

PEARSON NEW INTERNATIONAL EDITION

Macroeconomics
Robert J. Gordon
Twelfth Edition



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What Is Macroeconomics?



Business will be better or worse.
—Calvin Coolidge, 1928

1 How Macroeconomics Affects Our Everyday Lives

Macroeconomics is concerned with the big economic issues that determine your own economic well-being as well as that of your family and everyone you know. Each of these issues involves the overall economic performance of the nation rather than whether one particular individual earns more or less than another.

The nation's overall macroeconomic performance matters, not only for its own sake but because many individuals experience its consequences. The **Global Economic Crisis** that began in late 2007 has created enormous losses of income and jobs for millions of American families. Not only were almost 15 million people unemployed in late 2010, but many more have given up looking for jobs, have been forced to work part-time instead of full-time, or have experienced pay cuts or furlough days when they have not been paid. By one estimate, more than half of American families since 2007 have experienced the job loss of a family member, a pay cut, or being forced to work part-time instead of full-time.

Macroeconomic performance can also determine whether inflation will erode the value of family savings, as occurred in the 1970s when the annual inflation rate reached 10 percent. Today's students also care about economic growth, which will determine whether in their future lives they will have a higher standard of living than their parents do today.

The “Big Three” Concepts of Macroeconomics

Each of these connections between the overall economy and the lives of individuals involves a central macroeconomic concept introduced in this chapter—unemployment, inflation, and economic growth. The basic task of macroeconomics is to study the causes of good or bad performance of these three concepts, why each matters to individuals, and what (if anything) the government can do to improve macroeconomic performance. While there are numerous other important macroeconomic concepts, we start by focusing just on these, which are the “Big Three” concepts of macroeconomics:

1. The **unemployment rate**. The higher the overall unemployment rate, the harder it is for each individual who wants a job to find work. College seniors who want permanent jobs after graduation are likely to have fewer job offers if the national unemployment rate is high, as in 2009–10, than low, as

Macroeconomics is the study of the major economic totals, or aggregates.

The **Global Economic Crisis** is the crisis that began in 2007 that simultaneously depressed economic activity in most of the world's economies.

The **unemployment rate** is the number of persons unemployed (jobless individuals who are actively looking for work or are on temporary layoff) divided by the total of those employed and unemployed.

in 2005–2007. All adults fear a high unemployment rate, which raises the chances that they will be laid off, be unable to pay their bills, have their cars repossessed, lose their health insurance, or even lose their homes through mortgage foreclosures. In “bad times,” when the unemployment rate is high, crime, mental illness, and suicide also increase. The widespread consensus that unemployment is the most important macroeconomic issue has been further highlighted by the dismal labor market of 2009–10, when fully half of the unemployed were jobless for more than six months. And the recognized harm created by high unemployment is nothing new. Robert Burton, an English clergyman, wrote in 1621 that “employment is so essential to human happiness that indolence is justly considered the mother of misery.”

The **inflation rate** is the percentage rate of increase in the economy’s average level of prices.

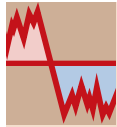
2. The **inflation rate**. A high inflation rate means that prices, on average, are rising rapidly, while a low inflation rate means that prices, on average, are rising slowly. An inflation rate of zero means that prices remain essentially the same, month after month. In inflationary periods, retired people, or those about to retire, lose the most, since their hard-earned savings buy less as prices go up. Even college students lose as the rising prices of room, board, and textbooks erode what they have saved from previous summer and after-school jobs. While a high inflation rate harms those who have saved, it helps those who have borrowed. Great harm comes from this capricious aspect of inflation, taking from some and giving to others. People want their lives to be predictable, but inflation throws a monkey wrench into individual decision making, creating pervasive uncertainty.
3. **Productivity** growth. “Productivity” is the aggregate output per hour of work that a nation produces in total goods and services; it was about \$61 per worker-hour in the United States in 2010. The faster aggregate productivity grows, the easier it is for each member of society to improve his or her standard of living. If productivity were to grow at 3 percent from 2010 to the year 2030, U.S. productivity would rise from \$61 per worker-hour to \$111 per worker-hour. When multiplied by all the hours worked by all the employees in the country, this extra \$50 per worker-hour would make it possible for the nation to have more houses, cars, hospitals, roads, schools, and to combat greenhouse gas emissions that worsen global warming.

Productivity is the aggregate output produced per hour.

But if the growth rate of productivity were zero instead of 3 percent, U.S. productivity would remain at \$61 in the year 2030. To have more houses and cars, we would have to sacrifice by building fewer hospitals and schools. Such an economy, with no productivity growth, has been called the “zero-sum society,” because any extra good or service enjoyed by one person requires that something be taken away from someone else. Many have argued that the achievement of rapid productivity growth and the avoidance of a zero-sum society form the most important macroeconomic challenge of all.

The first two of the “Big Three” macroeconomic concepts, the unemployment and inflation rates, appear in the newspaper every day. When economic conditions are poor—as in 2009–10—daily headlines announce that one large company or another is laying off thousands of workers. In the past, sharp increases in the rate of inflation have also made headlines, as when the price of gasoline jumped during 2006–08. The third major concept, productivity growth, has received widespread attention since 1995 as a source of an improving American standard of living compared to that in Europe and Japan.

Macroeconomic concepts also play a big role in politics. Incumbent political parties benefit when unemployment and inflation are relatively low, as in the landslide victories of Lyndon Johnson in 1964 and Richard Nixon in 1972. Incumbent presidents who fail to gain reelection often are the victims of a sour economy, as in the cases of Herbert Hoover in 1932, Jimmy Carter in 1980, and more recently George W. Bush in 2008. The defeat of Al Gore by George W. Bush in 2000 was an exception since the strong economy of 2000 should have helped Gore's incumbent Democratic party win the presidency.



GLOBAL ECONOMIC CRISIS FOCUS

What Makes It Unique?

The Global Economic Crisis that started in 2008 is by most measures the most severe downturn since the Great Depression of the 1930s. Its severity is most apparent in the high level of the unemployment rate (10 percent) reached in 2009–10, in the relatively long duration of unemployment suffered by those who lost their jobs, and in the prediction that the unemployment rate would not return to its normal level of around 5 percent until perhaps 2015 or 2016. Thus, of our three big macro concepts, the Global Economic Crisis mainly affected the unemployment rate, while the inflation rate remained low and productivity growth was relatively robust.

2 Defining Macroeconomics

How Macroeconomics Differs from Microeconomics

Most topics in economics can be placed in one of two categories: macroeconomics or microeconomics. *Macro* comes from a Greek word meaning large; *micro* comes from a Greek word meaning small. Put another way, macroeconomics deals with the totals, or **aggregates**, of the economy, and microeconomics deals with the parts.

Microeconomics is devoted to the relationships among the different *parts* of the economy. For example, in micro we try to explain the wage or salary of one type of worker in relation to another. For example, why is a professor's salary more than that of a secretary but less than that of an investment banker? In contrast, macroeconomics asks why the total income of all citizens rises strongly in some periods but declines in others.

An **aggregate** is the total amount of an economic magnitude for the economy as a whole.

Economic Theory: A Process of Simplification

Economic theory helps us understand the economy by *simplifying complexity*. Theory throws a spotlight on just a few key relations. Macroeconomic theory examines the behavior of aggregates such as the unemployment rate and the inflation rate while ignoring differences among individual households. It studies the causes and possible cures of the Global Economic Crisis at the level of individual nations, instead of trying to explain why some individuals are more prone than others to losing their jobs.

It is this process of simplification that makes the study of economics so exciting. By learning a few basic macroeconomic relations, you can quickly

learn how to sift out the hundreds of irrelevant details in the news in order to focus on the few key items that foretell where the economy is going. You also will begin to understand which national and personal economic goals can be attained and which are “pie in the sky.” You will learn when it is fair to credit a president for strong economic performance or blame a president for poor performance.

3 Actual and Natural Real GDP

We have learned that the “Big Three” macroeconomic concepts are the unemployment rate, the inflation rate, and the rate of productivity growth. Linked to each of these is the total level of output produced in the economy. The higher the level of output, the lower the unemployment rate. The higher the level of output, the faster tends to be the rate of inflation. Finally, for any given number of hours worked, a higher level of output automatically boosts output per hour, that is, productivity.

The official measure of the economy’s total output is called **gross domestic product** and is abbreviated GDP. Real GDP includes all currently produced goods and services sold on the market within a given time period and excludes certain other types of economic activity. As you will also learn, the adjective “real” means that our measure of output reflects the quantity produced, corrected for any changes in prices.

Actual real GDP is the amount an economy actually produces at any given time. But we need some criterion to judge the desirability of that level of actual real GDP. Perhaps actual real GDP is too low, causing high unemployment. Perhaps actual real GDP is too high, putting upward pressure on the inflation rate. Which level of real GDP is desirable, neither too low nor too high? This intermediate compromise level of real GDP is called “natural,” a level of real GDP in which there is no tendency for the rate of inflation to rise or fall.

Figure 1 illustrates the relationship between actual real GDP, natural real GDP, and the rate of inflation. In the upper frame the red line is actual real GDP. The lower frame shows the inflation rate. The thin dashed vertical lines connect the two frames. The first dashed vertical line marks time period t_0 . Notice in the bottom frame that the inflation rate is constant at t_0 , neither speeding up nor slowing down.

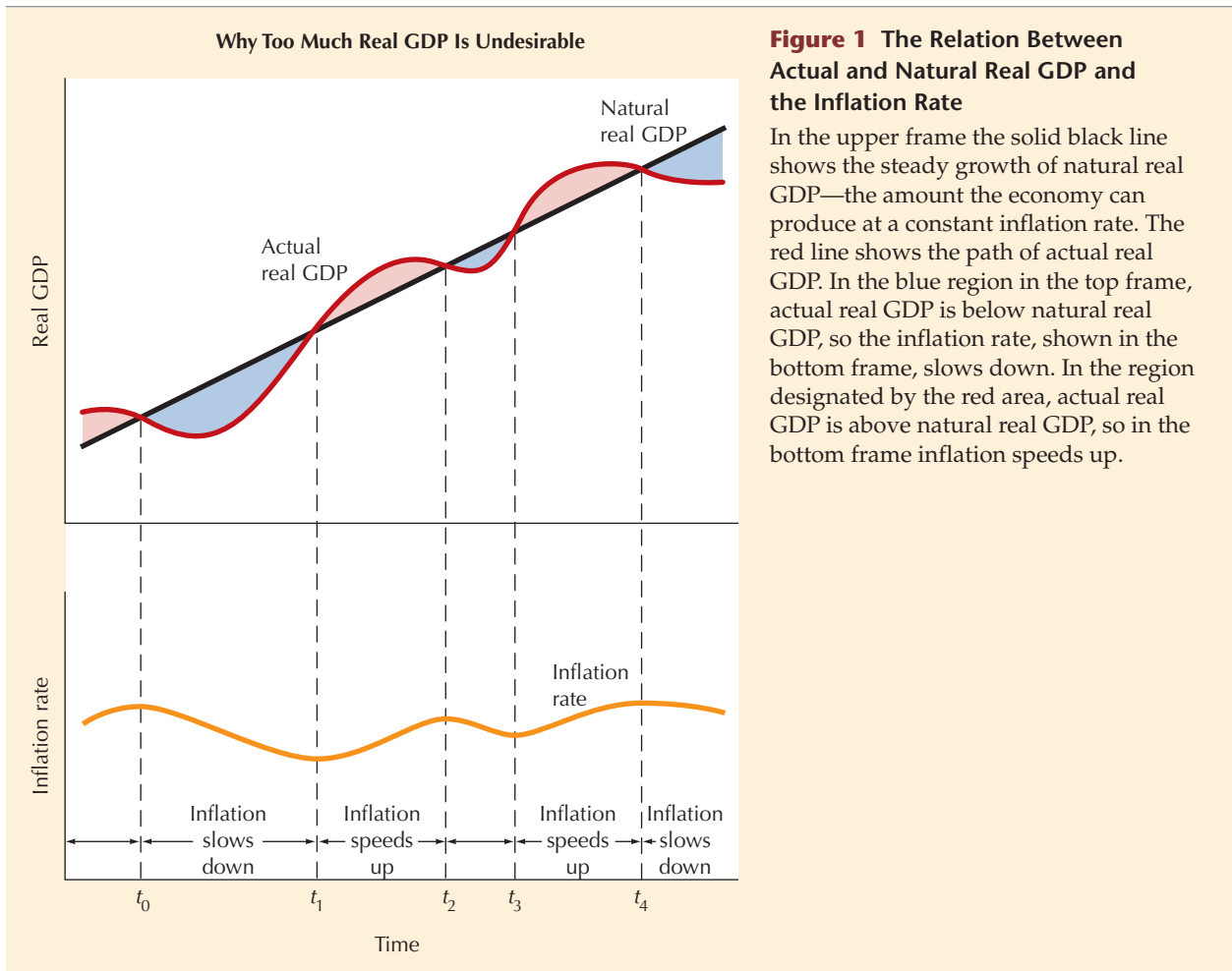
By definition, **natural real GDP** is equal to actual real GDP when the inflation rate is constant. Thus, in the upper frame, at t_0 the red actual real GDP line is crossed by the black natural real GDP line. To the right of t_0 , actual real GDP falls below natural real GDP, and we see in the bottom frame that inflation slows down. This continues until time period t_1 , when actual real GDP once again is equal to natural real GDP. Here the inflation rate stops falling and is constant for a moment before it begins to rise.

This cycle repeats itself again and again. *Only when actual real GDP is equal to natural real GDP is the inflation rate constant.* For this reason, natural real GDP is a compromise level to be singled out for special attention. During a period of low actual real GDP, designated by the blue area, the inflation rate slows down. During a period of high actual real GDP, designated by the shaded red area, the inflation rate speeds up.

Gross domestic product is the value of all currently produced goods and services sold on the market during a particular time interval.

Actual real GDP is the value of total output corrected for any changes in prices.

Natural real GDP designates the level of real GDP at which the inflation rate is constant, with no tendency to accelerate or decelerate.



Unemployment: Actual and Natural

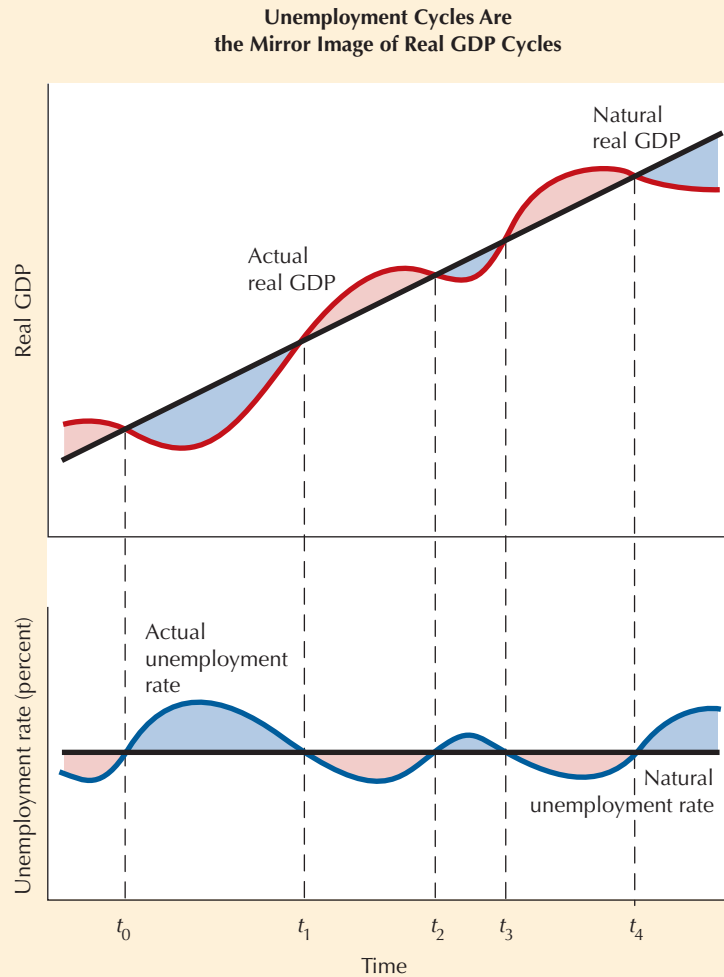
When actual real GDP is low, many people lose their jobs, and the unemployment rate is high, as shown in Figure 2. The top frame duplicates Figure 1 exactly, comparing actual real GDP with natural real GDP. The blue line in the bottom frame is the actual percentage unemployment rate, the first of the three central concepts of macroeconomics. The thin vertical dashed lines connecting the upper frame and lower frame show that whenever actual and natural real GDP are equal in the top frame, the actual unemployment rate is equal to the **natural rate of unemployment** in the bottom frame.

The definition of the natural rate of unemployment corresponds exactly to natural real GDP, describing a situation in which there is no tendency for the inflation rate to change. When the actual unemployment rate is high, actual real GDP is low (shown by blue shading in both frames), and the inflation rate slows down. In periods when actual real GDP is high and the economy prospers, the actual unemployment rate is low (shown by red shading in both frames) and the inflation rate speeds up. It is easy to remember the mirror-image behavior of real GDP and the unemployment rate. We use the shorthand

The **natural rate of unemployment** designates the level of unemployment at which the inflation rate is constant, with no tendency to accelerate or decelerate.

Figure 2 The Behavior Over Time of Actual and Natural Real GDP and the Actual and Natural Rates of Unemployment

When actual real GDP falls below natural real GDP, designated by the blue shaded areas in the top frame, the actual unemployment rate rises above the natural rate of unemployment as indicated in the bottom frame. The red shaded areas designate the opposite situation. When we compare the blue shaded areas of Figures 1 and 2, we see that the time intervals when unemployment is high (1–2) also represent time intervals when inflation is slowing down (1–1). Similarly, the red shaded areas represent time intervals when inflation is speeding up and unemployment is low.



The **GDP gap** is the percentage difference between actual real GDP and natural real GDP. Another name for this concept is the “output gap.”

The **unemployment gap** is the difference between the actual unemployment rate and the natural rate of unemployment.

label **GDP gap** for the percentage difference between actual real GDP and natural real GDP. We use the parallel shorthand label **unemployment gap** for the difference between the actual unemployment rate and the natural rate of unemployment. In recessions when the GDP gap is negative, the unemployment gap is positive, and both of the gaps are represented by the blue shaded areas in Figure 2. In highly prosperous periods like the late 1990s, the GDP gap is positive and the unemployment gap is negative, as indicated by the red shaded areas in Figure 2. Another name for the GDP gap is the “output gap.”

Figures 1 and 2 summarize a basic dilemma faced by government policymakers who are attempting to achieve a low unemployment rate and a low inflation rate at the same time. If the inflation rate is high, lowering it requires a decline in actual real GDP and an increase in the actual unemployment rate. This happened in the early 1980s, when inflation was so high that the government deliberately pushed unemployment to its highest level since the 1930s. If, to the contrary, the policymaker attempts to provide jobs for everyone and keep the actual unemployment rate low then the inflation rate will speed up, as occurred in the 1960s and late 1980s.

Real GDP and the Three Macro Concepts

The total amount that the economy produces, actual real GDP, is closely related to the three central macroeconomic concepts introduced earlier in this chapter. First, as we see in Figure 2, the *difference* between actual and natural real GDP moves inversely with the *difference* between the actual and natural unemployment rates. When actual real GDP is high, unemployment is low, and vice versa.

The second link is with inflation, since inflation tends to speed up when actual real GDP is higher than natural real GDP (as in Figure 1). The third link is with productivity, which is defined as actual real GDP per hour; data on actual real GDP are required to calculate productivity.

Each of these links with the central macroeconomic concepts requires that actual real GDP be compared with *something else* in order to be meaningful. It must be compared to natural real GDP to provide a link with unemployment and inflation, or it must be divided by the number of hours worked to compute productivity. Actual real GDP by itself, without any such comparison, is not meaningful, which is why it is not included on the list of the three major macro concepts.

SELF-TEST 1

1. When actual real GDP is above natural real GDP, is the actual unemployment rate above, below, or equal to the natural unemployment rate?
2. When actual real GDP is below natural real GDP, is the actual unemployment rate above, below, or equal to the natural unemployment rate?
3. When the actual unemployment rate is equal to the natural rate of unemployment, is the actual rate of inflation equal to the natural rate of inflation?

4 Macroeconomics in the Short Run and Long Run

Macroeconomic theories and debates can be divided into two main groups: (1) those that concern the “short-run” stability of the economy, and (2) those that concern its “long-run” growth rate. Much of macroeconomic analysis concerns the first group of topics involving the short run, usually defined as a period lasting from one year to five years, and focuses on the first two major macroeconomic concepts introduced in Section 1, the unemployment rate and the inflation rate. We ask why the unemployment rate and the inflation rate over periods of a few years are sometimes high and sometimes low, rather than always low as we would wish. These ups and downs are usually called “economic fluctuations” or **business cycles**. Much of this text concerns the causes of these cycles and the efficacy of alternative government policies to dampen or eliminate the cycles.

The other main topic in macroeconomics concerns the long run, which is a longer period ranging from one decade to several decades. It attempts to explain the rate of productivity growth, the third key concept introduced in Section 1, or more generally, **economic growth**. Learning the causes of growth helps us predict whether successive generations of Americans will be better off than their predecessors, and why some countries remain so poor in a world

Business cycles consist of expansions occurring at about the same time in many economic activities, followed by similarly general recessions and recoveries.

Economic growth is the topic area of macroeconomics that studies the causes of sustained growth in real GDP over periods of a decade or more.

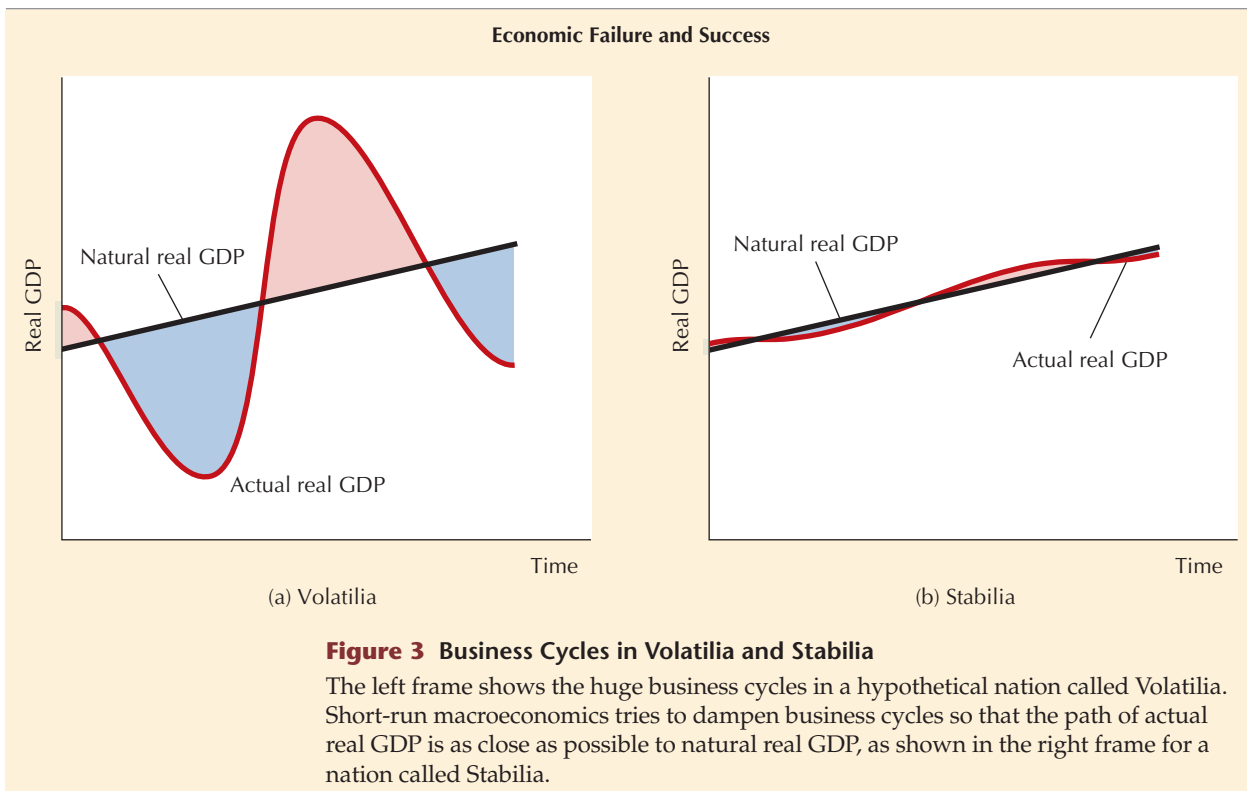
where other countries by contrast are so rich. The remarkable achievement of China in achieving economic growth of 8 to 9 percent per year consistently over the past three decades raises a new question about economic growth—how long will it take the Chinese economy to catch up to the American level of real GDP per person?

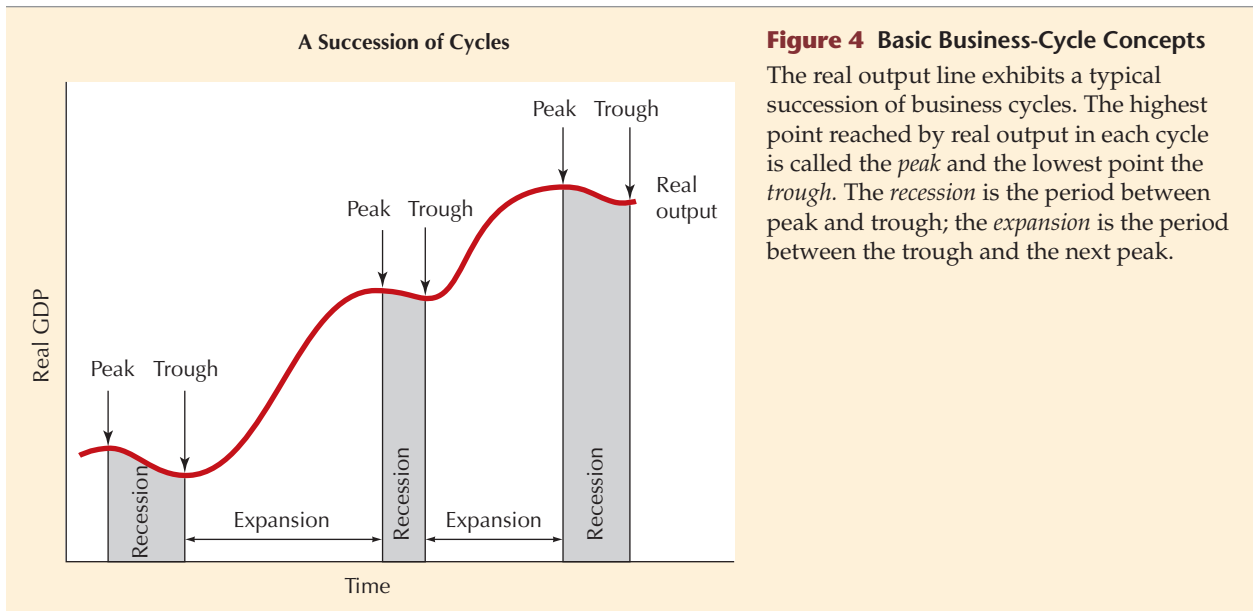
The Short Run: Business Cycles

The main short-run concern of macroeconomists is to minimize fluctuations in the unemployment and inflation rates. This requires that fluctuations in real GDP be minimized.

Figure 3 contrasts two imaginary economies: “Volatilia” in the left frame and “Stabilia” in the right frame. The black “natural real GDP” lines in both frames are *absolutely identical*. The two economies differ only in the size of their business cycles, shown by the size of their GDP gap, which is simply the difference between actual and natural real GDP shown by blue and red shading.

In the left frame, Volatilia is a macroeconomic hell, with severe business cycles and large gaps between actual and natural real GDP. In the right frame, Stabilia is macroeconomic heaven, with mild business cycles and small gaps between actual and natural real GDP. All macroeconomists prefer the economy depicted by the right-hand frame to that depicted by the left-hand frame. But the debate between macro schools of thought starts in earnest when we ask how to achieve the economy of the right-hand frame. Active do-something policies? Do-nothing, hands-off policies? There are economists who support each of these alternatives, and more besides. But everyone agrees that Stabilia





is a more successful economy than Volatilia. To achieve the success of Stabilia, Volatilia must find a way to eliminate its large real GDP gap.

The hallmark of business cycles is their pervasive character, which affects many different types of economic activity at the same time. This means that they occur again and again but not always at regular intervals, nor are they the same length. Business cycles in the past have ranged in length from one to twelve years.¹ Figure 4 illustrates two successive business cycles in real output. Although a simplification, Figure 4 contains two realistic elements that have been common to most real-world business cycles. First, the expansions last longer than the recessions. Second, the two business cycles illustrated in the figure differ in length.

The Long Run: Economic Growth

For a society to achieve an increasing standard of living, total output per person must grow, and such economic growth is the long-run concern of macroeconomists. Look at Figure 5, which contrasts two economies. Each has mild business cycles, like Stabilia in Figure 3. But in Figure 5, the left frame presents a country called “Stag-Nation,” which experiences very slow growth in real GDP. In contrast, the right-hand frame depicts “Speed-Nation,” a country with very fast growth in real GDP. If we assume that population growth in each country is the same, then growth in output per person is faster in Speed-Nation. In Speed-Nation everyone can purchase more consumer goods, and there is plenty of output left to provide better schools, parks, hospitals, and other public services. In Stag-Nation people must constantly face debates, since more money for schools or parks requires that people sacrifice consumer goods.

¹ A comprehensive source for the chronology of and data on historical business cycles, as well as research papers by distinguished economists, is Robert J. Gordon, ed., *The American Business Cycle: Continuity and Change* (Chicago: University of Chicago Press, 1986). An up-to-date chronology and a discussion of the 2007–09 recession can be found at www.nber.org/cycles/cyclesmain.html.



5 CASE STUDY

How Does the Global Economic Crisis Compare to Previous Business Cycles?

This section examines U.S. macroeconomic history since the early twentieth century. You will see that unemployment in the past four decades did not come close to the extreme crisis levels of the 1930s.

Real GDP

Figure 6 is arranged just like Figure 2. But whereas Figure 2 shows hypothetical relationships, Figure 6 shows the actual historical record. In the top frame the solid black line is natural real GDP, an estimate of the amount the economy could have produced each year without causing acceleration or deceleration of inflation.

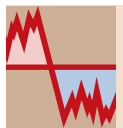
The red line in the top frame plots actual real GDP, the total production of goods and services each year measured in the constant prices of 2005. Can you pick out those years when actual and natural real GDP are roughly equal? Some of these years were 1900, 1910, 1924, 1964, 1987, 1997, and 2007.

In years marked by blue shading, actual real GDP fell below natural real GDP. A maximum deficiency occurred in 1933, when actual real GDP was only 64 percent of natural GDP; about 35 percent of natural real GDP was thus “wasted,” that is, not produced. In some years actual real GDP exceeded natural real GDP, shown by the shaded red areas. The largest red area occurred during World War II in 1942–45.

Unemployment

In the middle frame of Figure 6, the blue line plots the actual unemployment rate. By far the most extreme episode was the Great Depression, when the actual unemployment rate remained above 10 percent for ten straight years, 1931–40. The black line in the middle frame of Figure 6 displays the natural rate of unemployment, the minimum attainable level of unemployment that is compatible with avoiding an acceleration of inflation. The red shaded areas mark years when actual unemployment fell below the natural rate, and the blue shaded areas mark years when unemployment exceeded the natural rate.

Notice now the relationship between the top and middle frames of Figure 6. The blue shaded areas in both frames designate periods of low production, low real GDP, and high unemployment, such as the Great Depression of the 1930s. The red shaded areas in both frames designate periods of high production and high actual real GDP, and low unemployment, such as World War II and other wartime periods. ♦



GLOBAL ECONOMIC CRISIS FOCUS

How It Differs from 1982–83

The bottom frame of Figure 6 magnifies the middle frame by starting the plot in 1970 instead of 1900. Over the past four decades there have been three big recessions with unemployment reaching its peak in 1975, then 1982–83, and most recently in 2009–10. The recent episode of high unemployment is more serious

(continued)

A Historical Report Card on Real GDP and Unemployment

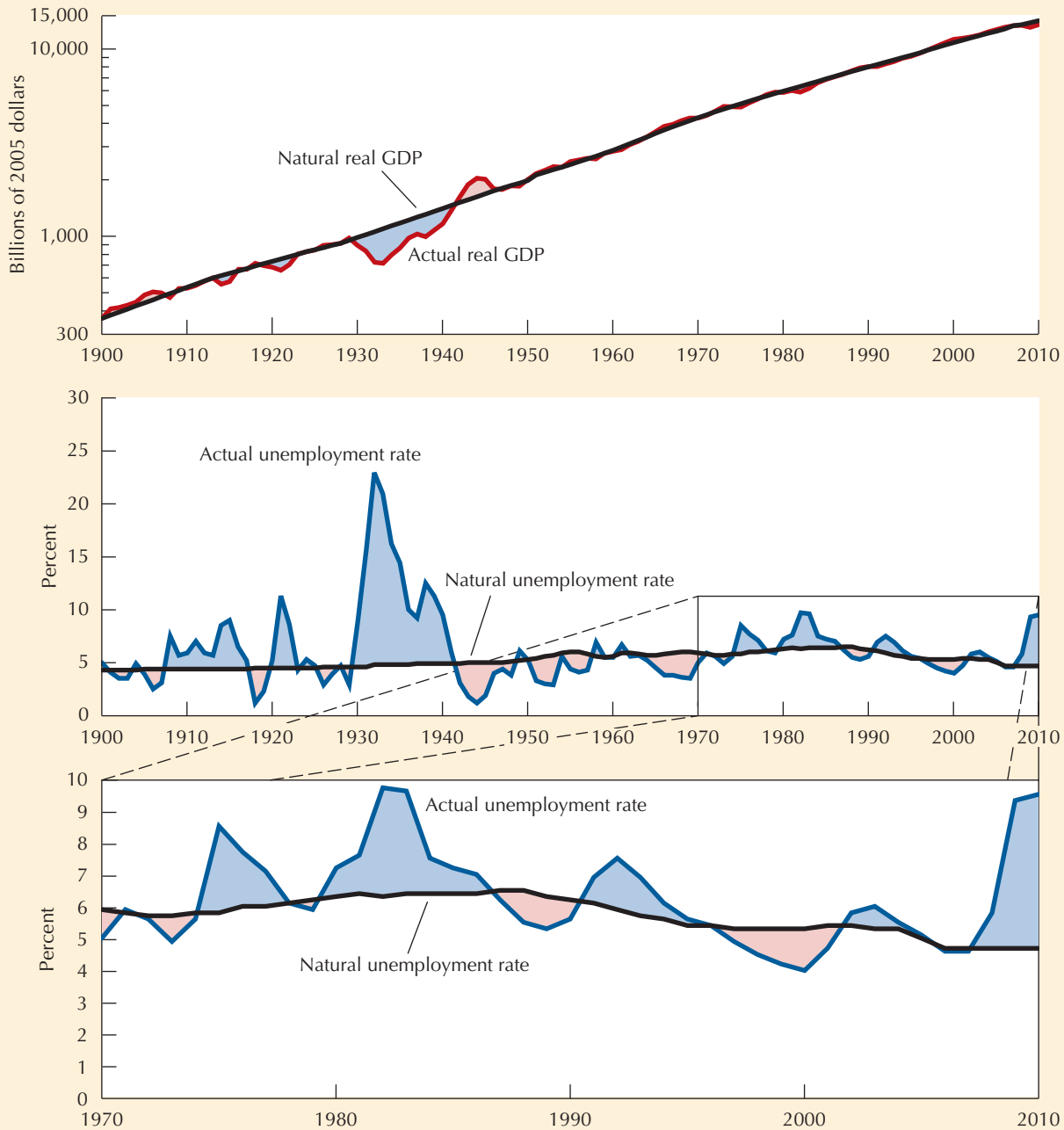


Figure 6 Actual and Natural GDP and Unemployment, 1900–2010

A historical report card for two important economic magnitudes. In the top frame the black line indicates natural real GDP. The red line shows actual real GDP, which was well below natural real GDP during the Great Depression of the 1930s and well above it during World War II. In the middle frame the black line indicates the natural rate of unemployment, and the blue line indicates the actual unemployment rate. Actual unemployment was much higher during the Great Depression of the 1930s than at any other time during the century. The bottom frame magnifies the middle frame to focus on unemployment since 1970. There we see that the 2009–10 levels of high unemployment were equivalent to 1982–83. However, the increase in unemployment was greater in 2007–10 than in 1980–82 since that economy started from a lower unemployment rate.

and harmful than in 1982–83 for several reasons. Notice that the unemployment rate dropped sharply from 1983 to 1984, while the decline in the unemployment rate in 2011–12 is forecast to be very slow. In the recent episode a larger share of the unemployed have been without jobs for six months or more, and a much larger share of the labor force than in 1982–83 has been forced to work on a part-time basis rather than their desired full-time status.

6 Macroeconomics at the Extremes

Most of macroeconomics treats relatively normal events. Business cycles occur, and unemployment goes up and down, as does inflation. Economic growth registers faster rates in some decades than in others. Yet there are times when the economy's behavior is anything but normal. The normal mechanisms of macroeconomics break down, and the consequences can be dire. Three examples of unusual macroeconomic behavior involving our “Big Three” concepts are the Great Depression of the 1930s, the German hyperinflation of the 1920s, and the stark difference in economic growth between two Asian nations over the past 50 years.

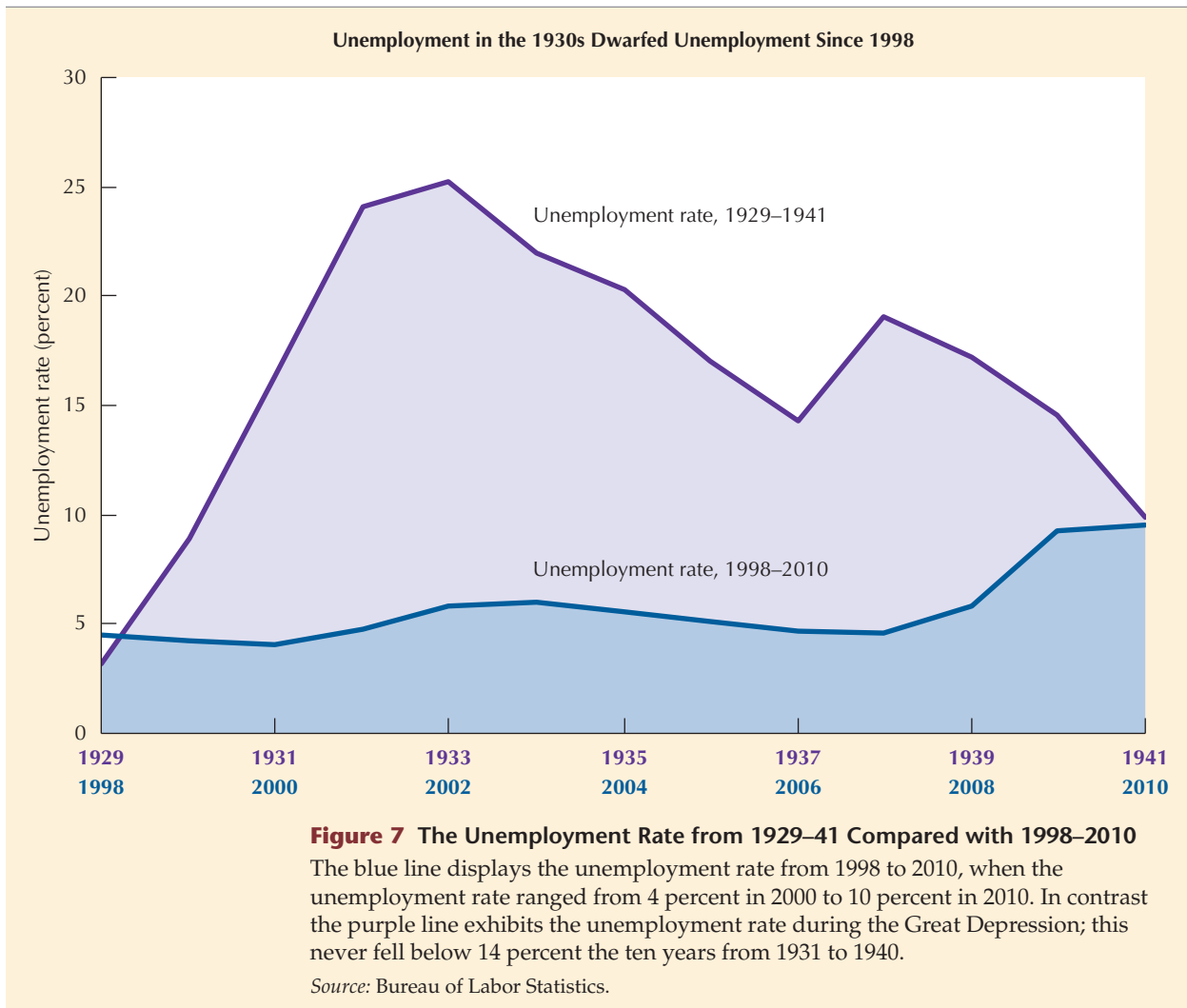
Unemployment in the Great Depression, 1929–40

The first of our “Big Three” macroeconomic concepts is the unemployment rate. The most extreme event involving unemployment in recorded history was the Great Depression of the 1930s. As is clearly visible in Figure 6 in the previous section, real GDP collapsed between 1929 and 1933, and the unemployment rate soared. A closer look at the decade of the 1930s is provided in Figure 7. For contrast with the 1930s, the blue line displays the unemployment rate from 1998 to 2010. The unemployment rate during the Great Depression behaved quite differently, as shown by the purple line, soaring from 3.2 percent in 1929 to 25.2 percent in 1933, and never falling below 10 percent until 1941. By 2010 the unemployment rate had reached 9.5 percent, almost as high as it was in 1941.

In the United States, the Great Depression caused many millions of jobs to disappear. College seniors could not find jobs. Stories of job hunting were unbelievable but true. For example, men waited all night outside Detroit employment offices so they would be first in line the next morning. An Arkansas man walked 900 miles looking for work. So discouraged were Americans of finding jobs that for the first (and last) time in American history, there were more emigrants than immigrants. In fact, there were 350 applications per day from Americans who wanted to settle in Russia. Since there was no unemployment insurance, how did people live when there were no jobs? Wedding rings were sold, furniture pawned, life insurance borrowed against, and money begged from relatives. Millions with no resources moved aimlessly from city to city, sometimes riding on freight cars; some cities tried to keep the wanderers out with barricades and shotguns.²

The Great Depression affected most of the industrialized world but was most serious in the United States and in Germany. The Great Depression in Germany led directly to Hitler's takeover of power in 1933 and indirectly

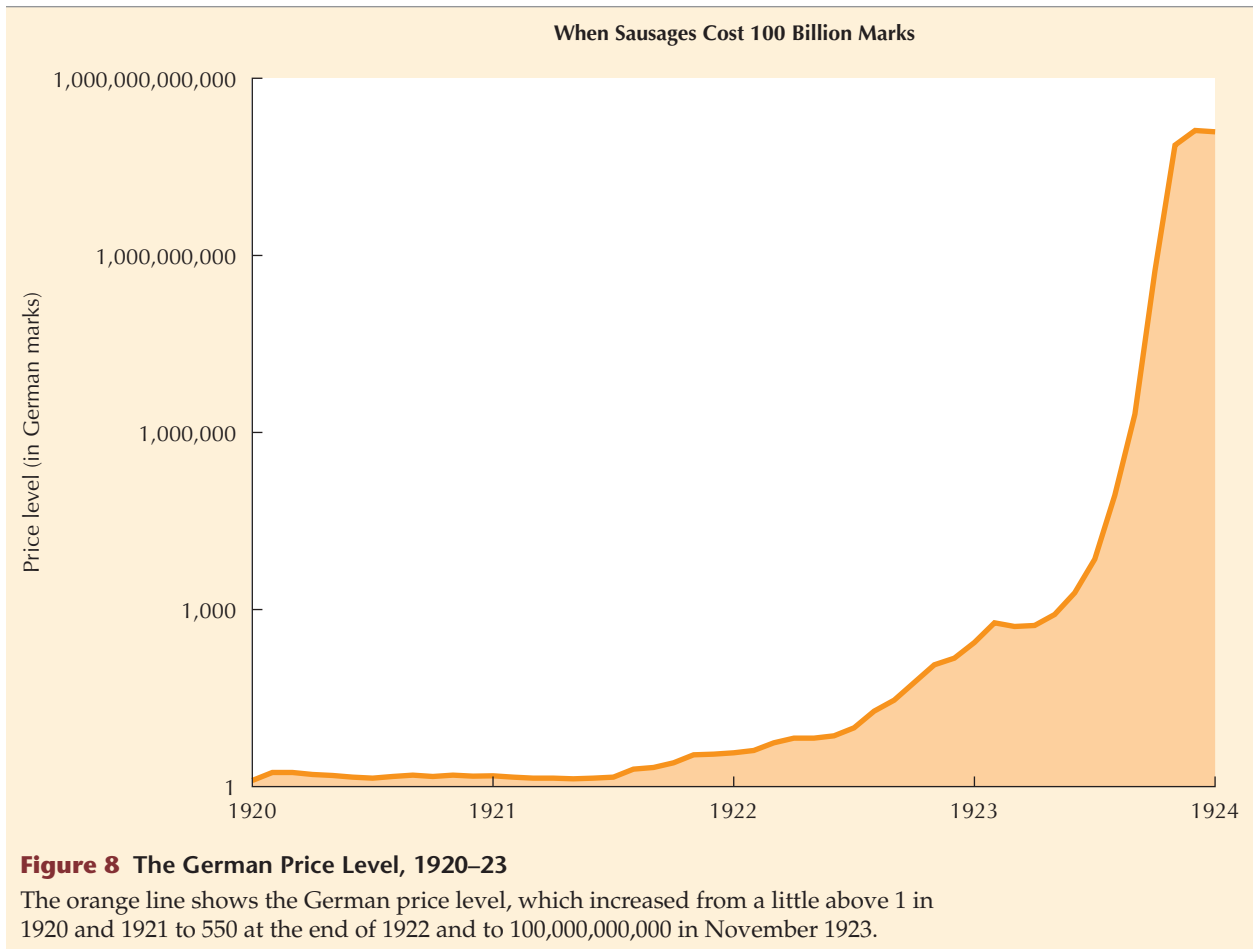
² Details in this paragraph are from William Manchester, *The Glory and the Dream: A Narrative History of America, 1932–72* (Boston: Little-Brown, 1973), pp. 33–35.



caused the 50 million deaths of World War II. What caused the disastrous depression and what could have been done to avoid it? We need to study basic macroeconomics first, and then we will examine the causes of the Great Depression.

The German Hyperinflation of 1922–23

A *hyperinflation* can be defined as an inflation raging at a rate of 50 percent or more per month. If a Big Mac cost \$2 in January, a 50 percent monthly inflation would raise the price to \$3 in February, \$4.50 in March, \$6.75 in April, and onward until it reached \$173 in December! There were several examples of hyperinflation in the twentieth century, most of them involving the experience of European countries after World Wars I and II. The best known is the German hyperinflation, which proceeded at 322 percent per month between August 1922 and November 1923; in its final climactic days in October 1923, the inflation rate was 32,000 percent per month! Figure 8 displays the German price level from 1920 to 1923. The price



level goes from slightly above 1.0 in 1920 and early 1921 to 550 by the end of 1922 and about 100,000,000,000 at the end of 1923.

The basic cause of the German hyperinflation was the Versailles Peace Treaty, which ended World War I and required payment of massive reparations by Germany to Britain and France. The Germans were unwilling to obtain funds to pay the reparations by raising taxes, so instead they ran huge government budget deficits financed by printing paper money. When people realized the implications of these deficits, they became less willing to hold money; it was both the rapid increase in the supply of money and the ever-declining demand for money that combined to fuel the hyperinflation.³

The inflation decimated the savings of ordinary Germans. A farmer who sold a piece of land for 80,000 marks as a nest egg for his old age could barely buy a sandwich with the money a few years later. Elderly Germans can still recall the days in 1923 when:

People were bringing money to the bank in cardboard boxes and laundry baskets. As we no longer could count it, we put the money on scales and weighed it. I can still see my brothers coming home Saturdays with heaps of paper money. When the

³ Data from Philip Cagan, “The Monetary Dynamics of Hyperinflation,” in Milton Friedman, ed., *Studies in the Quantity Theory of Money* (Chicago: University of Chicago Press, 1956), Table 1, p. 26.

shops reopened after the weekend they got no more than a breakfast roll for it. Many got drunk on their pay because it was worthless on Monday.⁴

Just as the Great Depression helped to create resentments about the existing government that turned voters to Hitler's Nazi party, so bitter memories of lost savings in the hyperinflation ten years earlier added to Hitler's growing support. Very rapid inflation is not an ancient artifact lacking relevance for today.

Throughout the 1980s and 1990s several Latin American countries suffered from inflation rates of 1,000 percent per year or more. Recently, a devastating inflation broke out in the southern African nation of Zimbabwe, where the inflation rate in October 2008 reached 210 billion percent per year! Because the government failed to raise the wages of teachers and hospital workers by even remotely the percentage by which prices had gone up, the nation in 2007–09 was in a state of collapse, with schools and hospitals closing down. So severe was the hyperinflation that in early 2009 the government cut 12 zeros off all types of currency and all prices, so that people would trade in a banknote marked 1,000,000,000,000 and receive a new banknote marked 1. In this chaotic environment more and more citizens turned to using currencies of other countries, particularly the South African Rand.

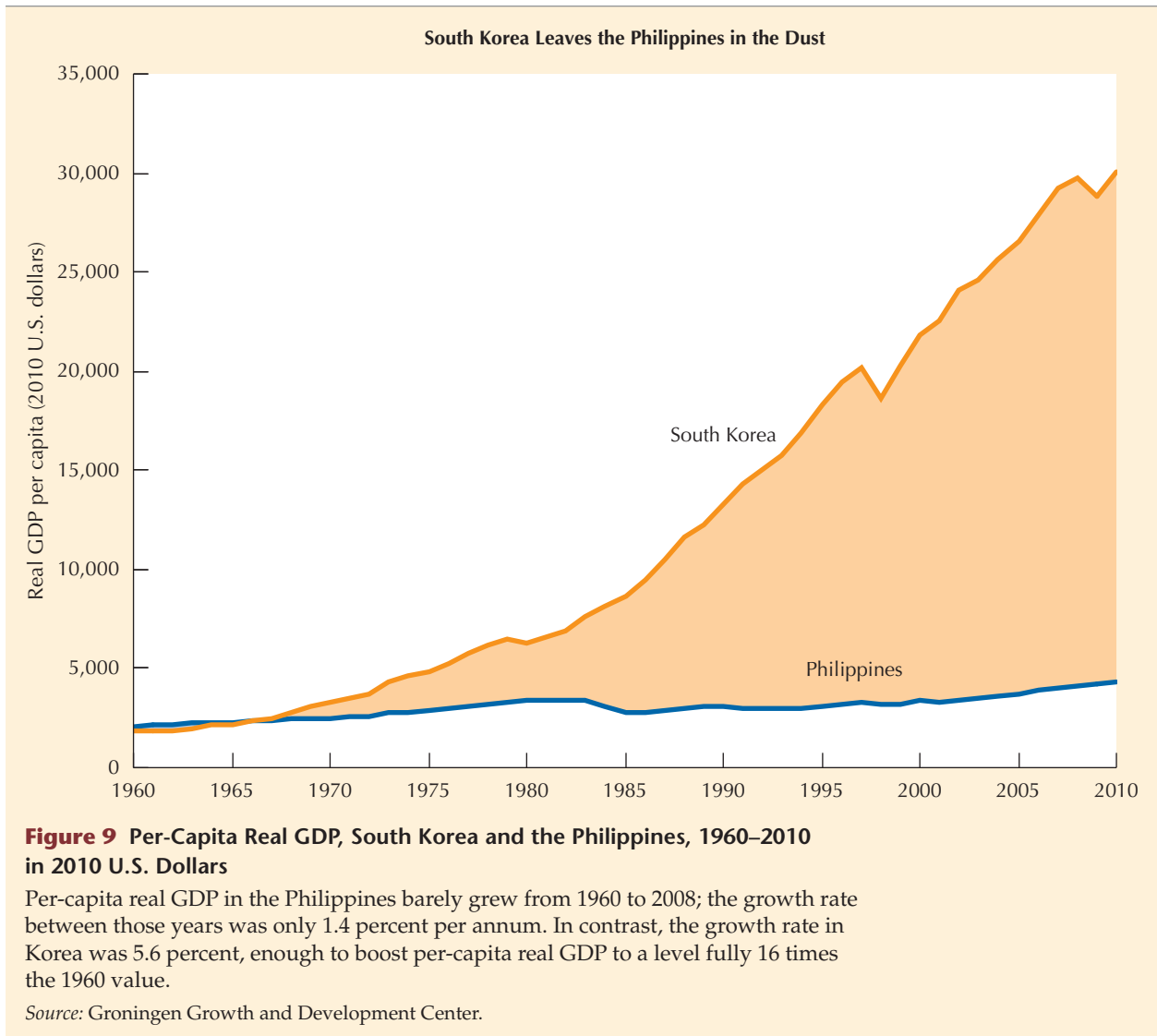
Fast and Slow Growth in Asia

Neither the Great Depression nor the German hyperinflation had any significant effect on the American or German standard of living a decade or two later. For effects that really matter over the decades, we need to look at the third of our "Big Three" macroeconomic concepts: productivity growth. Differences in growth rates that may appear small can compound over the decades and create enormous differences in the standard of living of any economic unit, from individuals to nations. A classic example of the importance of rapid growth is illustrated in Figure 9, which displays real GDP per capita in South Korea and the Philippines over the period 1960 to 2010.

In 1960, real GDP per capita in the Philippines was actually 20 percent higher than in South Korea. But between 1960 and 2010, real GDP per capita grew at 5.6 percent per year in South Korea compared to only 1.4 percent in the Philippines. Figure 9 shows the wide gap that opened up between the Korean and Philippine standards of living, with 2010 values of only \$4,357 for the Philippines and \$30,175 for South Korea. As a result of its superior economic growth record, the average Korean in 2010 could save or consume almost seven times as much as the average citizen of the Philippines. Stated another way, the Korean could consume everything enjoyed by the Philippine citizen and then have almost six times as much left over. This extra output in Korea is shown by the orange shading in Figure 9.

The outstanding achievement of South Korea has been duplicated in several other countries in East Asia, notably Hong Kong, Singapore, and Taiwan, and more recently by China. What secrets have the Koreans learned about economic growth that the Philippine government and population have not learned?

⁴ Alice Siebert, "When Inflation Ruined Germany," *Chicago Tribune*, November 30, 1974.



7 Taming Business Cycles: Stabilization Policy

Macroeconomic analysts have two tasks: to analyze the causes of changes in important aggregates and to predict the consequences of alternative policy changes. In policy discussions the group of aggregates that society cares most about—inflation, unemployment, and the long-term growth rate of productivity—are called goals, or **target variables**. When the target variables deviate from desired values, alternative **policy instruments** can be used in an attempt to achieve needed changes. Instruments fall into three broad categories: **monetary policies**, which include control of the money supply and interest rates; **fiscal policies**, which include changes in government expenditures and tax rates; and a third, miscellaneous group, which includes policies to equip workers with skills they need to qualify for jobs.

How are target variables and policy instruments related to the three central macroeconomic concepts introduced at the beginning of this chapter? All three

Target variables are aggregates whose values society cares about.

Policy instruments are elements that government policymakers can manipulate directly to influence target variables.

Monetary policy tries to influence target variables by changing the money supply or interest rate or both.

Fiscal policy tries to influence target variables by manipulating government expenditures and tax rates.

INTERNATIONAL PERSPECTIVE

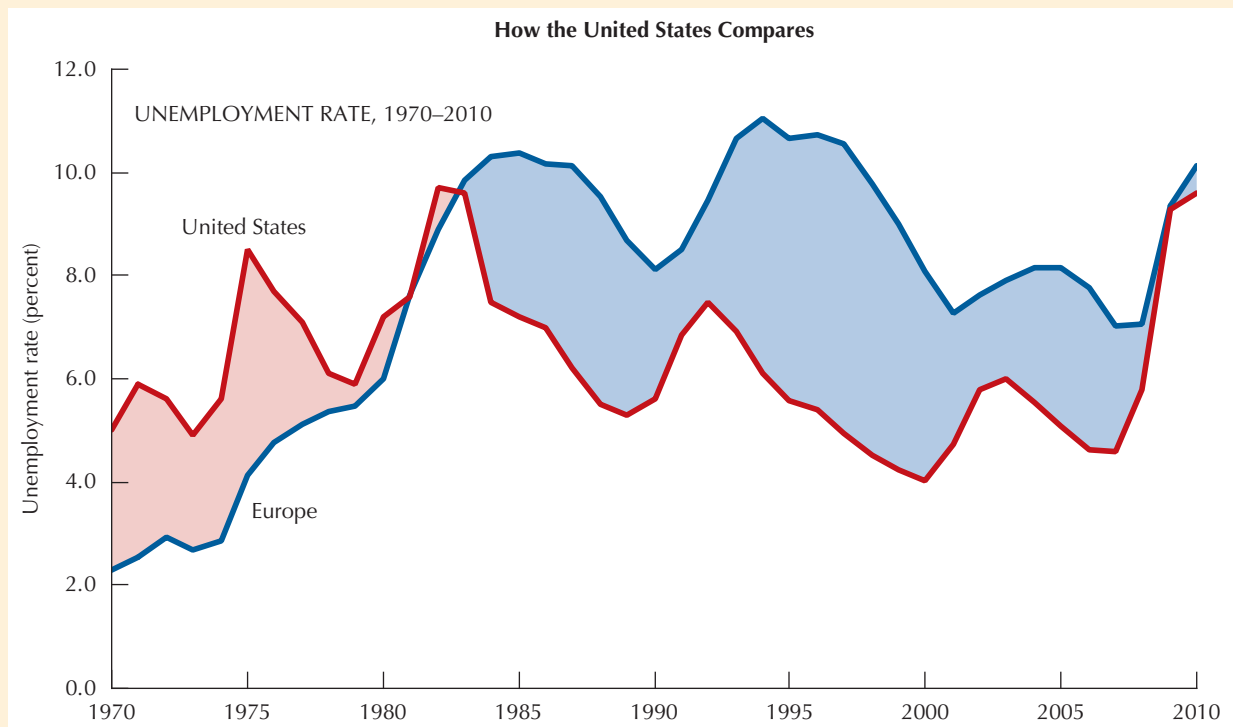
Differences Between the United States and Europe Before and During the Global Economic Crisis

One result of the internationalization of macroeconomics is the increased attention to the relative economic performance of major countries or regions in the world, such as the United States versus Europe or Asia. We learn from these comparisons that performance differs over time. Compared to Europe, the United States did not perform well from 1960 to 1985 but then started to improve and performed much better than Europe after 1995, at least until the 2007 start of the Global Economic Crisis.

Good performance means the achievement of low unemployment, low inflation, and rapid productivity

growth. The two charts in this box compare the United States and Europe on the unemployment rate and rate of productivity growth.^a We do not include the third big concept, the inflation rate, because differences between the U.S. and European inflation rates are minor.

The chart below shows Europe's unemployment rate as lower than the U.S. rate throughout the 1970s, but higher after 1980. In fact, in 1999 the European unemployment rate was double that in the United States. The reasons for the big increase in the European unemployment rate constitute one of the most important and exciting research topics in macroeconomics—what policies could the European



concepts—the unemployment rate, inflation rate, and productivity growth—are the key target variables of economic policy, the goals society cares most about.

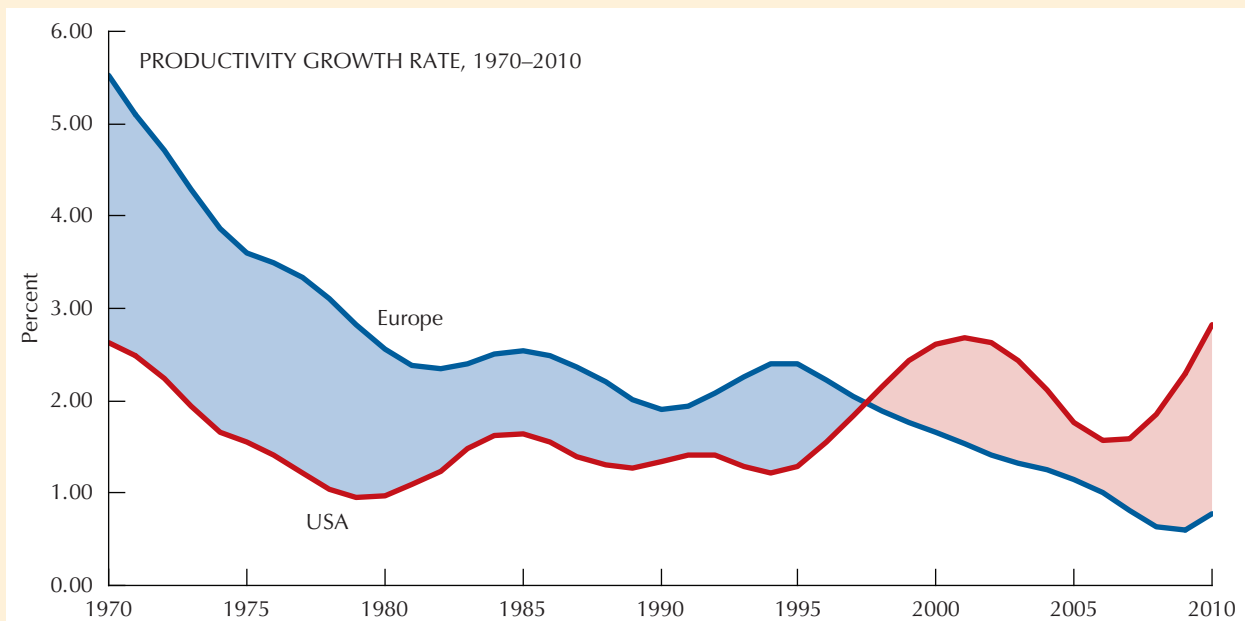
The goal of policymakers regarding productivity growth is simple—just make productivity growth as fast as possible. There are no negatives to rapid productivity growth, and virtually every country in the world admires the growth achievement of South Korea (and some other East Asian countries) displayed in Figure 9 in the previous section. However, the goal of policymakers regarding the unemployment rate is not so simple. An attempt to reduce unemployment to zero would be likely to cause a significant acceleration of inflation,

countries adopt to reduce the European unemployment rate? Notice that in 2010, while Europe's unemployment rate was slightly higher than that in the United States, it had increased much less in the Global Economic Crisis period of 2008–10 than in the United States. Why? Some European nations including Germany and the Netherlands adopted a “work-sharing” policy in which people retained their jobs but worked shorter hours. Some European governments subsidized firms to retain workers. As a result, European unemployment did not rise nearly as much in 2008–10 as in the United States, but as European output slumped while workers were protected from layoffs, European productivity declined while that in the United States soared.

The chart below shows the growth rate of productivity in the United States and the same group of European countries. European productivity growth was more rapid than in the United States until 1996, after which the U.S. growth rate sped up and the European rate slowed down.

The U.S. speedup after 1995 is often attributed to its rapid adoption of computer and Internet technology, but this creates a big puzzle because there are plenty of computers and Internet use within Europe. Notice in 2008–09 that European productivity growth dropped below one percent while U.S. productivity growth revived. This occurred mainly because European firms and governments protected workers from mass layoffs to some extent, at least in comparison to the United States where American firms were panicked by the crisis and laid off millions of workers. It is not yet clear whether the impressive gains in U.S. productivity in 2008–10 will last and will augment the post-1998 advantage of the United States over Europe in its productivity growth performance.

^a All data on Europe refer to the fifteen members of the European Union prior to its enlargement to twenty-five nations on May 1, 2004.



and moderation of inflation may be impossible if policymakers attempt to maintain the unemployment rate too low. A compromise goal for policymakers is to try to set the actual unemployment rate equal to the natural unemployment rate, since this would tend to maintain a constant inflation rate that neither accelerates nor decelerates.

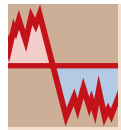
The Role of Stabilization Policy

Macroeconomic analysis begins with a simple message: Either type of **stabilization policy**, monetary or fiscal, can be used to offset undesired changes

A **stabilization policy** is any policy that seeks to influence the level of aggregate demand.

in private spending.

There are many problems in applying stabilization policy. It may not be possible to control aggregate demand instantly and precisely. A policy stimulus intended to fight current unemployment might boost aggregate demand only after a long and uncertain delay, by which time the stimulus might not be needed. The impact of different policy changes may also be highly uncertain. An added problem has been faced by Japan in the 1990s and by the United States in the late 1930s and since 2009. The interest rate cannot be negative, and so once monetary policy has reduced the rate to zero it loses the ability further to stimulate the economy.



GLOBAL ECONOMIC CRISIS FOCUS

New Challenges for Monetary and Fiscal Policy

The sudden collapse of the U.S. economy in the fall of 2008 created unprecedented challenges for the makers of monetary and fiscal policy. The banking and financial system almost ground to a halt, and loans were nearly impossible to obtain. Housing prices declined rapidly and many households either lost their home to foreclosure or found that they owed more on their mortgages than their houses were worth. Monetary policy reacted promptly to reduce the short-term interest rate to zero but then was stymied by its inability to reduce interest rates below zero, since the interest rate cannot be negative. Fiscal policy was also constrained by the growing public debt that resulted from deficit spending to combat the recession.

SELF-TEST 3

1. Is it the task of stabilization policy to set the unemployment rate to zero? Why or why not?
2. Is it the task of stabilization policy to set the inflation rate to zero? Why or why not?
3. What are the two big problems in applying stabilization policy to control aggregate demand?

8 The “Internationalization” of Macroeconomics

More than ever before, macroeconomics is an international subject. The days are gone when the effects of U.S. stabilization policy could be analyzed in isolation, without consideration for their repercussions abroad. This old view of the United States as a **closed economy** described reality in the first decade or so after World War II. In the 1940s and 1950s, trade accounted for only about 5 percent of the U.S. economy, exchange rates were fixed, and financial flows to and from other nations were restricted.

A **closed economy** has no trade in goods, services, or financial assets with any other nation.

The United States has increasingly become an **open economy**. Imports now equal 17 percent of U.S. GDP. The exchange rate of the dollar has been flexible since 1973 and has fluctuated far more widely than anyone had predicted prior to that time. International financial flows are massive and often instantaneous, with computers sending messages to buy or sell stocks, bonds, and foreign currencies at the speed of light among the major financial centers of Tokyo, London, New York, and Chicago.

The growing integration of the world economy was particularly evident in the emergence of the Global Economic Crisis in 2008–09. The Global Economic Crisis started in the United States, but it soon spread to the rest of the world as the meltdown of U.S. financial markets spread to banks and other financial institutions in Europe and Asia.

A primary example of global integration and interdependence had emerged long before the Global Economic Crisis. Back in 2005–07 (before the recession), the United States ran a large foreign trade deficit, importing far more than it exported. Many of these imports came from China, which was happy to lend money to the United States to continue to buy those American exports manufactured in China. Why would China so eagerly lend money to the United States to buy its goods? The simple answer, to which we return in Chapter 7, is that China pursues policies that keep its exports cheap, thus providing millions of jobs for Chinese workers, even though to achieve this China must lend billions of dollars to the United States.

An **open economy** exports (sells) goods and services to other nations, buys imports from them, and has financial flows to and from foreign nations.

Summary

1. The three central macroeconomic concepts are those that most affect everyday lives. They are the unemployment rate, inflation rate, and productivity growth.
2. Macroeconomics differs from microeconomics by focusing on aggregates that are summed up over all the economic activities in the economy. Theory in macroeconomics is a process of simplification that identifies the most important economic relationships.
3. Gross domestic product (GDP) is a measure of the overall size of the economy. While it does not affect everyday life directly, the behavior of GDP helps us to understand the behavior of the three central macroeconomic concepts that do influence everyday life.
4. Neither too much nor too little real GDP is desirable. The best compromise level is called natural real GDP and is consistent with a constant inflation rate. When the economy is operating at its natural level of real GDP, it is also by definition operating at its natural rate of unemployment.
5. The topic of “business cycles” studies short-run phenomena in macroeconomics over a period of one to five years. The topic of “economic growth” studies long-run phenomena over a period lasting a decade or more.
6. While most macroeconomic analysis concerns relatively normal events, a challenge for macroeconomists is to explain how extreme and unusual events can occur. Two of these were the Great Depression of the 1930s and the German hyperinflation of 1922–23. Another challenge is to understand how the rate of economic growth can be so different between two countries like South Korea and the Philippines that are located in the same region of the world.
7. In this century, periods of high unemployment have coincided with those of low real GDP. The Great Depression clearly scored worst on both counts.
8. The three central macroeconomic aggregates, (unemployment rate, inflation rate, and productivity growth) are the main targets of stabilization policy. Stabilization policy may not be effective in improving well-being if both unemployment and inflation are too high, and stabilization policy may operate with a long delay or have effects that are highly uncertain.
9. Macroeconomics is an international subject. International repercussions influence the way fiscal and monetary policy work and how the inflation process operates. Countries around the world face the same dilemmas as does the United States. How can low output and high unemployment be cured without massive increases in government deficits and government debt?

Concepts

macroeconomics
Global Economic Crisis
unemployment rate
inflation rate
productivity
aggregate
gross domestic product

actual real GDP
natural real GDP
natural rate of unemployment
GDP gap
unemployment gap
business cycles
economic growth

target variables
policy instruments
monetary policy
fiscal policy
stabilization policy
closed economy
open economy

Questions

1. Read either an entire week of the *Wall Street Journal* or a business-oriented weekly magazine such as *Business Week* or *The Economist*. Identify three stories that deal with topics related to microeconomics and another three stories that discuss topics related to macroeconomics. Explain why you have put each story in either the microeconomics or macroeconomics category.
2. Using the quarterly data for the period 1947–2010, attempt to identify the recession phases and the expansion phases of the basic business cycle depicted in Figure 4. (Note: The official start and end of each phase of a business cycle is determined by the National Bureau of Economic Research Business Cycle Dating Committee. The committee looks at more data than simply GDP in determining when each phase occurs and dates phases by months, not quarters. Therefore your answer will only approximate the official recession and expansion phases; for more details on the way the committee determines when each phase occurs and the official dates of business cycles, go to www.nber.org/cycles/main.html.)
3. Using your answer to question 2, compare the lengths of recessions and expansions for the period 1947–1982 with the years 1983–2007. Compare the length of the 2007–09 recession with the other recessions of the post–World War II era.
4. How are the natural real GDP and the natural real unemployment rates related to the rate of inflation?
5. Between June 2003 and June 2005, U.S. unemployment fell from 6.3 percent to 5.0 percent of the labor force. The Federal Reserve, the nation’s monetary policy-making authority, took active measures beginning in June 2004 to raise short-term interest rates. What might have motivated policymakers to raise interest rates and what were they hoping to accomplish?
6. In April 2000, the seasonally adjusted unemployment rate was 3.8 percent. By June 2001, the unemployment rate had increased to 4.5 percent. Yet the measures by the Federal Reserve to reduce short-term interest rates were taken in stages, and in fact the unemployment rate continued to rise. What might have motivated the policymakers’ cautious behavior?
7. (a) The “big three” concepts of macroeconomics are the unemployment rate, the inflation rate, and productivity growth. Discuss which of these concepts primarily relate to the behavior of the economy (i) in the short run and (ii) in the long run.
(b) Using Figures 3 and 5 as guides, discuss how natural real GDP is used to evaluate the behavior of the economy in both the short run and the long run.
8. Explain why productivity growth not only allows a society to have higher living standards in the form of more goods and services, but also allows it to increase the percentage of an average person’s life that is spent in school, on vacation, in retirement, or in other non-work related activities.
9. Explain how the value of real GDP relative to natural real GDP can be used by policymakers to decide how to change the values of the target variables.
10. How does the performance of the U.S. economy contrast with the performance of the European economy for the periods 1960–2007 and since the start of the Global Economic Crisis?

Problems



Visit www.MyEconLab.com to complete these or similar exercises.

- (a) Suppose that real GDP is currently \$97 billion per year and natural real GDP is currently \$100 billion. Measured as a percentage, what is the GDP gap?
 (b) Suppose natural real GDP is growing by \$4 billion per year. By how much must real GDP have risen after two years to close the GDP gap?
- The sum of exports and imports as a percent of gross domestic product is sometimes used as a measure of how open an economy is. In particular, the greater the percent, the more open the economy is considered.

Use the following data to compute this measure of the openness of the United States economy in 1960, 1970, 1980, 1990, 2000, and 2009. Discuss what the data show in terms of the “internationalization” of the United States economy since 1960.

	1960	1970	1980	1990	2000	2009
GDP	2,830.9	4,269.9	5,839.0	8,033.9	11,226.0	12,880.6
Exports	98.5	175.5	351.7	600.2	1,188.3	1,490.7
Imports	114.5	236.6	344.7	673.0	1,639.9	1,853.8

SELF-TEST ANSWERS

- (1) When actual real GDP is above natural real GDP, the actual unemployment rate is below the natural unemployment rate. (2) In this opposite case, the actual unemployment rate is above the natural unemployment rate. (3) There is no such thing as the natural rate of inflation. When the economy is operating at its natural rate of unemployment, the inflation rate does not change. But it does not change from whatever level is inherited from the past, and this could be zero, 10 percent per year, or 100 percent per year.
- (1) short-run, (2) long-run, (3) short-run, (4) both (the money can create jobs during a recession but also will stimulate long-run productivity growth).
- (1) Stabilization policy cannot set the unemployment rate to zero or any other rate below the natural rate of unemployment without causing accelerating inflation. (2) Stabilization policy can set the inflation rate to zero only at the cost of a recession and a substantial cost in terms of lost output. (3) The two big problems are lags and uncertainty. A policy change may affect aggregate demand only after a long and uncertain delay, and the impact of different policy changes may also be highly uncertain.

Data Sources and Methods

Sources and Methods for Figures

Some sources are abbreviated as follows:

FRB: The Board of Governors of the Federal Reserve System

BEA: U.S. Department of Commerce *Bureau of Economic Analysis*

NIPA Tables: *National Income and Products Accounts Tables* obtained from www.bea.gov

BLS: U.S. Department of Labor *Bureau of Labor Statistics*

GGDC: The Conference Board and Groningen Growth and Development Centre

Historical Statistics: *The Historical Statistics of the United States: Millennial Edition Online*

IMF: International Monetary Fund

OECD: The Organization for Economic Cooperation and Development

- Figure 6:

1900–2010: Real GDP (Y):

Same as Nominal GDP (X), except Table 1.1.6 for 1929–2010.

Natural Real GDP (Y^N):

1875–1955: Y^N is the geometric interpolation between real GDP for the benchmark years 1869, 1873, 1884, 1891, 1900, 1910, 1924, and 1949 and

the value of natural real GDP in 1955 (see below).

1955–2010: Average annual values of the natural real GDP series described in Appendix C-2.

Unemployment Rate (U):

1890–1899: Lebergott's series copied from Christina Romer, "Spurious Volatility in Historical Unemployment Data," *Journal of Political Economy*, vol. 94 (February 1986).

1900–1946: Series B1 in Long-Term Economic Growth, 1860–1970 (Washington, D.C.: U.S. Department of Commerce, 1973).

1947–2010: Series LNS14000000 from <http://stats.bls.gov>, Bureau of Labor Statistics, Department of Labor. Average of quarterly values.

Natural Unemployment Rate (U^N):

1890–1901: Assumed to be the same level as in 1902, 4.1 percent.

1902–1954: U^N is the linear interpolation between the U^N values of the benchmark years of 1902, 1907, 1913, 1929, and 1949 and is calculated as $U^N = B^* (U/UA)$ where UA is the published unemployment rate that adjusts for self-employment. UA equals the number of unemployed divided by the civilian labor force net of self-employed persons. The long-run equilibrium rate for UA (" B ") reflects the value of UA observed in late 1954 when the economy was operating at its natural rate of unemployment. Changes in U^N before 1954 reflect only changes in the U/UA ratio.

1955–2010: Time-varying NAIRU for chain-weighted GDP price index-based deflator with standard deviation = 0.2 from Robert J. Gordon, "Time-Varying NAIRU," *Journal of Economic Perspective*, vol. 11, pp. 11–34, extended to 2010 using unpublished research. For recent unpublished research papers on time-varying NAIRU, see <http://faculty-web.at.northwestern.edu/economics/gordon/researchhome.html>

2. Figure 7:

1929–41 and 1995–2010: Unemployment Rate (U):

1890–1899: Lebergott's series copied from Christina Romer, "Spurious Volatility in Historical Unemployment Data," *Journal of Political Economy*, vol. 94 (February 1986).

1900–1946: Series B1 in Long-Term Economic Growth, 1860–1970 (Washington, D.C.: U.S. Department of Commerce, 1973).

1947–2010: Series LNS14000000 from <http://stats.bls.gov>, Bureau of Labor Statistics, Department of Labor. Average of quarterly values.

3. Figure 8:

Thomas J. Sargent, "The Ends of Four Big Inflations," in Robert E. Hall, ed., *Inflation: Causes and Effects*, University of Chicago for NBER, 1982, Table G1, pp. 74–75

4. Figure 9:

GDP per capita is a linear average of GK and EKS PPP GDP measures

1960–2010: GGDC, Total Economy Database, January 2010, www.ggdc.net

U.S. implicit GDP deflator estimates
BEA NIPA Table 1.1.9

5. International Perspective box:

Labor Productivity

1960–2010: GGDC, Total Economy Database, January 2010

EU-15 Unemployment

1960–2010: OECD Labour Force Statistics—Summary tables Vol. 2010 release 03. Source: OECD Employment and Labour Market Statistics

EU-15 Civilian Labor Force

1960–2010: OECD Labour Force Statistics—Summary tables Vol. 2010 release 03. Source: OECD Employment and Labour Market Statistics

U.S. Unemployment

1960–2010: Unemployment Rate (U):

1890–1899: Lebergott's series copied from Christina Romer, "Spurious Volatility in Historical Unemployment Data," *Journal of Political Economy*, vol. 94 (February 1986).

1900–1946: Series B1 in Long-Term Economic Growth, 1860–1970 (Washington, D.C.: U.S. Department of Commerce, 1973).

1947–2010: Series LNS14000000 from <http://stats.bls.gov>, Bureau of Labor Statistics, Department of Labor. Average of quarterly values.

The Measurement of Income, Prices, and Unemployment



The Measurement of Income, Prices, and Unemployment

It has been said that figures rule the world; maybe. I am quite sure that it is figures which show us whether it is being ruled well or badly.

—Johann Wolfgang Goethe, 1830

Our first task is to develop a simple theoretical model to explain real output (gross domestic product, or GDP) and the price level. Before we can turn to theory, however, we must stop for a few definitions. What are GDP and the price level? How are they measured? What goods and services are included in or excluded from GDP? How are private saving, private investment, the government deficit, and the current account deficit related to one another? How are the inflation rate and unemployment rate measured?

1 Why We Care About Income

We identified two key links between real GDP and the three central concepts of macroeconomics. First, we noted that movements in the unemployment gap are inversely related to the parallel movements of the GDP gap. Thus the key to understanding changes in unemployment (the first central concept) is the change in actual real GDP.

Second, the level and growth rate of our standard of living are measured by productivity (the third central concept), defined as the ratio of output to the number of hours worked. Output is the same as real GDP. Thus any discussion of U.S. productivity performance in comparison with the country's history or with other nations requires an understanding of the data on real GDP.

This chapter begins by asking what is included in GDP and why. We then learn about the different sectors of the economy that purchase portions of the total GDP and how that GDP is the source of different types of income. We learn how the price level and rate of inflation are measured. Finally, we learn how the unemployment rate is measured and how important components of distress caused to families by the Global Economic Crisis are not included in the official measure of the unemployment rate.

2 The Circular Flow of Income and Expenditure

We begin with a very simple economy, consisting of households and business firms. We will assume that households spend their entire income, saving nothing,