

## **Ben Bernanke's Nobel Prize Lecture, "Banking, Credit, and Economic Fluctuations"**

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"You see the title of my lecture, banking, credit, and economic fluctuations. Here's an overview of what I'm going to talk about. Now my basic argument runs through a lot of my research is that banking and credit markets can become stressed. I will explain very precisely what I mean by stressed, which leads to increased cost of borrowing and reduced availability of credit. Now the important thing is that this credit market stress can have very consequential effects on the macro economy. And I'll do two case studies today. One of them is the Great Depression of the 1930s. And the second is the Global Financial Crisis of 2007 to 2009. But if I have time, I'll talk a little bit about how these ideas have gotten into standard macroeconomics about ordinary business cycles and ordinary monetary policy. So it has been something that has affected standard non-crisis analysis as well as episodes like the Global Financial Crisis. Now in order to talk about what it means for having a credit market be stressed, we have to talk about the economics of lending. Now lending markets are different from say markets for apples because they involve imperfect information and asymmetric information, meaning that one party to the transaction knows more than the other about the product being sold.

In this case, borrowers tend to know more than lenders about their own financial capacity, their own plans, their risks, what they're going to do with the money. Can you imagine if this market was one in which, for example, banks offered 5% loans for small businesses and just anyone who wanted to come to the door could take it? Well, would that work? Obviously not. You would have people who knew themselves to be very risky come and take loans and that's called adverse selection. Or you would have people come and take the loans and use them to make parties or to do anything other than what they're supposed to do and that's called moral hazard if you don't have some kind of oversight. So you do need banks or something like banks because what banks do is they overcome these information problems by screening borrowers. You have to fill in lots of forms by monitoring them, by putting restrictions on what they can do with the money and requiring collateral. So the purpose of banks is to overcome the information problems that permeate lending markets. Now, there's a cost to all this. So the cost of making a loan, again, includes all the costs the bank incurs in screening, monitoring the potential borrowers.

A concept I'll be using throughout the lecture is the external finance premium or the EFP. That's basically the entire cost of making the loan over and above the interest, the pure safe rate of interest that's in the economy. Think of it as being what the bank has to be paid in order to make loans instead of holding safe securities. Now, the EFP, the external finance premium, is borne by the borrower because the lender can always go to the safe Treasury market. So different borrowers have different EFPs. But as you'll see, even though, a small business has a higher external finance premium, has to pay more to get a loan than a big business, the EFPs tend to go together when the economy is getting stronger or weaker. And that will be an important concept as we look at the effects on the macro economy. Now, it's important to recognize also that we talk about borrowers, mortgage borrowers, small business borrowers, but banks themselves are

also borrowers. They have to get the funds they need to lend to ultimate borrowers. And for reasons that will be discussed by my co-laureates, it's Diamond & Dybvig, they tend to borrow on a short-term basis, deposits or other types of short-term money, which is valuable to the customers because it's easily converted to cash when it's needed and it provides a transactions medium in order to buy and sell. So banks tend to rely largely on short-term funding, but that makes them vulnerable to runs. George Bailey, "It's a Wonderful Life," his savings and loan came under pressure because people lost confidence in his savings and loan and pulled out their money and forced it to fail. Now, panics are a real concern. When there are a lot of panics or runs going on, banks become very cautious. They stop lending to risky borrowers because they want to maintain confidence. And this is called the flight to quality. Instead, they invest in very safe securities like Treasury bills. The problem with that is that if banks stop making loans to the private sector, all of this skill they develop, the accumulated information, the relationships and so on, the loan officers, the accountants who have developed the information needed to make loans, all of that is essentially being wasted because they're not making loans to the private sector. Now, an important insight here is that for both borrowers and lenders, the external finance premium depends a lot on how wealthy, how well off both sides of the transaction are. When borrowers have high net worth, they are essentially partners with the bank in their investment.

The bank borrower has to bear more of any losses that occur, creates a financial cushion for the bank, and it gives the appropriate incentives to the borrower because if they are the owner of a very large fraction of their home or their small business, then their efforts to make the business more successful will give them additional profits as well as the bank, which owns essentially some half or some other fraction. Likewise, when lenders are well off, when banks have lots of capital or cash to absorb losses, then their funders will be much more confident that the bank is not gonna fail, and therefore the bank will not have to worry so much about runs or panics.

So again, the external finance premium depends on the net worth of both borrowers and lenders. It also relates to the state of the economy. First, if the external finance premium is very high, that is, it's very costly to make loans to the private sector, that's what I mean by a stressed credit market, a high external finance premium. When that's true, then credit standards become tight, lending becomes scarce, credit is not available, and that obviously is gonna slow the economy down.

In the other direction, if the economy is weak for whatever reason, maybe an oil price shock or something else that hits the net worth of financial health of both lenders and borrowers, that makes it more difficult to make loans. And so by very relationship, external finance premium is affected by the economy, the economy affects the external finance premium. Now here is an attempt to measure the external finance premium. This happens to be from a paper by Simon Gilchrist and Egon Zakrajšek. They looked basically at the difference between the return on corporate bonds, carefully measured, and Treasury securities, safe Treasury securities of the same maturity. And they show this series going back to the 1970s. So a higher, this is a proxy for the external finance premium. When that value is high, that shows that the credit markets are under tremendous stress. The gray bars refer to periods of recession. And what you can see a couple of things, one is that the external finance premium does tend to go up during recessions generally. Secondly, that the external finance premium has become more volatile over time, in part because borrowers have become more dispersed.

We have more low-rated borrowers as well as the highest blue-chip borrowers. But notice how the external finance premium responds to crises. After 2000, in the recession that followed the dot com bust, you see external finance premium rising. And then after the recession, it rose as Enron and WorldCom and other companies came under pressure because of the fraudulent activities they were doing. Now, if you want to see a really high external finance premium, take a look at the global financial crisis in 2007 and 2009. This was saying basically if credit markets were shutting down completely during this period. And then another place, if you look at the last very short recession that began the pandemic, you see a sharp spike around March 2020, which was another financial crisis that the Fed put out pretty quickly. So let me do a little case study here, which is the Great Depression. Now, over the last 25 years, a lot of work has suggested that the Great Depression in the 1930s, which of course was a very consequential event, was caused in significant part by a malfunctioning gold standard. Before World War I, most countries tied their currencies to gold and that kept exchange rates fixed and promoted trade, et cetera.

The gold standard was suspended during the war. And after the war, they tried to reconstruct the gold standard system. But for various reasons, which would take me too far field, there were structural flaws in the new gold standard. And moreover, because there was a lot of residual hostility between France and Germany, for example, after the war, countries didn't work together to make the gold standard work. And so the gold standard collapsed in the late '20s and early '30s. It brought down the money supplies around the world. And that in turn brought down prices. So we're having inflation today. Well, in the 1930s, they had deflation, prices were falling and some evidence that the gold standard was important. And I've worked on this myself. I've been very interested in the depression for a long time. But very simple evidence is that countries that for whatever reason left the gold standard relatively earlier, like Great Britain, Japan, and the Scandinavian countries, recovered from the depression much more quickly than those that stayed on the gold standard late into the 1930s, like France and Switzerland. So that's, again, that's become a very central idea in the explanation of the depression, but there's still problems and questions to be answered.

What was the mechanism? Why did deflations lead to big declines in output? Why was the recovery so slow in the United States and other countries? Well, I would argue that the credit market stress, along with the gold standard, was a very important cause of the depression. There was certainly a lot of credit market stress in the 1930s. In the United States, we had something at that time, something like 25,000 banks. We had very large numbers of very small banks, a few large ones. About 40% of those banks disappeared between 1929 and 1933. Why disappeared? They failed, closed, or were absorbed by other banks. So, and that happened because there were massive runs, bank runs, where people lost confidence in the banks and pulled out their money. And that made banks, of course, the ones that were closed couldn't make loans, obviously, and the ones that survived became extremely cautious being very reluctant to make loans to the economy. Likewise, on the debtor side, there was massive insolvency and delinquency. Let me point to these first two bullets here. The first one is a survey in 1933, looking at 22 cities, showed mortgage delinquency rates ranging from 21% to 62% of homeowners were behind on their payments.

Secondly, about half of all farm mortgage debt was delinquent in 1933. So this is far worse than what we saw after the global financial crisis. Private borrowers were in very bad shape and unable to make payments on their loans. And surveys of banks showed that what they were trying to do was not to make loans, but rather to liquidate the existing loans, call them in, and to refuse to make any new loans except to the very, very safest borrowers, of which there weren't that many. So between what was happening to the banks, the runs, and what's happening to borrowers, the credit market was basically shutting down.

Now, this helps explain a lot of interesting facts about the Depression. I won't go through all of these, but let me talk about the last four quickly. First, in the United States, there was a 30% decline in prices between 1931 and '33. Why was that so damaging? Well, one of the reasons was the effect on borrowers. Suppose you're a farmer, you owe a certain amount every month on your mortgage, and the prices of the things you grow, your commodity prices, are falling by 30%, 40%, 50%, 60%, how are you going to make your payments? You're going to go into default. So the decline in prices had its effects on the economy by putting many, many borrowers into very bad situations. A strong recovery began in 1933 when Franklin Roosevelt became president. In my opinion, Roosevelt did exactly two things that made the economy better. All the programs, all the Works Project Administration, all that stuff was small potatoes. What was important was first that he weakened or eliminated the relationship of the dollar to gold, got off the gold standard, that was very important. But the other thing he did was he stabilized the banking system.

Shortly after he became president, he called a bank holiday and all the banks had to shut down, and he promised the American public that they wouldn't open up until the government had inspected them and was confident that they were in viable condition. And then the Congress passed deposit insurance, so that small depositors would be guaranteed that even if their bank failed, the government would pay them off. And that led instantaneously to a stabilization of the banking system. And that, of course, as the banking system became workable, that led to, helped lead to recovery.

Now, even after going off the gold in 1933, the recovery was very slow. When the United States entered World War II in late 1941, the unemployment rate was still 15% in the United States, very high. So it was a very slow recovery, why? Well, I would argue that on the one hand, banks, although they were no longer failing, they were still very, very cautious, and borrowers were still in very, very bad financial shape it took a long time for them to work out their debt problems. And for that reason, credit was constricted, and that kept the economy from recovering more quickly. And finally, just some other work that I did with a historian at Princeton named Harold James, we looked at 24 different countries and compared them how serious their banking crises were. And we found evidence that all else equal, that countries where the banking system remained stable, and that included Sweden, Japan, the Netherlands, that they did better than countries where there were severe banking crises like Germany, Austria, and the United States. So clearly, across countries, there was some evidence that the collapse of the banking system was a cause of the Depression.

Second case study, the Great Recession of 2007-2009, I argued that the Depression was the product of really two main forces, the gold standard and the financial crisis or the breakdown of

credit markets. I'm going to argue that the breakdown of credit markets was basically the main reason for the 2007-2009 recession and for the very slow recovery that followed. Now, there were changes in the financial system between 1929 and 2007. In the United States, many, many financial institutions that were not officially banks grew up -- mortgage companies, consumer finance companies, investment banks, money market mutual funds, securitizations, off-balance-sheet vehicles. I could go on for a while. All these companies or vehicles were created that did lending or held credit instruments, but they were not banks. And the fact that they were not banks meant that they were not eligible for deposit insurance. Nevertheless, they still financed themselves by using short-term funding, which meant that they were vulnerable to runs potentially. Now, everybody knows about the subprime mortgages and how disastrous they were, but why were they so disastrous? One of the things that confused us at the Federal Reserve was that subprime mortgages were not a large asset class.

One of our staff calculated that if all the subprime mortgages in the world went to zero in one day, it would be like a bad day in the stock market. It would be almost nothing. The reason the subprime mortgages were so damaging was because they were sprinkled, essentially, throughout the financial system. They were held in the portfolios of banks and shadow banks. There were many derivative instruments that were tied to subprime mortgages. There were securitizations that included subprime mortgages and on and on and on. And what happened was that the investors, particularly in shadow banks, but also in commercial chartered banks, became very fearful that their particular institution was very exposed to subprime and other bad mortgages. And so there was an ongoing run, maybe a slow run in some cases, on these types of institutions, which in turn led them to dump their assets on the market because they didn't have the cash to make those loans, which led to what's called fire sales. So emergency sales of credit really knocked down the price of credit instruments, raised interest rates on credit, and brought not just the shadow banks, but even many major commercial banks in Europe, of course, as well as in the United States, close to the brink of insolvency.

Now borrowers did come under great stress in the global financial crisis. In the United States, there was a housing bubble. When the housing bubble burst, then many mortgage holders or homeowners were "underwater", that is their mortgage value was bigger than the price of their house. And so in the United States, when that happens, you can go to the bank and say, "Here's the key, I'm leaving." You don't have to pay off the remaining part. And that happened a lot. Delinquency rates rose sharply and people stopped spending, consumer spending dropped. There was also a lot of delinquency among businesses, but of course the small businesses were badly hit because they couldn't get credit. But even very large businesses had difficulty. You may remember that the US government had to rescue General Motors and Chrysler because they were about to fail.

So as in the Depression, the stress of credit markets led to the downturn, I would argue, that the very severe recession of 2007-2009 and the slow recovery. Now, there's no particular reason why on the one hand, the lenders' side or the borrowers' side should be the most important. But I would argue that in this particular episode, 2007-2009, the global financial crisis, it was the financial panic that put the financial markets and financial institutions on the brink of failure that was the more important factor in terms of why the recession was so bad.

Particularly after Lehman Brothers collapsed in September of 2008, there was basically a complete shutdown of our financial lenders, financial institutions, and that had, of course, very, very negative effects on the economy. A bit of evidence here from a paper I wrote in 2018 at the Brookings Institution. The black line shows you the actual path of US GDP, real GDP, the gray bar is the recession, so you can see GDP falling during the recession. The blue line, which I call panic indicators, that is essentially the forecast of output that comes when you use variables related to the financial panic, the things that were affecting lenders, like the cost of funds to banks, for example, or the price of credit securitizations. And what you can see, and these are actually very far ahead forecasts, the panic indicators, that is the indicators of stress in the lenders, forecast the GDP extremely well. Whereas, what I call the delinquency indicators, which are measures of what rate the mortgage borrowers were failing to pay, is correlated with the actual GDP, but is much weaker. I'm not saying this is a general result, but in this particular episode, it was the crisis on Wall Street that was more important than the stress, as dangerous and as damaging as it was, on consumers and homeowners.

So what are the implications of that? Well, one of them is that if the financial system is collapsing, in the 1930s until Roosevelt, they didn't do anything about it, so it went on and on, and it brought the credit markets down. One of the lessons I think we learned from the depression is we cannot allow that to happen, and the Federal Reserve and the Treasury worked very hard to stop the financial crisis and to get the financial institutions lending again. Now that's after the fact, that's after you have the crisis. It's better not to have the crisis in the first place. And how do you do that? Well, I think it's very important to have strong financial regulation that makes sure that the financial institutions are safe and sound, meaning they have very good capital that they have safe portfolios, that they are not taking excessive risks and so on. And you should have a macroprudential approach, meaning that you should be looking not just at individual institutions, but thinking about the entire system and how problems in one part of the system can affect other parts.

My sense is that globally, since the crisis and the Great Recession, that regulation has made a lot of progress, particularly for commercial banks. In the United States, commercial banks hold a lot more capital than they did. They are more liquid. They do stress testing to make sure that they're not holding overly risky assets. My concern is that the shadow banks, which were the original source of the crisis, there's been some regulatory change but not nearly enough, in my opinion. And that is, I think, a problem that's still there. And we saw that in March of 2020 when there was a very sharp but short financial crisis, which came primarily from the shadow banks. So I think that's a lesson of this whole experience that we need to do something about that regulatory area.

I will talk a little bit about how this research has entered into the mainstream macroeconomics, how it becomes part of ordinary business cycle analysis, one slide each on two topics. The first one is that these models of credit stress can help explain why recessions tend to last as long as they do. Even if there's a once and for all shock, a recession will tend to last for a while.

And the reason for it is, I would argue, is that when there's a shock to the economy, say again, an energy crisis, that drives down income and wealth, that increases the external finance premium in the economy, that is, it makes it harder, credit markets become less efficient, borrowers are more

stressed, banks are becoming more conservative, that reduces the availability of credit and that amplifies the shock. It makes the economy weaken even longer than the initial shock did. And likewise in the other direction, if there's a positive shock to the economy, that makes borrowers and lenders better off, that reduces the external finance premium and makes the economy even stronger. So credit factors or stress in credit markets tend to amplify ordinary recessions and ordinary booms, a phenomenon which we have dubbed, my co-authors and I, Mark Gertler and Simon Gilchrist, have dubbed the financial accelerator.

Mark, Simon and I have created an econometric macro model that incorporates these factors and found that we could better match the data, match the actual behavior of the economy with a model like that. A second thing that we've done that related to ordinary macroeconomics is looking at how monetary policy affects the economy. Monetary policy seems to be quite powerful. In periods where it has had very big effects, particularly during tightening channels, tightening episodes, and that's a little puzzling because, for example, studies of big firms' investments show that they're not that responsive to short-term interest rates. So what is it that's making the economy slow down when the Fed raises interest rates or the Riksbank raises interest rates? Well, these theories give us something called the credit channel of monetary policy. And the idea, once again, is that if the Fed raises interest rates and slows the economy, that's gonna tend to raise the external finance premium by making borrowers and lenders worse off, you know, by reducing employment, by reducing profits and so on, and that, in turn, will affect the economy.

So that's a channel through which monetary policy can affect the economy. So that's another place where these theories have been, I think, helpful in understanding the ordinary macroeconomy. So I've come to my conclusion, which is that, first, a lot of this might sound very familiar to you by now, but 40 years ago, when I was 29 years old and I wrote the paper that was cited by the Nobel committee, there was very little attention paid to financial instability as a factor in macroeconomics. George Akerlof, a Nobel winner, wrote a very interesting historical paper arguing that the macro schools of thought, like the Keynesian school of thought, for example, had no place for financial instability as one of the factors affecting the economy. So in particular, and I tell you this from personal experience, when the financial crisis hit in 2008, the Federal Reserve's models consistently underestimated the impact on the economy, because they were not prepared to take into account the full effect of stressed credit markets.

So obviously, to understand the effects of financial crises on the economy, we have to understand these relationships. And as I've argued that looking at variations in the effectiveness of credit markets can also help us understand more normal circumstances. Right now, the Fed is tightening interest rates that presumably is affecting, making credit markets more stressed. That is one of the reasons why our economy in the United States is slowing down. Now, the last point I want to make is that there is a policy implication of all this, which is that we need to avoid unnecessary deteriorations in credit markets. That involves, first of all, before the fact, before the crisis happens, it involves monitoring and effective regulation that makes the financial system more resistant to shocks.

And I'm a big fan of regulation of the financial system. I think is very different from regulating other industries. It's a very special industry, it requires a particular type of oversight. I think it's

very important to have adequate oversight to make sure that you minimize the risk of major breakdowns. And then on the other side, occasionally, of course, financial crises do happen. There have been financial crises ever since the Romans. So that's a long time ago. So they do happen, and when they happen, we need to have good tools to deal with them. So just to give one example, the Dodd-Frank reforms of 2010 included something called a liquidation authority, which would allow the Fed and the Treasury and the FDIC to "safely" wind down a failing financial firm in a way that didn't have so much damaging effect on the rest of the financial system. So having tools exposed to fight the crisis is equally important.

So those are some of the implications of the stress and credit markets perspective and how it can have both major effects like the Depression or the Global Financial Crisis, or more moderate effects in standard business cycles. Thank you.