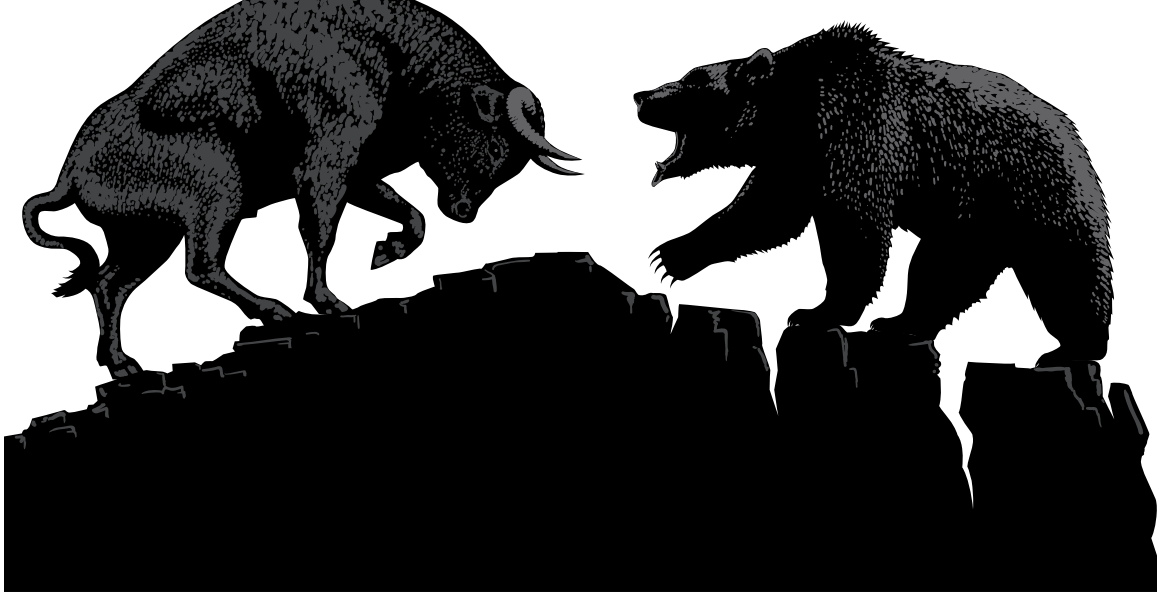
GLOBAL EDITION

Financial Markets and Institutions

NINTH EDITION

Frederic S. Mishkin • Stanley G. Eakins

Pearson



FINANCIAL MARKETS AND INSTITUTIONS

Ninth Edition

Global Edition

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Stage Three: Debt Deflation

If, however, the economic downturn leads to a sharp decline in the price level, the recovery process can be short-circuited. In stage three in Figure 8.1, **debt deflation** occurs when a substantial unanticipated decline in the price level sets in, leading to a further deterioration in firms' net worth because of the increased burden of indebtedness.

In economies with moderate inflation, which characterizes most advanced countries, many debt contracts with fixed interest rates are typically of fairly long maturity, ten years or more. Because debt payments are contractually fixed in nominal terms, an unanticipated decline in the price level raises the value of borrowing firms' liabilities in real terms (increases the burden of the debt) but does not raise the real value of borrowing firms' assets. The borrowing firm's net worth in real terms (the difference between assets and liabilities in real terms) thus declines.

To better understand how this decline in net worth occurs, consider what happens if a firm in 2018 has assets of $100 million (in 2018 dollars) and $90 million of long-term liabilities, so that it has $10 million in net worth (the difference between the value of assets and liabilities). If the price level falls by 10% in 2019, the real value of the liabilities would rise to $99 million in 2018 dollars, while the real value of the assets would likely remain unchanged at $100 million. The result would be that real net worth in 2018 dollars would fall from $10 million to $1 million ($100 million minus $99 million).

The substantial decline in real net worth of borrowers from a sharp drop in the price level causes an increase in adverse selection and moral hazard problems facing lenders. Lending and economic activity decline for a long time. The most significant financial crisis that displayed debt deflation was the Great Depression, the worst economic contraction in U.S. history.

CASE

The Mother of All Financial Crises: The Great Depression

With our framework for understanding financial crises in place, we are prepared to analyze how a financial crisis unfolded during the Great Depression and how it led to the worst economic downturn in U.S. history.

Stock Market Crash

In 1928 and 1929, prices doubled in the U.S. stock market. Federal Reserve officials viewed the stock market boom as excessive speculation. To curb it, they pursued a tightening of monetary policy to raise interest rates to limit the rise in stock prices. The Fed got more than it bargained for when the stock market crashed in October 1929, falling by 40% by the end of 1929, as shown in Figure 8.2.

Bank Panics

By the middle of 1930, stocks recovered almost half of their losses and credit market conditions stabilized. What might have been a normal recession turned into something far worse, however, when severe droughts in the Midwest led to

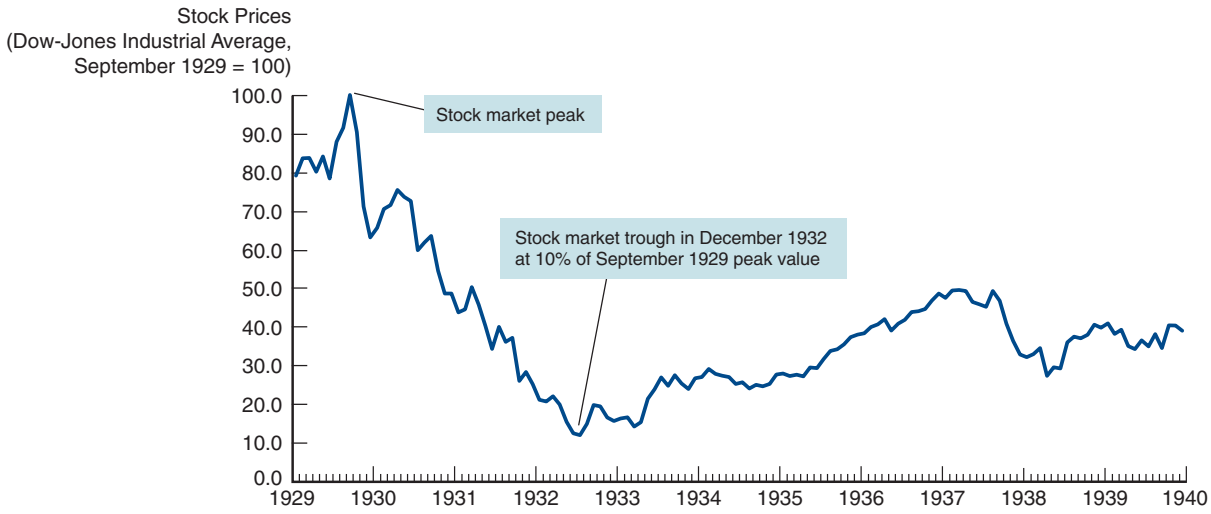

FIGURE 8.2 Stock Price Data During the Great Depression Period

Stock prices crashed in 1929, falling by 40% by the end of 1929, and then continued to fall to only 10% of their peak value by 1932.

Source: Federal Reserve Bank of St. Louis, FRED database: https://fred.stlouisfed.org/series/M1109AUSM293NNBR.

a sharp decline in agricultural production, with the result that farmers could not pay back their bank loans. The resulting defaults on farm mortgages led to large loan losses on bank balance sheets in agricultural regions. The weakness of the economy and the banks in agricultural regions in particular prompted substantial withdrawals from banks, building to a full-fledged panic in November and December 1930, with the stock market falling sharply. For more than two years, the Fed sat idly by through one bank panic after another, the most severe spate of panics in U.S. history. After what would be the era's final panic in March 1933, President Franklin Delano Roosevelt declared a bank holiday, a temporary closing of all banks. "The only thing we have to fear is fear itself," Roosevelt told the nation in his first inaugural address. The damage was done, however, and more than one-third of U.S. commercial banks had failed.

Continuing Decline in Stock Prices

Stock prices kept falling. By mid-1932, stocks had declined to 10% of their value at the 1929 peak (as shown in Figure 8.2), and the increase in uncertainty from the unsettled business conditions created by the economic contraction worsened adverse selection and moral hazard problems in financial markets. With a greatly reduced number of financial intermediaries still in business, adverse selection and moral hazard problems intensified even further. Financial markets struggled to channel funds to borrower-spenders with productive investment opportunities. As our analysis predicts, the amount of outstanding commercial loans fell by half from 1929 to 1933, and investment spending collapsed, declining by 90% from its 1929 level.

A manifestation of the rise in financial frictions is that lenders began charging businesses much higher interest rates to protect themselves from credit losses. The resulting rise in **credit spread**—the difference between the interest rate on loans to households and businesses and the interest rate on completely safe assets that are sure to be paid back, such as U.S. Treasury securities—is shown in Figure 8.3, which displays the difference between interest rates on corporate bonds with a Baa (medium-quality) credit rating and similar-maturity Treasury bonds.

Debt Deflation

The ongoing deflation that started in 1930 eventually led to a 25% decline in the price level. This deflation short-circuited the normal recovery process that occurs in most recessions. The huge decline in prices triggered a debt deflation in which net worth fell because of the increased burden of indebtedness borne by firms. The decline in net worth and the resulting increase in adverse selection and moral hazard problems in the credit markets led to a prolonged economic contraction in which unemployment rose to 25% of the labor force. The financial crisis in the Great Depression was the worst ever experienced in the United States, and it explains why the economic contraction was also the most severe ever experienced by the nation.

International Dimensions

Although the Great Depression started in the United States, it was not just a U.S. phenomenon. Bank panics in the United States also spread to the rest of the world,

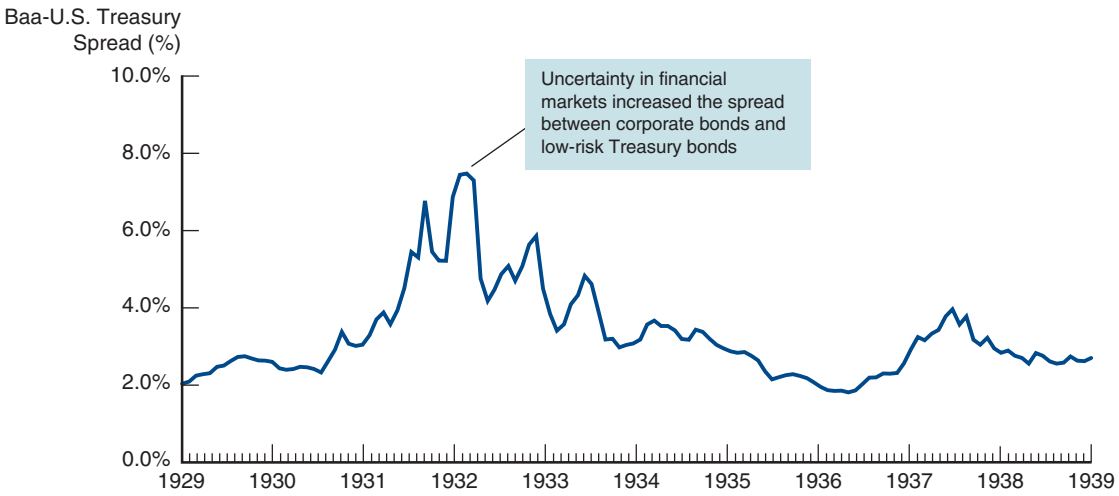

FIGURE 8.3 Credit Spreads During the Great Depression

Credit spreads (the difference between rates on Baa corporate bonds and U.S. Treasury bonds) rose sharply during the Great Depression.

Source: Federal Reserve Bank of St. Louis, FRED database: https://fred.stlouisfed.org/series/M13036USM193NNBR, https://fred.stlouisfed.org/series/LTGOVTBD.

and the contraction of the U.S. economy sharply decreased the demand for foreign goods. The worldwide depression caused great hardship, with millions upon millions of people out of work, and the resulting discontent led to the rise of fascism and World War II. The consequences of the Great Depression financial crisis were disastrous.

CASE

The Global Financial Crisis of 2007–2009

Most economists thought that financial crises of the type experienced during the Great Depression were a thing of the past for advanced countries like the United States. Unfortunately, the financial crisis that engulfed the world in 2007–2009 proved them wrong.

Causes of the 2007–2009 Financial Crisis

We begin our look at the 2007–2009 financial crisis by examining three central factors: financial innovation in mortgage markets, agency problems in mortgage markets, and the role of asymmetric information in the credit-rating process.

Financial Innovation in the Mortgage Markets Before 2000, only the most credit-worthy (prime) borrowers could obtain residential mortgages. Advances in computer technology and new statistical techniques, known as data mining, however, led to enhanced, quantitative evaluation of the credit risk for a new class of risky residential mortgages. Households with credit records could now be assigned a numerical credit score, known as a FICO score (named after the Fair Isaac Corporation, which developed it), that would predict how likely they would be to default on their loan payments. In addition, by lowering transactions costs, computer technology enabled the bundling of smaller loans (like mortgages) into standard debt securities, a process known as **securitization**. These factors made it possible for banks to offer **subprime mortgages** to borrowers with less-than-stellar credit records.

The ability to cheaply quantify the default risk of the underlying high-risk mortgages and bundle them in standardized debt securities called **mortgage-backed securities** provided a new source of financing for these mortgages. Financial innovation didn't stop there. **Financial engineering**, the development of new, sophisticated financial instruments, led to **structured credit products** that pay out income streams from a collection of underlying assets, designed to have particular risk characteristics that appeal to investors with differing preferences. The most notorious of these products were **collateralized debt obligations (CDOs)** (discussed in the Mini-Case box, "Collateralized Debt Obligations (CDOs)").

Agency Problems in the Mortgage Markets The mortgage brokers that originated the loans often did not make a strong effort to evaluate whether the borrower could pay off the loan, since they would quickly sell (distribute) the loans

MINI-CASE

Collateralized Debt Obligations (CDOs)

The creation of a collateralized debt obligation involves a corporate entity called a *special purpose vehicle (SPV)*, which buys a collection of assets such as corporate bonds and loans, commercial real estate bonds, and mortgage-backed securities. The SPV then separates the payment streams (cash flows) from these assets into a number of buckets that are referred to as tranches. The highest-rated tranches, called super senior tranches, are the ones that are paid off first and so have the least risk. The super senior CDO is a bond that pays out these cash flows to investors, and because it has the least risk, it also has the lowest interest rate. The next bucket of cash flows, known as the senior tranche, is paid out next; the senior CDO has a little more risk and pays a higher interest rate. The next tranche of payment streams, the mezzanine tranche of the CDO, is paid out after the super senior and senior tranches and so it bears more risk and has an even higher interest rate. The lowest tranche of the CDO is the equity tranche; this is the first set of cash flows that are not paid out if the underlying assets go into default and stop making payments. This tranche has the highest risk and is often not traded.

If all of this sounds complicated, it is. There were even CDO^2s and CDO^3s that sliced and diced risk even further, paying out the cash flows from CDOs to CDO^2s and from CDO^2s to CDO^3s. Although financial engineering has the potential benefit of creating products and services that match investors' risk appetites, it too has a dark side. Structured products like CDOs, CDO^2s, and CDO^3s can get so complicated that it can be hard to value cash flows of the underlying assets for a security or to determine who actually owns these assets. Indeed, at a speech given in October 2007, Ben Bernanke, the chairman of the Federal Reserve, joked that he "would like to know what those damn things are worth." In other words, the increased complexity of structured products can actually reduce the amount of information in financial markets, thereby worsening asymmetric information in the financial system and increasing the severity of adverse selection and moral hazard problems.

to investors in the form of mortgage-backed securities. This **originate-to-distribute business model** was exposed to the **principal–agent problem** of the type discussed in Chapter 7, in which the mortgage brokers acted as agents for investors (the principals) but did not have the investors' best interests at heart. Once the mortgage broker earns his or her fee, why should the broker care if the borrower makes good on his or her payment? The more volume the broker originates, the more he or she makes.

Not surprisingly, adverse selection became a major problem. Risk-loving investors lined up to obtain loans to acquire houses that would be very profitable if housing prices went up, knowing they could "walk away," i.e., default on their loans, if housing prices went down. The principal–agent problem also created incentives for mortgage brokers to encourage households to take on mortgages they could not afford or to commit fraud by falsifying information on a borrower's mortgage applications in order to qualify them for mortgages. Compounding this problem was lax regulation of originators, who were not required to disclose information to borrowers that would have helped them assess whether they could afford the loans.

The agency problems went even deeper. Commercial and investment banks, which were earning large fees by underwriting mortgage-backed securities and structured credit products like CDOs, also had weak incentives to make sure that the ultimate holders of the securities would be paid off. **Financial derivatives**, financial instruments whose payoffs are linked to (i.e., derived from) previously issued

securities, also were an important source of excessive risk taking. Large fees from writing financial insurance contracts called **credit default swaps**, which provide payments to holders of bonds if they default, also drove units of insurance companies like AIG to write hundreds of billions of dollars' worth of these risky contracts.

Asymmetric Information and Credit-Rating Services Credit-rating agencies, who rate the quality of debt securities in terms of the probability of default, were another contributor to asymmetric information in financial markets. The rating agencies advised clients on how to structure complex financial instruments, like CDOs, at the same time they were rating these identical products. The rating agencies were thus subject to conflicts of interest because the large fees they earned from advising clients on how to structure products they were rating meant that they did not have sufficient incentives to make sure their ratings were accurate. The result was wildly inflated ratings that enabled the sale of complex financial products that were far riskier than investors recognized.

Effects of the 2007–2009 Financial Crisis

Consumers and businesses alike suffered as a result of the 2007–2009 financial crisis. The impact of the crisis was most evident in five key areas: the U.S. residential housing market, financial institutions' balance sheets, the shadow banking system, global financial markets, and the headline-grabbing failures of major firms in the financial industry.

Residential Housing Prices: Boom and Bust The subprime mortgage market took off after the recession ended in 2001. By 2007, it had become over a trillion-dollar market. The development of the subprime mortgage market was encouraged by politicians because it led to a "democratization of credit" and helped raise U.S. homeownership rates to the highest levels in history. The asset-price boom in housing (see Figure 8.4), which took off after the 2000–2001 recession was over, also helped stimulate the growth of the subprime mortgage market. High housing prices meant that subprime borrowers could refinance their houses with even larger loans when their homes appreciated in value. With housing prices rising, subprime borrowers were also unlikely to default because they could always sell their house to pay off the loan, making investors happy because the securities backed by cash flows from subprime mortgages would have less risk and higher returns. The growth of the subprime mortgage market, in turn, increased the demand for houses and so fueled the boom in housing prices, resulting in a housing price bubble.

Further stimulus to the housing market came from low interest rates on residential mortgages, which were the result of several different forces. First was the huge capital inflows into the United States from countries like China and India. Second was congressional legislation that encouraged Fannie Mae and Freddie Mac to purchase trillions of dollars of mortgage-backed securities.[2] Third was easy Federal Reserve monetary policy to lower interest rates. The resulting low cost of financing housing purchases then further stimulated the demand for housing, pushing up housing prices. (A highly controversial issue is whether the Federal Reserve was to blame for the housing price bubble, and this is discussed in the Inside the Fed box.)

[2]For a discussion of the government's role in encouraging the boom which led to the bust in the housing market, see Thomas Sowell, *The Housing Boom and Bust*, Revised Edition (New York, Basic Books, 2010).