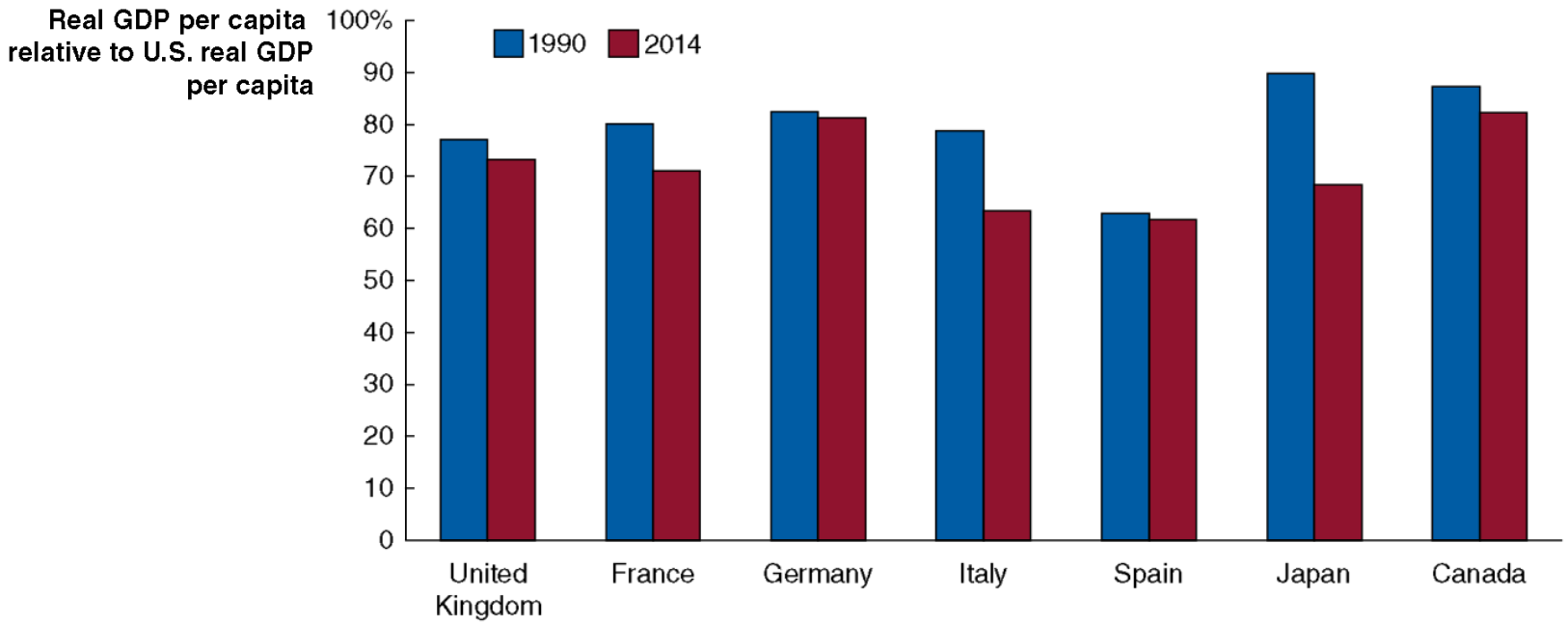


Figure 11.8 Most of the World Hasn't Been Catching Up



- However if we extend the set of countries to all countries for which statistics are available, our catch-up model appears to be worthless.
- We need to address the failures of the catch-up model.

Figure 11.9 Other High-Income Countries Have Stopped Catching Up to the United States



- The blue bars show real GDP per capita in 1990 relative to the United States.
- The red bars show real GDP per capita in 2014 relative to the United States.
- In each case, the red bar is lower; these countries are not catching up to the United States. Why?

Why Are Other High-Income Countries Not Catching the U.S.?

A combination of reasons explain this:

- U.S. labor markets are relatively flexible; hiring and firing workers is relatively unrestricted by government regulation.
    - Similarly, American workers tend to enter the work force sooner and retire later than do workers in Europe.
- The U.S. financial system is relatively efficient, and the high volume of trading ensures high *liquidity*, making the U.S. an attractive place to invest.
    - Small firms find obtaining capital relatively easy in the U.S. due to the advent of venture capital firms.

The Lack of Growth in Many Low-Income Countries

Economists point to four key factors in explaining why many low-income countries are growing so slowly:

- Failure to enforce the rule of law
- Wars and revolutions
- Poor public education and health
- Low rates of saving and investment

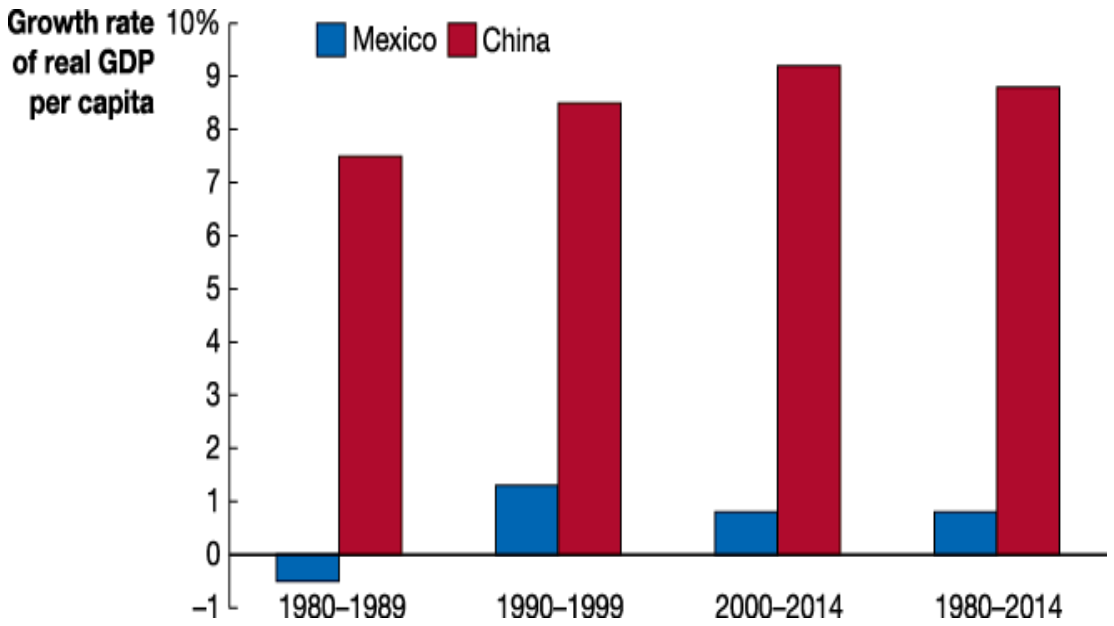
We will address each of these over the following slides.

Failure to Enforce the Rule of Law

- The **rule of law** refers to the ability of a government to enforce the laws of the country, particularly with respect to protecting private property and enforcing contracts.
- For entrepreneurs in a market economy to succeed, the government must guarantee **property rights**: the rights individuals or firms have to the exclusive use of their property, including the right to buy or sell it.
- Otherwise, entrepreneurs will not risk starting a business.
- Also important is an independent court system to enforce contracts.

Making the Connection: Why Hasn't Mexico Grown as Fast as China?

- Turning away from central planning toward a market system unleashed economic growth in China.
- On the other hand, Mexico still suffers from a corrupt government, weak rule of law, and a weak court system that discourages financial contracting.
- While Mexico's GDP per capita remains ahead of China's, it seems like it will not be long before China overtakes it.



Other Reasons for Lack of Growth in Poor Countries

- *Wars and revolutions*

Wars and revolutions make investment and technological growth difficult.

Example: Mozambique had almost two decades of civil war in the 1970s and 1980s, with declining real GDP per capita.

When the civil wars ended, it experienced growth: 3.7 percent *per year, from 1990 to 2009.*

- *Poor public education and health*

With weak public schools and poor health care, workers are less productive.

- *Low rates of saving and investment*

Undeveloped and insecure financial systems create a “vicious cycle” of low savings and investment, preventing growth.

Foreign Investment

One way to exit the vicious cycle of low savings and investment is through foreign investment:

- **Foreign direct investment**: The purchase or building by a corporation of a facility in a foreign country.
- **Foreign portfolio investment**: The purchase by an individual or a firm of stocks or bonds issued in another country.

Foreign investment can take the place of insufficient domestic investment, whether from private or government sources.

Globalization

- In the Great Depression and WWII, many low-income countries were hurt by falling exports, but they took the wrong lesson, cutting themselves off from foreign trade and investment.
- By the 1980s, many countries started to realize their mistake and started to reverse these policies.
- This resulted in **globalization**, the process of countries becoming more open to foreign trade and investment.
- Countries embracing globalization experienced much higher rates of growth than countries that didn't.

Making the Connection: Will China's Standard of Living Exceed the U.S.? (1 of 2)

- If Chinese and American growth rates continue, China's standard of living would exceed that of the U.S. in 2036.
- Will this really happen? Several factors suggest that it will not:
  - Much of Chinese growth is due to capital investment, which will have diminishing returns.

Making the Connection: Will China's Standard of Living Exceed the U.S.? (2 of 2)

- Some of Chinese growth is due to transition to a market economy.
- Aging Chinese population due to population control policies.
- China remains largely autocratic, with lingering concerns about security of property rights and independent rule of law.

11.5 Growth Policies

- By now, we can summarize the types of policies that are essential to fostering economic growth:

1. *Enhancing property rights and the rule of law*

- Working toward independent courts and eliminating corruption is important for encouraging growth.
- Although the U.S. is relatively free from corruption today, in the 1800s this was not the case. Reform efforts were important in setting the stage for growth.

Pro-Growth Policies

2. *Improving health and education*

- Health care and education have *increasing returns* for a country, with their benefits spilling over to other members of the country.
- Improvements in these can help prevent *brain drain*, where highly educated and successful people leave developing countries to go to high-income countries.

3. *Policies that promote technological change*

- Technological change is essential for growth—as we have seen, often more important than acquiring capital.
- Low-income countries can encourage technological change by encouraging foreign direct investment.

More Pro-Growth Policies

4. Policies that promote savings and investment

- Eliminating corruption is important here, so that people know their assets won't be seized.
- Once this is done, governments can encourage savings and investment through tax incentives, like *tax-deferred savings plans*, or *investment tax credits*.

Is Economic Growth Good or Bad?

A central assumption of this chapter is that economic growth is beneficial for citizens.

This seems relatively clear for low-income countries, but some people maintain that further economic growth may not be desirable in high-income countries.

Arguments against growth might include:

- Negative effects on the environment
- Depletion of natural resources
- Diminishment of distinctive cultures

Since many of these arguments are normative, economic analysis can contribute to the debate but cannot settle the issue.

THE END

“The goal of long-run economic growth without asset price bubbles is not only achievable, but is something we should expect if we put a sound regulatory framework in place and if policymakers remain vigilant.”
- Christina Romer

“A rise in the level of saving can reduce aggregate activity temporarily but only a sustained high level of saving makes it possible to have the sustained high level of business investment that contributes to the long-run growth of output.”
- Martin Feldstein