

## 2: DEBT AND DESTRUCTION

All of us face unforeseen threats that can alter our lives: an unexpected illness, a horrible storm, a fire. We understand we need to be protected against such events, and we buy insurance to be compensated when these events happen. This is one of the most common ways we interact with financial markets. It is far better for the financial system as a whole to bear these risks than any one individual.

One of us (Amir) grew up in Topeka, Kansas, where the threat of tornadoes has long been hardwired in people's minds. From an early age, Kansans go through tornado drills in schools. Kids pour out of classrooms into hallways and are taught to curl up into a ball next to the wall with their hands covering their heads and necks. These drills are done at least twice a year; school administrators know they must be prepared for a tornado striking out of the blue. Similarly, home owners in Kansas prepare for tornadoes by making sure their insurance policy will pay them if, God forbid, their home is destroyed in a tornado. Money can't make up for the loss of one's home, but it ensures that a family can begin rebuilding their lives during such a desperate time. Insurance *protects* people—this is one of the primary roles of the financial system.

A collapse in house prices, while presumably not dangerous in terms of injury or death, presents another serious unforeseen risk to home owners. For many Americans, home equity is their only

source of wealth. They may be counting on it to retire or to help pay for a child's college education. A dramatic decline in house prices is just as unexpected as a tornado barreling down on a small town in Kansas. But when it comes to the risk associated with house prices, the financial system's reliance on mortgage debt does the exact opposite of insurance: it concentrates the risk on the home owner. While insurance protects the home owner, debt puts the home owner at risk. Here's how.

### The Harshness of Debt

Debt plays such a common role in the economy that we often forget how harsh it is. The fundamental feature of debt is that the borrower must bear the first losses associated with a decline in asset prices. For example, if a home owner buys a home worth \$100,000 using an \$80,000 mortgage, then the home owner's equity in the home is \$20,000. If house prices drop 20 percent, the home owner loses \$20,000—their full investment—while the mortgage lender escapes unscathed. If the home owner sells the home for the new price of \$80,000, they must use the full proceeds to pay off the mortgage. They walk away with nothing. In the jargon of finance, the mortgage lender has the *senior claim* on the home and is therefore protected if house prices decline. The home owner has the *junior claim* and experiences huge losses if house prices decline.

But we shouldn't think of the mortgage lender in this example as an independent entity. The mortgage lender uses money from savers in the economy. Savers give money to the bank either as deposits, debt, or equity, and are therefore the ultimate owners of the mortgage bank. When we say that the mortgage lender has the senior claim on the home, what we really mean is that savers in the economy have the senior claim on the home. Savers, who have high net worth, are protected against house-price declines much more than borrowers.

Now let's take a step back and consider the entire economy of borrowers and savers. When house prices in the aggregate collapse

by 20 percent, the losses are concentrated on the borrowers in the economy. Given that borrowers already had low net worth before the crash (which is why they needed to borrow), the concentration of losses on them devastates their financial condition. They already had very little net worth—now they have even less. In contrast, the savers, who typically have a lot of financial assets and little mortgage debt, experience a much less severe decline in their net worth when house prices fall. This is because they ultimately own—through their deposits, bonds, and equity holdings—the senior claims on houses in the economy. House prices may fall so far that even the senior claims take losses, but they are much less severe than the devastation wrought on the borrowers.

Hence, the concentration of losses on debtors is inextricably linked to wealth inequality. When house prices collapse in an economy with high debt levels, the collapse amplifies wealth inequality because low net-worth households bear the lion's share of the losses. While savers are also negatively impacted, their relative position actually improves. In the example above, before the crash savers owned 80 percent of the home whereas the home owner owned 20 percent. After the crash, the home owner is completely wiped out, and savers own 100 percent of the home.

### Debt and Wealth Inequality in the Great Recession

During the Great Recession, house prices fell \$5.5 trillion—this was enormous, especially considering the annual economic output of the U.S. economy is roughly \$14 trillion. Given such a massive hit, the net worth of home owners obviously suffered. But what was the *distribution* of those losses: how worse off were borrowers, actually?

Let's start with an examination of the net-worth distribution in the United States in 2007.<sup>1</sup> A household's net worth is composed of two main types of assets: financial assets and housing assets. Financial assets include stocks, bonds, checking and savings deposits, and other business interests a household owns. Net worth is de-



ward. Bond prices, as measured by the Vanguard Total Bond Market Index, experienced a strong rally throughout the recession as market interest rates plummeted—from 2007 to 2012, bond prices rose by more than 30 percent. Any household that held bonds coming into the Great Recession had a fantastic hedge against the economic collapse. But, as we have shown above, only the richest households in the economy owned bonds.

The collapse in house prices hit low net-worth households the hardest because their wealth was tied exclusively to home equity. But this tells only part of the story. The fact that low net-worth households had very high debt burdens amplified the destruction of their net worth. This amplification is the *leverage multiplier*. The leverage multiplier describes mathematically how a decline in house prices leads to a larger decline in net worth for a household with leverage.

To see it at work, let's return to the example we've been using, where a home owner has 20 percent equity in a home worth \$100,000, and therefore a loan-to-value ratio of 80 percent (and therefore an \$80,000 mortgage). If house prices fall 20 percent, what is the percent decline in the home owner's equity in the home? Here's a hint: it's much larger than 20 percent! The home owner had \$20,000 in equity before the drop in house prices. When the prices drop, the house is only worth \$80,000. But the mortgage is still \$80,000, which means that the home owner's equity has been completely wiped out—a 100 percent decline. In this example, the leverage multiplier was 5. A 20 percent decline in house prices led to a decline in the home owner's equity of 100 percent, five times larger.<sup>2</sup>

From 2006 to 2009, house prices across the country fell by 30 percent. But since poor home owners were levered, their net worth fell by much more. In fact, because low net-worth home owners had a leverage ratio of 80 percent, a 30 percent decline in house prices completely wiped out their entire net worth. This is a fact often overlooked: when we say house prices fell by 30 percent,

the decline in net worth for indebted home owners was much larger because of the leverage multiplier.

Taken together, these facts tell us exactly which home owners were hit hardest by the Great Recession. Poor home owners had almost no financial assets; their wealth consisted almost entirely of home equity. Further, their home equity was the junior claim. So the decline in house prices was multiplied by a significant leverage multiplier. While financial assets recovered, poor households saw nothing from these gains.

Figure 2.2 puts these facts together and shows one of the most important patterns of the Great Recession. It illustrates the evolution of household net worth for the bottom quintile, the middle quintile, and the highest quintile of the home-owner wealth distribution. The net worth of poor home owners was absolutely hammered during the Great Recession. From 2007 to 2010, their net worth collapsed from \$30,000 to almost zero. This is the leverage multiplier at work. The decline in net worth during the Great Recession completely erased all the gains from 1992 to 2007. This is exactly what we would predict given the reliance on home equity and their large amount of debt. The average net worth of rich home owners declined from \$3.2 million to \$2.9 million. While the dollar amount of losses was considerable, the percentage decline was negligible—they were hardly touched. The decline wasn't even large enough to offset any of the gains from 1992 to 2004. The rich made out well because they held financial assets that performed much better during the recession than housing. And many of the financial assets were senior claims on houses.

High debt in combination with the dramatic decline in house prices increased the already large gap between the rich and poor in the United States. Yes, the poor were poor to begin with, but they lost everything because debt concentrated overall house-price declines directly on their net worth. This is a fundamental feature of debt: it imposes enormous losses on exactly the households that have the least. Those with the most are left in a much better relative

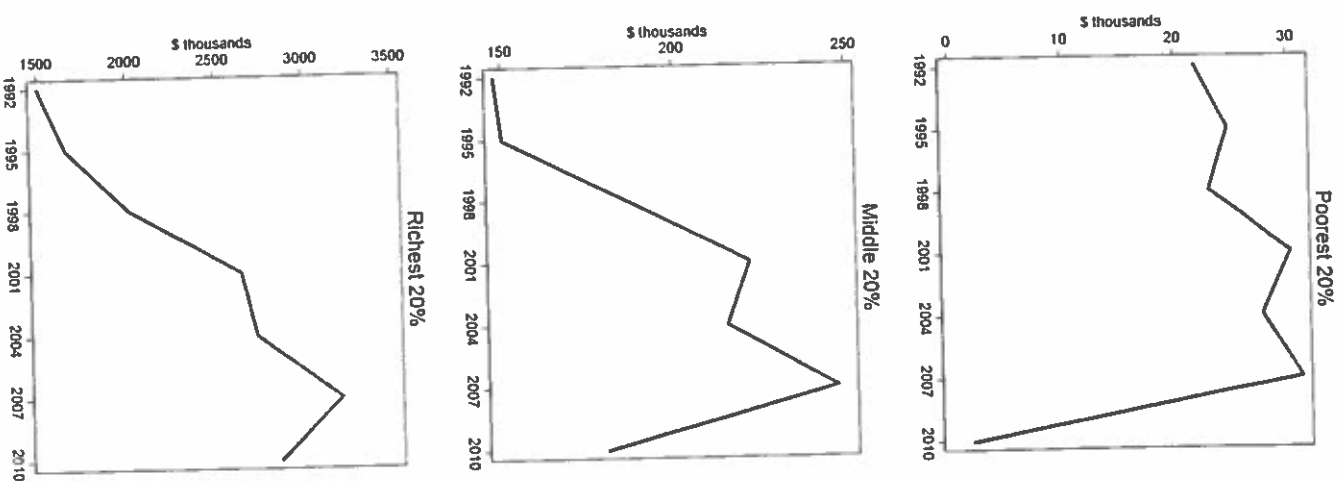


Figure 2.2: Home-Owner Net Worth, Poorest, Median, and Richest Quintiles

position because of their senior claim on the assets in the economy. Inequality was already severe in the United States before the recession. In 2007 the top 10 percent of the net-worth distribution had 71 percent of the wealth in the economy. This was up from 66 percent in 1992. In 2010 the share of the top 10 percent jumped to 74 percent, which is consistent with the patterns shown above. The rich stayed rich while the poor got poorer.

Many have discussed trends in income and wealth inequality, but they usually overlook the role of debt. A financial system that relies excessively on debt amplifies wealth inequality. While there is much to learn about the causes of inequality by looking into the role of debt, our focus is on how the uneven distribution of losses affects the entire economy.

### The Geography of Net-Worth Destruction

The crash in house prices during the Great Recession had a strong geographic component, and our research relies on this.<sup>3</sup> The counties with the sharpest drops in net worth were located in California and Florida. Other pockets of the country also had very large drops, including counties in Colorado, Maryland, and Minnesota. Counties in the middle of the country, such as those in Kansas, Oklahoma, and Texas, largely escaped the housing collapse.

In some areas of the country, the decline in housing net worth was stunning. In four counties in the Central Valley of northern California—Merced, San Joaquin, Solano, and Stanislaus—the fall in house prices led to a 50 percent drop in net worth. And all four counties were already below the median net worth in the United States in 2006. Prince Georges County, Maryland, just north of Washington, D.C., saw a 40 percent decline in net worth, and it was also well below the national median.

In 2000 the median household in Merced County, about 130 miles southeast of San Francisco, had an income of \$35,000, which made it relatively poor compared to other areas of California. From 2002 to 2006, fueled by lending to households with low credit

scores, house prices in the county rose by 60 percent. Home owners responded by borrowing aggressively, and household debt increased by 80 percent. When the housing market turned sour, the consequences were disastrous. Merced County saw a decline in home equity of 50 percent from 2006 to 2009.

For many households during the Great Recession, the value of their homes dropped below the amount still owed on the mortgage. Home owners then became “underwater” or “upside-down” on their mortgage and actually had negative equity in their home. If they chose to sell, they had to pay the difference between the mortgage and the sale price to the bank. Faced with this circumstance, home owners could either stay in their homes and owe the bank more than their homes were worth, or walk away and let the bank foreclose.

Many chose to stay. In 2011, 11 million properties—23 percent of all properties with a mortgage—had negative equity.<sup>4</sup> Even though we know these numbers well, we are still shocked as we write them. They are truly stunning and worth repeating: home owners in 1 out of every 4 residential properties with a mortgage in the United States were underwater. In the Central Valley counties mentioned above, there were four zip codes with more than 70 percent of home owners underwater. For Merced County, the number was 60 percent. Many other home owners walked away, allowing the bank to foreclose. Walking away, of course, was not costless. Failing to pay a mortgage payment shattered one’s credit score. Further, foreclosures led to a vicious cycle that further destroyed household net worth.

### Foreclosures and Fire Sales

The negative effects of debt during the Great Recession extended far beyond the indebted. When house prices collapsed, problems related to excessive leverage infected the entire economy. The spillover effects included higher unemployment and a failing construction sector. But the most direct consequence was the startling rise in foreclosures. Economists have long appreciated that debt affects

everyone when asset prices collapse. A fire sale of assets at steeply discounted prices is the most common reason why. A fire sale is a situation in which a debtor or creditor is willing to sell an asset for a price far below its market value. In the context of housing, this typically happens after a foreclosure: when a bank takes the property from a delinquent home owner, they sell it at a steeply discounted price.

After the sale, other home buyers and appraisers use the fire-sale price to estimate the prices of all other homes in the area. As a result, the prices of *all* the homes in the area suffer. Even home owners with no debt at all see the value of their homes decline. Consequently, financially healthy home owners may be unable to refinance their mortgages or sell their home at a fair price. Over the last few years, many home owners in the United States have been shocked by a very low appraisal of their home during a refinancing. This low appraisal was typically the direct result of an appraiser using a fire-sale foreclosure price to estimate the value of all homes in the neighborhood.

Some of the most insidious effects of debt financing are called the externalities of foreclosure. In the jargon of economists, a negative externality occurs whenever there are negative effects on other people from a private transaction between two parties. In a foreclosure, the bank selling the property does not bear the negative effects of a fire sale that all the other home owners in the area do. As a result, the bank is perfectly willing to sell at a lower price, even though society as a whole would not want the bank to do so.

Foreclosures greatly exacerbated the housing downturn during the Great Recession. In 2009 and 2010, foreclosures reached historically unprecedented levels. The last peak before the Great Recession was in 2001, when about 1.5 percent of all mortgages were in foreclosure. During the Great Recession, foreclosures were three times higher: about 5 percent of all mortgages were in foreclosure in 2009. Daniel Hartley has estimated that between 30 and 40 percent of all home sales in 2009 and 2010 were foreclosures or short sales.<sup>5</sup>

In research with Francesco Trebbi, we estimated some of the negative effects of foreclosures.<sup>6</sup> We used the fact that some states have more lenient foreclosure policies than others. In some states, for example, a lender must go through the courts to evict a delinquent borrower from a home. Other states require no court action, and, as one would expect, foreclosures are much faster in these states. As a result, there were far more foreclosures in some states than others during the Great Recession due to this fact alone, and this difference can be used to estimate the effects of foreclosures on local economies.

After following a similar trajectory from 2004 to 2006, house prices fell much more in states where foreclosure was easier. States that required a judicial foreclosure saw house prices fall 25 percent, whereas states not requiring judicial foreclosure saw house prices fall more than 40 percent. Figure 2.3 shows house prices over time in both types of states—the sharp relative decline in house prices in states not requiring a judicial foreclosure is clear.<sup>7</sup> Using this difference across states, our research concludes that house prices declined by 1.9 percentage points for every 1 percent of home owners going into foreclosure between 2007 and 2009. Further, by pulling down house prices, foreclosures dampened consumption and home building.

Debt-induced fire sales are not limited to the housing market. Andrei Shleifer and Robert Vishny emphasize the importance of fire sales following the leveraged-buyout wave of the late 1980s.<sup>8</sup> In that episode, companies with extremely high leverage were forced to sell assets at steeply discounted prices, which then lowered the value of collateral for all businesses. John Geanakoplos has written extensively on the impact of fire sales.<sup>9</sup> His work demonstrates how default means that an asset is transferred from someone for whom it's worth a lot (the borrower) to someone for whom it's worth much less (the lender). The lender does not want the property, and the borrower cannot afford it. As a result, the lender is forced to sell the asset at a depressed price. This leads to a vicious cycle. Defaults rise when asset prices collapse. But the rise in de-

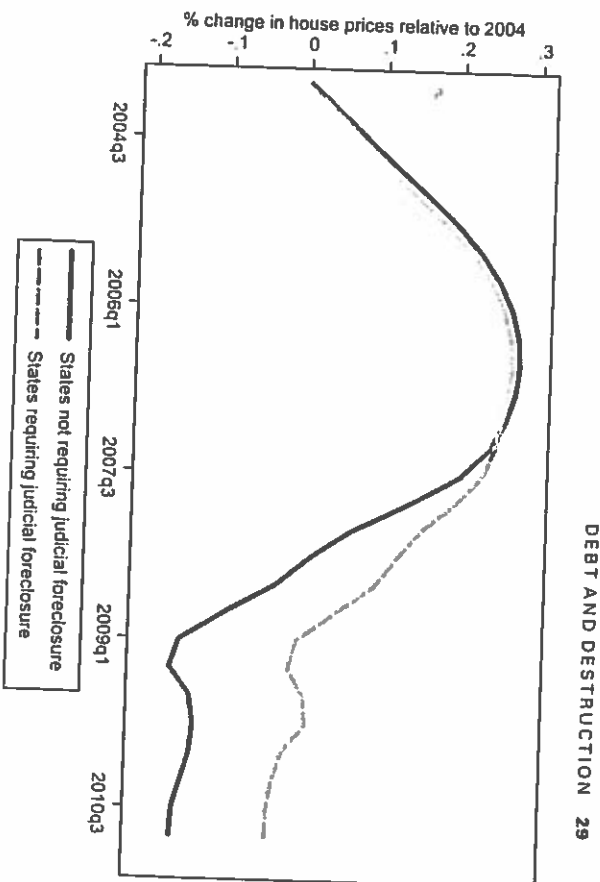


Figure 2.3: Foreclosures and House Prices

faults leads to depressed fire-sale prices as lenders unload the asset. This leads to even more defaults as even lower prices induce more borrowers to default.

When the housing bubble burst, there was undoubtedly a need for reallocation of resources in the economy. Too many renters had become home owners. Too many home owners had moved into homes they could not afford. Too many homes had been built. But when the crash occurred, the debt-ridden economy was unable to reallocate resources in an efficient manner. Instead, debt led to fire sales of properties, which only exacerbated the destruction of net worth.

### Debt: The Anti-Insurance

There are about 350,000 residential fires in the United States every year.<sup>10</sup> If a family loses their house to a fire, the loss can be devastating. They will have to restart their lives from scratch, children

may have to delay or completely give up on college, and certain medical needs may go unaddressed because the family can no longer afford such expenditures. Tornadoes and fires are examples of a number of such risks that we face every day. It makes no sense for individuals to bear these risks. Instead, a sound financial system should allow us to collectively insure one another against such risks that are beyond the control of any one person. It is a relatively small cost for us to protect each other on a regular basis, and the gains benefit everyone in the long run. When a family is able to move forward after a disaster, they can properly take care of their kids and can continue working. Our overall economic productivity and happiness are higher.

Debt is the anti-insurance. Instead of helping to share the risks associated with home ownership, it concentrates the risks on those least able to bear it. As we have shown, debt significantly amplified wealth inequality during the Great Recession. It also depressed prices through foreclosures. And once the decline in house prices destroyed the net worth of indebted home owners, one consequence proved disastrous—they stopped spending.

### 3: CUTTING BACK

A powerful narrative of the Great Recession focuses on the collapse of Lehman Brothers in September 2008. Allowing the bank to go bankrupt, the argument goes, was a “colossal error,” and the failure to save it triggered the global economic downturn.<sup>1</sup> In an article on the causes of the Great Recession, Jacob Weisberg of the *Daily Beast* described it as “near-consensus” that “a global recession became inevitable once the government decided not to rescue Lehman Brothers.”<sup>2</sup> This narrative is closely tied to the banking view articulated in chapter 1. According to this view, the collapse of Lehman Brothers froze the credit system, preventing businesses from getting the loans they needed to continue operating. As a result, they were forced to cut investment and lay off workers. In this narrative, if we could have prevented Lehman Brothers from failing, our economy would have remained intact.

#### The Consumption-Driven Recession

Is the collapse of Lehman Brothers the linchpin of any theory of the recession? Let's go back to the data. One of the facts that jumped out in chapter 1 is that the Great Recession was *consumption-driven*. Let's look more closely at the timing and magnitude of the spending declines.



The decline in spending was in full force *before* the fall of 2008. The National Bureau of Economic Research dates the beginning of the recession in the fourth quarter of 2007, three quarters before the failure of Lehman Brothers. The collapse in residential investment and durable consumption was dramatic well before the events of the fall of 2008. What happened in the fall of 2008 no doubt exacerbated economic weakness, but it should not be viewed as the primary cause.

Let's take a closer look at durable consumption and residential investment. Durable goods are those products that a consumer expects to last for a long time, like autos, furniture, appliances, and electronics. Residential investment reflects both new construction of housing units and remodeling of existing units. Both new construction and remodeling are a function of household demand for housing services. As a result, residential investment is best viewed as another form of household spending on durable goods.

The collapse in residential investment was already in full swing in 2006, a full two years before the collapse of Lehman Brothers. In the second quarter of 2006, residential investment fell by 17 percent on an annualized basis. In every quarter from the second quarter of 2006 through the second quarter of 2009, residential investment declined by at least 12 percent, reaching *negative* 30 percent in the fourth quarter of 2007 and the first quarter of 2008. The decline in residential investment alone knocked off 1.1 percent to 1.4 percent of GDP growth in the last three quarters of 2006.

While spending on other durable goods did not fall quite as early as residential investment, it still fell *before* the heart of the banking crisis. Compared to 2006, furniture purchases in 2007 were down 1.4 percent, and expenditures at home-improvement stores were down 4 percent. Spending on appliances was still up 2 percent in 2007, but the growth was significantly lower than the 7 percent growth in 2005 and 2006.

Looking within the year of 2008, however, provides important insights. The heart of the banking crisis began in September 2008, when both Lehman Brothers and AIG collapsed. So by focusing

on January through August, we can estimate the pre-banking-crisis spending decline in 2008. As a benchmark, we want to compare spending in January through August 2008 to that in January through August 2007, because retail sales are seasonal. A clear pattern emerges. In 2008, auto spending was down 9 percent, furniture spending was down 8 percent, and home-improvement expenditures were down 5 percent. These declines were all registered *before* the collapse of Lehman Brothers. So the sharp reduction in household spending on durable goods had to have been triggered by something other than the banking crisis. The Monaco Coach Corporation example from chapter 1 is consistent with this evidence. Remember, large layoffs in the plants in northern Indiana occurred in the summer of 2008, before the peak of the banking crisis. Indeed, demand for motor homes collapsed in 2007 and early 2008, before Lehman Brothers failed.

Of course, the decline in overall household spending in the third and fourth quarters of 2008 was unprecedented. During these two quarters, overall consumption as measured by the National Income and Product Accounts (NIPA) declined by 5.2 percent. This was the largest two-quarter drop in NIPA-measured consumption in the historical data, which go back to 1947. The only other period that even comes close is that of the first and second quarters of 1980, when consumption fell by 4.6 percent. The collapse in consumption began before the end of 2008, but it no doubt accelerated during the banking crisis.

However, looking more closely at the banking-crisis period suggests that, even then, consumption was the key driver of the recession. NIPA breaks down the total output of the U.S. economy, or GDP, into its subcategories of consumption—investment, government spending, and net exports—and gives data on how much each contributes to overall GDP growth. We are particularly interested in the contributions of consumption and investment to GDP growth during the Great Recession. We split investment into residential investment and non-residential investment. The former reflects investment in housing services (both new construction and

remodeling), while the latter reflects business investment in plants, capital goods, computers, and equipment.

Businesses and banks, as opposed to households, play the dominant role in the argument that troubles in the banking sector caused the recession. Under this argument, when Lehman Brothers collapsed, banks tightened credit, which forced businesses to massively cut non-residential investment and lay off workers. But the evidence from the NIPA accounts contradicts this argument. *Residential* investment was a serious drag on GDP growth even before the banking crisis. And the contribution of consumption was also negative in both the first and second quarters of 2008, which is consistent with the evidence above demonstrating that weakness in household spending preceded the banking crisis. In figure 3.1, we present this evidence for the Great Recession, which formally began in the fourth quarter of 2007. The figure splits out the contributions to total GDP growth from consumption, residential investment, and non-residential investment. As it illustrates, residential investment and consumption were the main drivers of weakness for the first three quarters of the recession.

But even more importantly, notice what happened during the worst part of the recession. In the third quarter of 2008, the collapse in GDP was driven by the collapse in *consumption*. Non-residential investment contributed negatively to GDP growth, but its effect was less than *half* the effect of consumption. Further, in the fourth quarter of 2008, consumption again registered the largest negative contribution to GDP growth. It wasn't until the first and second quarters of 2009 that business investment contributed most negatively to GDP growth.

The timing implicates household spending as the key driver of the recession, not the effects of the banking crisis on businesses. Job losses materialized because households stopped buying, not because businesses stopped investing. In fact, the evidence indicates that the decline in business investment was a *reaction* to the massive decline in household spending. If businesses saw no demand for their products, then of course they cut back on investment. To

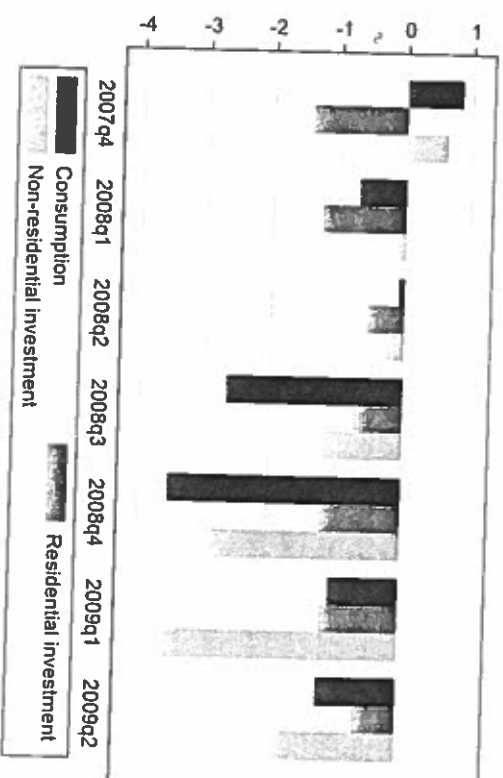


Figure 3.1: What Drove Recession? Contributions to GDP Growth

explain the decline in business investment at the end of 2008 and beginning of 2009, there is no need to rely on the banking crisis.

However, while the aggregate U.S. data demonstrate a clear pattern—consumption was the key driver of the recession—they alone do not perfectly distinguish the cause of the decline in spending. Perhaps the decline happened in anticipation of a banking crisis? Perhaps people somehow knew they were likely to be laid off in the future, so they cut back on durable purchases even before the recession began? Or perhaps the early decline in spending was driven by irrational fears? In the rest of this chapter, we use geographic data to explore the decline in household spending during the recession. These data allow us to see exactly where spending declined. As we will show, patterns emerge that help us make sense of why spending plummeted so dramatically.

### Where Spending Declined?

We know from the previous chapter that some areas of the country were hit much harder by the housing collapse than others. House-

holds in Florida, for example, faced an average decline of 16 percent in their net worth from the housing collapse, whereas households in Texas saw an average decline of only 2 percent. In the Central Valley of northern California, net worth collapsed by 50 percent. Examining data at a more specific level allows us to see whether the decline in housing wealth was the key driver of spending declines, as opposed to other factors like the collapse of Lehman Brothers. If the decline in net worth of indebted households was the key driver of the recession, we should expect household spending to fall much more steeply in areas that experienced the largest declines in housing net worth. And these drops should begin early in the recession.

We split counties in the United States into five quintiles based on the decline in net worth from 2006 to 2009 due to the collapse in house prices. Each quintile contains 20 percent of the total U.S. population. We call the quintile with the largest decline in net worth “large net-worth-decline counties,” and we call the quintile with the smallest decline in net worth “small net-worth-decline counties.” Large net-worth-decline counties were located in many states, including California, Florida, Georgia, Maryland, Michigan, and Virginia. Small net-worth-decline counties were also widespread across the country.

Large net-worth-decline counties lost an average of 26 percent of net worth, while small net-worth-decline counties lost almost exactly 0 percent. Recall that the decline in net worth coming from the housing crash can be decomposed into two factors: the decline in house prices and the leverage multiplier. As a result, areas of the country with higher debt burdens experienced a much larger percentage decline in net worth even for the same percentage decline in house prices. Large net-worth-decline counties were not just counties where house prices collapsed. Instead, they were counties that had a *combination* of high debt levels and a collapse in house prices.

From 2006 to 2009, large net-worth-decline counties cut back on consumption by almost 20 percent. This was massive. To put it into perspective, the total decline in spending for the U.S. economy

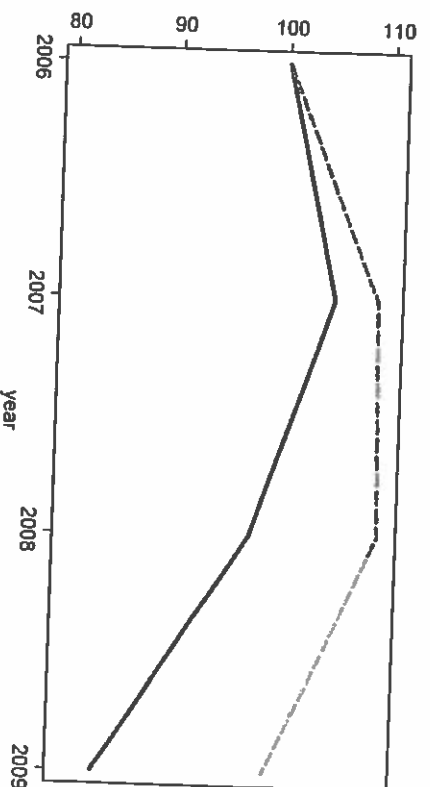


Figure 3.2: Spending in Large and Small Net-Worth Decline Counties

was about 5 percent during these same years. The decline in spending in these counties was four times the aggregate decline. In contrast, small net-worth-decline counties spent almost the exact same amount in 2006 as in 2009. Figure 3.2 shows spending in large and small net-worth-decline counties. (Both series are indexed to 2006.) Even as early as 2007, a large gap opened up between spending by counties with large and small declines in net worth. Clear signs of the recession emerged very early in counties hit with a negative net-worth shock. But 2008 was the year in which the difference accelerated substantially. In fact, in counties with only a small decline in home-equity values, household spending actually rose from 2007 to 2008. If we examine only U.S. counties that avoided the collapse in net worth through 2008, we wouldn't even see much evidence of a recession. In contrast, spending in areas with a large decline in net worth collapsed in 2008.

Of course, the effects of the economic disaster were ultimately felt even in areas that avoided the collapse in net worth. After rising from 2006 to 2008, spending in 2009 fell by almost 10 percent in counties with the smallest decline in net worth. But the decline

in these counties in 2009 doesn't invalidate the importance of the shock to net worth. When spending fell in large net-worth-decline counties, the damage was not limited. It spread throughout the entire country. (We return to this point in chapter 5 when we discuss unemployment during the Great Recession.)

The tremendous effect of net-worth declines on spending can be seen very clearly by zeroing in on the colossal housing mess in the Central Valley in California. As mentioned earlier, four counties with steep drops in house prices—Merced, San Joaquin, Solano, and Stanislaus—witnessed a decline in net worth of about 50 percent. The spending response was dramatic, as spending in these counties fell by 30 percent from 2006 to 2009. Much of this occurred very early in the recession. Compared to the summer of 2006, auto purchases in the summer of 2008—before the collapse of Lehman Brothers—were already down 35 percent. The banking crisis in the fall of 2008 cannot explain why spending had already fallen so steeply in the Central Valley in the summer of 2008.

The geographic pattern is sharp. Areas of the country suffering a collapse in net worth pulled back much earlier and much more strongly than areas that didn't. We attribute this to the decreased net worth of indebted households. But even if one believes other channels were more important, the pattern in figure 3.2 dampens alternative hypotheses. Whatever one wants to blame for the severe recession, it must be consistent with the strong geographic pattern in the spending data.

### What's Debt Got to Do with It?

In November 2011, James Surowiecki wrote an article titled "The Deleveraging Myth" in his influential *New Yorker* column, in which he claimed that debt was not the main reason household spending had collapsed during the Great Recession. Instead, he argued that the decline in house prices alone, even in the absence of debt, easily explained weakness in consumer spending. As he put it, "It's well established that when housing prices go up people feel richer and

spend more. . . . But when housing prices go down people cut their spending by the same amount in response. That means that—even if consumers had no debt at all—we'd expect a dropoff in consumption."<sup>4</sup>

This argument is a common one that we have heard when presenting our research: a housing-wealth effect alone, even in a world without debt, can explain why household spending declined by so much when house prices collapsed. However, in our view, there are two problems with this argument. First, recall the foreclosure externality we described in the previous chapter. Foreclosures have a dramatic effect on house prices. In the absence of debt, there would have been no foreclosures, and house prices would not have fallen as much as they did. We will quantify the effect of foreclosures on spending later in the book, but the important point is that we cannot treat the decline in house prices as independent of debt.

Second, in the pure housing-wealth-effect view, the distribution of net worth is unimportant. The collapse in house prices would be disastrous for household spending regardless of which households bear the loss. As we outlined in the previous chapter, debt concentrates the losses on those with the least net worth. This begs the question: Does the fact that debt forces losses on the lowest net-worth borrowers amplify the effect of house-price declines on spending? In the pure housing-wealth-effect view, it does not. In the debt-centric view, it does.

Let's look at the data. The geographic patterns in spending show that the negative shock to net worth caused people to spend less. In economic jargon, the spending response is called the marginal propensity to consume, or the MPC, out of housing wealth. The MPC out of housing wealth tells us how many dollars less an individual spends in response to a wealth shock. For example, if an individual responds to a \$10,000 fall in home value by cutting spending by \$500, then the MPC is  $(\$500/\$10,000) = \$0.05$  per \$1. The larger the MPC, the more responsive the household is to the same change in wealth. In the pure housing-wealth-effect view, everyone has the same MPC and hence debt does not matter.

Our research estimates an MPC out of housing wealth during the recession on the order of 5 to 7 cents per dollar. In other words, if an individual's house price fell by \$10,000 during the Great Recession, the individual cut spending on average about \$500 to \$700. Given the aggregate decline in home values of about \$5.5 trillion, our estimate implies that the decline in home values led to a \$275 to \$385 billion decline in retail spending, which is a very large amount.

But this estimate is only the *average* MPC across the entire population. It does not tell us who cut back the most. If debt matters for spending over and above the pure housing-wealth effect, we should expect a *higher* MPC out of housing wealth for indebted households. Or, in other words, a household with more debt would respond to the same decline in house prices by cutting back more aggressively on spending.

This is a crucial point, so here is a simple example to clarify. Two households live next door to each other. They had identical homes in 2006, both worth \$100,000. Household D (for Debt) had an \$80,000 mortgage, which they borrowed from household N (for No debt), and household N had no mortgage at all. So in 2006, household D had a home equity of \$20,000 and a leverage ratio of 80 percent. Household N had a home equity of \$100,000, a leverage ratio of 0 percent, and a financial asset (the mortgage) worth \$80,000.

From 2006 to 2009, house prices in their neighborhood fell 10 percent, or \$10,000. So in 2009, both Household D and N had a home worth \$90,000 instead of \$100,000. Both lost \$10,000 of home equity from 2006 to 2009. The mortgage of Household D remained worth \$80,000. Household N owns the mortgage, but there is no change in its value. Therefore, both households saw a total drop in their wealth of \$10,000 driven completely by the change in home equity. Household D has remaining net worth of \$10,000, whereas Household N has remaining net worth of \$170,000, comprised of \$90,000 of home equity and the \$80,000 mortgage asset.

The key question is: Which household cut spending by more? Both lost \$10,000. If the decline in spending is just a housing-

wealth effect, then debt is irrelevant for understanding how much home owners cut spending in response to a decline in wealth. In our example, this translates to saying that both household D and N had the same MPC out of housing wealth. In this view, if both households have the same MPC of 0.05, then both households cut spending by \$500. If these two households have the same MPC, then debt indeed does not matter. Only the decline in home values is relevant.

But what should we expect if debt does matter? If debt amplifies the effect of house-price declines on spending, we would expect to see a higher MPC for household D than household N. In other words, the indebted household pulls back on spending more for the exact same decline in home value. If household D has a higher MPC than household N, then the distribution of leverage matters when house prices collapse. If the house-price decline concentrates losses on the people with the most debt, then the effects on their consumption will be especially severe.

The MPC of households is also relevant for thinking about the effectiveness of government stimulus programs for boosting demand. When the government sends out stimulus checks to spur consumer demand, as it did in both 2001 and 2008, policy makers want to understand how much of the stimulus check will be spent. The policy will be considered more effective if individuals spend a larger share of the checks, which would happen if individuals who get the checks have higher MPCs.

### More than a Wealth Effect

Our research directly tests if the MPC varies by household income and leverage by focusing on zip-code-level information on auto purchases. Zip-code-level data lets us go inside counties that saw large net-worth shocks and see if they cut spending the most during the Great Recession. More specifically, our research estimates how much a household with high leverage versus low leverage cut spending on autos in response to the same dollar value decline in

house prices. In other words, our research estimates how the MPC out of housing wealth varies with household leverage during the Great Recession.

The results are dramatic and strongly indicate that Household D in the example above would cut back far more than Household N. In the real world, a household with a loan-to-value ratio of 90 percent or higher in their home in 2006 had an MPC out of housing wealth that was more than three times as large as a household with a loan-to-value ratio of 30 percent or lower. For example, in response to a \$10,000 decline in home value, households with an LTV higher than 90 percent cut spending on autos by \$300. Households with an LTV lower than 30 percent cut spending on autos by less than \$100. For the exact same dollar decline in home value, households with more debt cut back on spending more aggressively. Figure 3.3 shows the MPC estimates across the distribution of leverage. There is a strong relation: the higher the leverage in the home, the more aggressively the household cuts back on spending when home values decline.

The higher MPC out of housing wealth for highly levered households is one of the most important results from our research. It immediately implies that the distribution of wealth and debt matters. During the Great Recession, house-price declines weren't the same for households with high leverage versus those with low leverage—they fell the most for households that had the highest leverage. As we discussed in the last chapter, these were households with low net worth and all of their wealth tied to home equity. As a result, the collapse of the housing market was especially toxic for them. Not only did house prices fall, but they fell most for households with the highest MPC out of housing wealth. Put another way, the decline in spending from 2006 to 2009 would have been far less severe if house prices fell more for households with low debt levels and a large amount of financial assets.<sup>5</sup>

The MPC differences across the population can also help us understand other spectacular asset-price collapses, like the bursting of the dot-com bubble in the early 2000s. We shouldn't for-

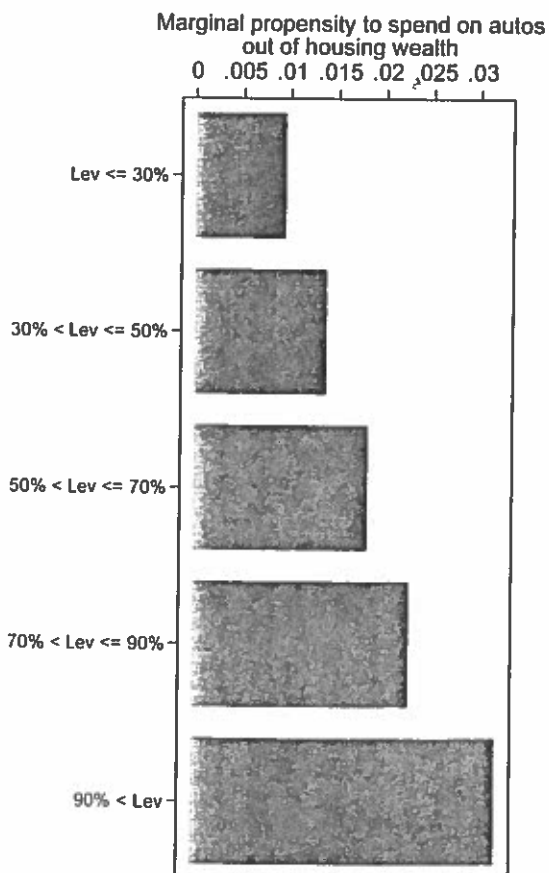


Figure 3.3: MPC Based on Housing Leverage Ratio

get that this represented a huge loss in wealth. From 2000 to 2002, households in the United States lost \$5 trillion in financial asset value, mostly from the decline in stocks. This is remarkably similar to lost housing wealth during the Great Recession. Yet despite this dramatic decline in financial wealth during the tech bust, household spending barely budged. In fact, household spending grew from 2000 to 2002 by 5 percent. This was lower than the 15 percent growth in household spending from 1998 to 2000, but it was nowhere near the *decline* in spending of 8 percent from 2007 to 2009.

So the bursting of the tech bubble resulted in a huge loss of household wealth but had little effect on household spending, while the bursting of the housing bubble during the Great Recession had a great effect. Why? The differential MPCs shown above provide the answer: tech stocks were owned by very rich households with almost no leverage. As of 2001, almost 90 percent of all stocks in the United States were owned by the top 20 percent of the net-worth distribution. And these households had a leverage ratio of only 6 percent (that is, these households had only \$6 of debt for

every \$100 of assets). Rich households with little debt tend to have a very low MPC out of wealth. As a result, we shouldn't be surprised that the bursting of the tech bubble had almost no impact on spending.

A comparison of the tech-bubble and housing-bubble collapses offers a useful lesson as we move forward. Asset-price declines are never a good thing. But they are extremely dangerous when the asset is highly levered. The combination of high debt levels and a sharp asset-price decline results in a massive decline in spending.

### A Summary of the Evidence

We started this book with a challenging puzzle: economic contractions lead to painful job losses, but we don't understand exactly why. Solving any mystery requires a collection of facts. We have now shown a number of facts that help uncover the mechanism leading to these economic catastrophes. In the next chapter, we will outline the exact theory that we believe explains why severe recessions happen. But first, we want to summarize the evidence so far presented.

The initial piece of evidence is that severe economic downturns are almost always preceded by a sharp run-up in household debt. This was true of the Great Recession and the Great Depression in the United States. It was also true of many of the worst economic contractions in Europe in the last decade. Even back in 1994, scholars recognized the strong relation between the severity of recessions and the increase in household debt that preceded them. Further, recessions are triggered when household spending collapses.

Another important fact is how debt distributes losses when asset prices like home values collapse. During the Great Recession in the United States, the housing bust disproportionately affected low net-worth, highly indebted home owners. Indebted home owners bore the first losses associated with the collapse in house prices; as a result, they saw a massive collapse in their net worth. The financial system's reliance on debt means that those with the most

wealth were protected when house prices fell, while those with the least were hammered. Wealth inequality, which was already severe before the Great Recession, increased substantially from 2006 to 2009.

When one sees the geography of spending patterns, the mysterious collapse in consumption during the Great Recession isn't so mysterious. Counties with high household-debt burdens and a large decline in house prices cut back sharply on spending when home-owner net worth was decimated. Counties that avoided the collapse in net worth saw almost no decline in spending even through 2008. Eventually, however, even counties that avoided the collapse in housing saw a decline in spending.

Finally, debt is critical to understanding the collapse in consumption. It amplifies the loss in home values due to the foreclosure externality, and it concentrates losses on the indebted households that have the highest marginal propensity to consume.

As we mentioned at the beginning of this book, people like those laid off in northern Indiana deserve an evidence-based explanation for why they lost their jobs during the Great Recession. We now have a collection of facts that brings us closer to providing such an explanation. In the following chapters, we propose a theory of economic contractions that can explain why debt leads to severe economic contractions, and why millions of jobs are lost as a result.

## 4: LEVERED LOSSES: THE THEORY

Hal Varian, the chief economist at Google and a professor emeritus of economics at the University of California, Berkeley, believes in the power of data. "Between the dawn of civilization and 2003," he said in a recent interview, "we only created five exabytes of information; now we're creating that amount every two days." He has famously pronounced that "the sexy job in the next 10 years will be statisticians." Varian also understands that the explosion of data requires increased skill in interpreting them. As he put it, "The ability to take data—to be able to understand it, to process it, to extract value from it, to visualize it, to communicate it—that's going to be a hugely important skill in the next decades."<sup>1</sup> As you've probably guessed, we share Varian's passion for data, which is why we've spent the last three chapters collecting facts to help us understand the cause of severe economic downturns. But we also agree with Varian's message on the skills required to *interpret* data correctly.

The ability to interpret data is especially important in macroeconomics. The aggregate U.S. economy is an unwieldy object—it contains millions of firms and households. Their interactions with each other are like an ecosystem where one party's actions affect everyone else. With the information explosion described by Varian, one could collect an infinite number of data points to figure out what is going on. What actions are driving the economy? Whose

behavior is most important? What actions could help resuscitate economic activity? But unless an economist can put some structure on the data, he or she will drown in a deep ocean of numbers trying to answer these questions.

Which brings us to the importance of an economic model. Macroeconomists are defined in large part by the theoretical model they use to approach the data. A model provides the structure needed to see which data are most important, and to decide on the right course of action given the information that is available. This chapter presents the core economic model in this book, a model we refer to as the *levered-losses* framework. It is motivated by the facts we have uncovered so far. We need a model that rationalizes why recessions are preceded by a large rise in household debt and why they begin with a dramatic decline in spending. The theory we present connects these dots to explain why a collapse in asset prices when an economy has elevated debt levels leads to economic disaster with massive job losses.

In our explanation of the levered-losses framework, we start with the standard benchmark frictionless macroeconomic model, which we have referred to before as the *fundamentals* view.<sup>2</sup> We view this model as unrealistic and unable to explain severe economic contractions. But it is nonetheless important to understand before delving into the levered-losses framework. Only by understanding the fundamentals view can we appreciate the departures from it that cause economic disasters.

### The Fundamentals View and Robinson Crusoe

The basic idea behind the fundamentals view is that the total output, or GDP, of the economy is determined by its productive capacity: workers, capital, and the technology of firms. The economy is defined by what it can produce, not by what is demanded. Total production is limited only by natural barriers, like the rate at which our machines can convert various inputs into output, the number



of working hours in a day per person, and the willingness of people to work versus relax. This is sometimes called the *supply-side* view because it emphasizes the productive capacity, or supply, of resources.

Given the emphasis on the supply side of the economy, economic fluctuations in these models are driven by changes in the economy's productive capacity. For example, one of the crucial building blocks of the fundamentals view is the "Robinson Crusoe" economy, which is an economy with just one person, Robinson Crusoe, and one good, coconuts.<sup>3</sup> The production of coconuts is determined by the number of coconut trees ("capital") and the amount Robinson Crusoe chooses to work to get the coconuts from the trees ("labor supply"). The GDP of this economy is the total number of coconuts produced given capital and labor supply.

What causes a severe contraction in output in this simplified economy? Any shock to the island that destroys productive capacity. A hurricane is an obvious example. If a hurricane hits the island and destroys a large number of coconut trees, then the production of coconuts falls considerably. The economy goes through a "recession" characterized by lower coconut consumption, where the decline in consumption is driven by the hurricane's destruction of productive capacity. The output of the economy is determined by the available resources for production, not by any shift in demand.

Further, unless productive capacity is diminished, it is very difficult to understand why Robinson Crusoe would all of a sudden choose to massively cut coconut consumption. In the absence of some disastrous event, the only reason Robinson would cut coconut consumption would be a change in his preferences or beliefs. For example, perhaps he wakes up one morning and decides he would prefer to delay eating coconuts until later in life. Or perhaps he has a belief that a hurricane is coming, so he needs to save up on coconuts. These kinds of shocks are difficult to measure and, in our view, hard to justify in practice.

The fundamentals view has a difficult time explaining severe

contractions in advanced economies. Severe contractions are almost never associated with an obvious shock to the productive capacity of the economy. For example, no severe calamity such as war or natural disaster initiated the Great Depression, the Great Recession, or the current economic malaise plaguing Europe. There was no loss of technological capacity. We did not forget how to make cars, airplanes, or houses. And while the price of real estate crashed during each of these episodes, we did not witness a destruction of homes or buildings. *Severe recessions are triggered even when no obvious destruction of productive capacity occurs.*

The failure of the fundamentals view can be boiled down to two main issues. First, severe recessions are not initiated by some calamity that destroys the productive capacity of the economy. They are set off when asset prices collapse and households sharply pull back on spending. Second, in the fundamentals view, even if we have some shock that causes a decline in spending, there is no obvious reason why the economy would suffer. That is, lower spending in the fundamentals view does not lead to contraction or job loss. Remember, output in the fundamentals view is determined by the *productive capacity* of the economy, not by *demand*. In response to a sharp decline in consumption, the economy in the fundamentals view has natural corrective forces that keep it operating at full capacity. These include lower interest rates and consumer prices, which we explain further below. Obviously, however, these corrective forces weren't able to keep the economy on track.

Significant departures from the fundamentals view are needed to explain severe contractions, and any theory that departs from the fundamentals view must address these key issues. An alternative theory must explain why households sharply pull back on spending, and why the cut in spending is so destructive for total output. Why doesn't the economy adjust to lower spending? Why does economic output decline? Why do people lose their jobs? The levered-losses framework answers these questions and is strongly supported by the data. Let's go through it.

### The Levered-Losses Framework<sup>4</sup>

The first ingredient of the levered-losses framework is differences across the population due to debt. There are borrowers and savers in the economy, and the borrowers have substantial leverage. They borrow in the form of debt contracts from savers, and these debt contracts require an interest payment each period. The debt contract gives the saver the *senior claim* on the assets of the borrower. Or, in other words, in the event that the borrower does not pay, the saver has the right to foreclose on the assets of the borrower. If the house price falls and the borrower sells, he must still pay back the full amount of the mortgage. The borrower has the junior claim on the home and therefore experiences the first losses associated with any decline in house prices.

Borrowers tend to be households that have low net worth, which is exactly the reason they have to borrow to buy a home. Savers tend to be households that have high net worth. In the model, the savers lend directly to the borrowers, which is equivalent to saying the rich lend to the poor. In reality, of course, the savers put their money into a bank, a money-market fund, or direct holdings of financial assets such as stocks. That money finds its way into mortgages for the borrower. The point remains: Savers, through their financial holdings, have the senior claim on the underlying houses. The rich are protected against house-price declines not only because they are rich but also because they have a senior claim on housing.

The second ingredient of the levered-losses framework is a shock to the economy that leads to a sharp pullback in spending by debt-burdened families. This shock can be viewed generally as any event that lowers the net-worth position of levered households or makes it more difficult for them to borrow. Practically speaking, a collapse in real estate prices is almost always the shock. As we showed in chapter 2, the collapse in house prices during the Great Recession destroyed the net worth of indebted households.

The spending impact of the fall in real estate prices is *amplified*

in the levered-losses framework due to two effects. The first is the concentration of losses on those who have the highest spending sensitivity with respect to housing wealth: debtors. The second is the amplification of the original house-price shock due to foreclosures.

When debt concentrates losses on indebted households, there are several reasons why they stop spending. One is that they must rebuild their wealth in order to make sure they have money to spend in the future. For example, consider a married couple in their late fifties approaching retirement. They had 20 percent equity in their home that they were planning on using to finance their retirement, either by downsizing and selling their home, or by taking out a home-equity loan. When house prices collapse by 20 percent and their home equity disappears, they are in dire straits. They no longer have sufficient wealth to cover their planned spending in retirement. As a result, they cut spending in order to build up savings.<sup>5</sup>

Beyond the immediate effect of wanting to save more due to lost wealth, levered households also cut back on spending due to tighter constraints on borrowing. For example, levered households no longer have sufficient home equity to use as collateral for borrowing. They are also likely to have a hard time refinancing into a lower mortgage interest rate. These tighter borrowing constraints depress spending by indebted households. The overall decline in spending in the levered-losses framework is larger than it would be if the housing losses were more *equally distributed* across the population. As we have demonstrated in chapter 3, the spending of indebted households is more sensitive to housing-wealth losses than the spending of savers. In other words, savers can absorb losses much more easily without reducing their spending.

The second channel through which debt amplifies the impact of housing shock is the foreclosure externality discussed in chapter 2. If the initial decline in house prices is large enough, some of the indebted home owners may owe more on their house than it is worth. Underwater households are much more likely to default on their mortgage payments, either because the payment becomes prohibi-

tively expensive or because of strategic motives. Regardless, these defaults lead to foreclosures that in turn lead to further reductions in house prices. Spending cuts driven by the initial decline in home values are further amplified as foreclosures push house prices further down.

While we have focused on the example of creditor and debtor households in our levered-losses framework, the intuition applies more broadly. For example, the borrower may be a country, such as Spain, that has borrowed substantially from another country, such as Germany. A fall in house prices in Spain in this example forces Spanish households to cut back sharply on spending for the same reasons discussed above. Germany is protected from the house-price declines because Germans have the senior claim on the Spanish housing stock.

We have now described how a large decline in spending occurs in the levered-losses framework, a decline that the fundamentals view cannot easily explain. But as we pointed out above, there is an additional failure of the fundamentals view we must address. In the fundamentals view, the economy has natural corrective forces that keep it operating at full capacity, even if there is a severe decline in spending.

### How Does the Economy Try to React?

The first way that the economy tries to prevent economic catastrophe when indebted households cut back is through a sharp reduction in interest rates. As borrowers rebuild their balance sheets by reducing borrowing, the demand for savings in the economy rises. This pushes interest rates down as money flows into the financial system where nobody is borrowing. Eventually, interest rates should become low enough to induce businesses to borrow and invest, which should help make up for lower consumer spending. Further, savers in the economy, those less affected by the decline in house prices, should be induced to spend more—extremely low interest rates should encourage savers to buy a new car or remodel

their kitchen. This process is aided by the central bank, which typically responds to a crisis by pushing down short-term interest rates. Spending by savers and investment by businesses should fill in for the gap left by borrowers cutting back, and the aggregate economy should escape unharmed.

The economy also tries to prevent economic catastrophe through the goods market: when spending collapses, businesses reduce prices. As prices decline, buyers should eventually return to the market. Similarly, for a smaller country that relies heavily on exports, a decline in domestic spending will lead to exchange-rate depreciation, which makes that country's exports less expensive to foreigners and should boost domestic output. All together, the combination of lower interest rates, lower domestic prices, and a depreciated currency is how an economy tries to handle a massive negative demand shock from indebted households.

But we already know that these adjustments don't work. In the Great Recession, the economy was unable to react to the massive demand shock from indebted households. There must be *frictions* that prevent these adjustments—frictions that amplify the decline in spending by levered households into a nationwide recession with high unemployment.

### The Frictions

The most well-known friction is called the zero lower bound on nominal interest rates.<sup>6</sup> The zero lower bound means that interest rates cannot get low enough to actually induce savers in the economy to start buying. If interest rates cannot decrease enough, the gap in spending left by levered households cutting back remains unfilled. This is also referred to as the "liquidity trap," because when an interest rate is kept at zero when it needs to be negative, people save their money in liquid instruments such as cash and U.S. government treasury bills. Instead of spending, savers hoard money in risk-free assets.

The zero lower bound on interest rates exists because the gov-

ernment issues paper money—cash—which cannot have a negative return.<sup>7</sup> We normally value cash for its transaction purposes: paying the babysitter or the parking valet at a restaurant. But cash is also an asset. You could theoretically hold all of your assets in cash. If you put all of your money into cash, what is the worst interest rate you could possibly get? The answer: 0 percent. In the absence of inflation, cash will always yield an interest rate of 0 percent for the investor, and it is risk-free. Given that any investor could always hold a risk-free asset (cash) and be guaranteed a return of 0 percent, no asset can ever have a negative expected nominal return. This means there is a *zero lower bound* on interest rates: no nominal interest rate in the economy can be below 0 percent.

Suppose instead savers were *charged* for saving money in the bank. If you put \$100 in today, you get only \$90 out in a year. In such a situation, the saver would be induced to buy goods instead of save—why let money rot in the bank when you could buy a new home or car? Savers would consume in response to negative interest rates, therefore helping to offset the decline in spending by borrowers.

But the zero lower bound on interest rates prevents interest rates from becoming negative. In the example above, if a bank tried to charge you \$10 for putting money in a deposit account, you would take the money and put it in your safe at home, which would guarantee you a 0 percent return—hence, the zero lower bound. As a result, the economy is stuck in a liquidity trap. Borrowers cannot spend as they rebuild their balance sheets and face severe borrowing constraints. Savers refuse to spend because interest rates are not sufficiently *negative* to induce them to consume.<sup>8</sup> Economic activity then becomes *demand-driven*. Anything that can induce households in the economy to spend will increase total output. It should come as no surprise that almost every major economic contraction in history is associated with very low nominal interest rates. As we write, interest rates on short-term U.S. treasury bills have been 0 percent for five years.

Inflation is an obvious way of getting real interest rates into

negative territory. Inflation acts similarly to a bank charging a saver for holding cash. For now, we will ignore inflation (but will return to it in the policy section of the book in chapter 11).

“What about lower consumer prices? Shouldn’t they make people want to spend? The answer again is no, and a decline in consumer prices may even make the problem worse. Lower prices are possible only if firms lower their costs—by reducing wages. However, a wage cut crushes indebted households who have debt burdens fixed in nominal terms. If an indebted household faces a wage cut while their mortgage payment remains the same, they are likely to cut spending even further. This leads to a vicious cycle in which indebted households cut spending, which leads firms to reduce wages, which leads to higher debt burdens for households, which leads them to cut back even further. This was famously dubbed the “debt-deflation” cycle by Irving Fisher in the aftermath of the Great Depression.<sup>9</sup>

There are several other important frictions that prevent the economy from adjusting to a severe spending shock. For example, borrowers tend to buy different types of products than savers. If borrowers start buying less, the economy would need to ramp down production of goods that borrowers like and ramp up production of goods that savers like. There are frictions in the reallocation process. The economy may need to transfer workers from the construction sector to other sectors. It may need to transfer workers from local retail to industries exporting to other countries in an effort to boost output via depreciation.<sup>10</sup> It may need to transfer spending from borrowers to savers. Generally, any friction that prevents such reallocation will translate the decline in spending by levered households into a severe economic recession with high unemployment.

### **We Are in This Together**

When debtors sharply pull back on household spending, frictions such as the zero lower bound prevent savers from making up for

the shortfall. But the disastrous economic effects of lower demand are not borne uniquely by debtors—they spread through the entire economy. Levered losses affect even those who never had any debt during the boom.

The most devastating knock-on effect of lower demand driven by levered losses is a massive increase in unemployment. Even workers living in areas completely immune from the housing bust lose their jobs because of the decline in household spending. The Monaco Coach Corporation is a useful example. Northern Indiana didn't have high debt levels or even a large collapse in house prices. Why did these workers lose their jobs?

Tackling the reasons for high unemployment is a serious challenge. Even today, macroeconomists continue a long and heated debate on the reasons for and even the existence of involuntary unemployment. Standard macroeconomic models struggle with involuntary unemployment because wages should adjust to shocks in order to equate the amount that households want to work ("labor supply") with the amount that firms want to hire ("labor demand"). Involuntary unemployment can only exist in a macroeconomic model if there are some "rigidities" that prevent wages from adjusting and workers from finding jobs.

We'll start with a simple example to illustrate employment dynamics in the face of levered losses.<sup>1</sup> Suppose an economy is made up of two islands, Debtor Island and Creditor Island. Everyone on Debtor Island has very large debt burdens, whereas no one on Creditor Island has any debt. Households on both Debtor Island and Creditor Island consume two goods: autos and haircuts. Autos can be traded between Debtor Island and Creditor Island, whereas haircuts cannot. In other words, employment in the auto industry on each island is a function of total demand on both Debtor and Creditor Islands, whereas employment in barbershops depends only on the number of haircuts demanded on the local island. We assume that people cannot move across the islands; they are stuck where they are.

Let's suppose that house prices collapse on Debtor Island. Levered losses lead to a sharp pullback in spending on cars and haircuts on that island. If wages and prices flexibly adjust, what should we expect to happen? Demand for haircuts comes only from those living on Debtor Island; as a result, lower demand for haircuts will push down the price of haircuts. This will in turn push down the wage of barbers on Debtor Island. Barbers don't like lower wages, so many barbers will quit to go work in the auto industry.

But more workers in the auto industry will also push down wages at the auto plant until the wages in the auto plant and the barbershop are equalized. Auto manufacturers will have more available workers, so they will pay them less. For Debtor Island, the end result will be higher employment in the auto industry, fewer barbers, and lower wages. But total employment will not change. Workers will move out of barbershops and into the auto industry, and they will be forced to accept lower wages.

Creditor Island is connected to Debtor Island through the auto industry. So even though Creditor Island has not experienced levered losses, it will nonetheless be affected. Wages fell on Debtor Island in the auto industry, which allows auto manufacturers on Debtor Island to sell cars more cheaply. Because autos produced on Debtor Island can be sold on Creditor Island, Creditor Island manufacturers must respond by also lowering auto prices—and the wages paid to autoworkers. On Creditor Island, autoworkers respond to lower wages by leaving the auto plant to become barbers. But of course, this pushes down the wage of barbers until it is again equalized with the lower wage in the auto plant. Even in this example in which wages and prices flexibly adjust, Creditor Island households are directly affected by levered losses on Debtor Island. They must now accept lower wages.

But much more severe problems exist if wages and prices do not fully adjust. Let's suppose we have full price and wage rigidity, so neither prices nor wages adjust in the face of lower demand from Debtor Island households. When house prices collapse on Debtor

Island, households again cut spending on autos and haircuts. Auto plants and barbershops will bring in less revenue, and they will need to cut costs. But if they cannot lower wages in response to this decline in demand, both auto plants and barbershops will be forced to lay off workers. Debtor Island experiences a sharp increase in unemployment.

But here is the crucial insight: *Creditor Island also suffers high unemployment.* When Debtor Island households cut back on auto spending, Creditor Island auto plants have lower demand for their cars from Debtor Island, and therefore lower revenue. If they cannot lower costs by lowering wages, they will fire workers. Fired autoworkers will try to get hired at the barbershop, but the inability of wages to decline will prevent them from getting a job. As a result, workers on Creditor Island become unemployed even though they never had any debt at all.

This simple example assumes wage rigidity to prevent the reallocation needed to maintain full employment. Debtor Island workers need to switch from barbershops to the auto industry, and Creditor Island workers need to switch from the auto industry to barbershops. When a local economy suffers a demand shock, workers need to be reallocated from sectors catering to local demand to sectors catering to external demand. Flexible wages would allow this reallocation to occur, while rigid wages prevent it. But of course, there are many other frictions that would serve the same role. In this example, if barbers need extensive training to become autoworkers and vice versa, we would also see a rise in unemployment when the demand shock occurred.

We do not mean to give the impression that flexible wages are the solution. We have already seen how a reduction in wages for indebted households exacerbates the spending problem due to what Irving Fisher calls the “debt-deflation” cycle. The bottom line is that very serious adjustments in the economy are required when levered households cut spending. Wages need to fall, and workers need to switch into new industries. Frictions in this reallocation process translate the spending decline into large job losses.

### Reallocation?

A common argument put forward during the contraction is that we should rely on the reallocation process to save us from disaster. Allow wages to fall and workers to reallocate, the argument goes. But this approach faces enormous obstacles. The economy requires quick adjustment in response to such a massive decline in spending. Any friction that prevents quick adjustment will hurt the entire economy. A more effective approach would prevent the sharp decline in spending by targeting the levered-losses problem directly. This will be a major theme of our policy recommendations later in the book.

The important lesson from this example is that we are in this mess together. Even households in the economy that stayed away from toxic debt during the boom suffer the consequences of the collapse in household spending during the bust. For example, many auto plants in the United States are in areas of the country that completely avoided the housing boom and bust: Indiana, Ohio, and Kentucky. Yet autoworkers in these states suffered during the Great Recession because highly levered households in other parts of the country stopped buying cars. Employment is the most important channel through which levered losses propagates through the economy. But there are also other channels. When highly levered households default on their obligations, foreclosures by banks depress house prices throughout the neighborhood. Defaults also lead banks to cut back on lending to other households. The entire country suffers.

In an economic crisis brought about by levered losses, the natural reactions are moral judgment and outrage. A common refrain we hear is that irresponsible home owners borrowed too much, and they should be made to suffer. But such moralizing during the crisis is also counterproductive. The problem of levered losses quickly spreads throughout the economy; the sharp pullback in household spending by levered households affects us all.

## 5: EXPLAINING UNEMPLOYMENT

In January 2012 Senator Bob Corker, a Republican from Tennessee, blasted the Obama administration's proposal to write down principal on underwater home mortgages at taxpayer expense. He called it "terrible public policy." His office released a harsh statement: "[The legislation] means Tennesseans and other Americans who acted responsibly will be paying for the consequences of reckless housing practices in other states like California, Florida, Nevada, and New York, where exotic mortgages and no down payment loans were most prevalent prior to the 2008 financial crisis." To prevent such bailouts for reckless home owners, Senator Corker said, "I intend to introduce a bill this week that says if states like California or Florida want to reduce principal on mortgages in their states, they can do so themselves with state money, not with federal taxpayer dollars."<sup>1</sup>

From the perspective of his constituents in Tennessee, would helping home owners in hard-hit housing states indeed be "terrible public policy," as Senator Corker argued? Let's examine the Tennessee economy a bit closer to answer this question. Senator Corker was correct that Tennessee mostly avoided the housing boom and bust. From 2002 to 2006, house prices in Tennessee rose by only 25 percent, far below the 60 percent growth in California and Florida. Households in Tennessee came into the recession with debt

levels well below the national average, and net worth dropped by only 2 percent during the housing crash.

So Tennessee avoided the housing boom and crash, but does that mean they were immune to the disaster in other states? Would Tennesseans be better off forcing hard-hit households in California and Florida to fend for themselves? The problem with Senator Corker's logic is that Tennessee is not an isolated island. Jobs in Tennessee are highly dependent on the performance of the rest of the U.S. economy. For example, Tennessee had a thriving auto manufacturing industry in 2007. In fact, Tennessee had the sixth highest fraction of workers in the auto manufacturing industry of any state in the country. In 2007 more than 114,000 Tennesseans were employed in auto or auto-parts production plants. When a Tennessee auto plant produced a car, that car was almost always sent to be sold in another state. And many of these cars were shipped to states where the housing crash was especially severe. So when Floridians massively cut back on auto spending, workers at auto plants in Tennessee suffered the consequences. During the Great Recession, one out of every four Tennesseans working in the auto manufacturing industry lost their job. That's 30,000 Tennesseans who lost their jobs.

It wasn't just auto plants. We see a similar pattern with other goods produced to be shipped to other parts of the country. In 2007 Tennessee ranked eleventh in the country in terms of the share of workers producing goods meant to be shipped to areas outside the state they were working in. From 2007 to 2009, one out every six Tennessee workers producing these goods lost their job. The sharp drop in household spending in California, Florida, Nevada, and New York directly affected Tennessee workers. We cannot be certain of the number of jobs in Tennessee that would have been saved by policy efforts to mitigate the housing crisis elsewhere. But the view that helping troubled home owners in California and Florida was "terrible public policy" from the perspective of Tennesseans is suspect. When it comes to problems associated with levered losses,

it does not matter where you live. As we've said, the ripple effects on the labor market mean that we are all in this together.

The previous chapter laid out the levered-losses theory that demonstrates why Senator Corker's argument is flawed. We showed how a shock to spending on Debtor Island would ultimately lead to job losses on Creditor Island through the auto sector. In this chapter, we turn to data to figure out exactly how many jobs were lost because of the destruction in household net worth in the real economy. We also uncover the exact frictions that translated the large demand shock into the biggest jobs crisis since the Great Depression.

### Quantifying Jobs Lost

From March 2007 to March 2009, the private sector of the U.S. economy shed 6 million jobs, and the unemployment rate shot up to 9 percent. This was unprecedented in recent U.S. history. How many of these jobs were lost due to the shock to household net worth that we emphasized in the preceding chapters? Our goal here is to use the data to answer this question. As we discussed in chapter 3, household spending from 2006 to 2009 declined by much more in highly levered counties that experienced a sharp drop in net worth. We want to estimate how many jobs were lost *throughout the economy* due to this decline in spending in the hardest-hit areas of the United States.

A natural starting point would be to see how many more jobs were lost in housing-disaster areas relative to areas that avoided the housing downturn. For example, we could show that more jobs were lost in California than in Tennessee. But this would be incomplete for the same reason that Senator Corker's logic was flawed—goods bought in housing-disaster areas were produced all over the country. This presents a serious challenge: How do we estimate the number of jobs lost in areas that avoided the housing collapse because of the decline in spending coming from other parts of the country?

We start by splitting employment in the United States into two major groups: jobs catering to the local economy and jobs catering to the national economy. We call jobs that cater to the local economy *non-tradable* jobs. These are in retail and local services, such as jobs at restaurants and grocery stores. They depend on spending in the local economy. We call jobs catering to the national economy *tradable* jobs. Tradable jobs are those that produce goods that are shipped to other parts of the country. These jobs include building autos or other durable goods like furniture or home appliances. Tradable jobs also include building machines meant for other businesses to use in their production processes. They depend on national spending. This is the same measure we used in the Tennessee example above—Tennessee ranked eleventh in the country on the fraction of all jobs in the tradable sector.<sup>2</sup>

As we explained in the Creditor Island–Debtor Island example in the last chapter, the levered-losses view of employment makes specific predictions about the location of job losses during the Great Recession. We expect to see much larger declines in jobs catering to the *local* economy in areas of the country suffering the net-worth shock. However, we don't expect losses in jobs catering to the *national* economy to be unique to areas with net-worth shocks. Instead, we expect to see the decline in jobs catering to the national economy spread evenly throughout the country. Observing these two joint patterns in the data—non-tradable job losses concentrated in hard-hit areas and tradable job losses spread throughout the country—would support the levered-losses framework.

The auto industry provides an excellent example to illustrate this. The production and selling of autos utilizes *both* tradable and non-tradable jobs. Workers at an auto plant produce cars meant to be sold throughout the country. These tradable jobs are therefore reliant on *national* demand for autos. However, the actual selling of cars needs workers at an auto dealership. At some time during a purchase, a worker must interact with a buyer, even if only briefly. Non-tradable jobs at a local dealership therefore rely heavily on the *local* demand for autos.



The levered-losses framework makes strong predictions on geographic patterns in auto-industry employment during the Great Recession. The data should show many layoffs at dealerships in areas of the country that experienced the largest drop in net worth. We should see fewer job losses at dealerships in areas that avoided the housing downturn. And given the enormous decline in demand for autos coming from hard-hit areas, the data should also reveal that jobs producing autos or auto parts were lost throughout the country. The levered-losses framework predicts layoffs at auto plants regardless of the local shock to net worth.

This is exactly what we find in the data. There was a very strong relation between job losses at auto *dealers* in a county and the size of the local net-worth shock. In counties with the largest shock to net worth, 14 percent of jobs at dealerships were lost. Counties with the smallest shock saw a decline of only 3 percent. We know that indebted households in hard-hit counties sharply pulled back on auto spending. This large decline directly affected jobs at dealerships. In contrast, the decline in spending was more modest in counties that avoided the housing shock, especially at the beginning of the recession. As a result, fewer jobs were lost at dealers in those areas. However, job losses at plants *producing* autos were large *throughout the country*. Job losses among auto production workers ranged from 20 to 30 percent across all counties producing autos, completely independent of local housing markets.

When we put the evidence together, it tells a compelling story. In counties that avoided net-worth decimation, auto sales hardly declined. Jobs at dealerships were safe. Yet workers producing autos at plants in these same counties experienced massive layoffs. These facts demonstrate that job losses in auto production plants were a direct result of the spending shock coming from hard-hit housing areas of the country.

Of course, the exact same test can be performed for all jobs, not just those in the auto industry. And the evidence is pretty clear. The decline in non-tradable jobs catering to local demand was much larger in indebted counties experiencing the biggest drop in house-

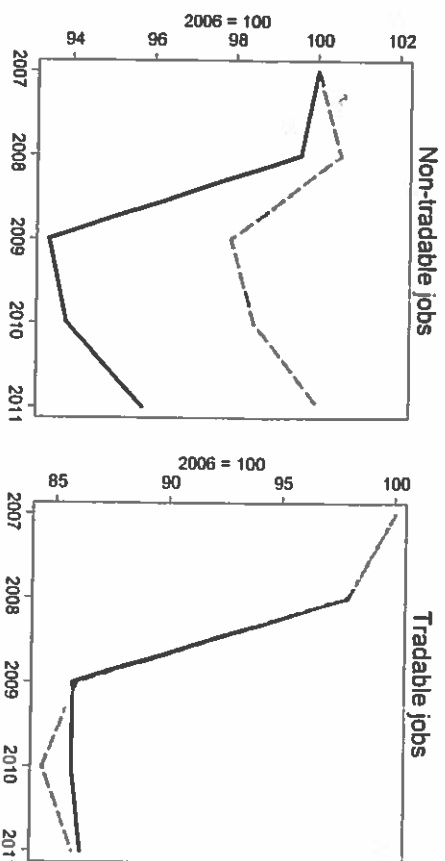


Figure 5.1: Employment Decline during Great Recession

hold net worth. But the decline in tradable jobs catering to national demand was widespread across the country. Figure 5.1 plots the pattern graphically. Just as in chapter 3, high net-worth-decline counties are the 20 percent of counties that experienced the largest drop in housing net worth during the recession, and low net-worth-decline counties are the 20 percent with the smallest drop. As the left panel illustrates, the drop in non-tradable jobs was much larger in counties getting hammered by the housing shock. But the right panel demonstrates how tradable jobs were lost at the same rate across the country. Regardless of whether there was a local housing collapse, jobs producing goods for national demand dropped almost 15 percent across the country.

The pattern in figure 5.1 didn't play itself out in only in Tennessee. Another good example is Iowa. During the housing boom, house prices in Iowa barely rose above the rate of inflation. And Iowans entered the Great Recession with household-debt levels far below the national average. From 2006 to 2009, house prices remained constant in Iowa; there was no dramatic housing bust. Fur-

ther, total spending by Iowans actually *increased* during the Great Recession by 5 percent. Given the strength of the local economy in Iowa, we shouldn't be surprised that almost no jobs catering to local demand were lost during the Great Recession. Employment in retail outlets and restaurants remained the same. But jobs catering to national demand fell by 10 percent. Despite the strength of the local economy, Iowans working in these industries suffered. This is exactly what we would expect if levered losses in other parts of the country were driving unemployment in Iowa.

The pattern in figure 5.1 underlies our aggregate estimate of the total jobs lost in the U.S. economy as a result of the shock to net worth coming from the housing collapse. Using a few technical assumptions, we estimate that 4 million jobs were lost between March 2007 and March 2009 because of levered losses, which represents 65 percent of all jobs lost in our sample.<sup>3</sup>

### Frictions, Frictions

As mentioned in the last chapter, according to the fundamentals view, there shouldn't be such widespread unemployment. Instead, the economy has mechanisms that should make it flexible and maintain full employment, even in the face of a large negative demand shock. For example, in the sectors and locations hardest hit, wages should decline. In the Central Valley in California, the sharp decline in demand should have lowered wages in restaurants, retail outlets, and other jobs catering to local demand. Lower wages should have encouraged retail establishments to keep workers rather than firing them. And as some workers left these industries in search of better wages, this should have lowered wages in the exporting sector of the economy.

In theory, wages would get pushed down to the point that exporting companies would find it profitable to set up plants in the Central Valley. This exporting effect is a standard mechanism emphasized by economists. When a city or country has a collapse in spending, a flexible economy should be able to adjust by lowering

wages and making exporting industries more competitive. Another adjustment mechanism should have been migration. Perhaps it was time for workers to pack up and move to other parts of the country with a stronger job market. Economists going back to Joseph Schumpeter have argued that this "creative destruction" process is natural and even healthy. When the economy needs to reallocate its production to new activities, workers move in order to take advantage of new opportunities.

But unfortunately, the U.S. economy during the Great Recession didn't work that way, and unemployment persisted. John Maynard Keynes had it exactly when he wrote: "It may well be that the classical theory represents the way in which we should like our economy to behave. But to assume that it actually does so is to assume our difficulties away."<sup>4</sup> We can't assume that these mechanisms take care of unemployment. We should instead closely investigate why they don't. Put another way, what exactly is it that prevents the economy from adjusting in the way we think it should?

We have already mentioned the zero lower bound on nominal interest rates. But two other frictions jump out from the data: wages don't fall, and people don't move. A trio of economists at the Federal Reserve Bank of San Francisco studied wage growth from 2008 to 2012 and found striking results.<sup>5</sup> Wage growth adjusted for inflation actually *increased* annually by 1.1 percent from 2008 to 2011. And this happened despite the highest rate of unemployment in recent history.

Wages didn't fall because of what's called nominal wage rigidity, or a situation in which wages in nominal dollar terms stay constant. The San Francisco Fed economists examined the change in wages from year to year and found a dramatic spike in the fraction of employees receiving the exact same nominal wage. In other words, employers during the Great Recession didn't cut wages, but just kept them either fixed or increased them slightly. The fraction of workers receiving the exact same nominal wage from one year to the next was higher during the Great Recession than at any other point since 1980.

Looking into the differences across the country in net-wealth shocks, we found some weak evidence of relative downward wage adjustment in the hardest-hit areas. Remember, the hardest-hit areas of the country witnessed a sharp decline in jobs catering to the national economy *and* the local economy. But the relative decline in wages in these areas was quite modest. The declines were nowhere near large enough to stem the rise in unemployment. In the 20 percent of counties that were hardest hit by the decline in household net worth, the unemployment rate shot up from less than 5 percent to 13 percent during the Great Recession. It remained above 10 percent in the summer of 2012, three years after the official end of the recession.

With such dismal economic conditions, workers in these areas had strong incentives to look for jobs elsewhere. But that also didn't happen. In fact, from 2007 to 2009, the population of hard-hit counties grew at exactly the same rate as counties that avoided the housing downturn. For example, in the three hardest-hit counties of the Californian Central Valley, 50,000 workers lost their jobs from 2007 to 2009, and the unemployment rate neared 20 percent. And yet the population actually grew slightly from 2007 to 2009. Despite the disastrous economic circumstances, people did not leave.

### Why Unemployment?

The facts lead to one convincing conclusion: The economy was simply unable to adjust to the massive spending shock from levered losses. We've seen that wages didn't fall and people didn't look for jobs elsewhere. But why exactly? A large and ongoing body of research continues to grapple with this question. In fact, it was exactly the issue that motivated Keynes to write his new theory in 1935—in our view, there is still no satisfying answer explaining it.

One explanation offered is skills mismatch. The basic idea is that workers need to be retrained to work in other professions. Charles Plosser, the president of the Federal Reserve Bank of Philadelphia,

put it succinctly: “You can’t change the carpenter into a nurse easily, and you can’t change the mortgage broker into a computer expert in a manufacturing plant very easily.” But the skills mismatch story is difficult to reconcile with the widespread employment decline in the economy. Workers in every industry and of every education level witnessed a large increase in unemployment.

Another explanation is that delayed foreclosures and government assistance reduced the incentive of workers to find jobs during the Great Recession. For example, Kyle Herkenhoff and Lee Ohanian argue that the ability to skip mortgage payments without being immediately foreclosed upon acts as a type of unemployment insurance.<sup>7</sup> When a worker loses his job, he can choose to skip mortgage payments, but he must remain in his current home to take advantage of the benefit. As a result, he has no incentive to search for a new job in a different location. Similar arguments have been made concerning unemployment insurance and other government benefits, which in theory reduce the incentives for laid-off workers to take jobs with lower wages. If a laid-off worker receives unemployment-insurance payments, the argument goes, then the wage that will induce him to take a job must be sufficiently high to compensate him for the displeasure of working.

These arguments make sense in theory, but there is surprisingly little empirical evidence supporting them. Jesse Rothstein, for example, examined the effects of unemployment insurance on the unemployment rate.<sup>8</sup> He did find an effect: extending unemployment insurance did in fact increase the unemployment rate during the Great Recession. But the effects were very small, with the extension of unemployment insurance increasing the unemployment rate by only 0.1 to 0.5 percent compared to the overall increase of almost 5 percent. Johannes Schmieder, Till von Wächter, and Stefan Bender studied the effects of extending unemployment insurance in Germany during booms and recessions.<sup>9</sup> They found evidence that the effects of unemployment insurance that discouraged people from finding jobs were actually *smaller* in recessions.

Even if economists can’t explain unemployment, that should not

cloud the profession's view of the human consequences. They are severe. Steven Davis and Till von Wachter used income data from Social Security records to assess the pecuniary costs of unemployment during recessions.<sup>10</sup> They found that a worker laid off in a recession loses income equal to three times his or her annual pre-layoff earnings over the rest of their lifetime. As they point out, this is a staggering amount. And that is only the monetary loss. The non-pecuniary costs—depression, loss of dignity, divorce—may be harder to quantify, but they are almost certainly even larger.

Persistently high unemployment imposes devastating costs on society. And economists don't have good answers for why it persists. Our view is quite simple: we must work hard to change the economic system so that we avoid the shocks that lead to high unemployment. Once the levered-losses shock materializes, the sharp decline in spending and the painful increase in unemployment are almost inevitable. We must address the problem at the source, rather than expect the economy to adjust when the shock materializes.

### Levered Losses: A Summary

We started this book with a robust statistical pattern. The most severe recessions in history were preceded by a sharp rise in household debt and a collapse in asset prices. Both the Great Recession and Great Depression in the United States followed this script. Even looking internationally, we see that the Great Recession was much more severe in countries with elevated household-debt burdens. The relation between elevated household debt, asset-price collapses, and severe contractions is ironclad.

We then presented the levered-losses framework to explain this pattern. The key problem is debt. Debt amplifies the decline in asset prices due to foreclosures and by concentrating losses on the indebted, who are almost always households with the lowest net worth in the economy. This is the fundamental feature of debt: it forces the debtor to bear the brunt of the shock. This is espe-

cially dangerous because the spending of indebted households is extremely sensitive to shocks to their net worth—when their net worth is decimated, they sharply pull back on spending. The demand shock overwhelms the economy, and the result is economic catastrophe.

The evidence from the Great Recession in the United States supports this framework. The collapse in the housing market amplified wealth inequality by destroying the net worth of poor indebted home owners. Using geographical variation across the United States, we show that the spending decline was concentrated in exactly the counties where the levered-losses shock was largest. The consequences of the sharp drop in spending spread through the entire economy. Even workers in parts of the country that avoided the housing bust lost their jobs.

But so far we have avoided a central question: How does an economy get into this levered-losses trap in the first place? Or, in other words, what generates such a large and eventually unsustainable increase in debt? We begin our investigation into these questions in the next chapter. As we will argue, debt not only amplifies the crash. But it also fuels the bubble that makes the crash inevitable. If we want to permanently address the levered-losses problem, we must understand why debt is so toxic in both the bust *and* the boom.

PART II

# BOIL AND BUBBLE