THE SECOND GREAT CONTRACTION

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A **PRINCETON SHORTS** selection from *This Time Is Different*

We've been assured that the recession is over, but the country and the economy continue to feel the effects of the 2008 financial crisis, and people are still searching for answers about what caused it, what it has wrought, and how we can recover. This selection from the best-selling book *This Time Is Different*—the definitive history of financial crises, including the recent subprime meltdown—answers these questions and more.

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The Second Great Contraction comprises chapters 13, 14, 15, and 16 from *This Time Is Different: Eight Centuries of Financial Folly*, by Carmen M. Reinhart and Kenneth S. Rogoff, and includes a new note from the authors.

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AUTHORS' NOTE

The most recent global financial crisis—which we have termed the "Second Great Contraction"—is clearly and by far the most severe globally of any financial crisis since the Great Depression of the 1930s. Indeed, according to our index, it is the only post–World War II crisis that meets the definition of a global crisis. Even if the Second Great Contraction does not morph into the Second Great Depression, it was no garden-variety recession by any of our measures. The Second Great Contraction is already marked by severe banking crises in advanced economies and spectacular global exchange rate volatility globally. The synchronicity of the simultaneous collapses in housing markets and employment is unprecedented since the Great Depression.

Unlike a conventional recession, a Great Contraction is marked by a prolonged period of shrinking credit and housing prices on top of sustained high unemployment and slow growth. It should be apparent to the reader that recent global malaise is much more of a "Great Contraction" than a "Great Recession," as the latter term implies robust growth once the recession is over. In a Great Contraction, the overhang of debt holds back demand and changes both the pace of the recovery and the calculus of policies to cushion and strengthen growth.

For a free downloadable version of Appendix A.1, Macroeconomic Time Series, used in the complete book *This Time Is Different*, see http://press.princeton.edu/titles/8973.html. The data on government debt are described separately in Appendix A.2 and the banking crisis dates in Appendix A.3.

THE U.S. SUBPRIME MELTDOWN AND THE SECOND GREAT CONTRACTION

How relevant are historical benchmarks for assessing the trajectory of a modern global financial crisis? In this part of the book we draw on our historical data set to develop benchmarks for measuring the severity of the crisis in terms of both the run-up to it and the possible evolution of its aftermath. A few years back, many people would have said that improvements in financial engineering and the conduct of monetary policy had done much to tame the business cycle and limit the risk of financial contagion. But the recent global financial crisis has proven them wrong.

When the "subprime financial crisis" (as it was initially called) began to unfold in the summer of 2007, a cursory reading of the global financial press would have led one to conclude that the world economy was moving through dark and uncharted waters. Indeed, after events took a decided turn for the worse in the early fall of 2008, much of the commentary took on an apocalyptic tone usually reserved for a threat that could potentially end civilization (as we know it). Yet, had policy makers looked at the recent history of financial crises, they would have found that it provided an important qualitative and quantitative perspective on how to gauge the evolution of the crisis.

In the next four chapters we will attempt to do exactly that, drawing on past experiences for analogies and making use of our data set to establish quantitative benchmarks. Because many of our readers may want to begin with the most recent crisis, we have done our best to make this part of the book relatively self-contained, reviewing and repeating main themes from earlier chapters as necessary.

In the first of these chapters, chapter 13, we will begin with an overview of the history of banking crises that is tailored to give the reader a perspective of the current crisis. We will pay particular attention to the debate on the massive global current account imbalances that preceded the crisis and, some would say, helped trigger it. As we will show, the outsized U.S. borrowing from abroad that occurred prior to the crisis (manifested in a sequence of gaping current account and trade balance deficits) was hardly the only warning signal. In fact, the U.S. economy, at the epicenter of the crisis, showed many other signs of being on the brink of a deep financial crisis. Other measures such as asset price inflation, most notably in the real estate sector, rising household leverage, and the slowing output—standard leading indicators of financial crises—all revealed worrisome symptoms. Indeed, from a purely quantitative perspective, the run-up to the U.S. financial crisis showed all the signs of an accident waiting to happen. Of course, the United States was hardly alone in showing classic warning signs of a financial crisis, with Great Britain, Spain, and Ireland, among other countries, experiencing many of the same symptoms.

In the next chapter, chapter 14, we will extend the comparison between the past crises and the recent one by examining the aftermath of severe financial crises. To expand our data set, we will bring in a number of relatively well-known episodes in emerging markets. As we have seen in chapter 10, on banking crises, emerging markets and developed countries experience surprisingly similar outcomes in the wake of financial crises (at least in a number of core areas), so this would seem to be a reasonable exercise. For most of the chapter the crises we use as our comparison group will be postwar crises, but toward the end of the chapter we will make comparisons with the Great Depression. One can plausibly argue that macroeconomic policy was much too passive in the early stages of the Great Depression. Indeed, efforts to maintain balanced budgets in the wake of declining tax revenues were likely deeply counterproductive, while reluctance to abandon the gold standard contributed to deflation in many countries. Still, the comparisons are important because

no other financial crisis since the Great Depression has been nearly as global in nature.

In the chapter that follows, chapter 15, we will explore the links that transmit crises across countries, ranging from financial links to trade to common factors such as technology and geopolitical shocks. We will also make a distinction between high-velocity or "fast-and-furious" factors that transmit crises across borders very quickly—for instance, via stock markets—and low-velocity or "slow-burn" factors whereby transmission takes somewhat longer.

In the last of these four chapters, chapter 16, we look at the recent crisis from a global perspective. This chapter will be a culmination of all that has gone before it. Our expansive data set spanning nearly all regions allows us to offer a working definition of a global financial crisis. In addition, our analysis of the different kinds of crises described in this book allows us to develop a new crisis index that essentially aggregates the number of different crises each country is experiencing across the globe. Thus chapter 16 is quite crucial in bringing together the entire spectrum of crises we consider in this book. Even though the most recent crisis does not appear likely to come close to the severity of the Great Depression of the 1930s, readers may nevertheless find the comparisons sobering.

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THE U.S. SUBPRIME CRISIS: AN INTERNATIONAL AND HISTORICAL COMPARISON

This chapter begins with a broad-brush "pictorial" overview of the global incidence of banking crises through the past century, taking advantage of the expansive amount of data collected for this book. Our aim is to place the international situation of the late 2000s, the "Second Great Contraction," in a broader historical context.[1] We will then go on, in this chapter and the next, to look at how the late-vintage U.S. subprime financial crisis compares with past financial crises. Broadly speaking, we will show that both in the run-up to the recent crisis and in its aftermath (as of the writing of this book), the United States has driven straight down the quantitative tracks of a typical deep financial crisis.

In addition to making our quantitative comparisons in this chapter, we will also discuss the re-emergence of the this-time-is-different syndrome—the insistence that some combination of factors renders the previous laws of investing null and void—that appeared on the eve of the meltdown. This task is not particularly difficult, for the remarks and written works of academics, policy makers, and financial market participants in the run-up to the crisis provide ample evidence of the syndrome. We will place particular emphasis on the debate over whether massive borrowing by the United States from the rest of the world prior to the crisis should have been seen as a critical warning sign.

A Global Historical View of the Subprime Crisis and Its Aftermath

Before focusing on the Second Great Contraction, which began in 2007, it will be helpful to review the incidence of banking crises over a broader span of history, which we first examined in chapter 10. A closer look at those data shows that the earliest banking crisis in an advanced economy in our sample is that of France in 1802; early crises in emerging markets befell India in 1863, China (in several episodes) during the 1860s–1870s, and Peru in 1873. Because in this chapter we are interested in making broad cross-country comparisons, we will focus mainly on data for the period since 1900, for they are sufficiently rich to allow a systematic empirical treatment.[2]

Figure 13.1 plots the incidence of banking crises among the countries in our sample (which the reader will recall accounts for about 90 percent of world income on the basis of purchasing power parity, or PPP). The graph is, in fact, based on the same data as figure 10.1 except that here we concentrate only on banking crises and not on capital mobility. As before, the figure shows the percentage of all independent countries that experienced a banking crisis in any given year from 1900 through 2008, taking a three-year moving average. As in figure 10.1 and a number of similar figures throughout the book, the tally in figure 13.1 weights countries by their share of global GDP so that crises in larger economies have a greater impact on the overall shape of the graph. This weighted aggregate is meant to provide a measure of the "global" impact of individual banking crises. Therefore, a crisis in the United States or Germany is accorded a much greater weight than a crisis in Angola or Honduras, all of which are part of our sixty-six-country sample. The reader should be aware that although we believe that figure 13.1 gives a fair picture of the proportion of the world in banking crisis at any one time, it is only a rough measure, because banking crises are of varying severity.

As we noted in chapter 10, the highest incidence of banking crises during this 109-year stretch can be found during the worldwide

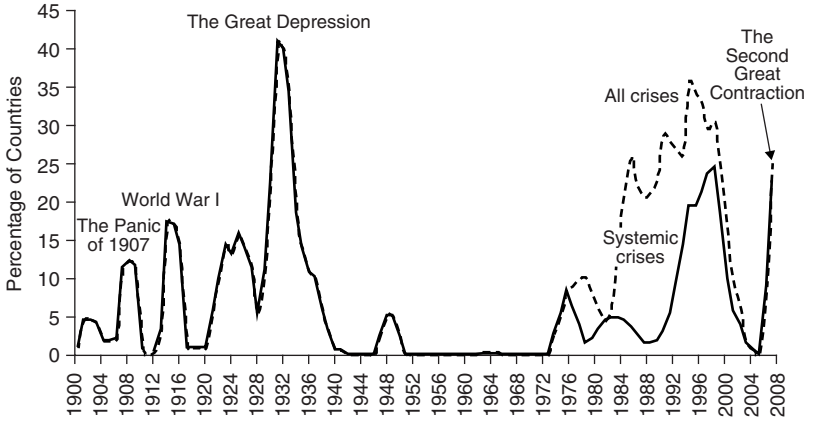

Figure 13.1. The proportion of countries with banking crises, 1900–2008, weighted by their share of world income.
Sources: Kaminsky and Reinhart (1999), Bordo et al. (2001), Maddison (2004), Caprio et al. (2005), Jácome (2008), and the additional sources listed in appendix A.3, which provides the dates of banking crises.
Notes: The sample size includes all sixty-six countries listed in table 1.1 that were independent states in the given year. Three sets of GDP weights are used, 1913 weights for the period 1800–1913, 1990 weights for the period 1914–1990, and finally 2003 weights for the period 1991–2008. The dotted line indicates all crises, the solid line systemic crises (for instance, for the 1980s and 1990s, the crises in the Nordic countries, then Japan, then the rest of Asia). The entries for 2007–2008 indicate crises in Austria, Belgium, Germany, Hungary, Japan, the Netherlands, Spain, the United Kingdom, and the United States. The figure shows a three-year moving average.

Great Depression of the 1930s. Earlier, less widespread "waves" of global financial stress were evident during and around the Panic of 1907, which originated in New York, as well as the crises accompanying the outbreak of the First World War. Figure 13.1 also reminds us of the relative calm from the late 1940s to the early 1970s. This calm may be partly explained by booming world growth but perhaps more so by the repression of the domestic financial markets (in varying degrees) and the heavy-handed use of capital controls that followed for many years after World War II. (We are not necessarily implying that such repression and controls are the right approach to dealing with the risk of financial crises.)

As we also observed in chapter 10, since the early 1970s, financial and international capital account liberalization—reduction and removal of barriers to investment inside and outside a country—have taken root worldwide. So, too, have banking crises.[3] After a long hiatus, the share of countries with banking difficulties first began to expand in the 1970s. The break-up of the Bretton Woods system of fixed exchange rates, together with a sharp spike in oil prices, catalyzed a prolonged global recession, resulting in financial sector difficulties in a number of advanced economies. In the early 1980s, a collapse in global commodity prices, combined with high and volatile interest rates in the United States, contributed to a spate of banking and sovereign debt crises in emerging economies, most famously in Latin America and then Africa. High interest rates raised the cost of servicing large debts, which were often funded at variable interest rates linked to world markets. Falling prices for commodities, the main export for most emerging markets, also made it more difficult for them to service debts.

The United States experienced its own banking crisis, rooted in the savings and loan industry, beginning in 1984 (albeit this was a relatively mild crisis compared to those of the 1930s and the 2000s). During the late 1980s and early 1990s, the Nordic countries experienced some of the worst banking crises the wealthy economies had known since World War II following a surge in capital inflows (lending from abroad) and soaring real estate prices. In 1992, Japan's asset price bubble burst and ushered in a decade-long banking crisis. Around the same time, with the collapse of the Soviet bloc, several formerly communist countries in Eastern Europe joined the ranks of nations facing banking sector problems. As the second half of the 1990s approached, emerging markets faced a fresh round of banking crises. Problems in Mexico and Argentina (in 1994–1995) were followed by the famous Asian crisis of 1997–1998 and then the troubles of Russia and Colombia, among others.[4] That upswing in the banking crisis cycle was closed by Argentina in 2001 and Uruguay in 2002. A brief tranquil period came to an abrupt halt in the summer of 2007 when the subprime crisis in the United States began in earnest, soon transforming itself into a global financial crisis.[5]

As is well known, the U.S. financial crisis of the late 2000s was firmly rooted in the bubble in the real estate market fueled by sustained massive increases in housing prices, a massive influx of cheap foreign capital resulting from record trade balance and current account deficits, and an increasingly permissive regulatory policy that helped propel the dynamic between these factors (a pattern that we will quantify further). To place the housing bubble in historical perspective, figure 13.2 plots the now-famous Case-Shiller housing price index deflated by the GNP deflator (the picture is essentially unchanged if the consumer price index is used).[6] Since 1891, when the price series began, no housing price boom has been comparable in terms of sheer magnitude and duration to that recorded in the years culminating in the 2007 subprime mortgage fiasco. *Between 1996 and 2006 (the year when prices peaked), the cumulative real price increase was about 92 percent—more than three times the 27 percent cumulative increase from 1890 to 1996!* In 2005, at the height of the bubble, real housing prices soared by more than 12 percent (that was about six times the rate of increase in real per capita GDP for that year). Even the prosperous post–World War II decades, when demographic and income trends lent support to housing prices, pale in

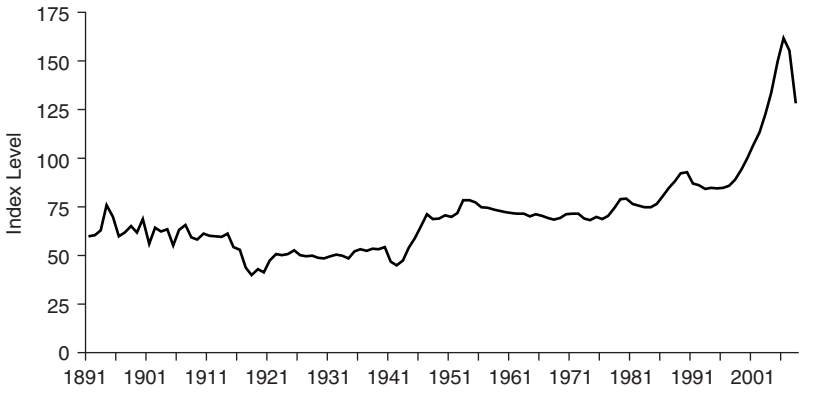

Figure 13.2. Real housing prices: United States, 1891–2008.
Sources: Shiller (2005), Standard and Poor's, and U.S. Commerce Department.
Notes: House prices are deflated by the GNP deflator. Real housing prices are indexed to equal 100 in 2000.

comparison to the pre-2007 surge in prices.[7] By mid-2007, a sharp rise in default rates on low-income housing mortgages in the United States eventually sparked a full-blown global financial panic.

The This-Time-Is-Different Syndrome and the Run-up to the Subprime Crisis

The global financial crisis of the late 2000s, whether measured by the depth, breadth, and (potential) duration of the accompanying recession or by its profound effect on asset markets, stands as the most serious global financial crisis since the Great Depression. The crisis has been a transformative moment in global economic history whose ultimate resolution will likely reshape politics and economics for at least a generation.

Should the crisis have come as a surprise, especially in its deep impact on the United States? Listening to a long list of leading academics, investors, and U.S. policy makers, one would have thought the financial meltdown of the late 2000s was a bolt from the blue, a "six-sigma" event. U.S. Federal Reserve Chairman Alan Greenspan frequently argued that financial innovations such as securitization and option pricing were producing new and better ways to spread risk, simultaneously making traditionally illiquid assets, such as houses, more liquid. Hence higher and higher prices for risky assets could be justified.

We could stop here and say that a lot of people were convinced that "this time is different" because the United States is "special." However, given the historic nature of the recent U.S. and global financial collapse, a bit more background will help us to understand why so many people were fooled.

Risks Posed by Sustained U.S. Borrowing from the Rest of the World: The Debate before the Crisis

Chairman Greenspan was among the legion that branded as alarmists those who worried excessively about the burgeoning U.S. current ac-

count deficit.[8] Greenspan argued that this gaping deficit, which reached more than 6.5 percent of GDP in 2006 (over $800 billion), was, to a significant extent, simply a reflection of a broader trend toward global financial deepening that was allowing countries to sustain much larger current account deficits and surpluses than in the past. Indeed, in his 2007 book, Greenspan characterizes the sustained U.S. current account deficit as a secondary issue, not a primary risk factor, one that (along with others such as soaring housing prices and the notable buildup in household debt) should not have caused excessive alarm among U.S. policy makers during the run-up to the crisis that began in 2007.[9]

The Federal Reserve chairman was hardly alone in his relatively sanguine view of American borrowing. U.S. Treasury Secretary Paul O'Neill famously argued that it was natural for other countries to lend to the United States given this country's high rate of productivity growth and that the current account was a "meaningless concept."[10]

Greenspan's successor, Ben Bernanke, in a speech he made in 2005, famously described the U.S. borrowing binge as the product of a "global savings glut" that had been caused by a convergence of factors, many of which were outside the control of U.S. policy makers.[11] These factors included the strong desire of many emerging markets to insure themselves against future economic crises after the slew of crises in Latin America and Asia during the 1990s and early 2000s. At the same time, Middle Eastern countries had sought ways to use their oil earnings, and countries with underdeveloped financial systems, such as China, had wanted to diversify into safer assets. Bernanke argued that it was also natural for some developed economies, such as Japan and Germany, to have high savings rates in the face of rapidly aging populations. All these factors together conspired to provide a huge pool of net savings in search of a safe and dynamic resting place, which meant the United States. Of course, this cheap source of funding was an opportunity for the United States. The question authorities might have wrestled with more was "Can there be too much of a good thing?" The same this-time-is-different argument appears all too often in the speeches of policy makers in emerging mar-

kets when their countries are experiencing massive capital inflows: "Low rates of return in the rest of the world are simply making investment in our country particularly attractive."

As money poured into the United States, U.S. financial firms, including mighty investment banks such as Goldman Sachs, Merrill Lynch (which was acquired by Bank of America in 2008 in a "shotgun marriage"), and the now defunct Lehman Brothers, as well as large universal banks (with retail bases) such as Citibank, all saw their profits soar. The size of the U.S. financial sector (which includes banking and insurance) more than doubled, from an average of roughly 4 percent of GDP in the mid-1970s to almost 8 percent of GDP by 2007.[12] The top employees of the five largest investment banks divided a bonus pool of over $36 billion in 2007. Leaders in the financial sector argued that in fact their high returns were the result of innovation and genuine value-added products, and they tended to grossly understate the latent risks their firms were taking. (Keep in mind that an integral part of our working definition of the this-time-is-different syndrome is that "the old rules of valuation no longer apply.") In their eyes, financial innovation was a key platform that allowed the United States to effectively borrow much larger quantities of money from abroad than might otherwise have been possible. For example, innovations such as securitization allowed U.S. consumers to turn their previously illiquid housing assets into ATM machines, which represented a reduction in precautionary saving.[13]

Where did academics and policy economists stand on the dangers posed by the U.S. current account deficit? Opinions varied across a wide spectrum. On the one hand, Obstfeld and Rogoff argued in several contributions that the outsized U.S. current account was likely unsustainable.[14] They observed that if one added up all the surpluses of the countries in the world that were net savers (countries in which national savings exceed national investment, including China, Japan, Germany, Saudi Arabia, and Russia), the United States was soaking up more than two out of every three of these saved dollars in 2004–2006. Thus, eventually the U.S. borrowing binge

would have to unwind, perhaps quite precipitously, which would result in sharp asset price movements that could severely stress the complex global derivatives system.[15]

Many others took a similarly concerned viewpoint. For example, in 2004 Nouriel Roubini and Brad Setser projected that the U.S. borrowing problem would get much worse, reaching 10 percent of GDP before a dramatic collapse.[16] Paul Krugman (who received a Nobel Prize in 2008) argued that there would inevitably be a "Wile E. Coyote moment" when the unsustainability of the U.S. current account would be evident to all, and suddenly the dollar would collapse.[17] There are many other examples of academic papers that illustrated the risks.[18]

Yet many respected academic, policy, and financial market researchers took a much more sanguine view. In a series of influential papers, Michael Dooley, David Folkerts-Landau, and Peter Garber—"the Deutschebank trio"—argued that the gaping U.S. current account deficit was just a natural consequence of emerging markets' efforts to engage in export-led growth, as well as their need to diversify into safe assets.[19] They insightfully termed the system that propagated the U.S. deficits "Bretton Woods II" because the Asian countries were quasi-pegging their currencies to the U.S. dollar, just as the European countries had done forty years earlier.

Harvard economist Richard Cooper also argued eloquently that the U.S. current account deficit had logical foundations that did not necessarily imply clear and present dangers.[20] He pointed to the hegemonic position of the United States in the global financial and security system and the extraordinary liquidity of U.S. financial markets, as well as its housing markets, to support his argument. Indeed, Bernanke's speech on the global savings glut in many ways synthesized the interesting ideas already floating around in the academic and policy research literature.

It should be noted that others, such as Ricardo Hausmann and Federico Sturzenegger of Harvard University's Kennedy School of Government, made more exotic arguments, claiming that U.S. foreign assets were mismeasured, and actually far larger than official es-

timates.[21] The existence of this "dark matter" helped explain how the United States could finance a seemingly unending string of current account and trade deficits. Ellen McGrattan of Minnesota and Ed Prescott of Arizona (another Nobel Prize winner) developed a model to effectively calibrate dark matter and found that the explanation might plausibly account for as much as half of the United States' current account deficit.[22]

In addition to debating U.S. borrowing from abroad, economists also debated the related question of whether policy makers should have been concerned about the explosion of housing prices that was taking place nationally in the United States (as shown in the previous section). But again, top policy makers argued that high home prices could be justified by new financial markets that made houses easier to borrow off of and by reduced macroeconomic risk that increased the value of risky assets. Both Greenspan and Bernanke argued vigorously that the Federal Reserve should not pay excessive attention to housing prices, except to the extent that they might affect the central bank's primary goals of growth and price stability. Indeed, prior to joining the Fed, Bernanke had made this case more formally and forcefully in an article coauthored by New York University professor Mark Gertler in 2001.[23]

On the one hand, the Federal Reserve's logic for ignoring housing prices was grounded in the perfectly sensible proposition that the private sector can judge equilibrium housing prices (or equity prices) at least as well as any government bureaucrat. On the other hand, it might have paid more attention to the fact that the rise in asset prices was being fueled by a relentless increase in the ratio of household debt to GDP, against a backdrop of record lows in the personal saving rate. This ratio, which had been roughly stable at close to 80 percent of personal income until 1993, had risen to 120 percent in 2003 and to nearly 130 percent by mid-2006. Empirical work by Bordo and Jeanne and the Bank for International Settlements suggested that when housing booms are accompanied by sharp rises in debt, the risk of a crisis is significantly elevated.[24] Although this work was not necessarily definitive, it certainly raised questions

about the Federal Reserve's policy of benign neglect. On the other hand, the fact that the housing boom was taking place in many countries around the world (albeit to a much lesser extent if at all in major surplus countries such as Germany and Japan) raised questions about the genesis of the problem and whether national monetary or regulatory policy alone would be an effective remedy.

Bernanke, while still a Federal Reserve governor in 2004, sensibly argued that it is the job of regulatory policy, not monetary policy, to deal with housing price bubbles fueled by inappropriately weak lending standards.[25] Of course, that argument begs the question of what should be done if, for political reasons or otherwise, regulatory policy does not adequately respond to an asset price bubble. Indeed, one can argue that it was precisely the huge capital inflow from abroad that fueled the asset price inflation and low interest rate spreads that ultimately masked risks from both regulators and rating agencies.

In any event, the most extreme and the most immediate problems were caused by the market for mortgage loans made to "subprime," or low-income, borrowers. "Advances" in securitization, as well as a seemingly endless run-up in housing prices, allowed people to buy houses who might not previously have thought they could do so. Unfortunately, many of these borrowers depended on loans with variable interest rates and low initial "teaser" rates. When it came time to reset the loans, rising interest rates and a deteriorating economy made it difficult for many to meet their mortgage obligations. And thus the subprime debacle began.

The U.S. conceit that its financial and regulatory system could withstand massive capital inflows on a sustained basis without any problems arguably laid the foundations for the global financial crisis of the late 2000s. The thinking that "this time is different"—because this time the U.S. had a superior system—once again proved false. Outsized financial market returns were in fact greatly exaggerated by capital inflows, just as would be the case in emerging markets. What could in retrospect be recognized as huge regulatory mistakes, including the deregulation of the subprime mortgage market and the

2004 decision of the Securities and Exchange Commission to allow investment banks to triple their leverage ratios (that is, the ratio measuring the amount of risk to capital), appeared benign at the time. Capital inflows pushed up borrowing and asset prices while reducing spreads on all sorts of risky assets, leading the International Monetary Fund to conclude in April 2007, in its twice-annual *World Economic Outlook,* that risks to the global economy had become extremely low and that, for the moment, there were no great worries. When the international agency charged with being the global watchdog declares that there are no risks, there is no surer sign that this time *is* different.

Again, the crisis that began in 2007 shares many parallels with the boom period before an emerging market crisis, when governments often fail to take precautionary steps to let steam out of the system; they expect the capital inflow bonanza to last indefinitely. Often, instead, they take steps that push their economies toward greater risk in an effort to keep the boom going a little longer.

Such is a brief characterization of the debate surrounding the this-time-is-different mentality leading up to the U.S. subprime financial crisis. To sum up, many were led to think that "this time is different" for the following reasons:

- The United States, with the world's most reliable system of financial regulation, the most innovative financial system, a strong political system, and the world's largest and most liquid capital markets, was special. It could withstand huge capital inflows without worry.
- Rapidly emerging developing economies needed a secure place to invest their funds for diversification purposes.
- Increased global financial integration was deepening global capital markets and allowing countries to go deeper into debt.
- In addition to its other strengths, the United States has superior monetary policy institutions and monetary policy makers.
- New financial instruments were allowing many new borrowers to enter mortgage markets.

- All that was happening was just a further deepening of financial globalization thanks to innovation and should not be a great source of worry.

The Episodes of Postwar Bank-Centered Financial Crisis

As the list of reasons that "this time is different" (provided by academics, business leaders, and policy makers) grew, so did the similarities of U.S. economic developments to those seen in other precrisis episodes.

To examine the antecedents of the 2007 U.S. subprime crisis (which later grew into the "Second Great Contraction"), we begin by looking at data from the eighteen bank-centered financial crises that occurred in the post–World War II period.[26] For the time being, we will limit our attention to crises in industrialized countries to avoid seeming to engage in hyperbole by comparing the United States to emerging markets. But of course, as we have already seen in chapter 10, financial crises in emerging markets and those in advanced economies are not so different. Later, in chapter 14, we will broaden the comparison set.

The crisis episodes employed in our comparison are listed in table 13.1.

Among the eighteen bank-centered financial crises following World War II, the "Big Five" crises have all involved major declines in output over a protracted period, often lasting two years or more. The worst postwar crisis prior to 2007, of course, was that of Japan in 1992, which set the country off on its "lost decade." The earlier Big Five crises, however, were also extremely traumatic events.

The remaining thirteen financial crises in rich countries represent more minor events that were associated with significantly worse economic performance than usual, but were not catastrophic. For example, the U.S. crisis that began in 1984 was the savings and loan crisis.[27] Some of the other thirteen crises had relatively little impact, but we retain them for now for comparison purposes. It will

TABLE 13.1
Post–World War II bank-centered financial crises in advanced economies

Country	Beginning year of crisis
Severe (systemic) crises: The "Big Five"	
Spain	1977
Norway	1987
Finland	1991
Sweden	1991
Japan	1992
Milder crises	
United Kingdom	1974
Germany	1977
Canada	1983
United States (savings and loan)	1984
Iceland	1985
Denmark	1987
New Zealand	1987
Australia	1989
Italy	1990
Greece	1991
United Kingdom	1991
France	1994
United Kingdom	1995

Sources: Caprio and Klingebiel (1996, 2003), Kaminsky and Reinhart (1999), and Caprio et al. (2005).

soon be clear that the run-up to the U.S. financial crisis of the late 2000s really did not resemble these milder crises, though most policy makers and journalists did not seem to realize this at the time.

A Comparison of the Subprime Crisis with Past Crises in Advanced Economies

In choosing the variables we used to measure the U.S. risk of a financial crisis we were motivated by the literature on predicting financial crises in both developed countries and emerging markets.[28] This literature on financial crises suggests that markedly rising asset prices,

slowing real economic activity, large current account deficits, and sustained debt buildups (whether public, private, or both) are important precursors to a financial crisis. Recall also the evidence on capital flow "bonanzas" discussed in chapter 10, which showed that sustained capital inflows have been particularly strong markers for financial crises, at least in the post-1970 period of greater financial liberalization. Historically, financial liberalization or innovation has also been a recurrent precursor to financial crises, as shown in chapter 10.

We begin in figure 13.3 by comparing the run-up in housing prices. Period *t* represents the year of the onset of the financial crisis. By that convention, period $t - 4$ is four years prior to the crisis, and the graph in each case continues to $t + 3$, except of course in the case of the recent U.S. crisis, which, as of this writing and probably for some time beyond, will remain in the hands of the fates.[29] The figure confirms what case studies have shown, that a massive run-up in housing prices usually precedes a financial crisis. It is a bit disconcerting to note that, according to this figure, the run-up in housing prices in the United States exceeded the average of the "Big Five" financial crises, and the downturn appears to have been sharper (year *t* +1 is 2008).

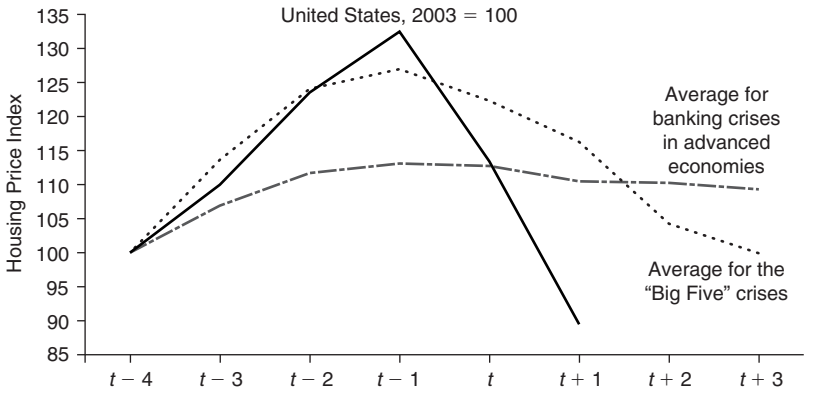

Figure 13.3. Real housing prices and postwar banking crises: Advanced economies.
Sources: Bank for International Settlements (2005); Shiller (2005); Standard and Poor's; International Monetary Fund (various years), *International Financial Statistics;* and the authors' calculations.
Notes: Consumer prices are used to deflate nominal housing price indices. The year of the crisis is indicated by *t*; $t - 4 = 100$.

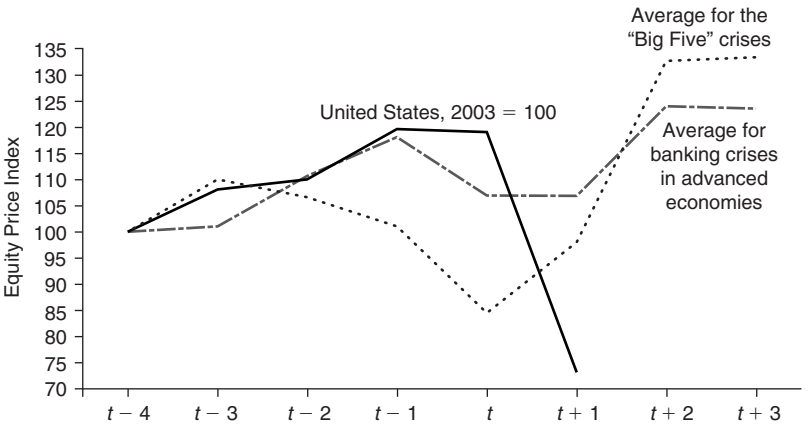

Figure 13.4. Real equity prices and postwar banking crises: Advanced economies.
Sources: Global Financial Data (n.d.); International Monetary Fund (various years), *International Financial Statistics;* and the authors' calculations.
Notes: Consumer prices are used to deflate nominal equity price indices. The year of the crisis is indicated by t; $t - 4 = 100$.

In figure 13.4 we look at real rates of growth in equity market price indexes.[30] We see that, going into the crisis, U.S. equity prices held up better than those in either comparison group, perhaps in part because of the Federal Reserve's aggressive countercyclical response to the 2001 recession and in part because of the substantial "surprise element" in the severity of the U.S. crisis. But a year after the onset of the crisis ($t + 1$), equity prices had plummeted, in line with what happened in the "Big Five" financial crises.

In figure 13.5 we look at the trajectory of the U.S. current account deficit, which was far larger and more persistent than was typical in other crises.[31] In the figure, the bars show the U.S. current account trajectory from 2003 to 2007 as a percentage of GDP, and the dashed line shows the average for the eighteen earlier crises. The fact that the U.S. dollar remained the world's reserve currency during a period in which many foreign central banks (particularly in Asia) were amassing record amounts of foreign exchange reserves certainly increased the foreign capital available to finance the record U.S. current account deficits.

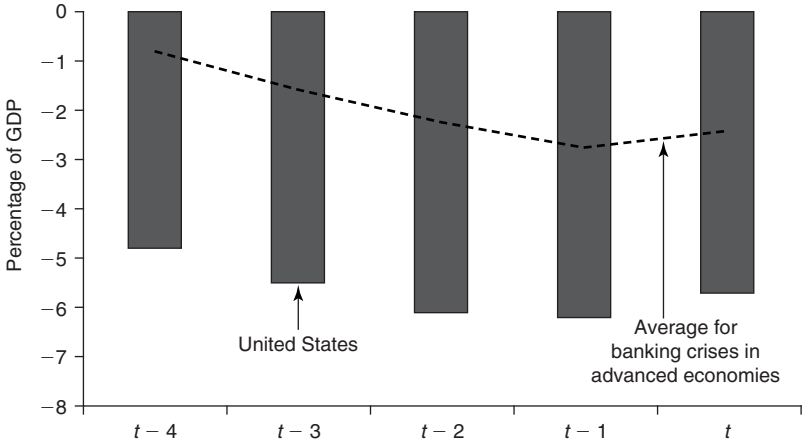

Figure 13.5. Ratio of current account balance to GDP on the eve of postwar banking crises: Advanced economies. *Sources:* International Monetary Fund (various years), *World Economic Outlook;* and the authors' calculations.

Financial crises seldom occur in a vacuum. More often than not, a financial crisis begins only after a real shock slows the pace of the economy; thus it serves as an amplifying mechanism rather than a trigger. Figure 13.6 plots real per capita GDP growth on the eve of banking crises. The U.S. crisis that began in 2007 follows the same inverted V shape that characterized the earlier crisis episodes. Like equity prices, the response in GDP was somewhat delayed. Indeed, in 2007, although U.S. growth had slowed, it was still more closely aligned with the milder recession pattern of the average for all crises.

In 2008, developments took a turn for the worse, and the growth slowdown became more acute. At the beginning of 2009, the consensus—based on forecasts published in the *Wall Street Journal*—was that this recession would be deeper than the average "Big Five" experience. Note that in severe Big Five cases, the growth rate has fallen by more than 5 percent from peak to trough and has remained low for roughly three years.

Our final figure in this chapter, figure 13.7, illustrates the path of real public debt (deflated by consumer prices).[32] Increasing

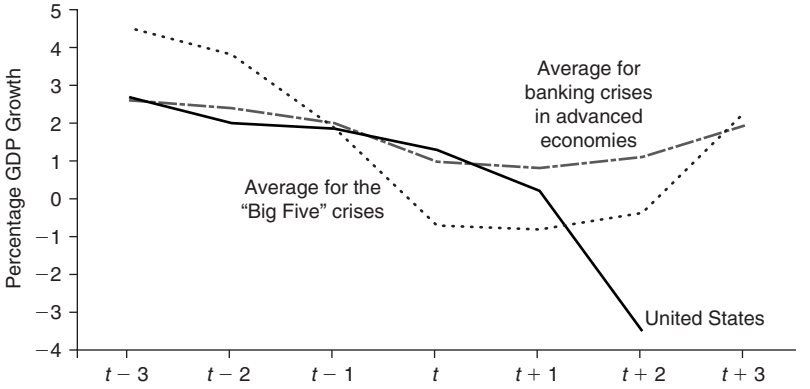

Figure 13.6. Growth in real per capita GDP (PPP basis) and postwar banking crises: Advanced economies.
Sources: International Monetary Fund (various years), *World Economic Outlook,* and *Wall Street Journal*.
Notes: The consensus forecast (–3.5 percent) for 2009 is plotted for the United States as of July 2009. The year of the crisis is indicated by *t*.

public debt has been a nearly universal precursor of other postwar crises, although, as we will see in chapter 14, the buildup in debt prior to a crisis pales in comparison to its growth after the crisis has begun, for weak growth crushes tax revenues. The U.S. public debt buildup prior to the 2007 crisis was less than the Big Five average. Comparisons across private debt (which we have already alluded to for the United States) would be interesting as well, but unfortunately, comparable data for the range of countries considered here are not easy to obtain. In the case of the United States, the ratio of household debt to household income soared by 30 percent in less than a decade and could well collapse as consumers try to achieve a less risky position as the recession continues.

One caveat to our claim that the indicators showed the United States at high risk of a deep financial crisis in the run-up to 2007: compared to other countries that have experienced financial crises, the United States performed well with regard to inflation prior to 2007. Of course, the earlier crises in developed countries occurred during a period of declining inflation in the rich countries.

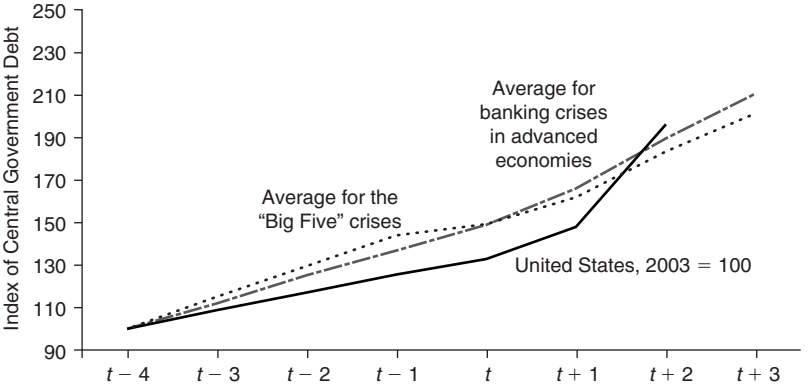

Figure 13.7. Real central government debt and postwar banking crises: Advanced economies.
Sources: U.S. Treasury Department; International Monetary Fund (various years), *International Financial Statistics;* appendixes A.1 and A.2 and sources cited therein; and the authors' calculations.
Note: Consumer prices are used to deflate nominal debt. The year of the crisis is indicated by t; $t - 4 = 100$.

Summary

Why did so many people fail to see the financial crisis of 2007 coming? As to the standard indicators of financial crises, many red lights were blinking brightly well in advance. We do not pretend that it would have been easy to forestall the U.S. financial crisis had policy makers realized the risks earlier. We have focused on macroeconomic issues, but many problems were hidden in the "plumbing" of the financial markets, as has become painfully evident since the beginning of the crisis. Some of these problems might have taken years to address. Above all, the huge run-up in housing prices—over 100 percent nationally over five years—should have been an alarm, especially fueled as it was by rising leverage. At the beginning of 2008, the total value of mortgages in the United States was approximately 90 percent of GDP. Policy makers should have decided several years prior to the crisis to deliberately take some steam out of the system. Unfortunately, efforts to maintain growth and prevent significant sharp

stock market declines had the effect of taking the safety valve off the pressure cooker. Of course, even with the epic proportions of this financial crisis, the United States had not defaulted as of the middle of 2009. Were the United States an emerging market, its exchange rate would have plummeted and its interest rates soared. Access to capital markets would be lost in a classic Dornbusch/Calvo–type sudden stop. During the first year following the crisis (2007), exactly the opposite happened: the dollar appreciated and interest rates fell as world investors viewed other countries as even riskier than the United States and bought Treasury securities copiously.[33] But buyer beware! Over the longer run, the U.S. exchange rate and interest rates could well revert to form, especially if policies are not made to re-establish a firm base for long-term fiscal sustainability.

- 14 -

The Aftermath of Financial Crises

In the preceding chapter we presented a historical analysis comparing the run-up to the 2007 U.S. subprime financial crisis with the antecedents of other banking crises in advanced economies since World War II. We showed that standard indicators for the United States, such as asset price inflation, rising leverage, large sustained current account deficits, and a slowing trajectory of economic growth, exhibited virtually all the signs of a country on the verge of a financial crisis—indeed, a severe one. In this chapter we engage in a similar comparative historical analysis focused on the aftermath of systemic banking crises. Obviously, as events unfold, the aftermath of the U.S. financial crisis may prove better or worse than the benchmarks laid out here. Nevertheless, the approach is valuable in itself, because in analyzing extreme shocks such as those affecting the U.S. economy and the world economy at the time of this writing, standard macroeconomic models calibrated to statistically "normal" growth periods may be of little use.

In the previous chapter we deliberately excluded emerging market countries from the comparison set in order not to appear to engage in hyperbole. After all, the United States is a highly sophisticated global financial center. What can advanced economies possibly have in common with emerging markets when it comes to banking crises? In fact, as we showed in chapter 10, the antecedents and aftermath of banking crises in rich countries and in emerging markets have a surprising amount in common. They share broadly similar patterns in housing and equity prices, unemployment, government revenues, and debt. Furthermore, the frequency or incidence of crises does not differ much historically, even if comparisons are limited to the post–World War II period (provided that the ongoing global financial crisis of the late 2000s is taken into account). Thus, in this

chapter, as we turn to characterizing the aftermath of severe financial crises, we include a number of recent emerging market cases so as to expand the relevant set of comparators.[1]

Broadly speaking, financial crises are protracted affairs. More often than not, the aftermath of severe financial crises share three characteristics:

- *First*, asset market collapses are deep and prolonged. Declines in real housing prices average 35 percent stretched out over six years, whereas equity price collapses average 56 percent over a downturn of about three and a half years.
- *Second*, the aftermath of banking crises is associated with profound declines in output and employment. The unemployment rate rises an average of 7 percentage points during the down phase of the cycle, which lasts on average more than four years. Output falls (from peak to trough) more than 9 percent on average, although the duration of the downturn, averaging roughly two years, is considerably shorter than that of unemployment.[2]
- *Third*, as noted earlier, the value of government debt tends to explode; it rose an average of 86 percent (in real terms, relative to precrisis debt) in the major post–World War II episodes. As discussed in chapter 10 (and as we reiterate here), the main cause of debt explosions is not the widely cited costs of bailing out and recapitalizing the banking system. Admittedly, bailout costs are difficult to measure, and the divergence among estimates from competing studies is considerable. But even upper-bound estimates pale next to actual measured increases in public debt. In fact, the biggest driver of debt increases is the inevitable collapse in tax revenues that governments suffer in the wake of deep and prolonged output contractions. Many countries also suffer from a spike in the interest burden on debt, for interest rates soar, and in a few cases (most notably that of Japan in the 1990s), countercyclical fiscal policy efforts contribute to the debt buildup. (We note that calibrating differences in countercyclical fiscal policy across countries can be difficult because some countries, such as the Nordic countries, have

powerful built-in fiscal stabilizers through high marginal tax rates and generous unemployment benefits, whereas other countries, such as the United States and Japan, have automatic stabilizers that are far weaker.)

In the last part of the chapter, we will look at quantitative benchmarks from the period of the Great Depression, the last deep global financial crisis prior to the recent one. The depth and duration of the decline in economic activity were breathtaking, even by comparison with severe postwar crises. Countries took an average of ten years to reach the same level of per capita output as they enjoyed in 1929. In the first three years of the Depression, unemployment rose an average of 16.9 percentage points across the fifteen major countries in our comparison set.

Historical Episodes Revisited

The preceding chapter included all the major postwar banking crises in the developed world (a total of eighteen) and put particular emphasis on the ones dubbed the "Big Five" (those in Spain, 1977; Norway, 1987; Finland, 1991; Sweden, 1991; and Japan, 1992). It is quite clear from that chapter, as well as from the subsequent evolution of the 2007 U.S. financial crisis, that the crisis of the late 2000s must be considered a severe Big Five–type crisis by any metric. As a result, in this chapter we will focus on severe systemic financial crises only, including the Big Five crises in developed economies plus a number of famous episodes in emerging markets: the 1997–1998 Asian crises (in Hong Kong, Indonesia, Korea, Malaysia, the Philippines, and Thailand); that in Colombia in 1998; and Argentina's 2001 collapse. These are cases for which we have all or most of the relevant data to allow for meaningful quantitative comparisons across key indicator variables, such as equity markets, housing markets, unemployment, growth, and so on. Central to the analysis are historical housing price data, which can be difficult to obtain and are critical for assessing the

recent episode.[3] We also include two earlier historical cases for which we have housing prices: those of Norway in 1899 and the United States in 1929.

The Downturn after a Crisis: Depth and Duration

In figure 14.1, based on the same data as table 10.8, we again look at the bust phase of housing price cycles surrounding banking crises in the expanded data set. We include a number of countries that experienced crises from 2007 on. The latest crises are represented by bars in dark shading, past crises by bars in light shading. The cumulative decline in real housing prices from peak to trough averages 35.5 percent.[4] The most severe real housing price declines were experienced by Finland, Colombia, the Philippines, and Hong Kong. Their crashes amounted to 50 to 60 percent, measured from peak to trough. The housing price decline experienced by the United States during the latest episode at the time of this writing (almost 28 percent in real terms through late 2008 according to the Case-Shiller index) is already more than twice that registered in the United States during the Great Depression.

Notably, the duration of housing price declines has been quite long lived, averaging roughly six years. Even excluding the extraordinary experience of Japan (with its seventeen consecutive years of real housing price declines), the average remains more than five years. As figure 14.2 illustrates, the equity price declines that accompany banking crises are far steeper than are housing price declines, albeit shorter lived. The shorter duration of a downturn compared with real estate prices is perhaps unsurprising given that equity prices are far less inertial. The average historical decline in equity prices has been 55.9 percent, with the downturn phase of the cycle lasting 3.4 years. As of the end of 2008, Iceland and Austria had already experienced peak-to-trough equity price declines far exceeding the average of the historical comparison group.

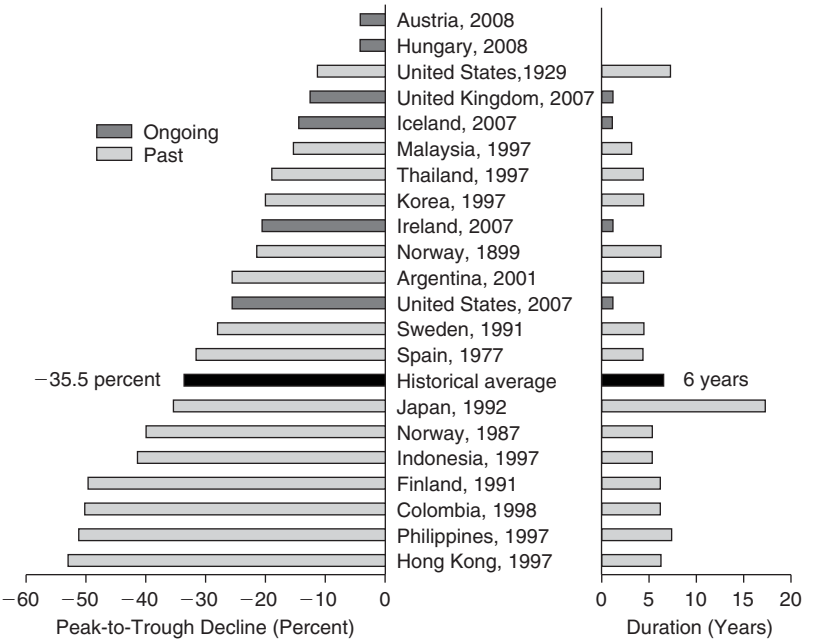

Figure 14.1. Cycles of past and ongoing real house prices and banking crises.
Sources: Appendixes A.1 and A.2 and sources cited therein.
Notes: Each banking crisis episode is identified by country and the beginning year of the crisis. Only major (systemic) banking crisis episodes are included, subject to data limitations. The historical average reported does not include ongoing crisis episodes. For the ongoing episodes, the calculations are based on data through the following periods: October 2008, monthly, for Iceland and Ireland; 2007, annual, for Hungary; and Q3, 2008, quarterly, for all others. Consumer price indexes are used to deflate nominal house prices.

In figure 14.3 we look at increases in unemployment rates across the historical comparison group. (Because the unemployment rate is classified as a lagging indicator, we do not include the most recent crisis, although we note that the U.S. unemployment rate has already risen by 5 percentage points from its bottom value of near 4 percent.) On average, unemployment rises for almost five years, with an increase in the unemployment rate of about 7 percentage points. Although none of the postwar episodes has rivaled the rise in un-

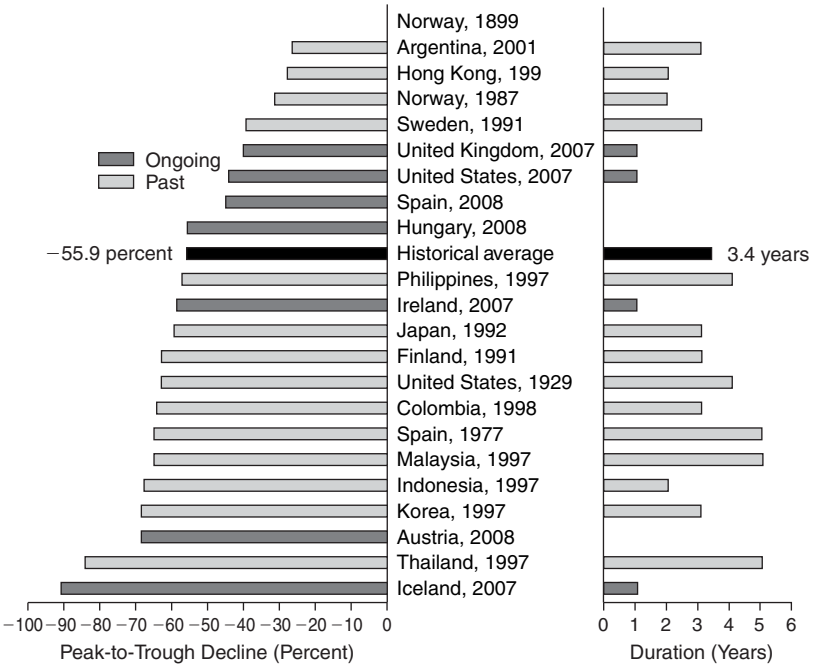

Figure 14.2. Cycles of past and ongoing real equity prices and banking crises.
Sources: Appendixes A.1 and A.2 and sources cited therein.
Notes: Each banking crisis episode is identified by country and the beginning year of the crisis. Only major (systemic) banking crisis episodes are included, subject to data limitations. The historical average reported does not include ongoing crisis episodes. For the ongoing episodes, the calculations are based on data through December 2, 2008. Consumer price indexes are used to deflate nominal equity prices.

employment of more than 20 percentage points experienced by the United States during the Great Depression, the employment consequences of financial crises are nevertheless strikingly large in many cases. For emerging markets the official statistics likely underestimate true unemployment.

Interestingly, figure 14.3 reveals that when it comes to banking crises, the emerging markets, particularly those in Asia, seem to do better in terms of unemployment than the advanced economies. (An exception was seen in the deep recession experienced by Colombia in 1998.) Although there are well-known data issues involved in

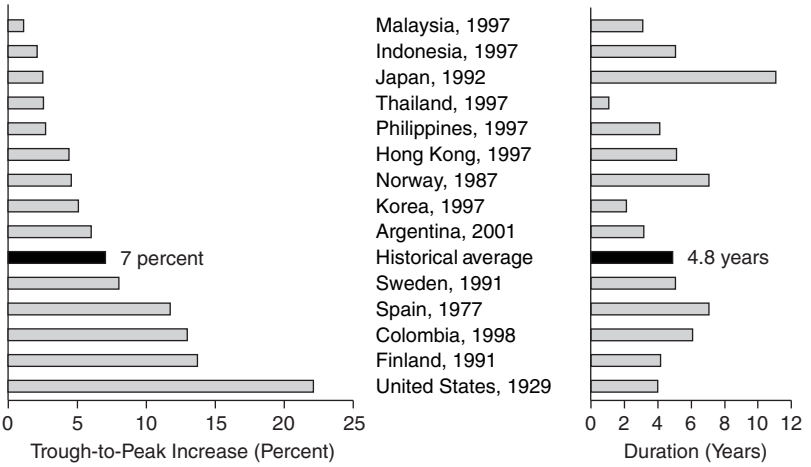

Figure 14.3. Cycles of past unemployment and banking crises.
Sources: Organisation for Economic Co-operation and Development; International Monetary Fund (various years), *International Financial Statistics;* Carter et al. (2006); various country sources; and the authors' calculations.
Notes: Each banking crisis episode is identified by country and the beginning year of the crisis. Only major (systemic) banking crisis episodes are included, subject to data limitations. The historical average reported does not include ongoing crisis episodes.

comparing unemployment rates across countries,[5] the relatively poor performance in advanced countries suggests the possibility that greater (downward) wage flexibility in emerging markets may help cushion employment during periods of severe economic distress. The gaps in the social safety net in emerging market economies, compared to industrial ones, presumably also make workers more anxious to avoid becoming unemployed.

In figure 14.4 we look at the cycles in real per capita GDP around severe banking crises. The average magnitude of declines, at 9.3 percent, is stunning. Admittedly, as we noted earlier, for the post–World War II period, the declines in real GDP have been smaller for advanced economies than for emerging market economies. A probable explanation for the more severe contractions in emerging market economies is that they are prone to abrupt reversals in the availability of foreign credit. When foreign capital comes to a

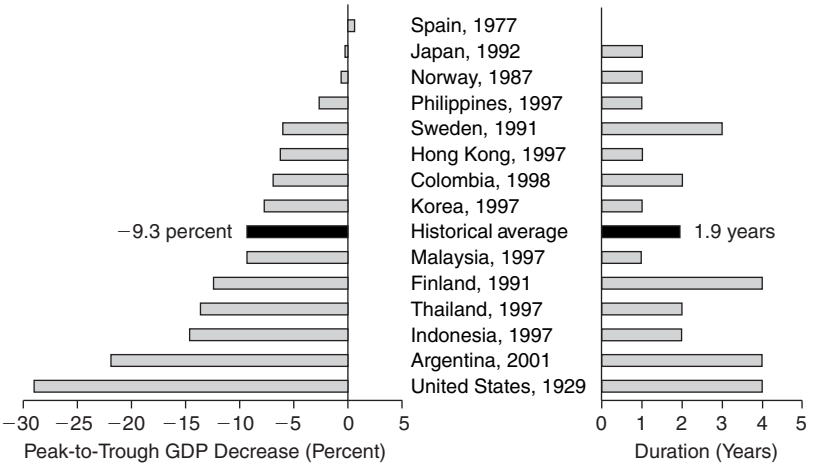

Figure 14.4. Cycles of past real per capita GDP and banking crises.
Sources: Total Economy Database (TED), Carter et al. (2006), and the authors' calculations.
Notes: Each banking crisis episode is identified by country and the beginning year of the crisis. Only major (systemic) banking crisis episodes are included, subject to data limitations. The historical average reported does not include ongoing crisis episodes. Total GDP in millions of 1990 U.S. dollars (converted at Geary Khamis PPPs) divided by midyear population.

"sudden stop," to use the phrase popularized by Rudiger Dornbusch and Guillermo Calvo, economic activity heads into a tailspin.[6]

Compared to unemployment, the cycle from peak to trough in GDP is much shorter, only two years. Presumably this is partly because potential GDP growth is positive and we are measuring only absolute changes in income, not gaps relative to potential output. Even so, the recessions surrounding financial crises are unusually long compared to normal recessions, which typically last less than a year.[7] Indeed, multiyear recessions usually occur only in economies that require deep restructuring, such as that of Britain in the 1970s (prior to the advent of Prime Minister Margaret Thatcher), Switzerland in the 1990s, and Japan after 1992 (the last due not only to its financial collapse but also to the need to reorient its economy in light of China's rise). Banking crises, of course, usually require painful restructuring of the financial system and so are an important example of this general principle.

The Fiscal Legacy of Crises

Declining revenues and higher expenditures, owing to a combination of bailout costs and higher transfer payments and debt servicing costs, lead to a rapid and marked worsening in the fiscal balance. The episodes of Finland and Sweden stand out in this regard; the latter went from a precrisis surplus of nearly 4 percent of GDP to a whopping 15 percent deficit-to-GDP ratio. See table 14.1.

Figure 14.5 shows the increase in real government debt in the three years following a banking crisis. The deterioration in government finances is striking, with an average debt increase of more than 86 percent. The calculation here is based on relatively recent data from the past few decades, but recall that in chapter 10 of this book we take advantage of our newly unearthed historical data on domestic debt to show that a buildup in government debt has been a defining characteristic of the aftermath of banking crises for over a century. We look at the percentage increase in debt rather than in

TABLE 14.1
Fiscal deficits (central government balance) as a percentage of GDP

Country, crisis year	Year before the crisis	Peak deficit (year)	Increase or decrease (–) in the fiscal deficit
Argentina, 2001	–2.4	–11.9 (2002)	9.5
Chile, 1980	4.8	–3.2 (1985)	8.0
Colombia, 1998	–3.6	–7.4 (1999)	3.8
Finland, 1991	1.0	–10.8 (1994)	11.8
Indonesia, 1997	2.1	–3.7 (2001)	5.8
Japan, 1992	–0.7	–8.7 (1999)	9.4
Korea, 1997	0.0	–4.8 (1998)	4.8
Malaysia, 1997	0.7	–5.8 (2000)	6.5
Mexico, 1994	0.3	–2.3 (1998)	2.6
Norway, 1987	5.7	–2.5 (1992)	7.9
Spain, 1977[a]	–3.9	–3.1 (1977)	–0.8
Sweden, 1991	3.8	–11.6 (1993)	15.4
Thailand, 1997	2.3	–3.5 (1999)	5.8

Sources: International Monetary Fund (various years), *Government Financial Statistics* and *World Economic Outlook,* and the authors' calculations.

[a]As shown in figure 14.4, Spain was the only country in our sample to show a (modest) increase in per capita GDP growth during the postcrisis period.

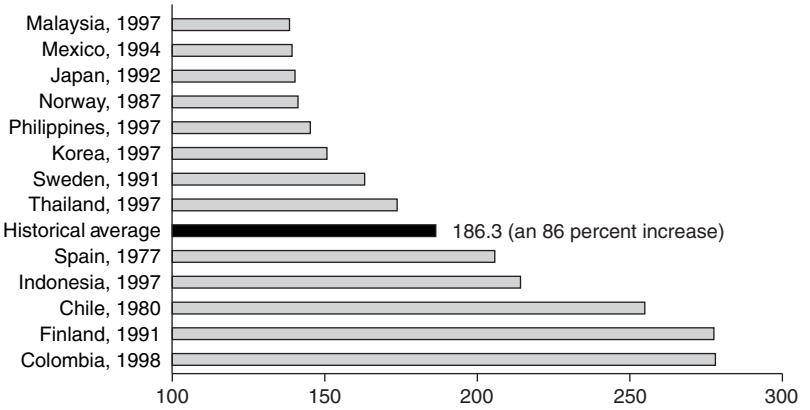

Figure 14.5. The cumulative increase in real public debt in the three years following past banking crises.
Sources: Appendixes A.1 and A.2 and sources cited therein.
Notes: Each banking crisis episode is identified by country and the beginning year of the crisis. Only major (systemic) banking crisis episodes are included, subject to data limitations. The historical average reported does not include ongoing crisis episodes, which are omitted altogether, because these crises began in 2007 or later, and the debt stock comparison here is with three years after the beginning of the banking crisis. Public debt is indexed to equal 100 in the year of the crisis.

debt relative to GDP because sometimes steep output drops complicate the interpretation of debt-to-GDP ratios. We have already emphasized but it bears being stated again, the characteristically huge buildup in government debt is driven mainly by a sharp falloff in tax revenue due to the deep recessions that accompany most severe financial crises. The much-ballyhooed bank bailout costs have been, in several cases, only a relatively minor contributor to the postcrisis increase in debt burdens.

Sovereign Risk

As shown in figure 14.6, sovereign default, debt restructuring, and/or near default (avoided by international bailout packages) have been a part of the experience of financial crises in many emerging markets; therefore, a decline in a country's credit rating during a crisis hardly

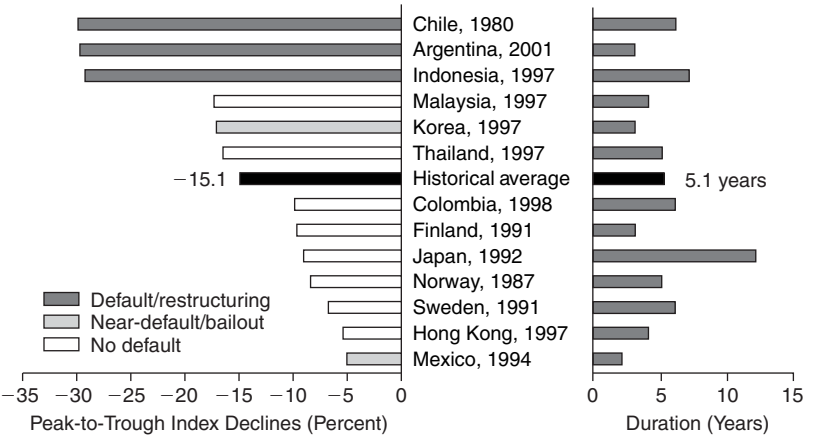

Figure 14.6. Cycles of *Institutional Investor* sovereign ratings and past banking crises.
Sources: Institutional Investor (various years) and the authors' calculations.
Notes: Institutional Investor's ratings range from 0 to 100, rising with increasing creditworthiness.

comes as a surprise. Advanced economies, however, do not go unscathed. Finland's sovereign risk rating score went from 79 to 69 in the space of three years, leaving it with a score close to those of some emerging markets! Japan suffered several downgrades from the more famous rating agencies as well.

Comparisons with Experiences from the First Great Contraction in the 1930s

Until now, our comparison benchmark has consisted of postwar financial crises. The quantitative similarities of those crises with the recent crisis in the United States, at least for the run-up and early trajectory, have been striking. Yet, in many ways this "Second Great Contraction" is a far deeper crisis than others in the comparison set, because it is global in scope, whereas the other severe post–World War II crises were either country-specific or at worst regional. Of course, as we will discuss in more detail in chapter 17, policy authorities reacted somewhat hesitantly in the 1930s, which may also

explain the duration and severity of the crisis. Nevertheless, given the lingering uncertainty over the future evolution of the crisis of the late 2000s (the Second Great Contraction), it is useful to look at evidence from the 1930s, the First Great Contraction.

Figure 14.7 compares the crises of the 1930s with the deep post–World War II crises in terms of the number of years over which

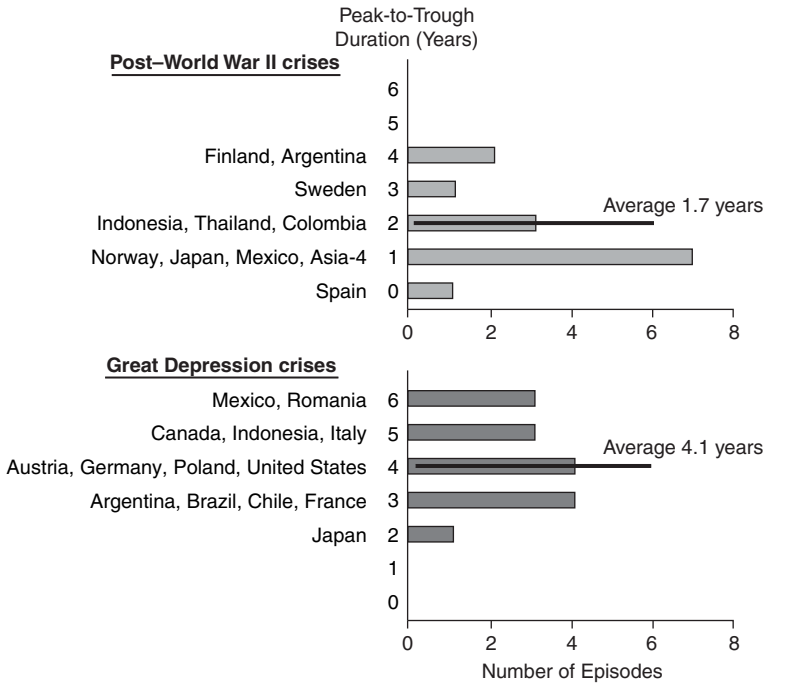

Figure 14.7. The duration of major financial crises: Fourteen Great Depression episodes versus fourteen post–World War II episodes (duration of the fall in output per capita).
Sources: Appendix A.3 and the authors' calculations.
Notes: The fourteen postwar episodes were those in Spain, 1977; Norway, 1987; Finland, 1991; Sweden, 1991; Japan, 1992; Mexico, 1994; Indonesia, Thailand, and (grouped as Asia-4 in the figure) Hong Kong, Korea, Malaysia, and Philippines, all 1997; Colombia, 1998; and Argentina, 2001. The fourteen Great Depression episodes were comprised of eleven banking crisis episodes and three less systemic but equally devastating economic contractions in Canada, Chile, and Indonesia during the 1930s. The banking crises were those in Japan, 1927; Brazil, Mexico, and the United States, all 1929; France and Italy, 1930; and Austria, Germany, Poland, and Romania, 1931.

output fell from peak to trough. The upper panel shows postwar crises including those in Colombia, Argentina, Thailand, Indonesia, Sweden, Norway, Mexico, the Philippines, Malaysia, Japan, Finland, Spain, Hong Kong, and Korea—fourteen in all. The lower panel shows fourteen Great Depression crises, including those in Argentina, Chile, Mexico, Canada, Austria, France, the United States, Indonesia, Poland, Brazil, Germany, Romania, Italy, and Japan.

Each half of the diagram forms a vertical histogram. The number of years each country or several countries were in crisis is measured on the vertical axis. The number of countries experiencing a crisis of any given length is measured on the horizontal axis. One sees clearly from the diagram that the recessions accompanying the Great Depression were of much longer duration than the postwar crises. After the war, output typically fell from peak to trough for an average of 1.7 years, with the longest downturn of four years experienced by Argentina and Finland. But in the Depression, many countries, including the United States and Canada, experienced a downturn of four years or longer, with Mexico and Romania experiencing a decrease in output for six years. Indeed, the average length of time over which output fell was 4.1 years in the Great Depression.[8]

It is important to recognize that standard measures of the depth and duration of recessions are not particularly suitable for capturing the epic decline in output that often accompanies deep financial crises. One factor is the depth of the decline, and another is that growth is sometimes quite modest in the aftermath as the financial system resets. An alternative perspective is provided in figure 14.8, which measures the number of years it took for a country's output to reach its precrisis level. Of course, after a steep fall in output, just getting back to the starting point can take a long period of growth. Both halves of the figure are stunning. For the postwar episodes, it took an average of 4.4 years for output to claw its way back to precrisis levels. Japan and Korea were able to do this relatively quickly, at only 2 years, whereas Colombia and Argentina took 8 years. But things were much worse in the Depression, and countries took an average of 10 years to increase their output back to precrisis levels, in part because no country was in a position to "export its way to re-

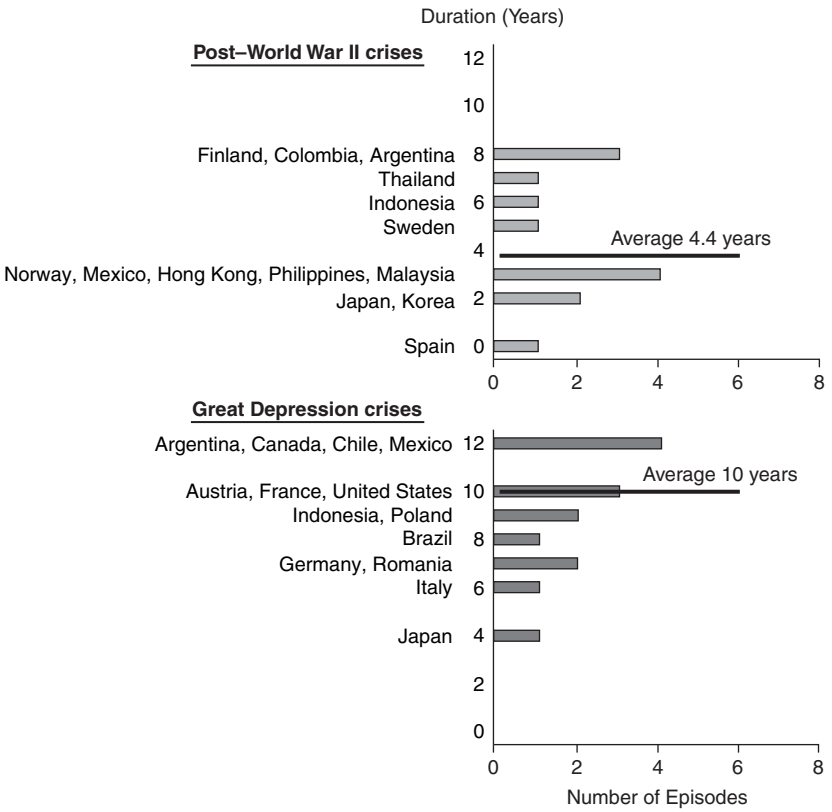

Figure 14.8. The duration of major financial crises: Fourteen Great Depression episodes versus fourteen post–World War II episodes (number of years for output per capita to return to its precrisis level). *Sources:* Appendix A.3 and the authors' calculations. *Notes:* The fourteen postwar episodes were those in Spain, 1977; Norway, 1987; Finland, 1991; Sweden, 1991; Japan, 1992; Mexico, 1994; Hong Kong, Indonesia, Korea, Malaysia, the Philippines, and Thailand, all 1997; Colombia, 1998; and Argentina, 2001. The fourteen Great Depression episodes were comprised of eleven banking crisis episodes and three less systemic but equally devastating economic contractions in Canada, Chile, and Indonesia. The banking crises were those in Japan, 1927; Brazil, Mexico, and the United States, all 1929; France and Italy, 1930; and Austria, Germany, Poland, and Romania, 1931. The precrisis level for the Great Depression was that of 1929.

covery" as world aggregate demand imploded. The figure shows, for example, that the United States, France, and Austria took 10 years to rebuild their output to its initial pre-Depression level, whereas Canada, Mexico, Chile, and Argentina took 12. Thus, the Great Depression era sets far more daunting benchmarks for the potential trajectory of the financial crisis of the late 2000s than do the main comparisons we have been making to severe postwar crises.

As we will show in chapter 16, the unemployment increases in the Great Depression were also far greater than those in the severe post–World War II financial crises. The average rate of unemployment increase was about 16.8 percent. In the United States, unemployment rose from 3.2 percent to 24.9 percent.

Finally, in figure 14.9 we look at the evolution of real public debt during the crises of the Great Depression era. Interestingly, public debt grew more slowly in the aftermath of these crises than it did

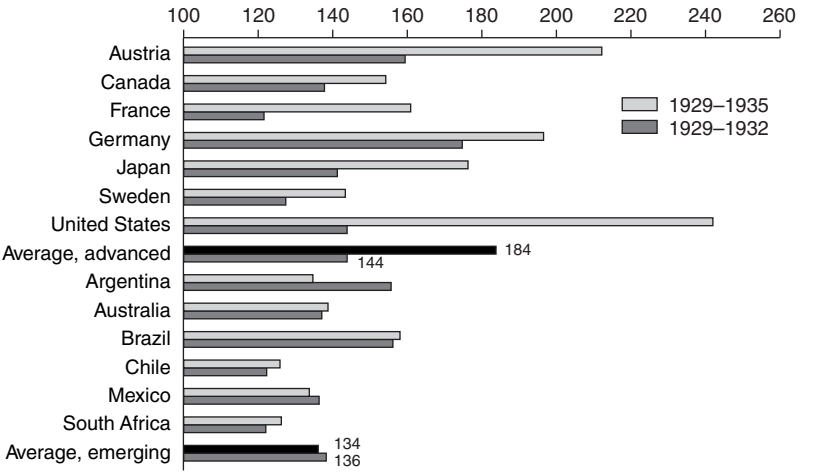

Figure 14.9. The cumulative increase in real public debt three and six years following the onset of the Great Depression in 1929: Selected countries.
Sources: Reinhart and Rogoff (2008b) and sources cited therein.
Notes: The beginning years of the banking crises range from 1929 to 1931. Australia and Canada did not have a systemic banking crisis but are included for comparison purposes, because both also suffered severe and protracted economic contractions. The year 1929 marks the peak in world output and hence is used as the marker for the beginning of the Depression episode.

in the severe postwar crises. In the Depression, it took six years for real public debt to grow by 84 percent (versus half that time in the postwar crises). Some of this difference reflects the very slow policy response that occurred in the Great Depression. It is also noteworthy that public debt in emerging markets did not increase in the later stages (three to six years) following the crises. Some of these emerging markets had already drifted into default (on both domestic and external debts); others may have faced the kind of external constraints that we discussed in connection with debt intolerance and, as such, had little capacity to finance budget deficits.

Concluding Remarks

An examination of the aftermath of severe postwar financial crises shows that these crises have had a deep and lasting effect on asset prices, output, and employment. Unemployment increases and housing price declines have extended for five and six years, respectively. Real government debt has increased by an average of 86 percent after three years.

How relevant are historical benchmarks in assessing the trajectory of a crisis such as the global financial crisis of the late 2000s, the Second Great Contraction? On the one hand, authorities now have arguably more flexible monetary policy frameworks, thanks particularly to a less rigid global exchange rate regime. And some central banks showed an aggressiveness early on by acting in a way that was notably absent in the 1930s or in the latter-day Japanese experience. On the other hand, we would be wise not to push too far the conceit that we are smarter than our predecessors. A few years back, many people would have said that improvements in financial engineering had done much to tame the business cycle and limit the risk of financial contagion. And as we saw in the final section of this chapter, the Great Depression crises were far more traumatic events than even the more severe of the post–World War II crises. In the Depression, it took countries in crisis an average of ten years for real per capita GDP to reach its precrisis level. Still, in the postwar crises

it has taken almost four and a half years for output to reach its precrisis level (though growth has resumed much more quickly, it has still taken time for the economy to return to its starting point).

What we do know is that after the start of the recent crisis in 2007, asset prices and other standard crisis indicator variables tumbled in the United States and elsewhere along the tracks laid down by historical precedent. It is true that equity markets have since recovered some ground, but by and large this is not out of line with the historical experience (already emphasized in chapter 10) that V-shaped recoveries in equity prices are far more common than V-shaped recoveries in real housing prices or employment. Overall, this chapter's analysis of the postcrisis outcomes for unemployment, output, and government debt provides sobering benchmark numbers for how deep financial crises can unfold. Indeed, our post–World War II historical comparisons were largely based on episodes that were individual or regional in nature. The global nature of the recent crisis has made it far more difficult, and contentious, for individual countries to grow their way out through higher exports or to smooth the consumption effects through foreign borrowing. As noted in chapter 10, historical experience suggests that the brief post-2002 lull in sovereign defaults is at risk of coming to an abrupt end. True, the planned quadrupling of International Monetary Fund (IMF) resources, along with the apparent softening of IMF loan conditions, could have the effect of causing the next round of defaults to play out in slow motion, albeit with a bigger bang at the end if the IMF itself runs into broad repayment problems. Otherwise, as we have mentioned repeatedly, defaults in emerging market economies tend to rise sharply when many countries are simultaneously experiencing domestic banking crises.

- 15 -

The International Dimensions of the Subprime Crisis: The Results of Contagion or Common Fundamentals?

In the preceding two chapters we emphasized the similarities between the latest financial crisis (the Second Great Contraction) and previous crises, especially when viewed from the perspective of the United States at the epicenter. Of course, the crisis of the late 2000s is different in important ways from other post–World War II crises, particularly in the ferocity with which the recession spread globally, starting in the fourth quarter of 2008. The "sudden stop" in global financing rapidly extended to small- and medium-sized businesses around the world, with larger businesses able to obtain financing only at much dearer terms than before. The governments of emerging markets are similarly experiencing stress, although as of mid-2009 sovereign credit spreads had substantially narrowed in the wake of massive support by rich countries for the International Monetary Fund (IMF), which we alluded to in the previous chapter.[1]

How does a crisis morph from a local or regional crisis into a global one? In this chapter we emphasize the fundamental distinction between international transmission that occurs due to common shocks (e.g., the collapse of the tech boom in 2001 or the collapse of housing prices in the crisis of the late 2000s) and transmission that occurs due to mechanisms that are really the result of cross-border contagion emanating from the epicenter of the crisis.

In what follows we provide a sprinkling of historical examples of financial crises that swiftly spread across national borders, and we offer a rationale for understanding which factors make it more

likely that a primarily domestic crisis fuels rapid cross-border contagion. We use these episodes as reference points to discuss the bunching of banking crises across countries that is so striking in the late-2000s crisis, where both common shocks and cross-country linkages are evident. Later, in chapter 16, we will develop a crisis severity index that allows one to define benchmarks for both regional and global financial crises.

Concepts of Contagion

In defining contagion, we distinguish between two types, the "slow-burn" spillover and the kind of fast burn marked by rapid cross-border transmission that Kaminsky, Reinhart, and Végh label "fast and furious." Specifically, they explain:

> We refer to contagion as an episode in which there are significant *immediate* effects in a number of countries following an event—that is, when the consequences are *fast and furious* and evolve over a matter of hours or days. This "fast and furious" reaction is a contrast to cases in which the initial international reaction to the news is muted. The latter cases do not preclude the emergence of gradual and protracted effects that may cumulatively have major economic consequences. We refer to these gradual cases as *spillovers*. *Common* external *shocks*, such as changes in international interest rates or oil prices, are also not *automatically* included in our working definition of contagion.[2]

We add to this classification that common shocks need not all be external. This caveat is particularly important with regard to the recent episode. Countries may share common "domestic" macroeconomic fundamentals, such as housing bubbles, capital inflow bonanzas, increasing private and (or) public leveraging, and so on.

Selected Earlier Episodes

Bordo and Murshid, and Neal and Weidenmier, have pointed out that cross-country correlations in banking crises were also common

during 1880–1913, a period of relatively high international capital mobility under the gold standard.[3] In table 15.1 we look at a broader time span including the twentieth century; the table lists the years during which banking crises have been bunched; greater detail on the dates for individual countries is provided in appendix A.3.[4] The famous Barings crisis of 1890 (which involved Argentina and the United Kingdom before spreading elsewhere) appears to have been the first episode of international bunching of banking crises; this was followed by the panic of 1907, which began in the United States and quickly spread to other advanced economies (particularly Denmark, France, Italy, Japan, and Sweden). These episodes are reasonable benchmarks for modern-day financial contagion.[5]

Of course, other pre–World War II episodes of banking crisis contagion pale when compared with the Great Depression, which also saw a massive number of nearly simultaneous defaults of both external and domestic sovereign debts.

Common Fundamentals and the Second Great Contraction

The conjuncture of elements related to the recent crisis is illustrative of the two channels of contagion: cross-linkages and common shocks. Without doubt, the U.S. financial crisis of 2007 spilled over into other markets through direct linkages. For example, German and Japanese financial institutions (and others ranging as far as Kazakhstan) sought more attractive returns in the U.S. subprime market, perhaps owing to the fact that profit opportunities in domestic real estate were limited at best and dismal at worst. Indeed, after the fact, it became evident that many financial institutions outside the United States had nontrivial exposure to the U.S. subprime market.[6] This is a classic channel of transmission or contagion, through which a crisis in one country spreads across international borders. In the present context, however, contagion or spillovers are only part of the story.

That many other countries experienced economic difficulties at the same time as the United States also owed significantly to the

TABLE 15.1
Global banking crises, 1890–2008: Contagion or common fundamentals?

Years of bunching in banking crises	Affected countries	Comments
1890–1891	Argentina, Brazil, Chile, Portugal, the United Kingdom, and the United States	Argentina defaulted and there were runs on all Argentine banks (see della Paolera and Taylor 2001); Baring Brothers faced failure.
1907–1908	Chile, Denmark, France, Italy, Japan, Mexico, Sweden, and the United States	A drop in copper prices undermined the solvency of a trust company (quasi-bank) in New York.
1914	Argentina, Belgium, Brazil, France, India, Italy, Japan, Netherlands, Norway, the United Kingdom, and the United States	World War I broke out.
1929–1931	Advanced economies: Belgium, Finland, France, Germany, Greece, Italy, Portugal, Spain, Sweden, and the United States Emerging markets: Argentina, Brazil, China, India, and Mexico	Real commodity prices collapsed by about 51 percent during 1928–1931. Real interest rates reached almost 13 percent in the United States.
1981–1982	Emerging markets: Argentina, Chile, Colombia, Congo, Ecuador, Egypt, Ghana, Mexico, the Philippines, Turkey, and Uruguay	Between 1979 and 1982, real commodity prices fell about 40 percent. U.S. real interest rates hit about 6 percent—their highest readings since 1933. The decade-long debt crisis in emerging markets began.
1987–1988	Many small, mostly low-income countries; Sub-Saharan Africa was particularly hard hit	These years marked the tail-end of a nearly decade-long debt crisis.
1991–1992	Advanced economies: the Czech Republic, Finland, Greece, Japan, and Sweden	Real estate and equity price bubbles in the Nordic countries and Japan burst;

(*continued*)

TABLE 15.1 Continued

Years of bunching in banking crises	Affected countries	Comments
	Other countries: Algeria, Brazil, Egypt, Georgia, Hungary, Poland, Romania, and the Slovak Republic	many transition economies coped with liberalization and stabilization.
1994–1995	Argentina, Bolivia, Brazil, Ecuador, Mexico, and Paraguay Others countries: Azerbaijan, Cameroon, Croatia, Lithuania, and Swaziland	The Mexican "tequila crisis" dealt the first blow to the surge in capital inflows to emerging markets since the early 1990s.
1997–1999	Asia: Hong Kong, Indonesia, Malaysia, the Philippines, Taiwan, Thailand, and Vietnam Other countries: Brazil, Colombia, Ecuador, El Salvador, Mauritius, Russia, Turkey, and Ukraine	The second blow was dealt to capital flows to emerging markets.
2007–present	Germany, Hungary, Iceland, Ireland, Japan, Spain, the United Kingdom, the United States, and others	The U.S. subprime real estate bubble—and other real estate bubbles in advanced economies—burst.

Sources: Based on chapters 1–10 of this book.

fact that many of the features that characterized the run-up to the subprime crisis in the United States were present in other advanced economies as well. Two common elements stand out. First, many countries in Europe and elsewhere (Iceland and New Zealand, for example) had their own home-grown real estate bubbles (figure 15.1). Second, the United States was not alone in running large current account deficits and experiencing a sustained "capital flow bonanza," as shown in chapter 10. Bulgaria, Iceland, Ireland, Latvia, New Zealand, Spain, and the United Kingdom, among others, were importing capital from abroad, which helped fuel a credit and asset price boom.[7] These trends, in and of themselves, made these countries vulnerable

to the usual nasty consequences of asset market crashes and capital flow reversals—or "sudden stops" à la Dornbusch/Calvo—irrespective of what may have been happening in the United States.

Direct spillovers via exposure to the U.S. subprime markets and common fundamentals of the kind discussed abroad have addi-

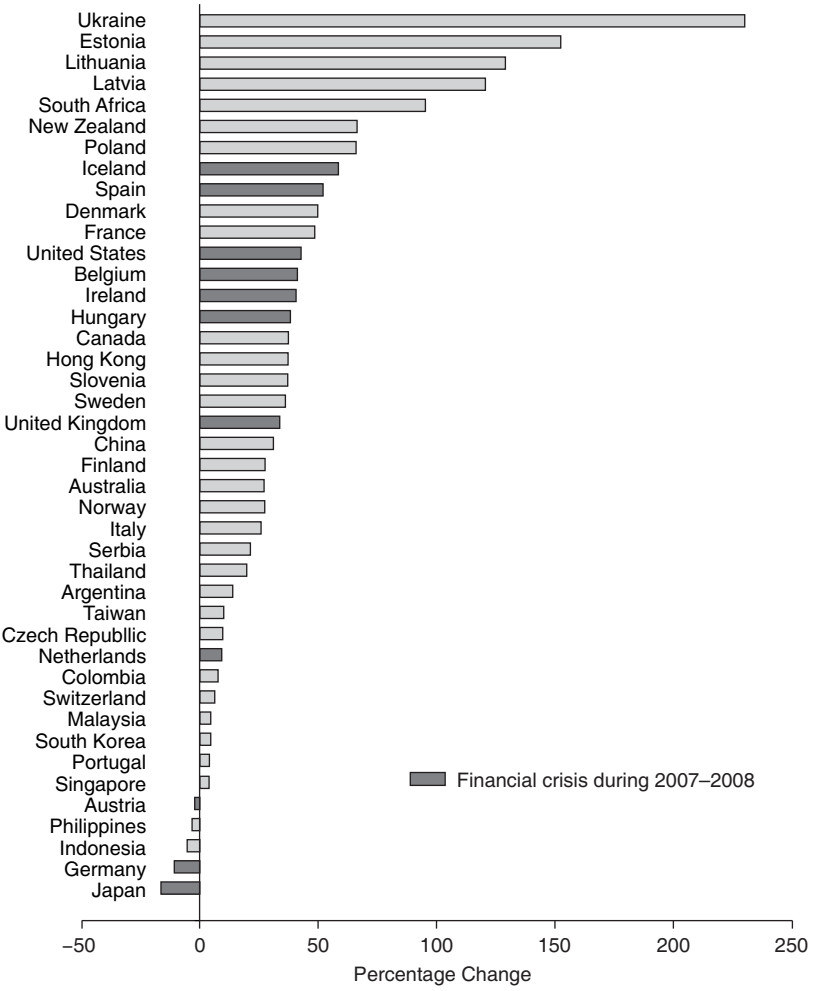

Figure 15.1. Percentage change in real housing prices, 2002–2006.
Sources: Bank for International Settlements and the sources listed in appendix A.1.
Notes: The China data cover 2003–2006.

tionally been complemented with other "standard" transmission channels common in such episodes, specifically the prevalence of common lenders. For example, an Austrian bank exposed to Hungary (as the latter encounters severe economic turbulence) will curtail lending not only to Hungary but to other countries (predominantly in Eastern Europe) to which it was already making loans. This will transmit the "shock" from Hungary (via the common lender) to other countries. A similar role was played by a common Japanese bank lender in the international transmission of the Asian crisis of 1997–1998 and by U.S. banks during the Latin American debt crisis of the early 1980s.

Are More Spillovers Under Way?

As noted earlier, spillovers do not typically occur at the same rapid pace associated with adverse surprises and sudden stops in the financial market. Therefore, they tend not to spark immediate adverse balance sheet effects. Their more gradual evolution does not make their cumulative effects less serious, however.

The comparatively open, historically fast-growing economies of Asia, after initially surviving relatively well, were eventually very hard hit by the recessions of the late 2000s in the advanced economies. Not only are Asian economies more export driven than those of other regions, but also their exports have a large manufactured goods component, which makes the world demand for their products highly income elastic relative to demand for primary commodities.

Although not quite as export oriented as Asia, the economies of Eastern Europe have been severely affected by recessions in their richer trading partners in the West. A similar observation can be made of Mexico and Central America, countries that are both highly integrated with and also significantly dependent on workers' remittances from the United States. The more commodity-based economies of Africa and Latin America (as well as the oil-producing nations) felt the effects of the global weakness in demand through its effect

on the commodity markets, where prices fell sharply starting in the fall of 2008.

A critical element determining the extent of the damage to emerging markets through these spillover effects is the speed at which the countries of the "north" recover. As cushions in foreign exchange reserves (built in the bonanza years before 2007) erode and fiscal finances deteriorate, financial strains on debt servicing (public and private) will mount. As we have noted, severe financial crises are protracted affairs. Given the tendency for sovereign defaults to increase in the wake of both global financial crises and sharp declines in global commodity prices, the fallout from the Second Great Contraction may well be an elevated number of defaults, reschedulings, and/or massive IMF bailouts.

- 16 -

Composite Measures of Financial Turmoil

In this book we have emphasized the clustering of crises at several junctures both across countries and across different types of crises. A country experiencing an exchange rate crisis may soon find itself in banking and inflation crises, sometimes with domestic and external default to follow. Crises are also transmitted across countries through contagion or common factors, as we discussed in the previous chapter.

Until now, however, we have not attempted to construct any quantitative index that combines crises regionally or globally. Here, in keeping with the algorithmic approach we have applied to delineating individual financial crisis events, we will offer various types of indexes of financial turbulence that are helpful in assessing the global, regional, and national severity of a crisis.

Our financial turbulence index reveals some stunning information. The most recent global financial crisis—which we have termed the "Second Great Contraction"—is clearly the only global financial crisis that has occurred during the post–World War II period. Even if the Second Great Contraction does not evolve into the Second Great Depression, it still surpasses other turbulent episodes, including the breakdown of Bretton Woods, the first oil shock, the debt crisis of the 1980s in the developing world, and the now-famous Asian crisis of 1997–1998. The Second Great Contraction is already marked by an extraordinarily global banking crisis and by spectacular global exchange rate volatility. The synchronicity of the collapses in housing markets and employment also appears unprecedented since the Great Depression; late in this chapter we will show little-used data from the Great Depression to underscore this comparison.

The index of financial turbulence we develop in this chapter can also be used to characterize the severity of regional crisis, and here we compare the experiences of different continents. The index shows how misinformed is the popular view that Asia does not have financial crises.

This chapter not only links crises globally but also takes on the issue of how different varieties of crisis are linked within a country. Following Kaminsky and Reinhart, we discuss how (sometimes latent) banking crises often lead to currency crashes, outright sovereign default, and inflation.[1]

Finally, we conclude by noting that pulling out of a global crisis is, by nature, more difficult than pulling out of a multicountry regional crisis (such as the Asian financial crisis of 1997–1998). Slow growth in the rest of the world cuts off the possibility that foreign demand will compensate for collapsing domestic demand. Thus, measures such as our index of global financial turbulence can potentially be useful in designing the appropriate policy response.

Developing a Composite Index of Crises: The BCDI Index

We develop our index of crisis severity as follows. In chapter 1 we defined five "varieties" of crises: external and domestic sovereign default, banking crises, currency crashes, and inflation outbursts.[2] Our composite country financial turbulence index is formed by simply summing up the number of types of crises a country experiences in a given year. Thus, if a country did not experience any of our five crises in a given year, its turbulence index for that year would be zero, while in a worst-case scenario (as in Argentina in 2002, for instance) it would be five. We assign such a value for each country for each year. This is what we dub the BCDI index, which stands for banking (systemic episodes only), currency, debt (domestic and external), and inflation crisis index.

Although this exercise captures some of the compounding dimensions of the crisis experience, it admittedly remains an incomplete measure of its severity.[3] If inflation goes to 25 percent per an-

num (meeting the threshold for a crisis by our definition), it receives the same weight in the index as if it went to 250 percent, which is obviously far more serious.[4] This binary treatment of default is similar to that of the rating agency Standard and Poor's (S&P), which lists countries as either in default or not in default. The S&P index (and ours) take account of debt crisis variables. For example, Uruguay's relatively swift and "market-friendly" restructuring in 2003 is assigned the same value as the drawn-out outright default and major "haircut" successfully imposed on creditors by its larger neighbor, Argentina, during its 2001–2002 default. Nevertheless, indexes such as S&P's have proven enormously useful over time precisely because default tends to be such a discrete event. Similarly, a country that reaches our crisis markers across multiple varieties of crises is almost surely one undergoing severe economic and financial duress.

Where feasible, we also add to our five-crises composite a "Kindleberger-type" stock market crash, which we show separately.[5] In this case, the index runs from zero to six.[6] Although Kindleberger himself did not provide a quantitative definition of a crash, Barro and Ursúa have adopted a reasonable benchmark for defining asset price collapses, which we adopt here. They define a stock market crash as a cumulative decline of 25 percent or more in real equity prices.[7] We apply their methods to the sixty-six countries covered in our sample; the starting dates for equity prices are determined by data availability, as detailed on a country-by-country basis in the data appendixes. Needless to say, our sample of stock market crashes ends with a bang in the cross-country megacrashes of 2008. As in the case of growth collapses, many (if not most) of the stock market crashes have coincided with the crisis episodes described here (chapters 1 and 11). "Most" clearly does not mean all; the Black Monday crash of October 1987 (for example) is not associated with a crisis of any other stripe. False signal flares from the equity market are, of course, familiar. As Samuelson famously noted, "The stock market has predicted nine of the last five recessions."[8] Indeed, although global stock markets continued to plummet during the first part of 2009 (past the end date of our core data set), they then rose markedly in the second quarter of the year, though they hardly returned to their precrisis level.

Beyond sovereign events, there are two other important dimensions of defaults that our crisis index does not capture directly. First, there are defaults on household debt. These defaults, for instance, have been at center stage in the unfolding subprime saga in the United States in the form of the infamous toxic mortgages. Household defaults are not treated separately in our analysis owing to a lack of historical data, even for advanced economies. However, such episodes are most likely captured by our indicator of banking crises. Banks, after all, are the principal sources of credit to households, and large-scale household defaults (to the extent that these occur) impair bank balance sheets.

More problematic is the incidence of corporate defaults, which are in their own right another "variety of crisis." This omission is less of an issue in countries where corporations are bank-dependent. In such circumstances, the same comment made about household default applies to corporate debt. For countries with more developed capital markets, it may be worthwhile to consider widespread corporate default as yet another variety of crisis. As shown in figure 16.1, the United States began to experience a sharp run-up in the incidence of corporate default during the Great Depression well before the government defaulted (the abrogation of the gold clause in 1934). However, it is worth noting that corporate defaults and banking crises are indeed correlated, so our index may partially capture this phenomenon indirectly. In many episodes, corporate defaults have also been precursors to government defaults or reschedulings as governments have tended to shoulder private sector debts.

An Illustration of the Composite at a Country Level

The Argentine crisis of 2001–2002 illustrates how crises may potentially reinforce and overlap one another. The government defaulted on all its debts, domestic and foreign; the banks were paralyzed in a "banking holiday" when deposits were frozen indefinitely; the exchange rate for pesos to U.S. dollars went from one to more than three practically overnight; and prices went from declining (with deflation running at an annual rate of –1 percent or so) to inflating at

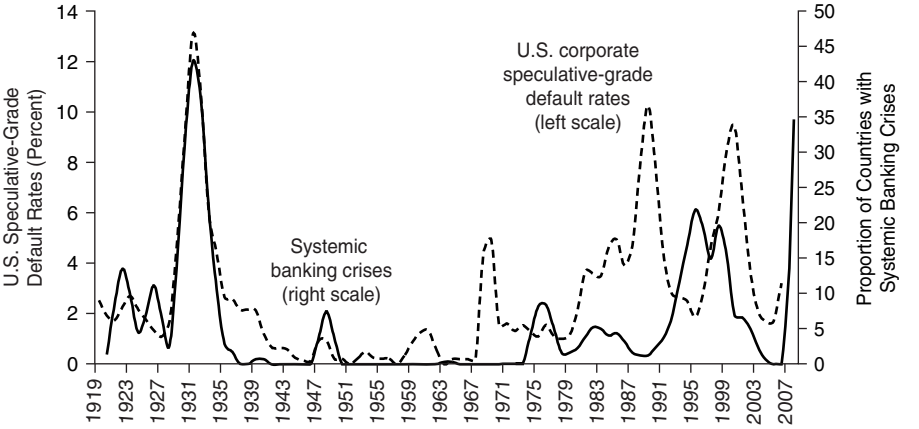

Figure 16.1. The proportion of countries with systemic banking crises (weighted by their share of world income) and U.S. corporate speculative-grade default rates, 1919–2008.
Sources: Kaminsky and Reinhart (1999), Bordo et al. (2001), Maddison (2004), Caprio et al. (2005), Jácome (2008), *Moody's Magazine* (various issues), and additional sources listed in appendix A.3, which provides banking crises dates.
Notes: The sample includes all sixty-six countries listed in table 1.1 that were independent states in the given year. Three sets of GDP weights are used, 1913 weights for the period 1800–1913, 1990 weights for the period 1914–1990, and finally 2003 weights for the period 1991–2008. The entries for 2007–2008 list crises in Austria, Belgium, Germany, Hungary, Japan, the Netherlands, Spain, the United Kingdom, and the United States. The figure shows two-year moving averages.

a rate of about 30 percent (by conservative official estimates). We might add that this episode qualifies as a Barro-Ursúa growth collapse (per capita GDP fell by about 20 to 25 percent), and real stock prices crashed by more than 30 percent, along the lines of a Kindleberger-type crash episode.

World Aggregates and Global Crises

To transition from the experience of individual countries to a world or regional aggregate, we take weighted averages across all countries or for a particular region. The weights, as discussed earlier, are given by the country's share in world output. Alternatively, one can calculate an average tally of crises across a particular country group using a simple unweighted average. We will illustrate both.

Historical Comparisons

Our aggregate crisis indexes are the time series shown for 1900–2008 in figures 16.2 and 16.3 for the world and for the advanced economies. The advanced economies aggregate comprises the eighteen high-income countries in our sample, while the emerging markets group

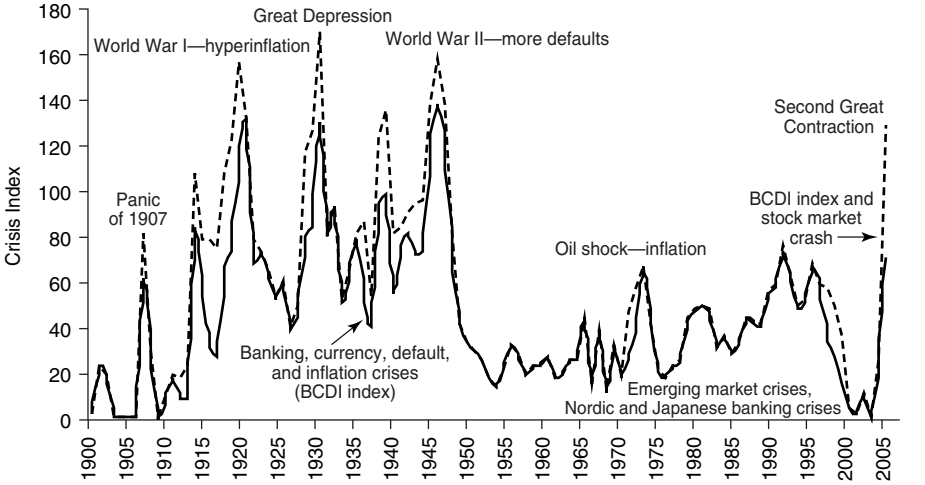

Figure 16.2. Varieties of crises: World aggregate, 1900–2008.
Source: The authors' calculations.
Notes: The figure presents a composite index of banking, currency, sovereign default, and inflation crises and stock market crashes (weighted by their share of world income).The banking, currency, default (domestic and external), and inflation composite (BCDI) index can take a value between zero and five (for any country in any given year) depending on the varieties of crises occurring in a particular year. For instance, in 1998 the index took on a value of 5 for Russia, which was experiencing a currency crash, a banking and inflation crisis, and a sovereign default on both domestic and foreign debt obligations. This index is then weighted by the country's share in world income. This index is calculated annually for the sixty-six countries in the sample for 1800–2008 (shown above for 1900 onward). In addition, we use the definition of a stock market crash given by Barro and Ursúa (2009) for the twenty-five countries in their sample (a subset of the sixty-six-country sample except for Switzerland) for the period 1864–2006; we update their definition of a crash through December 2008 to compile our banking, currency, default (domestic and external), and inflation composite (BCDI +) index. For the United States, for example, the index posts a reading of 2 (banking crisis and stock market crash) in 2008; for Australia and Mexico it also posts a reading of 2 (currency and stock market crash).

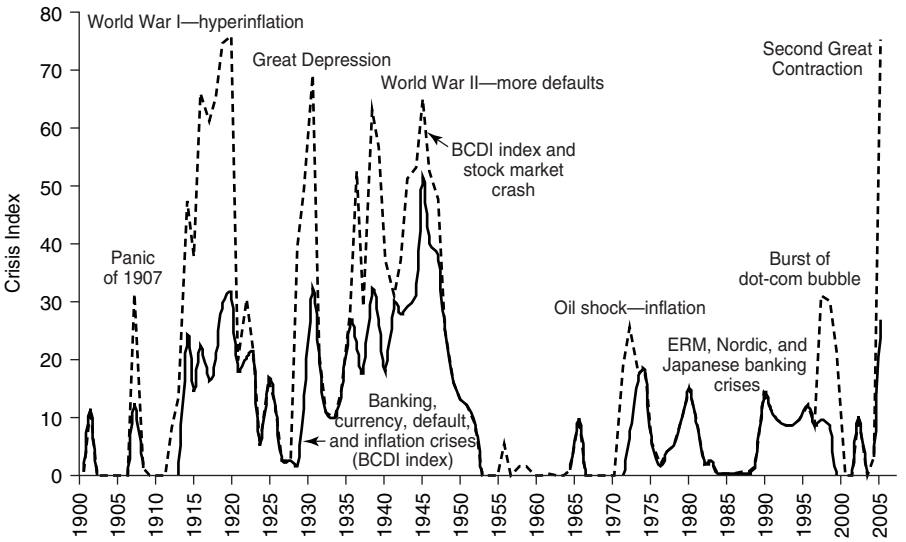

Figure 16.3. Varieties of crises: Advanced economies aggregate, 1900–2008.
Source: The authors' calculations.
Notes: This figure presents a composite index of banking, currency, sovereign default, and inflation crises and stock market crashes, weighted by their share of world income. The banking, currency, default (domestic and external), and inflation composite (BCDI) index can take a value between zero and 5 (for any country in any given year) depending on the varieties of crises taking place in a particular year. For instance, in 1947 the index took on a value of 4 for Japan, which was experiencing a currency crash, an inflation crisis, and a sovereign default on both domestic and foreign debt obligations. This index is then weighted by the country's share in world income. This index is calculated annually for the eighteen advanced economies (includes Austria but not Switzerland) in the Reinhart-Rogoff sample for 1800–2008 (shown above for 1900 onward). In addition, we use the definition of a stock market crash given by Barro and Ursúa (2009) for eighteen advanced economies (includes Switzerland but not Austria) for the period 1864–2006; we update their definition of a crash through December 2008 to compile our banking, currency, default (domestic and external), and inflation composite (BCDI +) index. For the United States and the United Kingdom, for example, the index posts a reading of 2 (banking crisis and stock market crash) in 2008; for Australia and Norway it also posts a reading of 2 (currency and stock market crash). ERM is exchange rate mechanism of the euro system.

aggregates forty-eight entries from Africa, Asia, Europe, and Latin America. The indexes shown are weighted by a country's share in world GDP, as we have done for debt and banking crises.[9] The country indexes (without stock market crashes) are compiled from the time of each country's independence (if after 1800) onward; the index that includes the equity market crashes is calculated based on data availability.

Although inflation and banking crises predated independence in many cases, a sovereign debt crisis (external or internal) is, by definition, not possible for a colony. In addition, numerous colonies did not always have their own currencies. When stock market crashes (shown separately) are added to the BCDI composite, we refer to it as the BCDI +.

Figures 16.2 and 16.3 chronicle the incidence, and to some degree the severity, of varied crisis experiences. A cursory inspection of these figures reveals the very different patterns of the pre–World War II and postwar experiences. This difference is most evident in figure 16.3, which plots the indexes for eighteen advanced economies. The prewar experience was characterized by frequent and severe crisis episodes ranging from the banking crisis–driven "global" panic of 1907 to the debt and inflation crises associated with World War II and its aftermath.[10]

The postwar periods offered some bouts of turbulence: the inflationary outbursts that accompanied the first oil shocks in the mid-1970s, the recessions associated with bringing down inflation in the early 1980s, the severe banking crises in the Nordic countries and Japan in the early 1990s, and the bursting of the dot-com bubble in the early 2000s. However, these episodes pale in comparison with their prewar counterparts and with the global contraction of 2008, which has been unparalleled (by a considerable margin) in the sixty-plus years since World War II (figure 16.3). Like its prewar predecessors, the 2008 episode has been both severe in magnitude and global in scope, as reflected by the large share of countries mired in crises. Stock market crashes have been nearly universal. Banking crises have emerged as asset price bubbles have burst and high degrees of

leverage have become exposed. Currency crashes against the U.S. dollar in advanced economies took on the magnitudes and volatilities of crashes in emerging markets.

A growing body of academic literature, including contributions by McConnell and Perez-Quiros and Blanchard and Simon, had documented a post-mid-1980s decline in various aspects of macroeconomic volatility, presumably emanating from a global low-inflation environment. This had been termed "a Great Moderation" in the United States and elsewhere.[11] However, systemic crises and low levels of macroeconomic volatility do not travel hand in hand; the sharp increases in volatility that occurred during the Second Great Contraction, which began in 2007, are evident across asset markets, including real estate, stock prices, and exchange rates. They are also manifestly evident in the macroeconomic aggregates, such as those for output, trade, and employment. It remains to be seen how economists will assess the Great Moderation and its causes after the crisis recedes.

For many emerging markets, the Great Moderation was a fleeting event. After all, the debt crisis of the 1980s was as widespread and severe as the events of the 1930s (figure 16.3). These episodes, which affected Africa, Asia, and Latin America in varying degrees, often involved a combination of sovereign default, chronic inflation, and protracted banking crises. As the debt crisis of the 1980s settled, new eruptions emanated from the economies of Eastern Europe and the former Soviet Union in the early 1990s. The Mexican crisis of 1994–1995 and its repercussions in Latin America, the fierce Asian crisis that began in the summer of 1997, and the far-reaching Russian crisis of 1998 did not make for many quiet stretches in emerging markets. This string of crises culminated in Argentina's record default and implosion in 2001–2002.[12]

Until the crisis that began in the United States in the summer of 2007 and became global in scope a year later, emerging markets enjoyed a period of tranquility and even prosperity. During 2003–2007, world growth conditions were favorable, commodity prices were booming, and world interest rates were low, so credit was

cheap. However, five years is too short a time span to contemplate extending the "Great Moderation" arguments to emerging markets; in effect, the events of the past two years have already rekindled volatility almost across the board.

Regional Observations

We next look at the regional profile of crises. In figures 16.2 and 16.3 we looked at averages weighted by country size. So that no single country will dominate the regional profiles, the remainder of this discussion focuses on unweighted simple averages for Africa, Asia, and Latin America. In figures 16.4–16.6 we show regional tallies for 1800–2008 for Asia and Latin America and for the post–World War II period for the more newly independent African states.

For Africa, the regional composite index of financial turbulence begins in earnest in the 1950s (figure 16.4), for only South Africa (1910) was a sovereign state prior to that period. However, we do have considerable coverage of prices and exchange rates for the years following World War I, so numerous preindependence crises (including some severe banking crises in South Africa) are dated and included for the colonial period. The index jumps from a low that is close to zero in the 1950s to a high in the 1990s. The thirteen African

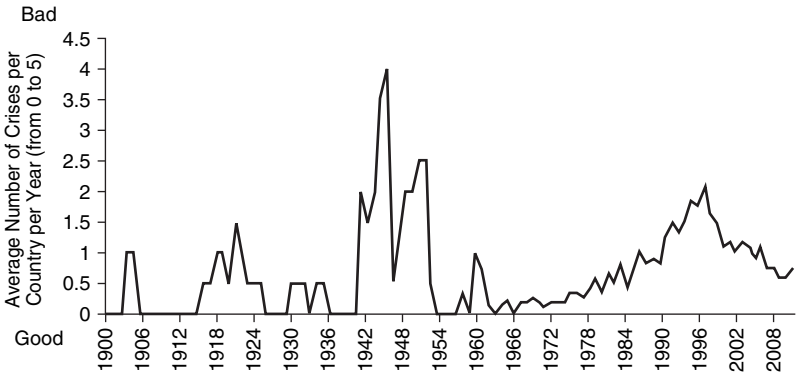

Figure 16.4. Varieties of crises: Africa, 1900–2008.
Source: The authors' calculations based on sources listed in appendixes A.1–A.3.

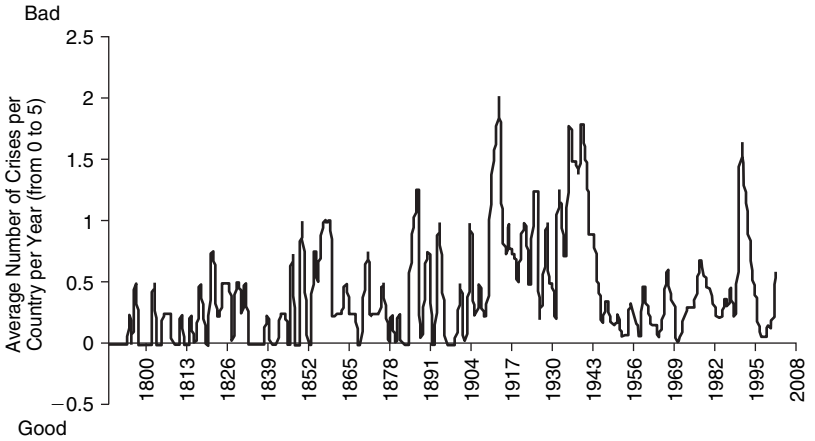

Figure 16.5. Varieties of crises: Asia, 1800–2008.
Source: The authors' calculations based on sources listed in appendixes A.1–A.3.

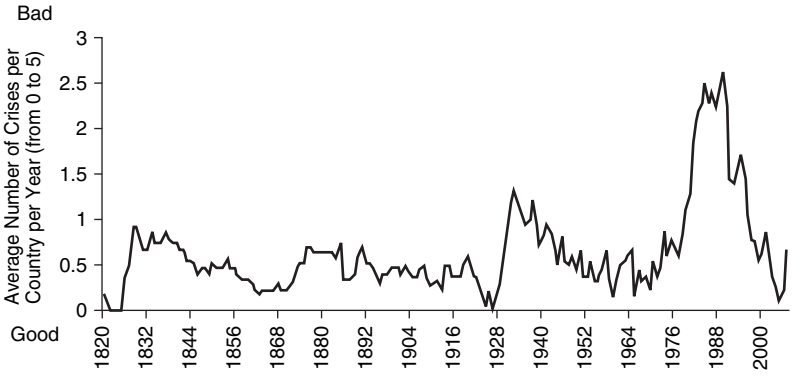

Figure 16.6. Varieties of crises: Latin America, 1800–2008.
Source: The authors' calculations based on sources listed in appendixes A.1–A.3.
Notes: The hyperinflations in Argentina, Bolivia, Brazil, Nicaragua, and Peru sharply increase in the index (reflected in the spike shown for the late 1980s and early 1990s) because all these episodes register a maximum reading of 5.

countries in our sample had, on average, two simultaneous crises during the worst years of the 1980s. In all cases, except that of Mauritius, which has neither defaulted on nor restructured its sovereign debts, the two crises could have been a pairing of any of our crisis varieties. The decline in the average number of crises in the 1990s reflected pri-

marily a decline in the incidence of inflation crises and the eventual (if protracted) resolution of the decade-long debt crisis of the 1980s.

The regional composite index of financial turbulence for Asia (figure 16.5) spans 1800–2008, for China, Japan, and Thailand were independent nations throughout this period. Having gained independence almost immediately following World War II, the remaining Asian countries in the sample then join in the regional average. The profile for Asia highlights a point we have made on more than one occasion: the economic claim of the superiority of the "tigers" or "miracle economies" in the three decades before the 1997–1998 crisis was naïve in terms of the local history. The region had experienced several protracted bouts of economic instability by the international standards of the day. The most severe crisis readings occurred during the period bracketed by the two world wars. In that period, China saw hyperinflation, several defaults, more than one banking crisis, and countless currencies and currency conversions. Japan had numerous bouts of banking, inflation, and exchange rate crises, culminating in its default on its external debt during World War II, the freezing of bank deposits, and its near-hyperinflation (approaching 600 percent) at the end of the war in 1945.

Perhaps Latin America would have done better in terms of economic stability had the printing press never crossed the Atlantic (figure 16.6). Before Latin America's long struggle with high, hyper-, and chronic inflation took a dark turn in the 1970s, the region's average turbulence index reading was very much in line with the world average. Despite periodic defaults, currency crashes, and banking crises, the average never really surpassed one crisis per year, in effect comparing moderately favorably with those of other regions for long stretches of time. The rise of inflation (which began before the famous debt crisis of the 1980s, the "lost decade") would change the relative and absolute performance of the region until the second half of the 1990s. During Latin America's worst moments in the late 1980s —before the 1987 Brady plan (discussed earlier in box 5.3) restructured bad sovereign debts and while Argentina, Brazil, and Peru were mired in hyperinflation—as we can see from the index, the region experienced an average of almost three crises a year.[13]

Defining a Global Financial Crisis

Although the indexes of financial turbulence we have developed can be quite useful in assessing the severity of a global financial crisis, we need a broader-ranging algorithm to systematically delineate true crises so as to exclude, for example, a crisis that registers high on the global scale but affects only one large region. We propose the working definition of a global financial crisis found in box 16.1.

Global Financial Crises: Economic Effects

We next turn to two broad factors associated with global crises, both of which are present in the recent-vintage global contraction: first, the effects of the crisis on the level and the volatility of economic activity broadly defined and measured by world aggregates of equity prices, real GDP, and trade; and second, its relative synchronicity across countries, which is evident in asset markets as well as trends in trade, employment, and other economic sectoral statistics, such as

BOX 16.1
Global financial crises: A working definition

Broadly speaking, a global crisis has four main elements that distinguish it from a regional one or a less virulent multicountry crisis:

1. One or more global financial centers are mired in a systemic (or severe) crisis of one form or another. This "requirement" ensures that at least one affected country has a significant (although not necessarily dominant) share in world GDP. Crises in global financial centers also directly or indirectly affect financial flows to numerous other countries. An example of a financial center is a lender to other countries, as the United Kingdom was to "emerging markets" in the 1820s lending boom and the United States was to Latin America in the late 1920s.
2. The crisis involves two or more distinct regions.
3. The number of countries in crisis in each region is three or greater. Counting the number of affected countries (as opposed to the share of regional GDP affected by crisis) ensures that a crisis in a large country—such as Brazil in Latin America or China or Japan in Asia—is not sufficient to define the crisis episode.
4. Our composite GDP-weighted index average of global financial turbulence is at least one standard deviation above normal.

Selected episodes of global, multicountry, and regional economic crisis

Episode	Type	Global financial center(s) most affected	At least two distinct regions	Number of countries in each region
The crisis of 1825–1826	Global	United Kingdom	Europe and Latin America	Greece and Portugal defaulted, as did practically all of newly independent Latin America.
The panic of 1907	Global	United States	Europe, Asia, and Latin America	Notably France, Italy, Japan, Mexico, and Chile suffered from banking panics.
The Great Depression, 1929–1938	Global	United States and France	All regions	Widespread defaults and banking crises across all regions.
Debt crisis of the 1980s	Multicountry (developing countries and emerging markets)	United States (affected, but crisis was not systemic)	Developing countries in Africa, Latin America, and to a lesser extent Asia	Sovereign default, currency crashes, and high inflation were rampant.
The Asian crisis of 1997–1998	Multicountry, extending beyond Asia in 1998	Japan (affected, but by then it was five years into the resolution of its own systemic banking crisis)	Asia, Europe, and Latin America	Affected Southeast Asia initially. By 1998, Russia, Ukraine, Colombia, and Brazil were affected.
The Global Contraction of 2008	Global	United States, United Kingdom	All regions	Banking crises proliferated in Europe, and stock market and currency crashes versus the dollar cut across regions.

Source: Earlier parts of this book.

housing. The emphasis of our discussion is on the last two global crises, the Great Depression of the 1930s and the Second Great Contraction, for which documentation is most complete. Obviously, looking at this broad range of macroeconomic data gives us a much more nuanced picture of a crisis.

Global Aggregates

The connection between stock prices and future economic activity is hardly new. The early literature on turning points in the business cycle, such as the classic by Burns and Mitchell, documented the leading-indicator properties of share prices.[14] Synchronous (across-the-board) and large declines in equity prices (crashes) characterized the onset of the episode that became the Great Depression and somewhat more belatedly the recent global crisis. Figure 16.7 plots an index of global stock prices for 1929–1939 and for 2008–2009 (to the present). For the more recent episode, the index accounts for about 70 percent of world equity market capitalization and covers seven distinct regions and twenty-nine countries. Stock prices are deflated by world consumer prices. The data for 1928–1939 are constructed using median inflation rates for the sixty-six-country sample; for 2007–2009 they are taken from the end-of-period prices published in the *World Economic Outlook*.[15] The years 1928 and 2007 marked the cycle peak in these indices.

The decline in equity markets during 2008 and beyond match the scale (and the cross-country reach) of the 1929 crashes. It is worth noting that during the crisis of the 1930s equity ownership worldwide was far more limited than it has become in the twenty-first century; the growth of pension funds and retirement plans and the ascent of an urban population have increased the links between household wealth and equity markets.

In much the same spirit as figure 16.7, figure 16.8 plots real per capita GDP (weighted by world population) for various country groupings for the two global crises.[16] The aggregate for Europe corresponds to Maddison's twelve-country population-weighted aggregate;[17] the index for Latin America is comprised of the region's eight

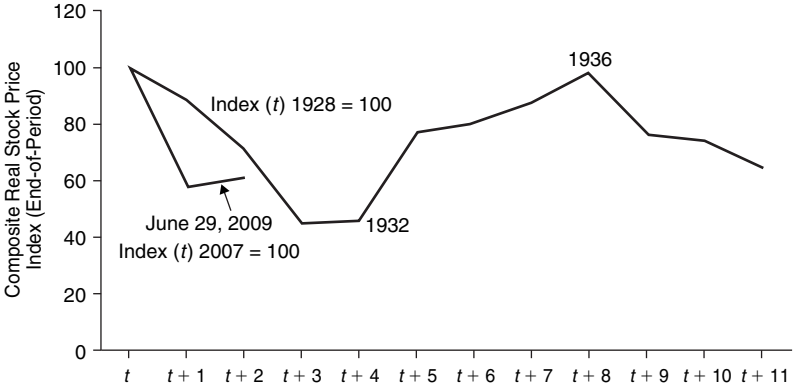

Figure 16.7. Global stock markets during global crises: The composite real stock price index (end of period).
Sources: Global Financial Data (GFD) (n.d.); Standard and Poor's; International Monetary Fund (various years), *World Economic Outlook;* and the authors (details provided in appendix A.1).
Notes: The world composite stock price index was taken from GFD for 1928–1939 and from S&P for 2007–2009. The S&P Global 1200 index covers seven distinct regions and twenty-nine countries and captures approximately 70 percent of the world market capitalization. Stock prices are deflated by world consumer prices. For 1928–1939 these have been constructed using median inflation rates for the sixty-six-country sample; for 2007–2009 these have been taken from the *World Economic Outlook* end-of-period prices. The years 1928 and 2007 marked the cycle peak in these indexes. The year of the crisis is indicated by *t*.

largest countries. The year 1929 marked the peak in real per capita GDP for all three country groupings. The current data come from the *World Economic Outlook*. When all this information is taken together, it is difficult to reconcile the projected trajectory in real GDP, particularly for emerging markets, and the developments of 2008 through early 2009 in equity markets.

As for trade, we offer two illustrations of its evolution during the two global crises. The first of these (figure 16.9) is a reprint of an old classic titled "The Contracting Spiral of World Trade: Month by Month, January 1929–June 1933." This inward spiral appeared in the *World Economic Survey, 1932–1933,* which in turn reprinted it from another contemporary source.[18] The illustration documents the 67 percent decline in the value of trade as the Depression took hold. As

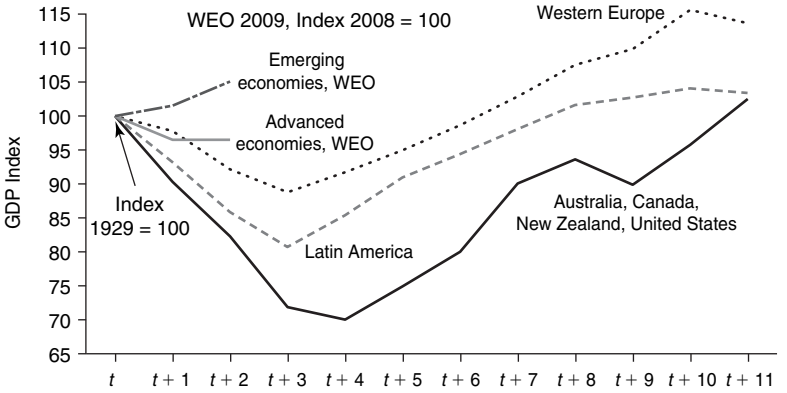

Figure 16.8. Real per capita GDP during global financial crises: Multicountry aggregates (PPP weighted).
Sources: Maddison (2004); International Monetary Fund (various years), *World Economic Outlook;* and the authors (details provided in appendix A.1).
Notes: The Europe aggregate corresponds to Maddison's twelve-country population-weighted aggregate; the Latin America index is comprised of the region's eight largest countries. The years 1929 and 2008 marked the peak in real per capita GDP for all three country groupings. The year of the crisis is indicated by *t*.

has been extensively documented, including by contemporaneous sources, the collapse in international trade was only partially the byproduct of sharp declines in economic activity, ranging from about 10 percent for Western Europe to about 30 percent for Australia, Canada, New Zealand, and the United States.[19] The other destructive factor was the worldwide increase in protectionist policies in the form of both trade barriers and competitive devaluations.

Figure 16.10 plots the value of world merchandise exports for 1928–2009. The estimate for 2009 uses the actual year-end level for 2008 as the average for 2009; this yields a 9 percent year-over-year decline in 2009, the largest one-year drop since 1938.[20] Other large post–World War II declines are in 1952, during the Korean War, and in 1982–1983, when recession hit the United States and a 1930s-scale debt crisis swept through the emerging world. Smaller declines occurred in 1958, the bottom of a recession in the United States; in 1998, during the Asian financial crisis; and in 2001, after September 11.

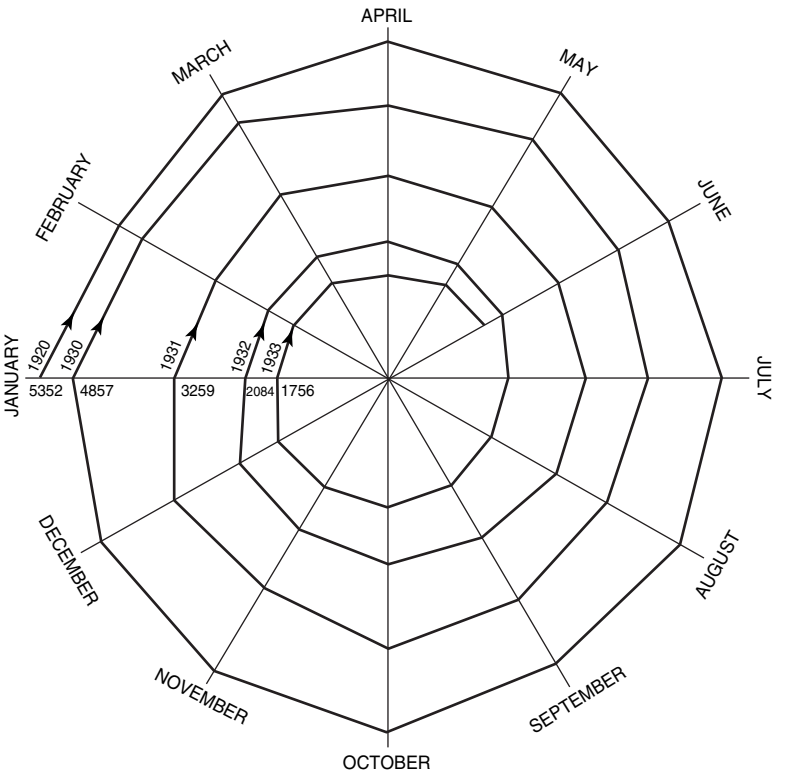

Figure 16.9. The contracting spiral of world trade month by month, January 1929–June 1933.
Source: Monatsberichte des Österreichischen Institutes für Konjunkturforschung 4 (1933): 63.

Cross-Country Synchronicity

The performance of the global aggregates provides evidence that a crisis has affected a sufficiently large share of the world's population and/or countries. However, because the information is condensed into a single world index, it does not fully convey the synchronous nature of global crises. To fill in this gap, we present evidence on the performance of various economic indicators during the most recent previous global crisis. Specifically, we present evidence on the changes in unemployment and indexes of housing activity, exports, and currency movements during 1929–1932.

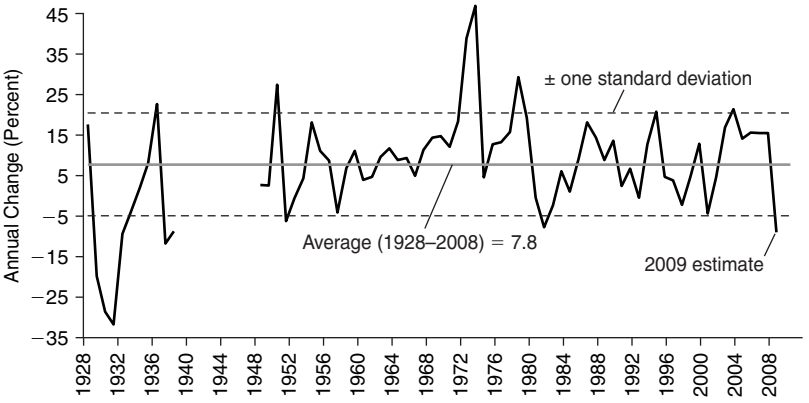

Figure 16.10. World export growth, 1928–2009.
Sources: Global Financial Data (GFD) (n.d.); League of Nations (various years), *World Economic Survey;* International Monetary Fund (various years), *World Economic Outlook;* and the authors (see notes).
Notes: No world aggregate is available during World War II. The estimate for 2009 uses the actual year-end level for 2008 as the average for 2009; this yields a 9 percent year-over-year decline in 2009, the largest postwar drop. Other large post–World War II declines were in 1952, during the Korean War, and in 1982–1983, when recession hit the United States and a 1930s-scale debt crisis swept through the emerging world. Smaller declines occurred in 1958, the bottom of a recession in the United States; in 1998, during the Asian financial crisis; and in 2001, after September 11.

The massive collapse in trade at the height of the Great Depression was already made plain by the two figures displaying world aggregates. Figure 16.11 adds information on the widespread nature of the collapse, which affected countries in all regions, low-, middle-, and high-income alike. In other words, the world aggregates are truly representative of the individual country experience and are not driven by developments in a handful of large countries that are heavily weighted in the world aggregates. Apart from wars that have involved a significant share of the world either directly or indirectly (including the Napoleonic Wars), such across-the-board synchronicity is not to be found in the data.

Cross-country synchronicity is not limited to variables for which one would expect close cross-country co-movement, such as international trade or exchange rates. The construction industry,

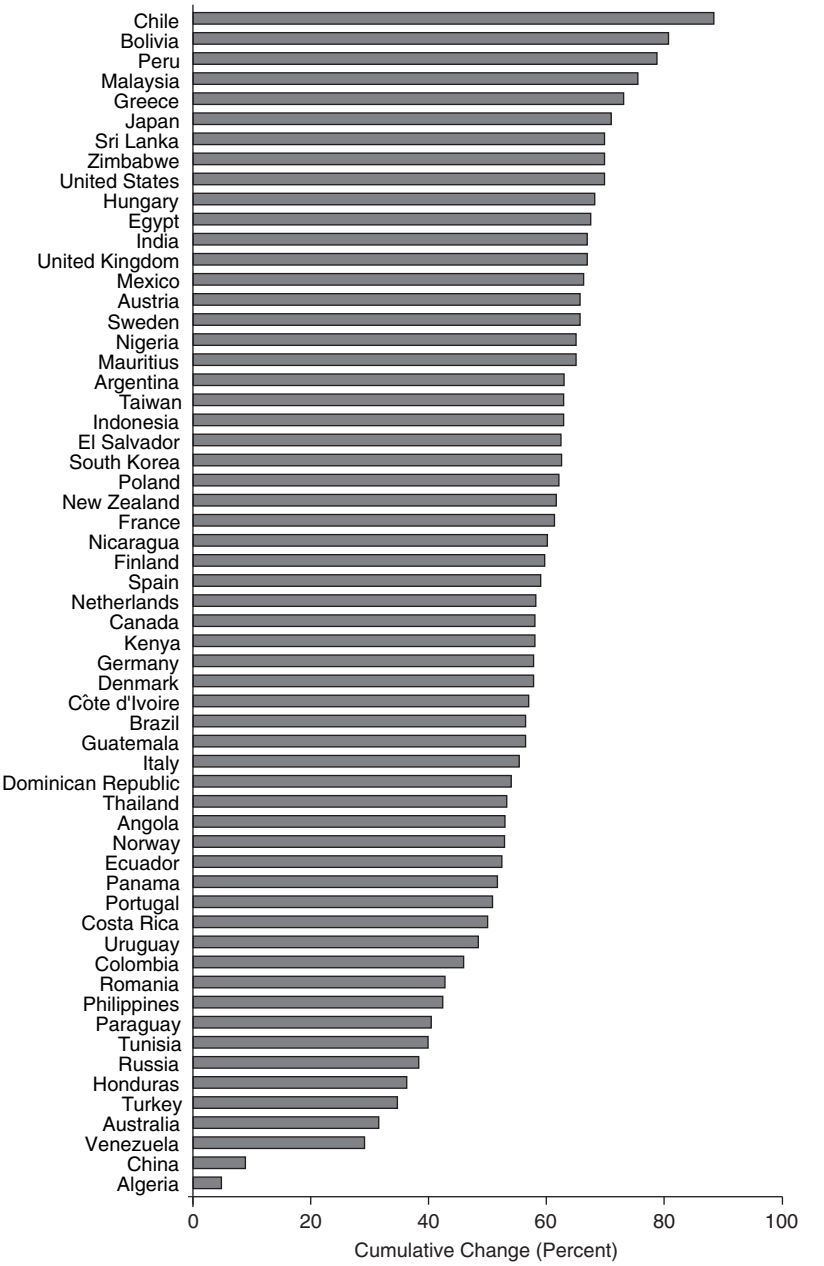

Figure 16.11. The collapse of exports, 1929–1932.
Sources: The individual country sources are provided in appendix A.1; the authors' calculations were also used.

which lies at the epicenter of the recent boom-bust cycle in the United States and elsewhere, is usually best characterized as being part of the "nontraded sector." Yet the decline in housing-related construction activity during 1929–1932 was almost as synchronous as that seen in trade, as illustrated in table 16.1.

With both traded and nontraded sectors shrinking markedly and consistently across countries, the deterioration in unemployment reported in table 16.2 should come as no surprise. Unemployment increases almost without exception (no comparable 1929 data are available for Japan and Germany) by an average of 17 percentage points. As in the discussion of the aftermath of the postwar crises in the preceding chapter, the figures reflect differences in the defini-

TABLE 16.1
Indexes of total building activity in selected countries (1929 = 100)

Country	Indicator	1932
Argentina	Permits (area)	42
Australia	Permits (value)	23
Belgium	Permits (number)	93
Canada	Permits (value)	17
Chile	Permits (area)	56
Colombia	Buildings completed (area)	84
Czechoslovakia	Buildings completed (number)	88
Finland	Buildings completed (cubic space)	38
France	Permits (number)	81
Germany	Buildings completed (rooms)	36
Hungary	Buildings completed (number)	97
Netherlands	Buildings completed (dwellings)	87
New Zealand	Buildings completed (value)	22
South Africa	Buildings completed (value)	100
Sweden	Buildings completed (rooms)	119
United Kingdom	Permits (value)	91
United States	Permits (value)	18
Average		64
Memorandum item: September 2005 peak = 100:		
United States	Permits (number)	25[a]

Sources: League of Nations, *World Economic Survey* (various issues), Carter et al. (2006).
Note: Note the differences in the definition of the indicator from country to country.
[a]Through February 2009.

TABLE 16.2
Unemployment rates for selected countries, 1929–1932

Country	1929	1932	Increase
Australia	11.1	29.0	17.9
Austria	12.3	26.1	13.8
Belgium	4.3	39.7	35.4
Canada	5.7	22.0	16.3
Czechoslovakia	2.2	13.5	11.3
Denmark	15.5	31.7	16.2
Germany	n.a.	31.7	n.a.
Japan	n.a.	6.8	n.a.
Netherlands	7.1	29.5	22.4
Norway	15.4	30.8	15.4
Poland	4.9	11.8	6.9
Sweden	10.7	22.8	12.1
Switzerland	3.5	21.3	17.8
United Kingdom	10.4	22.1	11.7
United States[a]	3.2	24.9	21.7
Average	8.2	25.0	16.8

Sources: League of Nations (various issues), *World Economic Survey*; Carter et al. (2006).
Note: The figures reflect differences in the definition of unemployment and in the methods of compiling the statistics, so cross-country comparisons, particularly of the levels, are tentative.
[a]Annual averages.

tion of unemployment and in the methods of compiling the statistics; hence cross-country comparisons, particularly of the levels, are tentative.

Some Reflections on Global Crises

Here we pause to underscore why global financial crises can be so much more dangerous than local or regional ones. Fundamentally, when a crisis is truly global, exports no longer form a cushion for growth. In a global financial crisis, one typically finds that output, trade, equity prices, and other indicators behave qualitatively (if not quantitatively) much the same way for the world aggregates as they do in individual countries. A sudden stop in financing typically not only hits one country or region but to some extent impacts a large part of the world's public and private sectors.

Conceptually, it is not difficult to see that for a country to be "pulled" out of a postcrisis slump is far more difficult when the rest of the world is similarly affected than when exports offer a stimulus. Empirically, this is not a proposition that can be readily tested. We have hundreds of crises in our sample, but very few global ones, and, as noted in box 16.1, some of the earlier global crises were associated with wars, which complicates comparisons even further.

More definitively, it can be inferred from the evidence of so many episodes that recessions associated with crises (of any variety) are more severe in terms of duration and amplitude than the usual business cycle benchmarks of the post–World War II period in both advanced economies and emerging markets. Crises that are part of a global phenomenon may be worse still in the amplitude and volatility (if not duration) of the downturn. Until the most recent crisis, there had been no postwar global financial crisis; thus, by necessity the comparison benchmarks are prewar episodes. As to severity, the Second Great Contraction has already established several postwar records. The business cycle has evidently not been tamed.

The Sequencing of Crises: A Prototype

Just as financial crises have common macroeconomic antecedents in terms of asset prices, economic activity, external indicators, and so on, common patterns also appear in the sequencing (temporal order) in which crises unfold. Obviously not all crises escalate to the extreme outcome of a sovereign default. Yet advanced economies have not been exempt from their share of currency crashes, bouts of inflation, severe banking crises, and, in an earlier era, even sovereign default.

Investigating what came first, banking or currency crises, was a central theme of Kaminsky and Reinhart's "twin crises" work; they also concluded that financial liberalization often preceded banking crises; indeed, it helped predict them.[21] Demirgüç-Kunt and Detragiache, who employed a different approach and a larger sample, arrived at the same conclusion.[22] Reinhart examined the link between currency crashes and external default.[23] Our work here has investi-

gated the connections between domestic and external debt crises, inflation crises and default (domestic or external), and banking crises and external default.[24] Figure 16.12 maps out a "prototypical" sequence of events yielded by this literature.

As Diaz-Alejandro narrates in his classic paper about the Chilean experience of the late 1970s and early 1980s, "Goodbye Financial Repression, Hello Financial Crash," financial liberalization simultaneously facilitates banks' access to external credit and more risky lending practices at home.[25] After a while, following a boom in lending and asset prices, weaknesses in bank balance sheets become manifest and problems in the banking sector begin.[26] Often these problems are more advanced in the shakier institutions (such as finance companies) than in the major banks.

The next stage in the crisis unfolds when the central bank begins to provide support for these institutions by extending credit to them. If the exchange rate is heavily managed (it does not need to be explicitly pegged), a policy inconsistency arises between supporting the exchange rate and acting as lender of last resort to troubled institutions. The numerous experiences in these studies suggest that (more often than not) the exchange rate objective is subjugated

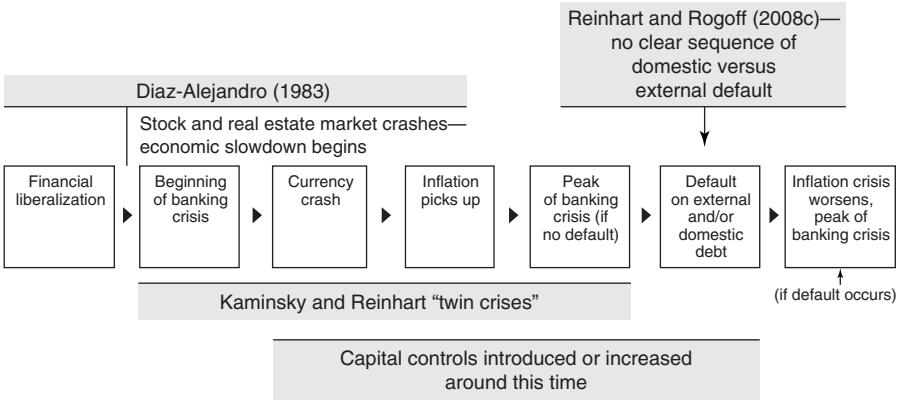

Figure 16.12. The sequencing of crises: A prototype.
Sources: Based on empirical evidence from Diaz-Alejandro (1985), Kindleberger (1989), Demirgüç-Kunt and Detragiache (1998), Kaminsky and Reinhart (1999), Reinhart (2002), and Reinhart and Rogoff (2004, 2008c), among others.

to the role of the central bank as lender of last resort. Even if central bank lending to the troubled financial industry is limited in scope, the central bank may be more reluctant to engage in an "interest rate defense" policy to defend the currency than would be the case if the financial sector were sound. This brings the sequence illustrated in figure 16.12 to the box labeled "Currency crash." The depreciation or devaluation of the currency, as the case may be, complicates the situation in (at least) three ways: (1) it exacerbates the problem of the banks that have borrowed in a foreign currency, worsening currency mismatches;[27] (2) it usually worsens inflation (the extent to which the currency crisis translates into higher inflation is highly uneven across countries, for countries with a history of very high and chronic inflation usually have a much higher and faster pass-through from exchange rates to prices);[28] and (3) it increases the odds of external and domestic default if the government has foreign currency–denominated debt.

At this stage, the banking crisis either peaks following the currency crash (if there is no sovereign credit crisis) or keeps getting worse as the crisis mounts and the economy marches toward a sovereign default (the next box in figure 16.12).[29] In our analysis of domestic and external credit events we have not detected a well-established sequence between these credit events. Domestic defaults have occurred before, during, and after external defaults, in no obvious pattern. As regards inflation, the evidence presented in chapter 9 all points in the direction of a marked deterioration in inflation performance after a default, especially a twin default (involving both domestic and foreign debt). The coverage of our analysis summarized here does not extend to the eventual crisis resolution stage.

We should note that currency crashes tend to be more serious affairs when governments have been explicitly or even implicitly fixing (or nearly fixing) the exchange rate. Even an implicit guarantee of exchange rate stability can lull banks, corporations, and citizens into taking on heavy foreign currency liabilities, thinking there is a low risk of a sudden currency devaluation that will sharply increase the burden of carrying such loans. In a sense, the collapse of a currency is a collapse of a government guarantee on which the pri-

vate sector might have relied, and therefore it constitutes a default on an important promise. Of course, large swings in exchange rates can also be traumatic for a country with a clear and explicit regime of floating exchange rates, especially if there are substantial levels of foreign exchange debts and if imported intermediate goods play an important role in production. Still, the trauma is typically less, because it does not involve a loss of credibility for the government or the central bank. The persistent and recurring nature of financial crises in various guises through the centuries makes us skeptical about providing easy answers as to how to best avoid them. In our final chapter we sketch out some of the issues regarding the prospects for and measurement of graduation from these destabilizing boom-bust cycles.

Summary

This chapter has greatly extended our perspective of crises by illustrating quantitative measures of the global nature of a crisis, ranging from our composite index of global financial turbulence to comparisons of the aftermath of crises between the Great Depression of the past century and the recent Second Great Contraction. We have seen that by all measures, the trauma resulting from this contraction, the first global financial crisis of the twenty-first century, has been extraordinarily severe. That its macroeconomic outcome has been only the most severe global recession since World War II—and not even worse—must be regarded as fortunate.

Chapter 13 The U.S. Subprime Crisis

1. As indicated in note 7 to the preamble, we use the term "Second Great Contraction" after Friedman and Schwartz's (1963) depiction of the 1930s as "The Great Contraction." See also Felton and Reinhart (2008, 2009), who use the term "First Global Financial Crisis of the 21st Century."
2. See chapter 10 for further discussion.
3. We have explored this issue further in chapter 10.
4. Although China's heavy-handed capital controls shielded it from contagious currency crashes during Asia's turmoil, they did not protect it from a systemic and costly banking crisis emanating primarily from large-scale lending to inefficient and bankrupt state-owned enterprises.

5. Figure 13.1 does not fully capture the extent of the present upsurge in financial crises, for Ireland and Iceland (both of which are experiencing banking crises at the time of this writing) are not part of our core sixty-six-country sample.

6. The Case-Shiller index is described by Robert Shiller (2005) and in recent years has been published monthly in conjunction with Standard and Poor's (as described at their Web site, www.standardandpoors.com). The Case-Shiller index focuses on resales of the same houses and therefore is arguably a more accurate gauge of price movements than indexes that look at all sales. Of course, there are many biases even in the Case-Shiller index (e.g., it is restricted to major metropolitan areas). Nevertheless, it is widely regarded as the most accurate gauge of changes in housing prices in the United States.

7. The Case-Shiller index appears to paint a quite plausible history of housing prices, but as a caveat we note that construction of the series required a significant number of assumptions to interpolate data missing for some intervals, particularly prior to World War II.

8. The current account balance is basically a broader measure of the trade balance—imports minus exports—extended to include investment returns. Note that the current account represents the sum of both government and private borrowing flows from abroad; it is not the same thing as the government deficit. It is perfectly possible for the government to be running a fiscal deficit and yet for the current account to be in surplus, provided the private savings compensate.

9. Greenspan (2007).

10. *Economist Magazine*, "The O'Neill Doctrine," lead editorial, April 25, 2002.

11. Bernanke (2005).

12. See Philippon (2007).

13. Securitization of mortgages involves the bunching and repackaging of mortgage pools to transform highly idiosyncratic individual loans into more standardized products. Thus, to the extent that the U.S. current account was being driven by superior U.S. financial innovation, there was also nothing to worry about. Or so top U.S. financial regulators maintained.

14. See Obstfeld and Rogoff (2001, 2005, 2007).

15. Obstfeld and Rogoff (2001).

16. Roubini and Setser (2004).

17. Krugman (2007). Wile E. Coyote is the hapless character from Chuck Jones's *Road Runner* cartoons. His schemes invariably fail, and, as he runs off a cliff, there is a moment or two before the recognition sets in that nothing is below him.

18. See Obstfeld and Rogoff (2009) for a more detailed discussion of the literature; see also Wolf (2008).

19. Dooley et al. (2004a, 2004b).

20. Cooper (2005).

21. Hausmann and Sturzenegger (2007).

22. Curcuru et al. (2008) argue that the "dark matter" hypothesis is at odds with the data.

23. See Bernanke and Gertler (2001).

24. Bordo and Jeanne (2002), Bank for International Settlements (2005).

25. See Rolnick (2004).

26. We first noted the remarkable similarities between the 2007 U.S. subprime crisis and other deep financial crises in Reinhart and Rogoff (2008b), first circulated in December 2007. By the time of this writing, of course, the facts overwhelmingly support this reading of events.

Our sources have included Caprio and Klingebiel (1996 and 2003), Kaminsky and Reinhart (1999), and Caprio et al. (2005).

27. Later we look at some alternative metrics for measuring the depth of these financial crises, arguing that the traditional measure—fiscal costs of the bank cleanup—is far too narrow.

28. See, for example, Kaminsky, Lizondo, and Reinhart (1998) and Kaminsky and Reinhart (1999).

29. For the United States, as earlier in this chapter, house prices are measured by the Case-Shiller index. The remaining house price data were made available by the Bank for International Settlements and are described by Gregory D. Sutton (2002). Of course, there are many limitations to the international housing price data; they typically do not have the long history that allows for a richer comparison across business cycles. Nevertheless, they probably reasonably capture our main variable of interest, peak-to-trough falls in the price of housing, even if they perhaps exaggerate the duration of the fall, because they are relatively slow to reflect changes in underlying market prices.

30. For the United States, the index is the S&P 500.

31. According to Reinhart and Reinhart (2009), during 2005–2007 the U.S. episode qualified as a "capital flow bonanza" (i.e., a period of abnormally large capital inflows, which is a different way of saying above-average borrowing from abroad).

32. In principle, the rise in real public debt is determined by taking the rise in nominal public debt and adjusting for the rise that represents inflation in all prices.

33. See the conclusions of Reinhart and Reinhart (2008), who explain these changes in interest rates and exchange rates as anomalies for the United States—because the United States is too big to fail.

Chapter 14 The Aftermath of Financial Crises

1. Also included in the comparisons are two prewar episodes in developed countries for which we have housing price and other relevant data.

2. To be clear, peak-to-trough calculations are made on an individual series-by-series basis. The trough and peak dates are those nearest the crisis date and refer to the local (rather than global) maximum or minimum, following much the same approach pioneered by Burns and Mitchell (1946) in their classic study of U.S. business cycles. So for example, in the case of Japan's equity prices, the trough is the local bottom in 1995, even though the subsequent recovery in the equity market left prices well below their prior peak before the crisis (and that the subsequent troughs would see prices at lower levels still).

3. In chapter 10, we looked at financial crises in sixty-six countries over two hundred years, emphasizing the broad parallels between emerging markets and developing countries, including, for example, the nearly universal run-up in government debt.

4. The historical average, which is shaded in black in the diagram, does not include the ongoing crises.

5. Notably, widespread "underemployment" in many emerging markets and the vast informal sector are not fully captured in the official unemployment statistics.

6. Again, see Calvo (1998) and Dornbusch et al. (1995).

7. See International Monetary Fund (various years), *World Economic Outlook,* April 2002, chapter 3.

8. Other noteworthy comparisons and parallels to the Great Depression are presented in Eichengreen and O'Rourke (2009).

Chapter 15 The International Dimensions of the Subprime Crisis

1. The IMF, of course, is effectively the global lender of last resort for emerging markets, which typically face severe strains in floating new debt during a crisis. Given the quadrupling of IMF resources agreed to at the April 2, 2009, London meeting of the Group of 20 heads of state (including those of the largest rich countries and the major emerging markets), world market panic about the risks of sovereign default have notably abated. The IMF guarantees apply only to government debt, however, and risk spreads on the corporate debt of emerging markets remain elevated as of mid-2009, with rates of corporate default continuing to rise. It remains to be seen to what extent, if any, these debt problems will spill over to governments through bailouts, as they often have in the past.

2. Kaminsky, Reinhart, and Végh (2003); quote on p. 55, emphasis ours.

3. Bordo and Murshid (2001), Neal and Weidenmier (2003). Neal and Weidenmier emphasize that periods of apparent contagion can be more readily interpreted as responses to common shocks, an issue we return to in the context of the recent crisis. But perhaps the bottom line as regards a historical perspective on financial contagion is best summarized by Bordo and Murshid, who conclude that there is little evidence to suggest that cross-country linkages are tighter in the aftermath of a financial crisis for the recent period as opposed to 1880–1913, the earlier heyday of globalization in financial markets that they study.

4. Table 15.1 does not include the bunching of other "types" of crises, such as the wave of sovereign defaults during 1825 or the currency crashes or debasements of the Napoleonic Wars. Again, the indexes developed in chapter 16 will allow us to capture this kind of bundling of crises across both countries and types of crises.

5. See Neal and Weidenmier (2003) and Reinhart and Rogoff (2008a).

6. Owing to the opaqueness of balance sheets in many financial institutions in these countries, the full extent of exposure is, as yet, unknown.

7. See Reinhart and Reinhart (2009) for a full listing of episodes of capital inflow bonanzas.

Chapter 16 Composite Measures of Financial Turmoil

1. Kaminsky and Reinhart (1999).

2. The tally would come to six varieties of crises if we included currency debasement. We do not follow this route for two reasons: first, there are far fewer sources of data across countries (about a dozen or so) on the metallic content of their currencies; second, the printing press displaced debasement and decoupled currencies in circulation from a metallic base with the rise of fiat money. Because the period we analyzed for the turbulence composite was after 1800 (when our dating of banking crises begins in earnest), the exclusion of debasement crises is not as troublesome as for 1300–1799, when debasement was rampant.

3. This goes back to the dichotomous measures of crises that we (and most studies) employ. Of course, it is possible to consider additional gradations of crises to capture some measure of severity.

4. As noted, one could easily refine this measure to include three categories, say, high inflation (above 20 percent but less than 40), very high inflation (above 40 percent but less than 1,000), and hyperinflation (1,000 percent or higher).

5. Namely, crash episodes associated with international financial crises and turbulence (mostly in advanced economies).

6. Our list of economic crises does not include a growth collapse crisis as defined by Barro and Ursúa (2008, 2009), which is an episode in which per capita GDP falls cumulatively by 10 percent or more. An important share of the crisis episodes we identify are candidates for this definition as well. We examine this issue later. Nor does our composite index of financial turbulence necessarily include all "sudden stop" episodes as defined by Guillermo Calvo and coauthors in several contributions (see references). The reader will recall that a sudden stop is an episode in which there is an abrupt reversal in international capital flows, often associated with loss of capital market access. It is noteworthy that most systemic banking crises past and present (the 2007 U.S. subprime crisis is an exception) have been associated with sudden stops. The same could be said of sovereign external defaults.

7. Barro and Ursúa (2009). They identify 195 stock market crashes for twenty-five countries (eighteen advanced economies and seven emerging markets) over 1869–2006.

8. Samuelson (1966).

9. The reader will recall from earlier chapters that our sixty-six-country sample accounts for about 90 percent of world GDP.

10. It is important to note that Austria, Germany, Italy, and Japan remained in default for varying durations after the end of the war.

11. See McConnell and Perez-Quiros (2000) and Blanchard and Simon (2001).

12. As in nearly all previous historical crises in Argentina, the 2001–2002 episode was followed by a crisis in its small neighbor, Uruguay.

13. The hyperinflation episodes are the most notorious, obviously, but the share of countries in the region with an annual inflation rate above 20 percent, thereby meeting our threshold for a crisis, hit a peak of nearly 90 percent in 1990!

14. Burns and Mitchell (1946). For more recent treatments of the early warning properties of equity markets in the context of crises, see Kaminsky et al. (1998), Kaminsky and Reinhart (1999), and Barro and Ursúa (2009).

15. International Monetary Fund (various years), *World Economic Outlook*.

16. Eichengreen and O'Rourke (2009) add trade to highlight the similarities while noting the difference in monetary policy response (specifically, central bank discount rates).

17. Maddison (2004).

18. League of Nations (various years), *World Economic Survey*.

19. See, for example, League of Nations (1944).

20. Although we have reliable trade data for most countries during World War II, there are sufficient missing entries to make the calculation of the world aggregate not comparable to other years during 1940–1947.

21. Kaminsky and Reinhart (1999).

22. Demirgüç-Kunt and Detragiache (1998).

23. Reinhart (2002).

24. Reinhart and Rogoff (2004) also examined the relationship between currency crashes and inflation as well as the timing of currency crashes and capital control (specifically, dual or multiple exchange rates).

25. Diaz-Alejandro (1985).

26. In contrast to other studies of banking crises, Kaminsky and Reinhart (1999) provide two dates for each banking crisis episode—the beginning of a banking crisis and the later peak.

27. See Goldstein and Turner (2004).

28. See Reinhart, Rogoff, and Savastano (2003a).

29. The second and third effects of the depreciation or devaluation of the currency listed earlier are less of an issue for advanced economies.

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