

Chapter 3 **Leverage**

Households and firms often borrow to make investments. Obtaining a mortgage for a new home or selling a corporate bond to build a new plant are common examples. More generally, we define the practice of borrowing to finance part of an investment as *leverage*. A household, a firm, or a bank that borrows a larger share of its investments than another is more *leveraged*.

Leverage played a key role in the financial crisis of 2007-09, so it is worth understanding how leverage relates to risk and how it can make the financial system vulnerable as a whole. The answers will highlight the importance of core principle 2 (risk requires compensation) both for households and individual financial institutions and for the overall financial system.

Leverage and risk. Some leverage is desirable. If young families cannot obtain a mortgage, most would be unable to buy a home. If new businesses could not borrow, most could not acquire the equipment needed to grow. Modern economies rely heavily on borrowing to make such investments. They are all leveraged.¹

Yet, the more leverage, the greater the risk that an adverse surprise will lead to bankruptcy. Imagine two identical families that have just bought matching houses for the same price: one borrows 100% of the value of the house, while the other borrows 50%. The terms are the same, so the first family's mortgage payments are twice that of the second. If both families experience a temporary loss of income, perhaps due to unemployment or illness, the one that has borrowed more – the one that is more highly leveraged – will face more difficulty meeting their mortgage payments and is more likely to default.

Not only that, but think about what happens if the price of the house itself falls. The family that has only borrowed 50% of the value owns half of the house. That is their *net worth* – their assets minus their liabilities – so they have a cushion to absorb the losses that come when housing prices fall. The family that borrowed 100% of the house value has no such cushion.

This example could apply equally well to firms, financial institutions or even countries. The more they borrow to finance investments, the greater the chance that an adverse surprise will make them unable to pay and render them bankrupt.

Financial institutions are much more highly leveraged than households or firms. The assets of American households are roughly 1¼ times net worth. For nonfinancial firms the value is around two. Yet, the average U.S. financial institution has assets of about ten times their net worth. And this figure is only the average. Some important

¹ For a technical definition of leverage see the *Tools of the Trade* box in Chapter 5.

financial firms leveraged more than thirty times their net worth.² Such high leverage meant that these firms would be vulnerable even to a very small adverse surprise in the value of their assets. For example, when a borrower is leveraged more than thirty times, even a small 3% decline of asset prices could eliminate the cushion created by the net worth and lead to bankruptcy.

When highly leveraged financial institutions experience a loss, they usually try to reduce their leverage – that is, to *deleverage* – by selling assets and issuing securities that raise their net worth. These actions could reflect an increased awareness of risk or a reduced willingness to take risk. Following an adverse shock that alters risk perceptions, financial institutions also may be compelled to deleverage by government rules that require them to hold a larger cushion to insure against possible losses from riskier assets.

However, unless there is sufficient demand outside of the financial system for the assets that banks are trying to sell, it is not possible for all institutions to deleverage at the same time. The paradox of leverage is that when too many institutions try to sell assets at once, their efforts will almost surely prove counterproductive: falling prices will mean more losses, diminishing their net worth further, raising leverage, and making the assets they hold seem riskier, thereby compelling further sales (see Figure 1).

You can see the connection between this deleveraging spiral and the liquidity spiral discussed in the Chapter 2 module: Liquidity and the Crisis of 2007-09. Falling prices and declining net worth make it riskier for financial institutions to hold the inventories of securities needed to make markets, so market liquidity declines. If prices fall sufficiently, concerns about the net worth of these financial institutions can cause investors to demand a risk premium for lending to them, so their funding liquidity declines, too.

Such a vicious cycle of falling prices and widespread deleveraging was a hallmark of the financial crisis of 2007-09. Highly leveraged financial institutions suddenly aware of their exposure to risk sought to sell assets quickly and raise their net worth. Ultimately, the demand from outside the system needed to halt the cycle had to come from the government.

We have seen that leverage increases the risk of default. Ahead of the financial crisis, many failed to appreciate or had grown complacent about the risks of leverage. When the crisis hit, leveraged households, financial institutions and even countries were forced to learn core principle 2 – risk requires compensation – in a painful fashion. Their efforts to reduce risk (for which they had been inadequately compensated) through deleveraging often proved infeasible. Some financial institutions failed. Others were forced to seek merger partners or public assistance

² A bank's net worth – its assets minus liabilities – is commonly known as *bank capital*. We will discuss this in more detail in Chapter 12.

to survive. Going forward, governments are seeking to charge a penalty for leverage, to make sure that risks to the financial system as a whole are properly compensated.

Figure 1. Deleveraging Spiral



