4.7 A wicked case study – the 2008 financial crisis

In this unit we will look at a complex problem and study it using the approach and tools we have learnt so far in this chapter. We will study the 2008 financial crisis in the US.

The 2008 financial crisis is considered by many economists to have been the worst financial crisis since the Great Depression of the 1930s. Wikipedia explains that :

"It threatened the collapse of large financial institutions, which was prevented by the bailout of banks by national governments, but stock markets still dropped worldwide. In many areas, the housing market also suffered, resulting in evictions, foreclosures and prolonged unemployment. The crisis played a significant role in the failure of key businesses, declines in consumer wealth estimated in trillions of U.S. dollars, and a downturn in economic activity leading to the Great Recession of 2008–2012 and contributing to the European sovereign-debt crisis"

This is definitely a problem worth studying.

I found an article entitled "'Human Action And Inaction' Caused 2008 Financial Crisis, Report Concludes". It is a review of the main conclusions from the Financial Crisis Inquiry Commission's investigation into the crisis.

There are a number of clues in the article that the crisis was a systemic problem.

The article begins by directly citing the report in the first paragraph:

"The crisis was the result of human action and inaction, not of Mother Nature or computer models gone haywire […] While the business cycle cannot be repealed, a crisis of this magnitude need not have occurred. To paraphrase Shakespeare, the fault lies not in the stars, but in us."

This sounds like "system-as-cause thinking", doesn't it?

The report blamed the crisis on excessive faith in the self-correcting nature of the markets and the ability of institutions to police themselves, excessive borrowing, risky investments and lack of transparency, and a breakdown in accountability and ethics.

Not all members of the committee agreed on its conclusions. One member wrote that:

"The majority's approach to explaining the crisis ... is too broad. Not everything that went wrong during the financial crisis caused the crisis, and while some causes were essential, others had only a minor impact. Not every regulatory change related to housing or the financial system prior to the crisis was a cause […] When everything is important, nothing is."

This is another clue that a systems approach may be useful to study the crisis. After all, "when everything is important but nothing is", then there is definitely a system of variables at work!

We will once again ask our three questions to help organize knowledge about the situation: What is changing? How is it changing? And why is it changing?

Firstly: what is changing? No doubt the most visible parts of the financial crisis were the boom and bust of the housing market, the overuse of subprime loans and the bankruptcies and bailouts of financial institutions.

The housing market was central to the 2008 financial crisis so we will first focus on its dynamics and then consider its connections with the financial system and other variables.

Our second question is how is it changing? We can see from this chart that housing prices rose steadily from the year 2000, peaked in 2007, rapidly fell in 2008 and leveled off by 2010. This corresponds to one of the change scenarios we saw in our first unit at the start of class.

Our third question is: why is it changing? We need to collect additional data and readings to identify other variables that may have contributed to the rise and fall of housing prices and also to improve our operational thinking on this problem. One of the main sources I will draw on is the work by Karen L. Higgins called “Financial Whirlpools: A systems story of the great global recession”. All references are provided in the bibliography.

Let’s begin by drawing the central engine that drives housing prices. We will then expand our story by adding variables as we go. In this case I use a causal loop diagram to focus on the variables and their feedback loops. Many of the complex behaviors observed during the financial crisis reflect reinforcing and balancing feedback loops, time delays and limits. We can always add stocks and flows later.

The buying and selling activity in the housing market can be represented as a systemic structure made up of two balancing loops, one for demand and another for supply that adjust according to current house prices.

This is a classic demand-supply structure that is true for most markets. Demand for houses pushes prices up until they reach a point where properties no longer find a buyer. When prices rise, owning property is less advantageous than other housing substitutes, such as renting and the relative value of housing falls which leads to a fall in demand. The supply of houses on the other hand increases with prices as owners are willing to sell their house at a higher price to make a profit.

Normally, these two loops adjust until a stable, equilibrium price is found. Instead, there was strong growth in housing prices from 2000 through until 2007. This happened despite the increase in the supply of new houses over this same period. Normally, an increase in supply should have a dampening effect on price but this didn’t happen. There must have been other external factors that were increasing demand for houses.

The first external factor that drove up demand for housing was interest rates.

The US Federal Reserve System (commonly known as the Fed) manipulates short-term federal funds rates and the money supply to influence the availability and the cost of credit. This is called monetary policy. The Fed’s mandate is to maximize employment, stabilize prices, and moderate long-term interest rates.

When interest rates fall, the cost of purchasing and repaying a house also falls. This tends to increase demand, housing prices and inflation. When interest rates increase, demand falls and housing prices fall. We can show monetary policy as a balancing loop which is driven by the Fed’s desired level of inflation.

Following the September 11 attacks in 2001, the Fed was afraid that the economic difficulties the US was already facing after the technology stock bubble of 2000 would get worse. To stimulate economic activity and avoid a recession, it lowered interest rates. The cost of borrowing fell over the following two years until 2003.

As CNN noted at the time:

"In a surprise move, the Federal Reserve slashed short-term interest rates Wednesday and signaled it is ready to make further cuts to keep the U.S. economy from sliding into a recession […] This is the first time in more than two years the Fed has cut interest rates in between policy meetings, and should virtually overnight make it easier for consumers to obtain financing for automobiles, homes and other big ticket items. It should also encourage more spending at stores. Consumer spending accounts for about two-thirds of the U.S. economy."

Lower interest rates increased the demand for housing and other products, such as cars. We can see from this chart that the average credit card balance almost doubled between 2000 and 2008. Increased purchases of other products fed a reinforcing consumption loop. This is known as "hedonic adaptation" where pleasure from purchases fades and we desire new things.

We can add the effect of the interest rate on other purchases to our model. I have removed the Fed's balancing loop and have simplified the supply and demand structure to keep our diagram simple.

A second factor that strongly affected the demand for housing over the period was government policy. In the decade preceding the financial crisis, the US government had put in place a number of policies and practices in support of home ownership. At the start of the millennium, the policy priority was to increase homeownership by low-income and minority families.

The government encouraged the easing of credit qualifications and the expansion of the loan market for low-income, less qualified borrowers. Low-income families that now had access to finance that had previously been refused were able to pursue their dream of home ownership. This increased demand. Home ownership in the US increased from 62 percent of households in 1994 to 69% in 2004.

Federal policies and practices in support of home ownership also encouraged private lenders to increase their mortgage goals for low-income households, expanding their loan products on offer, and incentivizing their agents to sign new borrowers. We can add these variables and relationships to our model.

Here is an example of a television ad that I found for one lender called Countrywide at the time.

Low-income borrowers were offered subprime loans which had higher insurance costs and a higher interest rate than prime loans to cover the increased risk of a default on debt repayments. The use of subprime loans was encouraged by the growing, highly profitable practice of subprime loan securization that had been going on since the early 2000s. We can see the strong growth in securization of subprime loans on this chart. Securization basically involves grouping loans together and selling them off to investors at a profit. These new, high-risk securities were made possible by industry deregulation and are called "mortgage backed securities" (or MBSs).

A large number of banks, financial institutions and investors bought these subprime mortgage backed securities that offered an apparent high level of security and a relatively high rate of return. We can add these variables and relationships to our model.

The increased competition between lenders sometimes resulted in a number of questionable commercial practices. To attract borrowers, lenders offered loans with adjustable rates or payment options. Adjustable Rate Mortgages (ARMs) were particularly popular with low-income borrowers as

they offered lower interest rates than on fixed rate loans and their monthly debt repayments were lower. By 2005 1 in every 3 of all mortgage loans had an adjustable rate.

Home ownership policies and practices and easy access to financing also created an expectation that housing prices would continue to rise. At the time, housing prices had been steadily rising since the 1960s as we can see here. Demand and housing prices were no longer driven by the intrinsic value of a home, but by the belief that it would be more valuable in the future. The expectation that prices would continue to rise, and the perspective of making a profit also drove contractors and property developers to supply more new homes. We can show these influences in our diagram.

The increase in housing prices also encouraged borrowers to refinance their mortgages with larger loans, using the appreciated value of their home as collateral. Many households "cashed-out" and spent the extra money on repaying other debts, or on other purchases such as home improvements, cars, vacations, education, and medical expenses. Of course such refinancing led to an increase in total debt that we can show in our model.

As high expectations drove demand upward, more and more people relied on high-risk loans so they could satisfy their desire for homes.

Normally, households would regulate their level of debt by comparing their financial resources to their monthly repayments. This represents a household's ability to pay and can be shown as a balancing loop. The easy availability of credit and relatively cheap ARM loans allowed households to temporarily maintain their ability to repay their debts.

A number of feedback loops drove up home ownership and debt levels. We can imagine these loops turning like gears. The momentum of the gears keeps them turning which makes them difficult to stop: until a spanner fell in the works.

The spanner was an increase in interest rates in 2004. The spanner didn't break the machine; it just made some of the gears change direction.

The increase in interest rates meant that borrowers with adjustable rate mortgages saw their loan repayments increase significantly and this affected their ability to repay their debt. Low-income households' with ARM loans rapidly found themselves in financial difficulty.

Housing prices peaked in 2007 and then began to fall as did consumer confidence and no doubt expectations of housing price increases. Demand fell and brought prices down with it. It is important to see that the systemic structure remained the same but the direction of change simply shifted from an increase in demand to a fall in demand: as there is a positive polarity between demand and housing prices, a fall in demand began to exert a downward pressure on housing prices.

As property prices fell, borrowers could no longer refinance their loans and had increasing difficulty selling their homes. The number of borrowers defaulting and foreclosing on their homes increased dramatically. Such serious delinquencies were substantially higher for subprime adjustable rate loans than for other types of mortgages as we can see from this chart.

As defaults on loans increased, the value of mortgage backed securities crashed and investors across the US and internationally lost enormous amounts of money. Banks reduced their lending which accelerated the fall of the housing market and sent shockwaves across the US economy.

We can examine this crisis using our iceberg diagram. The event at the tip was the meltdown of the financial system in 2008. The forced sale of the investment bank Bear Stearns and the bankruptcy of

Lehman Brothers both brought the crisis to the public's attention. The US government undertook a massive bailout of the financial and automotive sectors acting as lender, investor and insurer. Its most public action was the Troubled Asset Relief Program (TARP) that was signed into law by U.S. President George W. Bush on October 3, 2008 with the goal of purchasing assets and equity from financial institutions to strengthen the US financial sector. In terms of levels of leverage, this was "reactive" behavior.

What about the "adaptive" level? The article criticizes the government for not seeing the crisis coming. The Queen of England even asked academics at the London School of Economics "Why did nobody notice it?" It would seem that certain regulatory mechanisms were not in place or were too weak to regulate the reinforcing loops.

Moving down to the level of the systemic structure, a number of changes to the workings of the housing and financial industry were proposed, enacted and some were contested in the wake of the crisis. Industry reactions to regulation reveal a number of balancing loops at work that seek to limit the level of government intervention in industry. At a structural level, we can also see the role incentives such as short-term goals, objective based remuneration and self-interest played in the crisis.

The collapse of ethical behavior played an important role at the level of mental models in the iceberg.

The lowest level of systems perspective is that of vision. It is at this level that we can bring about the most significant change. Work now perhaps needs to be done on the vision we have of the role of banking, finance and wealth accumulation in society.

The deeper down the iceberg we get, the harder it is to bring about change. But when we do succeed, we can make a real difference.