

The Federal Reserve and the Financial Crisis
The Federal Reserve after World War II, Lecture 2
George Washington University School of Business
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[Inaudible Discussions]

Dr. Tim Fort: OK, let's go ahead and get started. I would like to welcome the students back for our second lecture today as well as our faculty. I know we have some new guests and friends that are here today. You are in for a treat. And if it's anything like it was Tuesday, this will be another great session. Without further ado, Chairman Bernanke. [Applause]

Chairman Bernanke: Thank you very much, you came back. [Laughter] That's good news. As you know, today is the second of four lectures on the Financial Crisis and the Federal Reserve.

As I said, I think it's much--it's very helpful to try to put the recent crisis and the ongoing recovery into a historical context. And so, last time, we talked about the origins of central banking going back to Bank of England, and the debates of the 19th century, the origins of the Federal Reserve, and the Federal Reserve's first great challenge which was the Great Depression of the 1930s. And we drew some lessons from the 1930s that will come back and be relevant as we discuss more recent events. Today, I'm going to pick up the history after World War II, talking about some important episodes after the war, but I will be getting in today to the beginnings of the crisis, and so, the latter part of today's lecture and all of next week will be about the crisis. Now, as we go along, I just want to make sure you keep your eye on the ball. Thematically speaking, the two basic ideas, the two basic missions of a central bank are first, macroeconomic stability, maintaining stable growth, and keeping inflation low and stable, and of course, as you know, the principal policy tool for maintaining macroeconomic stability is monetary policy. In normal times, the Fed or other central banks will use open market operations, purchases and sales of securities in markets to move interest rates up or down, and in doing so try to create a more stable macroeconomic environment. So that's an important part of any central bank's mission.

The other part of its mission though is financial stability. Central banks are focused on trying to ensure that the financial system is functioning properly, and in particular, they want to prevent, if possible, and if not, to mitigate the effects of a financial crisis or a financial panic. And we talked last time about the lender of last resort function, the notion that in a financial panic, a central bank can follow Bagehot's rule of lending freely against good collateral at a penalty rate, and that by providing short-term credit to financial institutions, a central bank can offset the effects of a run or a panic and the accompanying damage to the financial system and the economy.

But let's move ahead and talk a little bit about the history. We left off at World War II which ended the depression, which led to a sharp drop in unemployment as people were put to work building munitions and serving the home front. Now, one of the aspects of wars that economists

pay attention to is how wars get financed. And normally, wars are financed very substantially by borrowing, and this was not a surprise. The U.S. national debt was built up quite substantially during World War II to pay for the war. And the Fed in cooperation with the Treasury used its ability to manage interest rates to keep interest rates low, so as to make it cheaper for the government to finance World War II. So that was the role of the Fed during the war. Now, after the war ended, the debt was still there. The government was still worried about paying the interest on the national debt which was at a very high level, and so, there was considerable pressure on the Fed to keep interest rates low, even after the war. But there was a drawback to that which is that if you keep interest rates low even as an economy is growing and recovering, you're risking an overheating economy, you're risking inflation. So by 1951, the Fed was very concerned about inflation prospects in the United States. And after a series of complex negotiations, the Treasury agreed to end the arrangement and let the Fed set interest rates independently, as needed, to achieve economic stability. And that agreement was called the Fed Treasury Accord of 1951. It was very important because it was the first clear acknowledgment by the government that the Federal Reserve should be allowed to operate on an independent basis. And today, around the world, there is you know a very strong consensus that central banks that operate independently will deliver better results than those which are dominated by the government. In particular, a central bank which is independent can ignore short-term political pressures, for example, to pump up the economy before an election, and in doing so, it can take a much a longer perspective and get better results and the evidence for this is quite strong. And as a result, major central banks around the world are typically independent which means that they make their decisions irrespective of short-term political pressures. Now in the 1950s and the 1960s, the primary concern of the Fed was macroeconomic stability. You see a picture there of the Chairman, William McChesney Martin. He was chairman from 1951 to 1970. Nineteen years, he was the leader of the Fed. Chairman Greenspan's term ended at eighteen years six months. He unfortunately didn't break the record. I know he was very disappointed about that. [Laughter] But in that case, we had two Federal Reserve Chairmen that between them accounted for more than 37 years of leadership at the Fed during the post war period.

Now, monetary policy during the '50s and early '60s was relatively simple, the economy was growing. Again, as after World War I, after World War II, the U.S. economy was dominant. The fears about a renewed depression had not come true. And as a result, a lot of growth was occurring. What the Feds tried to do basically was follow what's called a "Lean against the Wind Monetary Policy", which means that when the economy is growing quickly or perhaps too quickly, the Fed tightens to try to restrain overheating. And when the economy is growing more slowly, the Fed lowers interest rates, creates some expansionary stimulus in order to avoid a recession. William McChesney Martin was very attentive to the risks of inflation. You'll see a quote there for him, "inflation is a thief in the night." And he tried through this "Lean against the Wind Policy" to keep inflation and growth stable. And indeed despite the fact that the '50s were perhaps more tumultuous than you might think, there were after all, there was after all a serious war in Korea. There were a couple of recessions during that decade. Nevertheless, it was

basically a productive and prosperous decade as the economy went back to civilian operations after the end of World War II. However, as usual, things were not to remain completely trouble free. Starting in the mid 1960s for a variety of reasons, which I'll talk about, monetary policy became too easy. And after a period of time, and given the Fed didn't change its policy stance, this easy monetary policy led to a surge in inflation and inflation expectations. And on the right, you see a graph of inflation. You can see from 1960 to '64, inflation averaged only by a little over 1 percent a year. It picked up during the Vietnam period '65 to '69, even higher in the early '70s. But by the end of 70s, the CPI inflation rate peaked at about 13 percent. So you could see inflation was a growing problem starting in the mid '60s and into the '70s. So, an important question is, you know why, why was monetary policy so easy as to allow inflation to become a problem in the '70s? Well, one issue was really a technical issue, which was that monetary policy makers became too optimistic about how hot the economy could run without generating inflation pressures. It was a general view that unemployment could be kept at the low level like 3 or 4 percent. And by keeping inflation a little bit higher, you would be able to get that better performance, that higher employment level. And again, in the prosperity of the '50s and the early '60s, the Fed began to follow that approach. There was actually quite a subtle issue here which was that economic theory and practice in the '50s and early '60s suggested that there was a permanent tradeoff between inflation and employment, the notion being that if we could just keep inflation a little bit above normal that we could get permanent increases in employment, permanent reductions in unemployment. And that was a view that was taken by many economists during that time. It was actually Milton Friedman, the famous monetary economist, who wrote in the mid-'60s quite prophetically that this was going to cause trouble. And he argued that increase in inflation may give you a little bit of a bump up in employment, might cause unemployment to fall for a while, but at best that's going to be a transitory effect. The analogy might be to a candy bar. If you take a candy bar in the short run, it gives you a little bit of a burst of energy. But after a while, it just makes you fat. So, monetary policy was analogous to that. And Friedman argued, and he turned out to be quite prescient, that attempts to keep unemployment too low through monetary policy were going to end up creating inflation. So, that doctrinal issue was one reason why monetary policy was too easy. There are also debates still today about whether or not there were political pressures put on the Fed. After all, this was a period of, again, of government deficits, as the government was trying to deal with Vietnam, was trying to deal with the Great Society. And that may have also influenced the Fed's behavior. Now, the Fed--obviously, you can't have sustained inflation without monetary policy being too easy. Another famous quote from Milton Friedman is that inflation is always and everywhere a monetary phenomenon. Nevertheless, there were a bunch of exacerbating factors that made the problem worse and made it more difficult for the Fed to offset the increase in inflation. First, there were a number of shocks to the prices of oil and food. A very striking example was in 1973. In October of 1973, the Yom Kippur War in the Middle East broke out. In retaliation to US support of Israel, OPEC, the Organization of Petroleum Exporting Countries, found some cartel power, putting embargo on oil exports. And in a short period of time, in the early 1970s,

the price of oil almost quadrupled. So a very sharp increase in oil prices in this, and gas prices. People were lining up at gas stations to make sure their gas tanks were full. There was a system of even-odd rationing. If your, if your license plate was even, you can only go on Tuesdays and Thursdays to the gas station. If it was odd you can go on Mondays and Wednesdays. So it was a very serious issue and there was a lot of unhappiness obviously about gas prices then, as there is of course today as well. Fiscal policy, I also mentioned. Fiscal policy was overall too loose during the late '60s and early '70s. Vietnam War and other government programs increased government spending and increased deficits, which put additional pressure on the capacity of the economy. Now, another element that I will just mention briefly is wage price controls. When inflation got up to about 5 percent in the early '70s, President Nixon introduced wage price controls. That is a series of laws which forbade firms from raising their prices. There were exceptions and there were all kind of boards to try to find exceptions. And that it was basically a very unsuccessful policy on the one hand, by--as you know, prices are the thermostat of an economy. They are the mechanism by which an economy functions. So, putting controls on wages and prices meant that there were shortages and all kinds of other problems throughout the economy. But in addition, again, as Milton Friedman put it, this was like dealing with an overheating furnace by breaking the thermostat. The fundamental problem was the fact that there was too much aggregate demand driving up prices and simply putting--passing a law which says people couldn't raise prices doesn't address the underlying problem of excessive monetary ease and excessive demand. So, the wage price control has kept inflation artificially low for a couple of years, made it harder for the Fed to figure out what was going on. And when the wage price controls finally collapsed in disarray, because they were creating so much proximity problems in the economy, inflation surged, as like a spring that was released at the end of the wage price controls. So there were a lot of reasons supporting the increase in inflation. I think a general lesson--here is a picture of Arthur Burns who was the chairman of the Fed during the 1970s. And the quote is: "In a rapidly changing world, the opportunities for making mistakes are legion," which is certainly true. I think one way to think about this whole episode is that after World War II and the end and the conquest of the depression and the prosperity that they saw, economists and policy makers became a little bit too confident about their ability to keep the economy on an even keel. And there was the term fine tuning, the notion that the Fed and other fiscal policy and other government policies could keep the economy more or less perfectly on course and not worry about bumps and wiggles in the economy. Now that turned out to be too optimistic, too hubristic, and we learned that collectively during the '70s when the efforts of policy makers resulted not in the lower unemployment rate, which was the original goal, but instead a higher and very sharp increase in inflation. So I think one of the themes here is that--and this probably applies in any complex endeavor--that a little humility never hurts. Now there was a reaction to the increase in inflation in the '70s, and the key person in this period is Chairman Paul Volcker, who remains to this day an influential figure in economic policy discussions. To deal with double digit inflation--I should say first that President Carter, whose reelection was under serious threat by the poor performance of the US economy, appointed Paul Volcker to be the new chairman of

the Fed. And in part he did so, because President Carter thought that Volcker was a tough central banker, who would do what was necessary to get inflation under control. And Paul Volcker, who stands 6 foot 8 and smokes a big cigar, certainly created an impression of somebody who was willing to take strong action. And perhaps it wasn't a total coincidence. So Paul Volcker came into office, he was only in office for a few months when he determined that strong action was needed to address the inflation problem. And in October of '79, he and the Federal Open Market Committee, the policy making committee of the Fed, instituted a strong break in the way that monetary policy was managed. It's not really necessary to go into the details of what that break was and how it worked. Basically, what it did was allow the Fed to raise interest rates quite sharply. And again, as you know, raising interest rates slows the economy and brings inflation pressures down. As Paul Volcker said: "To break the inflation cycle, we must have credible and disciplined monetary policy." And it worked. In the years after this program began, inflation fell quite sharply. You can see from 1980 to 1983, inflation fell from about 12 or 13 percent all the way down to about 3 percent, so a relatively quick decline in inflation that offset the problems of the late '70s. So in that respect, the policies of the '80s were quite successful, they achieved their objective of bringing inflation under control. However, nothing is free, and one of the effects of these policies was to raise interest rates quite sharply. I do remember vaguely, in--I just got out of graduate school about '81, '82 and I do remember looking at a possibility of buying a home and being informed that the mortgage rate for a 30-year mortgage was 18 and a half percent. So interest rates were quite high and as you might expect that brought down economic activity and effective inflation as well. So if you look at the graph, you see this is the unemployment rate. The high interest rates, which were necessary to bring down inflation, also caused a very sharp recession. And in fact, the unemployment rate in 1982 was almost 11 percent, even higher than we saw in the most recent recession. So, there was definitely a very negative side effect from Volcker's activities. Now, I think an interesting aspect of this is that the political pressure you can imagine on the Fed and on Chairman Volcker was intense. During this period, it was common practice to mail to the Fed bits of two-by-fours. And on the two by fours it would say, "Stop killing construction," or, "Save the farmer," or whatever it might be because the high interest rates were having very negative effects on the economy. And I have a few of these on my desk just to remind me that, you know, that inflation is a concern and that we always have to pay attention to price stability. But, this is also an example of why independence is important. If Paul Volcker had been to be reelected, perhaps, he wouldn't have been able to sustain his policy. But instead, he maintained an independent monetary policy. He received at least sufficient support from President Reagan and from the Congress, and he was able to carry through the policy, which, again, succeeded in bringing inflation down. Now, during the '70s, obviously, output and inflation were very volatile. We saw how much inflation moved around. We saw that there was--I didn't mention, but there was a pretty sharp recession also in 1973-75 after the OPEC embargo. And then of course there was more volatility in the early '80s as Volcker brought down inflation and as the economy went into recession. Now, Paul Volcker left the chairmanship in 1987, and he was replaced by Alan Greenspan, who again, held that position for

almost 19 years from '87. As the quote suggests, one of the important accomplishments of Greenspan for most of his tenure was achieving greater economic stability. As he says, greater economic stability has been key to impressive growth in standards of living in the United States. So, in fact, there was so much improvement in the stability of the economy that the period has been--come to be known as the Great Moderation, as opposed to the Great Stagflation of the '70s or the Great Depression of the '30s. Now this was a very real and striking phenomenon, the Great Moderation. The first picture here shows you the variability of real GDP growth. So the graph covers the period from 1950 all the way up essentially to the present. The line just shows you quarterly growth rates in GDP. So a sharp line--a sharp peak shows increase in GDP growth, a negative decline shows a fall in GDP growth. These are quarterly numbers. And so you can see the bounciness, you know, periods of growth followed by periods of slower growth. The yellow bar is a one standard deviation band. Essentially it's a measure of the average volatility of GDP growth quarter to quarter during the period between 1950 and 1986 or '85, I guess. And you can see that GDP growth was pretty variable throughout the entire period. There's a lot of volatility in the economy. There were a number of recessions, including the severe ones in '73 and '81. Now, amazingly, starting from about 1986, look at what happens to GDP variability between 1986 and 2007 or so. The variability from quarter-to-quarter is much less, and the blue line shows the average variability of one standard deviation band for GDP growth in this latter period. And it's just very striking how much more stable the economy was over these 20-year or so year period. This was true not only for real GDP growth; it was also true for inflation. So again, this is the same picture basically. The line, the vertical line in the middle of the graph splits the time period from pre-1986 and post-1986. The graph shows inflation quarter by quarter as measured by the consumer price index. Again, the 10-bar shows one standard deviation average volatility of inflation in the pre-1986 period. You can see the huge spikes in inflation in the '70s. And then in post '86, you see much more stable, much lower volatility. So both growth and inflation were much more stable and really quite remarkable to a quite remarkable extent and something that economists commented on quite frequently. That was the so-called The Great Moderation. Now, why? Why was the economy so much more stable between the mid-'80s and the mid-2000s? Well, there's lots of research on it, lot of issues, lot of papers. I think there's a good bit of evidence that monetary policy played a role in creating better stability. In particular, Volcker's contribution was, even though his short term efforts to bring down inflation in the early '80s led to a high recession, led to a lot of pain, there was a payoff. And that payoff was an economy which was much more stable with low stable inflation, more stable monetary policy, more confidence on the part of business people and households, and that contributed very importantly to broader stability. So you remember that the--Friedman pointed out that there was no long-term tradeoff between inflation and unemployment. By keeping inflation a little higher, you couldn't permanently lower unemployment. But in a different sense--which is true--but in a different sense, low and stable inflation over a long period of time thus make an economy more stable, and supports healthy growth and productivity and economic activity. So low inflation is obviously a very good thing to have, and the reduction in inflation that occurred in the '80s was

really a global phenomenon. A lot of countries had inflation problems in the '80s, but all around the world, even developing countries brought down their inflation rates quite considerably, and that has been a positive for economic growth and stability since the mid-'80s. Now, not all of The Great Moderation was caused by monetary policy. There are other factors, no doubt, playing a role. I mentioned just general structural change in the economy. An example would be that over time, firms have learned how to manage their inventories much more effectively. The practice of so-called "just in time inventory management" is a practice whereby instead of having large stocks of inventories on hand, firms only acquire inputs when they need them to produce. And without large stocks of inventories on hand, that reduces an important source of fluctuations in the economy because if demand slows down and you have a big inventory, then you don't do anymore production for quite a while until you run down that inventory. But improved management inventories, it's just an example--and many others could be cited--of better business practices and other factors in the economy that made things more stable. And it may also just be the case that there was better luck that we had fewer oil price shocks and other things happening and that too may have contributed to the Great Moderation. But as those previous pictures showed, I hope that it's clear that it was quite a striking change in the way the economy operated after the mid '80s. OK, now, this takes us up then into the mid-2000s. And so now finally, we can begin to talk about financial stress and recent developments. Now, just a final word about the Great Moderation, one of the other aspects of that period is that there weren't any big damaging financial crises in the United States. There was a stock market crash in 1987, but it didn't do much damage. A more significant event was the boom and bust in the dot-com stocks in the late '90s, and that touched off a mild recession in 2001. But one of the inferences that people took away from the Great Moderation was not only was the economy more stable but the financial system seemed more stable as well. And as a result, financial stability policies got de-emphasized to some extent during this period. Well, let's turn now finally to the prelude to the financial crisis. And what I'll do today is just talk about some of the initiating triggering events, particularly the housing bubble. And again, as I said next, we'll get next week into more details about what happened during the crisis and the Federal Reserve's response. One of the key events that led ultimately to the recent crisis was a big increase in house prices. So the graph on the right shows prices of existing single family homes, where January 2000 is indexed to be 100. From the late 1990s until early 2006, house prices across the country increased by about 130 percent. You can see that line going straight up, a very sharp increase in home prices. And as I'll discuss, at the same time that was happening or perhaps a little bit later in the process, the lending standards for new mortgages to buy homes were deteriorating. Now clearly, a big part of what was happening to create the housing bubble or the increase in housing prices was psychology. After all, the late '90s was a period, as you know again, with a lot of optimism about the tech stocks and stock market more generally. And some of that optimism, some of that psychology, no doubt, fed over into the housing market. So there was an increasing sense that house prices would keep rising and that housing was a "can't lose" investment. I lived in California for a while and, earlier than this, but it was a period during which house prices are

rising and everybody--all everybody ever talked about in cocktail parties was you know, "What's your house price now?" and, "How much money are you making on your home?" And it kind of made working kind of unnecessary because all you had to do was keep checking the real estate listings. So there was a lot of excitement and enthusiasm about the fact that house prices are going up and making everybody rich. At the same time that this was happening, the standards for underwriting new mortgages were getting worse and worse, which in turn was bringing more and more people into the housing market and pushing up prices even further. So let's talk a bit about the mortgage quality and what happened. Prior to the early 2000s, home buyers were typically asked to make a down--significant down payment, 10 percent, 15 percent, maybe 20 percent of the home price. And of course they had to document their finances, their income, their assets and so on in great detail to persuade the bank to make them a loan, which in many cases might be, you know, 4 or 5 times their annual salary. Unfortunately, as house prices rose, many lenders began to offer mortgages to less qualified borrowers, so-called nonprime mortgages. And these mortgages often required little or no down payment, and little or no documentation. I say nonprime instead of sub-prime. Sub-prime mortgages were the lowest quality mortgages in terms of the credit of the borrowers, but there were other mortgages that were below so-called prime mortgages, so-called Alt-A and other types of mortgages. They were also not up to the traditional standards of credit underwriting. So I say nonprime, what was happening again was that essentially that lenders, mortgage lenders were moving further down the credit spectrum, lending to more and more people whose credit was less stellar. You can see this in a number of different ways. On the left side of this picture is the share, the percentage of mortgage originations, that is new mortgages created, that were nonprime, that is either subprime or Alt-A or some other lower quality and mortgage. And you can see the very sharp increase, particularly in the middle of 2000s and 2006. Almost a third of all mortgages that were originated were nonprime. Another indicator of the duration of mortgage quality in the right figure is the percent of nonprime loans with low or no documentation. Now if you think about this, this is kind of perverse. If you're going to loan, make a loan to somebody whose credit is shaky, who doesn't have a down payment and maybe their FICO score is low and so on, you think you would want to ask them even more questions about their income and their prospects. But, in fact, it went the other way. And as you can see that by 2007, 60 percent of nonprime loans had little or no documentation to describe the credit-worthiness of the borrower. So there was clearly an ongoing deterioration of mortgage quality. Now this is a situation that couldn't go on forever, this picture shows the house show--sorry. This picture shows the debt service ratio. As house prices went up and up and up, the amount of income or the share of income being spent on your monthly mortgage payment went up. And as you can see, eventually the mortgage payments became quite a large share of personal disposable income, finally reaching the point that the cost of homeownership was as high enough that it began finally to dampen the demand for new houses. And as we see that mortgage rate--that service ratio collapsed going after that, basically because interest rates came down. But the main point here is that high interest rates--sorry high--high payments on mortgages finally meant that there were no longer new borrowers, new home purchasers, and so

house prices burst, the bubble burst. And here's a picture of home prices. You can see again, the sharp increase from the late '90s up until about 2006. But from 2006 until today, house prices have fallen more than 30 percent. So there's been a very sharp decline in home prices across the country. Now one comment about this picture, if you look at this picture you might say to yourself, "Oh my gosh, we have a long way to go," because as you can see, house prices today are still a good bit above where they were 15 years ago. But remember, these prices are in dollar or nominal terms, there's no adjustment for inflation. So even if there was just 2 percent inflation a year, over a period of 15 years that would raise prices by 30 or 40 percent. So if you adjust this for inflation, you get that house prices now are coming much closer to where they were before the beginning of the bubble. Now the house price collapse had some significant consequences. One consequence is that many people who had felt rich because their home values had gone up and they had a lot of equity. Suddenly they found themselves underwater, which means that they--their mortgage, the amount of money they owed, was greater than the value of their home, so this is a negative equity. So this is an upside-down situation where the borrower in fact has negative wealth or negative equity in the home. And you can see that starting in 2007, the number of mortgages that were in negative equity grew very sharply. Currently, there are about 12 or 13 million mortgages out of a total of about 55 million or so in United States, so roughly 20 to 25 percent of all mortgages are now currently underwater. So that's a very big change from the situation we saw before. At the same time, given the decline in house prices, given the fact that a lot of people borrowed more than they could afford, the decline in house prices also led to a big increase in mortgage delinquencies, people not paying on time, and ultimately the bank taking over the property--and that's called a foreclosure--and then reselling the property to somebody else. So this is mortgage delinquencies and you can see that in 2009, there were more than 5 million mortgages in delinquency, which is about again almost 10 percent of all mortgages. So a very, very high rate of delinquencies. Now of course we--what we just looked at was the effects of the house price bust on the borrowers and on the homeowners and those are quite serious. But of course, there's another side to this, which is the lenders, people who made the loans. And obviously with something close to 10 percent of mortgages in delinquency, banks and other holders of mortgage-related securities suffered sizable losses and that proved to be an important trigger of the crisis. Now, there's an interesting question here. In 1999, 2000, 2001, we had a big increase in stock prices, including, but not only dot-com or tech bubble prices. And that--those prices fell very sharply in 2000, 2001, and a lot of paper wealth was destroyed by that. And in fact, the amount of paper wealth destroyed by the decline in dot-com and other stock prices was not radically different from the amount of wealth destroyed by the housing boom and bust. And yet, as you know, the dot-com bust led only to a mild recession. The 2001 recession went from, I believe, March to November of 2001; it's was only an 8-month recession. Unemployment rose but it was not anything nearly so dramatic as in the '80s or more recently. And so, here we had a big boom and bust in the asset price, but without too much real serious or lasting damage to the financial system or the economy. Now, in the recent case, we had a housing boom and bust. If we were looking back at 2001, we would think that well, that's going

to cause a slowdown in the economy, but probably it won't be that serious. And, you know, that was one of the views that we were discussing in the Fed in 2006 as we saw house prices decline might--this might not like—might this be like--more like the 2001 episode than something different. Yet of course as we know, the decline of house prices had a much bigger impact on the financial system in the economy than the decline of stock prices. And I think to understand that, it's important to make a distinction between triggers and vulnerabilities. The decline in house prices and the mortgage losses were a trigger. They--to put it and use another metaphor, it was a match thrown on kindling. But there would not have been a conflagration unless there was a lot of dry tinder around. And in this case, there were vulnerabilities in the economy, in the financial system that the housing bust in some sense set afire. In other words, there were weaknesses in the financial system that were--that made--that transformed what might otherwise have been a modest recession into a much more severe crisis. Now, what were those vulnerabilities? Why--what was it about the financial system of the United States and of other countries as well that transformed the housing boom and bust into again a much more serious crisis. Again, we'll talk about this in much more detail next week, but just to preview, there were vulnerabilities in both the private sector of our financial system and also in the public sector. On the private sector, many borrowers and lenders took on too much debt, too much leverage. And one reason they might have done that is because of the Great Moderation. There is 20 years of relatively calm economic and financial conditions, and people became more confident, more willing to take on more debt. The problem with taking on too much debt is that if you don't have much margin, if the value of your asset goes down like the value of your house, then pretty soon, you'll find that you have an asset which is worth less than the amount of money you borrowed. Second problem, very important problem was that throughout this period, financial contracts, financial transactions are becoming more and more complex in ways which I'll describe. But the ability of banks and other financial institutions to monitor and measure and manage those risks was not keeping up. That is, they were--they--their IT systems, their resources they devoted to risk management were insufficient for them to understand fully what risks they were actually taking and how big the risks were. So if you would ask a bank in 2006, well, suppose house prices fall 20 percent, they probably would have greatly underestimated the impact of that on their balance sheet because they didn't have the capacity to measure accurately or completely the risks that they were facing. Third problem, which I'll come back to again, is the funding side. Financial firms in a variety of contexts relied very heavily on short term funding like commercial paper which can have a duration as short as one day or most of it is less than 90 days. So, like the banks in the 19th century that were relying on deposits and making loans, they had, essentially on the liability side of their balance sheet, they had a very short-term liquid form of liability, which is, we'll see, was subject to runs in the same way that deposits were subject to runs in the 19th century. A final private sector vulnerability was the use of exotic financial instruments, complex derivatives, and so on. An example of this was the credit default swaps employed by the AIG Financial Products Company. AIG used the credit default swaps essentially to sell insurance to investors on the complex financial instruments that the investors held. So basically, what AIG

was promising was that if you lose any money on these collateralized debt obligations or whatever these things are, we'll make good. As long as the economy was doing well and the financial system was doing well, then they were just collecting the premiums on this insurance essentially and there was no problem. But once things went bad, their being on one side of all these bets meant that they were exposed to enormous losses, which had, as we'll see, very serious consequences. So those are some of the problems that occurred on the--in the private sector. And we talked a little bit about the public sector. There were also serious problems there as well. First, the financial regulatory structure was--had been changed of course a number of times and basically, it was the same structure that had been created in the 1930s after, you know, during the depression. And in particular, it didn't keep up with all kinds of changes in the structure of the financial system. One aspect of that was that there were many important financial firms that didn't really have any serious comprehensive supervision by any financial regulator. So an example of this was AIG, which was an insurance company. The insurance regulators looked primarily at the insurance products they sold. The Office of Thrift Supervision looked at primarily at the thrift of the small banks that they owned. But nobody was really looking carefully at this CDS problem that I was just describing. Another category of firms that didn't have much oversight were investment banks like Lehman Brothers and Bear Stearns and Merrill Lynch. There was no statutory oversight of those firms. They had a voluntary agreement with the SEC for oversight, but there really was not comprehensive oversight of those firms. And as I'll talk about another group of firms was the government-sponsored enterprises Fannie and Freddie, which did have supervisors, did have regulators, but for reasons I'll explain were--was very, very inadequate. So their--the regulatory structure had lots of holes in it, and there were many important firms that proved important during the crisis that didn't have good oversight. There were also, even where the law is provided for, regulation and supervision, there were often--it often wasn't done as well as it should've been. And while this was true across the whole range of agencies and parts of the government, let me, since I'm the Fed chairman, let me talk about the Fed. The Fed made mistakes in supervision and regulation. I think two I would point out. One would be in our supervision of banks and bank holding companies. We didn't press hard enough on this issue of measuring your risks. I mentioned before that a lot of banks simply didn't have the capacity to thoroughly understand the risks that they were taking. The supervisor should have pressed them harder to develop that capacity and if they didn't develop that capacity, should have restricted their ability to take these risky positions. I think the Fed and other bank supervisors didn't press hard enough on this and that turned out to be obviously a serious problem. Another area where the Fed I think performed poorly was in consumer protection. The Fed had some authorities to provide some protections to mortgage borrowers that would have, if used effectively, would have reduced at least some of the bad lending that occurred during the latter part of the housing, housing bubble. But for variety of reasons that wasn't done, not nearly to the extent it should have been. In 2007, when I became chairman, we did undertake some of these protections but it was obviously too late to avoid the crisis. So, where there were authorities and powers, they weren't always effectively used, and that obviously led to some weaknesses. And

then a final, and perhaps more subtle point, the way our regulatory system is set up, individual agencies like the Fed or like the OCC or the Office of Thrift Supervision, typically had as their responsibility just a specific set of firms. So the Office of Thrift Supervision was only responsible for thrifts and similar institutions. Unfortunately, the problems that arose during the crisis were much broader based than that. They transcended any single firm or small group of firms; they transcended the whole system. And so essentially what was missing here was attention, enough attention being paid to things that could affect the system as a whole as opposed to just individual firms. And so nobody was really in charge of looking to see whether there were problems related to the overall financial system or the relationship between different markets and different firms that could create stress or even a crisis. So those were some of the vulnerabilities in the public sector. And we're going to come back to, we're going to come back to these vulnerabilities and how they played out next week. Let me conclude here by talking about a controversial topic, which is another aspect, which is the role of monetary policy. Now, many people have argued that another contributor to the housing bubble was the fact that the Fed kept interest rates low in the early part of the 2000s following the recession of 2001. So when the economy got very weak and there was very slow job growth in 2001 and subsequently and when inflation fell very low, the Fed cut interest rates. And in 2003, the federal funds rate got down to 1 percent. And there are people who argue that this wasn't one of the reasons that house prices went up as much as they did. And in fact it is true that low interest rates, one of the purposes of low interest rates that the monetary policy achieves is to increase the demand for housing and thereby to strengthen the economy. Now as I say, this is very controversial. But it's also very important not only because we want to understand the crisis but because going forward, we want to think about, you know, what, you know, what should we take into account when we look at monetary policy. To what extent should we be thinking about things like housing bubbles when we make monetary policy? Now, we've looked at this in great detail inside the Fed, and there's been a lot of research outside the Fed and I--and let me just warn you that there's no consensus on this, and you'll probably hear different points of view. But the evidence that I've seen that we've done within the Fed suggests that monetary policy did not play an important role in raising house prices during the upswing. And let me just talk a little bit about some of the evidence on this question. One piece of evidence is the international comparison. People don't appreciate that the United States--the boom and bust in the United States was not unique. Many, many countries around the world had booms and busts in house prices, and those booms and busts were not very closely related to the monetary policies of those particular countries. For example, the United Kingdom had a house price boom that was as big or bigger than that in the United States. But monetary policy was much tighter in UK than it was in the United States. And so there's a bit of a puzzle for the monetary theory of the house boom. Another example, which is not on the slide, as you know Germany and Spain both share the Euro. So they have the same central bank, European Central Bank, the same monetary policy. Germany's house prices remain absolutely flat throughout the entire crisis. Spain had an enormous house price increase considerably larger than that in the United States. So the cross national evidence raises at least some, at least some

concerns. Second issue is the size of the bubble. It's true that changes in interest rates and mortgage rates should affect house prices and demand for homes as I said. And there is a lot of history, a lot of evidence to look at that over a long period of time. But when you look at the--how much interest rates changed, including mortgage rates, and how much house prices moved, based on historical relationships, you can only explain a very, very small part of the increase in house prices. In other words, the increase in house prices was way too large to be explained by the relatively small change in interest rates associated with monetary policy in the early part of the 2000s. The final piece of evidence I would raise is the timing of the bubble. Robert Shiller, an economist who was well-known for his work on bubbles, including the housing bubble, argued that the housing bubble began in 1998, which of course is well before the 2001 recession and before the--before the cut in Federal Reserve interest rates. Moreover, house prices rose very sharply after the tightening began in 2004. So the timing doesn't line up particularly well. Now, what the timing does suggest might be a couple of other possible explanations. One is obviously '98 was right in the middle of the tech bubble, the tech boom. And it could be that again, the same psychological optimism, the same mentality that was feeding stock prices may have been feeding house prices as well. Another possibility is that--that's been pointed out by a number of economists is that in the late '90s, there was a very serious financial crisis called the Asian financial crisis that hit a number of Asian countries and other emerging market economies as well. And one--after that crisis was tamed, one response was that many countries, emerging market countries, began to accumulate large amounts of reserves, which meant they had to acquire safe dollar assets. So there's a big increase in the demand for assets, including mortgages. It came from abroad as countries decided they need to acquire more dollar assets to service reserves. I think interestingly, probably the strongest correlation across countries that you can find to house price increases is capital inflows, the amount of money coming in to buy mortgages and other safer or at least perceived to be safe assets. And that timing would also fit with the '98 or so beginning. So, those are some arguments against the view that the monetary policy was a big source, an important source. But I emphasize, economists continue to debate this issue. And it's a very important issue, because going forward we also have to think about the implications of our low interest rates on the economy and on the financial system. And in particular, currently, just out of caution, we're doing a lot of financial oversight and a lot of regulatory oversight to make sure that--at least do the best we can--to ensure that nothing is getting unbalanced in the financial system. Here are a few references just to take with you if you want to get into this more. The bottom one is a speech I gave a couple of years ago which summarizes some of the evidence. My speech is based very heavily on the second paper, which is the results of all the internal Federal Reserve research. There's a paper there by Carmen Reinhart and Vincent Reinhart, which makes the point that interest rates didn't move enough to move house prices. And they also make the point about capital inflows and then, Kenneth Kutner has a recent survey, which comes to conclusion again that there was no connection. But again, I emphasize that this is something that is--continues to be debated. Well, what were the consequences of the crisis? We'll talk more about the crisis next time, but the economic consequences were severe.

Here's a measure of financial stress. It's just an index which combines a variety of financial indicators that indicate that the financial system is under great stress. And you can see what happened in 2008, 2009, sharp increase in financial stress in the financial markets. Stock market plunged, and we've been talking about the first decline there where it says 2000, the 2001 recession. That was the very large decline in tech stocks, but notice the decline in the stock market in the more recent recession was even bigger than the one in 2000, 2001. Here's home construction. You can see the very sharp decline there. Home construction fell before the recession, because of course it was a trigger of the crisis. But looking to the right, you can see that it still hasn't really begun to recover. And then finally, unemployment rose very sharply, peaked around 10 percent and has currently fallen down to about 8.3 percent. So in the next two lectures, we're going to get into the crisis in more detail, talk about how the housing boom and bust and the vulnerabilities in the financial system led to the worst financial crisis at least in severe depression and possibly even worse than in the depression and how the Fed responded to that crisis. And then in lecture 4, we'll talk about the recession recovery and the aftermath and again, the policy responses there. So that's what I wanted to cover today and we do have a few minutes and I'd be happy to take questions. Yeah?

Student: So in the previous--

Chairman Bernanke: Anybody would take a mic so--

Student: Sorry. [Noise] In the previous lecture, we discussed that the depression--it seemed that policy was tightened too early and that led to a double dip. And then today, we were discussing that policy in the '70s was too slow to tighten. How do we know when the right time is and is there a right time or does it vary all the time?

Chairman Bernanke: Well, it's challenging, and it's certainly one of the reasons that, you know, we have so many economists and models and everything, you know, we can use to try to figure out what the appropriate moment is to tighten or to ease policy and it's not an easy thing. Forecasting is not very accurate and so we have to provisionally keep looking at what's happening and making our adjustments as we go along. The '70s was particularly difficult because at that time inflation expectations were not at all tied down. One thing that happened then was that if gas prices went up, then people began to expect higher inflation. And then they began to go and demand higher wages to compensate for the higher prices. And then of course higher wages would feed to the higher prices and so on and so on. And that in turn was a result of the fact that everybody expected inflation to go up; nobody had any confidence that the Fed or the government in general will keep inflation low and stable. Now a very different situation now, fortunately, and this owes a lot to Paul Volcker and to Chairman Greenspan as well, is that after a long period of low inflation, most people are pretty comfortable that inflation will stay reasonably low despite the fact that there are ups and downs, you know, with gas prices and so on. And that helps a lot because with inflation staying low, the Fed has more leeway. If policy is easy for a period, that's not necessarily going to feed into a wage price spiral that would create a

much bigger inflation problem down the road. So keeping inflation expectations low and stable is in fact one of the great accomplishments of Chairman Volcker and Chairman Greenspan, and an important objective of central banks around the world. So the environment changes over time. It's a difficult task, but the '70s was particularly difficult because at that time, with expectations so volatile, any kind of inflation pressure from gas prices wherever quickly fed into wage demands and into other prices. So it's a much more difficult situation. Yeah? [Inaudible Remark]

Student: Hi. My name is Jonathan Cohen. So I had a question about the low interest rate monetary policy that you mentioned in the early 2000s and how your view with all the different research that was conducted is that it didn't spark the job analyzing that we had. So if as in your role as Fed Chairman, if you were Chairman now, do you think that was the right--

Chairman Bernanke: I am the Chairman now. [Laughter]

Student: Yeah. Sorry. If you were Chairman in 2001, would you have kept rates that low and do you--or if not, do you think it was the correct thing to do, although it didn't--although you don't think it affected the housing crisis?

Chairman Bernanke: The very first--I believe yes. The very first speech--I was a governor of the Fed during that time. I was on the Fed Board during that time and the very first speech I wrote when I became a governor in 2002 was about bubbles and financial supervision and regulation. And the theme of my speech was "Use the right tool for the job." The problem with tying interest rate policy to perceived bubbles and asset prices is it's like using a sledgehammer to, you know, kill a mosquito. I mean, the problem is housing is only one part of the economy if--and interest rates are dedicated to achieving overall economic stability. So we estimate that in order to have stopped the increase in house prices, interest rates would have been--had been raised very dramatically in a period where the economy was very weak. Unemployment was still above normal. Inflation was falling down towards zero. And so the right--generally speaking, the right way to use monetary policy is to achieve overall macroeconomics stability. Now it doesn't mean you should ignore financial imbalances and I think what we could have done, the Federal Reserve could have done, would have been to have been more aggressive on the supervisory and regulatory side to make sure for example that the mortgages that were being made were a better quality and that firms were appropriately monitoring their risk and so on. So I think the first line of defense should be regulation supervision. Now, I think one of the lessons I talked about today was not to be too sure of anything, you know, to be humble. And for that reason, I think we should never rule out the possibility that if all of our regulatory and other types of interventions don't achieve the stability and the financial system we want, that, as a last resort, monetary policy might, you know, be modified to some extent to deal with that. But again, because monetary policy is such a blunt tool which affects all asset prices and affects the entire economy, if you can get a focused laser, you know, a type of tool, that's going to be much better for everybody. Yeah?

Student: At the end of the lecture you mentioned the role that global imbalances played in filling the housing bubble. So doesn't the current monetary and fiscal policy that focuses on boosting consumption in the United States from borrowing more--doesn't that kind of lead us down the same road of overconsumption from borrowing that we had that got us into the crisis in the first place?

Chairman Bernanke: Well, first of all, the--we'd like to get a better balance in general, so monetary policy stimulates capital formation as well. It also tends to promote exports. So we would like to get it overall--over time, we'd like to get a better balance of consumption investment and exports as well as government spending, those are the main components of final demand. So monetary policy is consistent with a better balance. With that being said, you know, we are now way below where we were before the crisis. Consumer spending is not, you know, recovered. It's still quite weak relative to where it was before the crisis. Private debt has come down quite a bit. And importantly, you mentioned the global imbalances so we're talking about the current account imbalance or the trade deficit that the US has. It has come down quite significantly. So all those things have moved, you know, if anything in some sense too far in the short run because we lack a source of demand to keep the economy growing. Now again, I agree that just as every country needs to have an appropriate balance of consumption, capital formation, exports, and government spending, and that's an important task for us going forward. But right now, in terms of debt and consumption and so on, we're still, you know, way low relative to the pattern before the crisis.

Student: My name is Alexander Akel and the latter part of your lecture was about monetary policy in the 2000s after the dot-com bubble and how interest rates were kept low of course. You argued that that wasn't a trigger to the increase in rising--the increase in house prices. But to look at from another point of view, could--what's your take on the argument that the low interest rates caused private investors and banks to make riskier trades because of the low interest rates at the time, and how that could have also been the trigger to the crisis?

Chairman Bernanke: Well, that's a good question and I think there is some effect of low interest rates on risk taking. But once again, very similar to the previous question, it's an issue of getting the right balance. You know, during a recession, generally speaking, on most dimensions, investors become very cautious. That's certainly where they've been for much of the recent past. And so again, you want to get an appropriate balance between the amount of risk being taken, not too much, not too little and--but once again, this is yet another reason why financial supervision and regulation needs to be playing a role. And that's been--particularly with institutions, large institutions, banks, we need to be looking directly at those firms and making sure that they are managing their risks appropriately. So it's, again, it's a question of what's the right tool for the job. I should go over on this side. Mr. Littman [phonetic].

Student: Hi. Daniel Littman. The slides on the housing bubble like show how clearly one thing led to another, like rising prices and then eventually like a fall. When you were observing the economy in the 2000s, what did you think would happen, like to the rising house prices in the housing bubble? Did you think that it would eventually lead to a recession and--because I know, there's a book called the Big Short where some investors were like very pressing in, in like, in shorting, shorting that like, what's your take on that?

Chairman Bernanke: Well, as I tried to argue, the decline in house prices itself, by itself, was not obviously a major threat. When I was a--when I was the chief--I was the head of the Chairman, I was the Chairman of the Council of Economic Advisers for President Bush. And in 2005, we did an analysis for him on what would happen if house prices came down. And what we concluded was, well, we'd have a recession. But we didn't anticipate that the financial crisis, we didn't anticipate that the decline of house prices would have such a broad-based effect on the stability of the financial system. And when I became Chairman in 2006, house prices were already declining. And in my two weeks after I became chairman, I gave a testimony where I said house prices are falling, that's going to have negative impacts in the economy and we're not sure of all the consequences and so on. So the fact that house prices might come down, you know, that was always a possibility. The really hard thing, at least in my view, to anticipate fully, was that the effects of the decline in house prices would be so much more severe than the--than the sort of similar decline in dot-com stocks. And again, the reason is I'll get into more next time is the ways in which decline at house prices affected mortgages, affected the soundness of the financial system and created a panic which in turn led to the instability of the financial system. So it was that the whole chain of events that was critical. It was not just decline in house prices, it was the whole chain. Miles?

Student: My name is Miles McGreevy [phonetic]. Amidst the dispersion of cheap credit in the years preceding the housing crisis, there was a bipartisan push for American homeownership, originally spearheaded by President Clinton and later carried on by George W. Bush. To what degree could it be argued that that aggressive government policy supporting increased lending during this period contribute to the eventual erosion of credit standards on behalf of the mortgage originators?

Chairman Bernanke: That's a very good question, another controversial question. Certainly, there was some pressure to increase homeownership. There was the American dream aspect of owning a home and so on. Homeownership rose during this period. But I think to put it all in the government is probably wrong in this case. Most of the worst loans were made by private sector lenders and then sold to private sector--to private sector securitizations, that is they didn't touch Fannie and Freddie. For example, they went directly to investors. Fannie and Freddie did acquire some sub-prime mortgages but actually that was a little bit later in the process rather than the beginning of the process. So I think there was some of this going on everywhere. But clearly the private sector, you know, without any encouragement from the government, was a big player in the decline in mortgage underwriting and in the selling of package mortgages to private investors. Yeah.

Student: So, I think, one of the hallmarks of the Fed under your leadership has been your commitment to transparency. And I think, you know, we're all benefits that are in the room here.

But I'm wondering whether you think perhaps too much transparency could actually damage credibility of the Central Bank, in the way from which you sort of get things wrong, I guess.

Chairman Bernanke: Okay, so you're a little bit off topic here 'cause we didn't get to transparency today. But just generally, I think that I agree that transparency is very important. It's important for at least a couple of reasons. One is I talked already about the importance of a central bank being independent. So there is one linkage there. But if a central bank is independent and making important decisions which affect everybody, then obviously, it's got to be accountable. People have to understand what it's doing, why it's doing it, what, you know, what's the basis of its decisions. And so for democratic accountability, I think it's important for the Central Bank to be transparent. And I testify all the time, I give speeches, I have all kinds of town halls and other kinds of meetings like this and I think it's very important for me, I give press conferences, it is very important for me to explain what we're doing and why we're doing it, so that's one reason for transparency. The other is that over time, there has been increased understanding that for most of the time, transparency can make monetary policy work better. So for example if the Federal Reserve communicates that its future actions will be X or Y and conveys that information to the markets, the markets may respond to that by building those expectations into the interest rates and may have a more powerful effect in the economy. So communication also reduces uncertainty and helps increase the impact of monetary policy in financial markets. I have time only for one more. Yes.

Student: Thank you, Mr. Chairman. My name is Jay [inaudible] and my question is in regards to price stability and inflation expectations. You mentioned the importance of that macroeconomic stability and long run economic growth. And given the massive amounts of liquidity that's been pumped in the market recently, how has the Fed been able to maintain inflation expectations so low?

Chairman Bernanke: So, we're going to have to come back, let me ask for us to try to stick with that particular topic. On the last day we'll be talking about current monetary policy, we have plenty of opportunities. But let me just answer just in the following very brief way which is that I think we owe something to our predecessors in this respect, Chairman Volcker in particular, and also Chairman Greenspan, you know, got inflation down low and kept it there. And people get used to what they see, right? And in a world in which inflation remains low, you know, year after year, people are going to become more and more confident that the Central Bank, the Fed or whoever will meet its mandate of keeping inflation low. And so, it has been very striking that even though we've had movements in oil prices and other shocks to the economy of deep recession of financial crisis, everything throughout most of the period, inflation expectations had been very well tied down to about the two percent range that the Fed is trying to hit. Thanks, and next week, we'll go into more into the crisis. Thank you very much.

[Applause]

Dr. Tim Fort: Okay, well this has certainly exceeded my expectations and we're grateful that you stayed all the way to 2 o'clock, yet again. As with Tuesday, I know that there are still pent up questions, students, that you have and so why don't you send one or two questions to the Blackboard site so we can capture them, so we can talk about them not next week but the

following week when we have our discussions. Have a great weekend everybody. We will see you next week. [Applause]