Economics of Banking and Finance Markets
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Lecture - 35
Financial crisis-II

Hello, everyone. Welcome to this session. In this session, we will apply the concepts whatever we learned in the previous sessions about Financial Crisis.

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The Mother of All Financial Crises: The Great Depression 1929-30

- How did a financial crisis unfold during the Great Depression and how it led to the worst economic downturn in U.S. history?
- This event was brought on by:
- **Stock market crash:** In 1928 and 1929, prices doubled in the U.S. stock market.
- **Bank panics:** defaults on farm mortgages led to large loan losses on bank balance sheets in agricultural regions… prompted substantial withdrawals from banks, building to a full-fledged panic in November and December of 1930, with the stock market falling sharply.
- By 1933, more than one-third of U.S. commercial banks had failed

We apply all that framework to understand the sequence of events in the Great Depression of 1929 and 2007–8 crisis. We will be looking at this one from an economic angle, what led to, what caused this financial crisis and then we will apply this sequence of events in our framework.

So, the first one, the Great Depression of 1929–30 which lasted for one decade and this one is considered as the mother of all financial crisis. And importantly our question here is how a financial crisis unfolded during the Great Depression, and how it led to worst economic downturn in US history.

And this event was brought on by the stock market boom in the beginning, there was stock market stock boom in 1928-29. The stock prices doubled in the US market in these years.

The Federal Reserve officials viewed the stock market boom as caused by excessive speculations. So, to curb it they pursued a tightening of monetary policy to raise interest rates to limit the rise in stock prices. As we have seen in one of the previous sessions when the rate of interest declined, you know that when the rate of interest reduced in setting the prices of stocks, we have seen that when the monetary policy of reducing the rate of interest to increase stock prices.

So, when the Federal Reserve, the Central Bank realized that there is a boom the stock prices almost double and it is because of speculation, they understood that is a speculation that the stock price is not really reflecting the economic fundamentals, the monetary authorities tried a tight monetary policy to increase the rate of interest to reduce the stock price. As a result, the stock price declined further.

But the Fed got more than it expected when the stock market crashed in October 1929 by falling by 40 percentage by the end of 1929. So, that means, because of this tight monetary policy, it led to one of the crash biggest crashes in the stock price in the US. Further, to add to this, there were some other related aspects also happened in the US, one of them was many defaults on farm mortgages.

In parallel to the stock market crash, a bank panic also emerged in the US, especially in the agriculture sector. There were defaults on farm mortgages which led to large loan losses on bank balance sheet in agricultural regions. So, it prompted substantial withdrawals from banks, and building into a full-fledged panic in November and December of 1930 with the stock market further falling sharply.

So, two things we can see when the stock market fell because of the tightening monetary policy, the net worth of many firms declined. It affected their ability to repay their loans, that is one, and many banks experienced default risk, and in addition, there was default on farm mortgage as well.

So, then by 1933, more than one third of the US commercial banks had failed. The banking crisis happened, one third of the US commercial banks failed by 1933; that means, a full-fledged banking crisis erupted.

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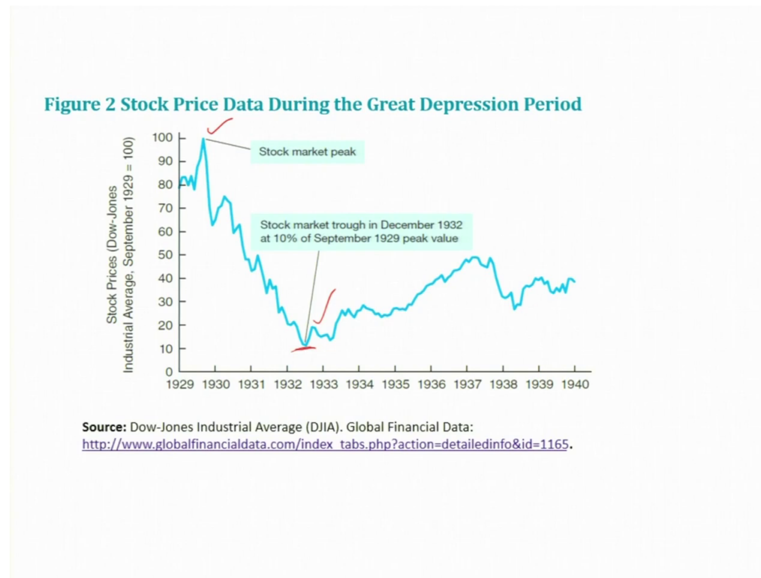

So, you can see the stock price in 1929; that means, the peak of the stock price, then because of the tight monetary policy, there was huge crash, sharp decline in the stock market price. So, as further this led to the asset market component, that the asset price effect, that is the stock market crash. Then, as we seen in the figure, the diagram that we discussed in the previous session, is that even led to the banking crisis.

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The Mother of All Financial Crises: The Great Depression 1929-30

- **Continuing decline in stock prices**
- By mid-1932, stocks had declined to 10% of their value at the 1929 and the increase in uncertainty from the unsettled business conditions created by the economic contraction worsened adverse selection and moral hazard problems in financial markets.
- A manifestation of the rise in financial frictions is that lenders began charging businesses much higher interest rates to protect themselves from credit losses. The resulting rise in the credit spread—the difference between the interest rate on loans to households and businesses and the interest rate on completely safe assets (U.S. Treasury securities)
- **Debt deflation**
- Declining economic activity eventually led to a 25% decline in the price level. The huge decline in prices triggered a debt deflation in which net worth fell because of the increased burden of indebtedness borne by firms and households. The decline in net worth and the resulting increase in adverse selection and moral hazard problems in the credit markets led to a prolonged economic contraction in which unemployment rose to 25% of the labor force.

Continued decline in stock prices by mid 1932, stock had declined to 10 percentage of their value, and there is increase in uncertainty from the unsettled business conditions created by

economic contraction, which worsen the adverse selection and moral hazard problems in financial markets.

A manifestation of the rise in financial friction is that lenders began charging businesses much higher interest rates to protect themselves from credit losses. That means, there are only a few lenders in the market, and because of the financial friction those who are in the market, they started charging high interest rate to protect themselves from credit losses.

The resulting rise in the credit spread, that is the difference between the interest rate on loans to households and businesses and the interest rate on completely safe US treasury securities began to increase. That means, there is increase in credit spread that happened in the US.

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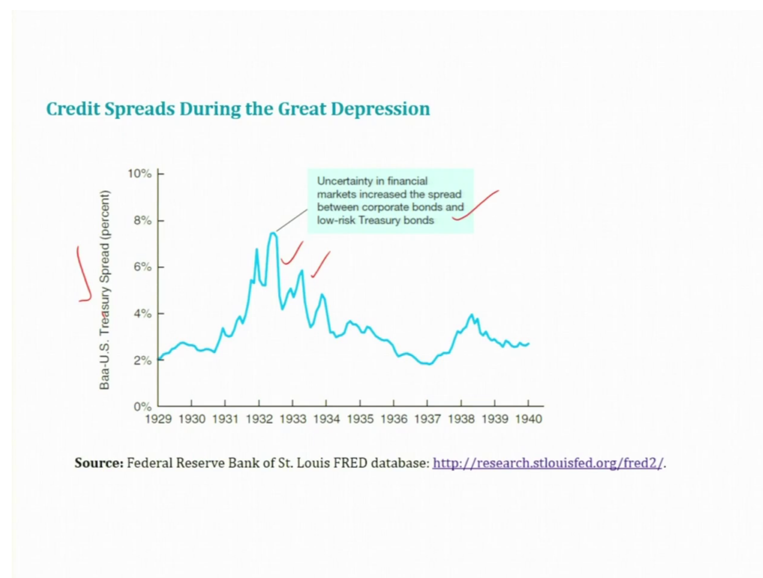

So, coming to the credit spread this is the credit spread during the great depression that the uncertainty in financial market increased the spread between the corporate bonds and the low-risk treasury bonds. So, this is the credit spread that increased further and further during this period. So, you can see an increase in the spread.

It became expensive for the borrowers to borrow because the interest rates for private firms increased. So, you can see that because of this, it led to decline in economic activity which further led to debt deflation; declining economic activity eventually led to a 25-percentage decline in price level.

We normally expect a moderate inflation, but you can see because of this economy experienced a 25-percentage decline in the price level, and since it was an unanticipated one, the huge decline in price triggered debt deflation in which net worth fell because of the increased burden of indebtedness borne by firms and households.

The decline in network and the resulting increase in adverse selection and moral hazard problems in the credit market led to prolonged economic contraction in which there is sharp decline in GDP and unemployment rose to 25 percentage of the labour force. So, here we can see that because of the series of events finally, the financial crisis led to the economic recessions where we can see that the unemployment rose to 25 percentage.

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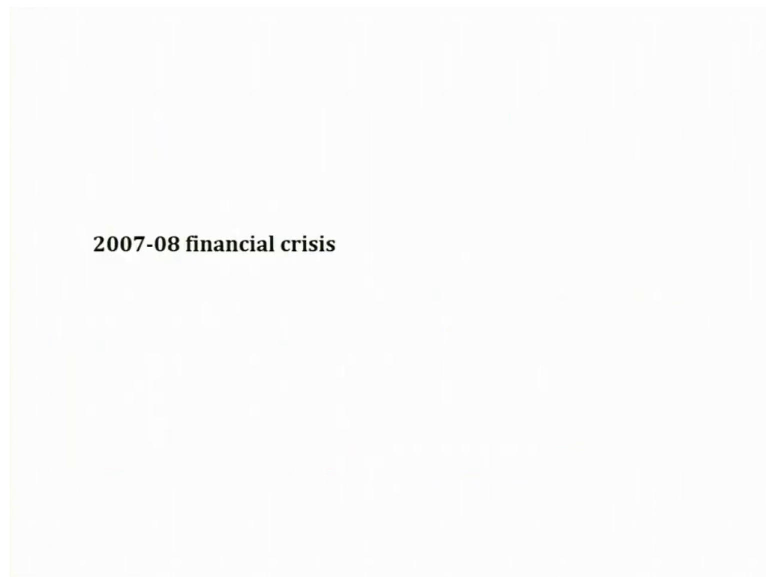

Let us now see apply the framework in understanding 2007–8 financial crisis.

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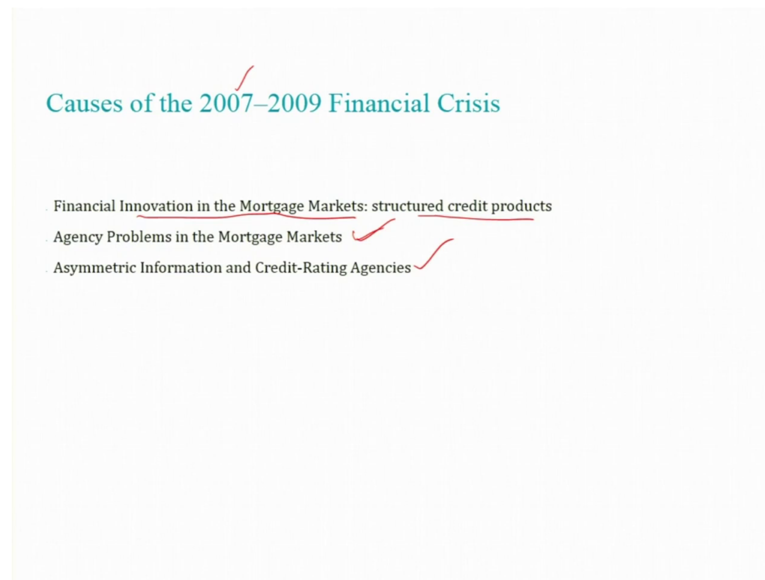

About the 2007–2009 crisis, what we can see that in 2007 it was mostly a subprime mortgage crisis; then in 2008 it became a financial crisis, and in 2009 it became an economic crisis. About the causes of 2007-09, overall, there is a debate on what caused the 2007–8 crisis, however, most of the arguments were in favour of that the financial innovation in the mortgage market is one of the reasons.

The financial innovation that is led to financial engineering, the development of new sophisticated financial instruments led to structured credit products in the financial markets. So, this created new products in the market, many people, even the investors, were not able to properly understand the actual economic fundamentals behind these financial products, then see lots of new products coming in the market.

As an outcome of financial engineering, most of these products did not truly reflect it is economic fundamentals. In addition, we can also see many agency problems in the mortgage markets because mortgage brokers who originated the mortgage loan often did not make a strong effort to evaluate whether the borrower could pay off the mortgage since they planned to quickly sell the loans to investors in the form of mortgage-backed securities.

So, agency problems happen here, they could not clearly take the default risk, the ability to pay back of the mortgage by the borrower, that also they could not investigate. In addition, we can also see that there were asymmetric information problems in the market. Credit rating

agencies who rate the quality or debt securities in terms of the probability of default, were another contributor to the asymmetric information in the financial markets.

So, we will see that the rating agencies advise clients on how to structure complex financial instruments in the market, and at the same time, they were rating these identical products. That means, they help as the conflict of interest that we have seen in the previous session, they advised them as the consultant for them, and they developed their products, at the same time they rated the same products as well.

So, that is conflict of interest, because of the large fee they earned from advising clients on how to structure products, and at the same time the income that they are earning from rating as well. So, all this led to the financial crisis.

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Stage 1:

Causes of the 2007-2009 Financial Crisis:

- Financial innovations emerge in the mortgage markets
  - Subprime mortgage
  - Mortgage-backed securities
  - Collateralized debt obligations (**CDOs**)
- Housing price bubble forms
  - Increase in liquidity from cash flows surging to the United States — 2001
  - Development of subprime mortgage market fueled housing demand and housing prices

So, in stage 1, what we can see that the causes of 2007–8–9 financial crisis mainly it is because the financial innovations emerging in the mortgage market. This in the first phase, which we have seen that the asset price effect happened. It was led by subprime mortgage, and mortgage-backed securities and collateralized debt obligations contributed to the first stage of financial crisis.

So, what is subprime mortgage means? So, subprime mortgage means giving housing loans to high-risk people, otherwise who is normally loans will be given to prime borrowers, but subprime borrowers mean those in otherwise unable to pay back. The financial innovation

and some of the economic and political developments in the US system promoted subprime mortgage.

Then because of the financial innovation, these mortgages were further developed into new financial products called mortgage-backed securities, and then these one, further developed into CDOs. So, this is the historical development, the increase in liquidity from cash flow surging into the United States happened in 2000 after 2001 when the economy was in near recession, and there was increase in liquidity from cash flows when the economy bounced back.

Then, as a result, the development of subprime mortgage markets fuel housing demand and housing prices.

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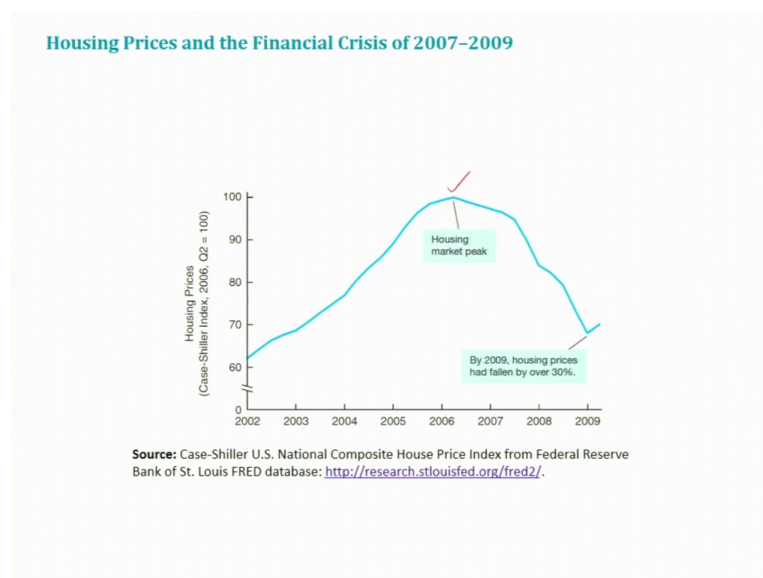

We can see that, because of both the increase in demand for housing, and at the same time more liquidity with the banking system, there was a peak in the housing price at the end of 2006.

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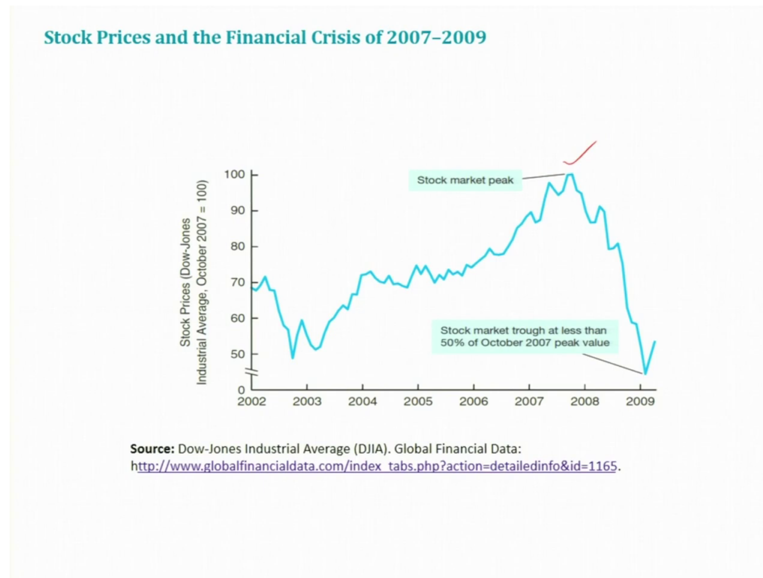

This again, there was an increase in stock market price, at its peak in the beginning of 2007.

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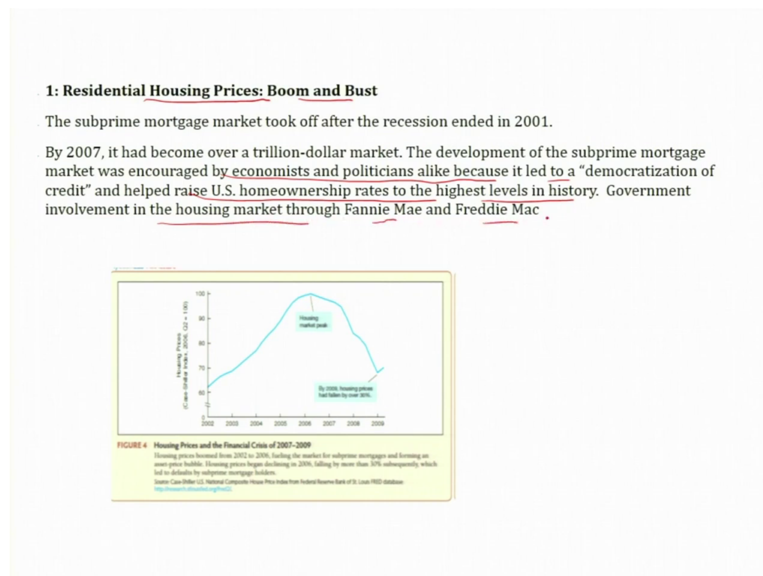

And let us see is the historical background. So, the historical background here is there was residential housing prices boom and bust. The boom happened because the subprime mortgage market took off after the recession ended in 2001. So, by 2007, it had become over a trillion-dollar market. The development of subprime mortgage market was engaged by economists and politicians alike because it led to democratization of a credit and help to raise US homeownership rates to the highest levels in history.

From an equity perspective, fairness perspective, everyone supported; they have been encouraging the lending to the subprime borrowers as well. That means, otherwise they are not eligible; based on the normal market condition, many people would not be eligible to get loans because of they do not have much collateral, their default risk was very high.

So, but because of the development happened in 2001, there was an increase in liquidity in the market, and then as a result there had been increase in overall support in favour of increasing the housing ownership. So, the even government involvement was also there in the housing market through Fannie Mae and Freddie Mac.

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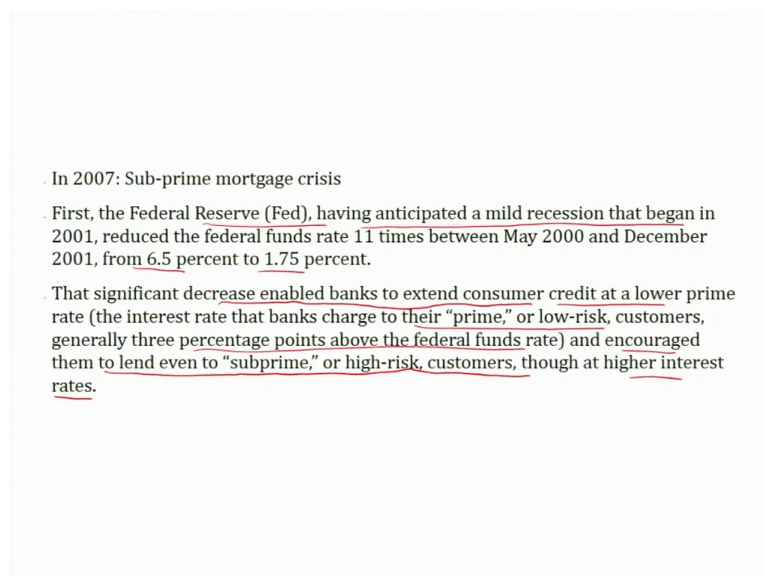

So, you can see that the Federal Reserve having anticipated a mild recession that began in 2001 reduced federal funds rate 11 times between May 2000 and December 2001; that means, it was to 6.5 in 2000, then it became 1.75 percent by the end of 2001. That means significant decrease in the interest rate in the market, a significant decrease in the interest rate enabled banks to extend consumer credit to a lower prime rate. The interest rate that banks charge to their prime or low risk customers generally 3 percentage above the federal funds rate.

And, since the rate of interest declined considerably in the market, the banks anyway lend 3 percentage above the federal funds rate to their prime customers and still are left with more cash, more liquidity. It encouraged them engage them to lend even to subprime or high-risk customers though at a higher interest rate.

Because market interest rate is very low, they even charged a little bit higher interest rate than the prime customers, then they extended the housing loans especially to subprime customers.

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Mortgages and Mortgage backed Securities

- Mortgages: Collateralized loans where the house that the borrowers are going to buy acts as the collateral.
- Securitization is the financial practice of pooling various types of contractual debt such as residential mortgages, commercial mortgages and selling their related cash flows to third party investors as securities
- MBS were a attractive investment because:
- High expected returns
- Less risky
- Very liquid
- Banks could make profit from these transactions
- Banks could transfer their risks

In the US market, the mortgages and mortgage-backed securities became a prominent in 2006-5–6–7 period. The mortgage means the collateralized loans where the house that borrowers are going to buy act as collateral. And, then there was a securitization as well; that means, a financial innovation or financial engineering.

That is, the securitization is the financial practice of pooling various types of contractual debt such as residential mortgages, commercial mortgages, and selling their related cash flow to third party investors or securities; that means, generating new financial products out of mortgages residential mortgages.

So, these mortgage-backed securities were an attractive investment opportunity for many investors because for them, it looks like a very new product a completely new product. They are not really knowing what the securities behind it are, the collaterals behind it, instead of their finding, it is a new product, and they are offering high expected returns and seemingly less risky and very liquid.

That means, what we can see here is that the collateral loan, the mortgage loans are converted into a new product, new financial products, and that was often traded in the market. So, banks could make profit from this transaction and then banks also could transfer their risk because

the cash flow from these loans will be handed will be handed to third party investors, right. It was handed into other firms, and it will be further sold out to new investors.

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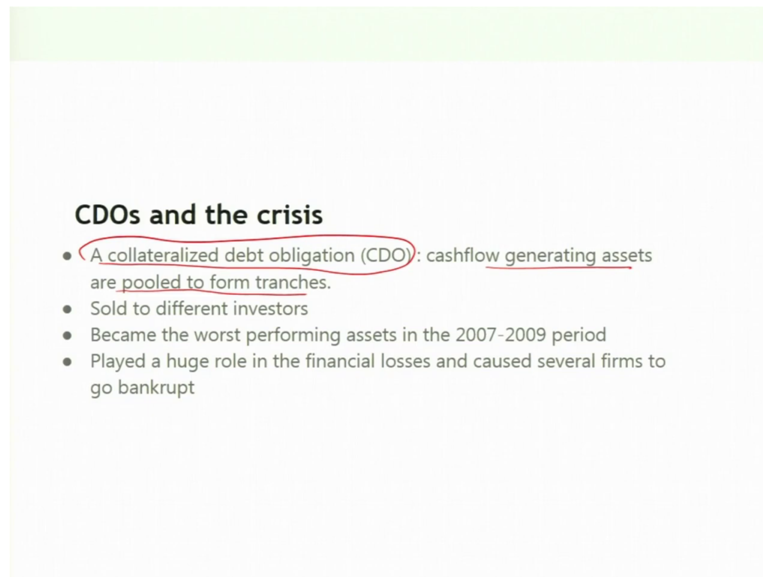

So, then further, this MBS, that the mortgage back securities, even out of them which is the high-risk component where the cash flow is low from those MBS mortgage-backed securities, new products were generated. That is, where the cash flow is less, it was further developed as new financial product called collateralized debt obligation, CDOs.

So, the cash flow generating from assets are pooled to form new tranches and sold to different investors again.

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Collateralized Debt Obligations (CDOs) (2 of 2)

- The highest rated tranches, referred to as super senior tranches are the ones that are paid off first and so have the least risk.
- The lowest tranche of the CDO is the equity tranche and this is the first set of cash flows that are not paid out if the underlying assets go into default and stop making payments. This tranche has the highest risk and is often not traded.

So, let us see what this collateralized debt obligation is, how it was developed.

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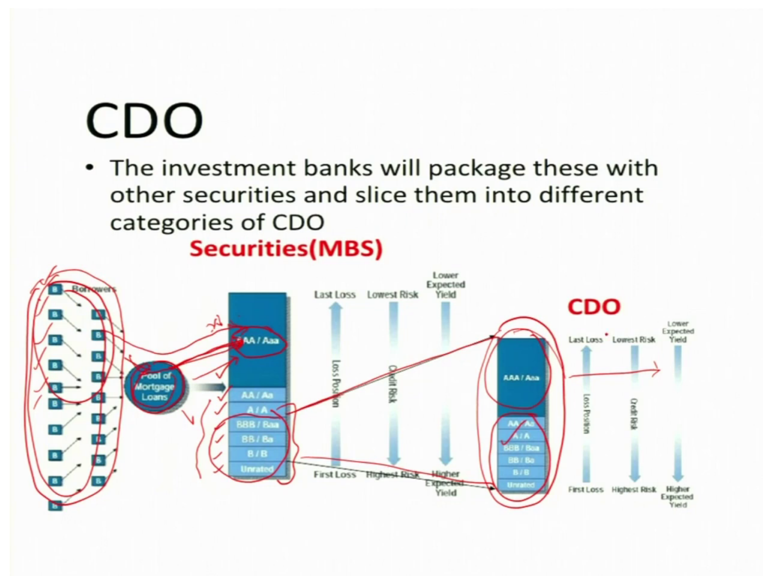

By seeing this figure, you will get an idea. Here what they did that these are all the housing loans, that is, mortgage loans to individual borrowers. All these were made into a new financial product called pool of mortgage loans because of the financial innovation and this has been rated as triple A; that means, low default risk. That means, the flow, which is coming from many borrowers, who is making no default.

Suppose these many borrowers are not making any defaults; they are repaying their EMI on time repaying their loan every month on the scheduled date, then that one will be categorized, within this whoever is repaying that will be categorized as double A.

This is the pool itself, mortgage loans, it is grouped into a different category, that is one product is this, another is this, this, like this. So, when there is a pool of fund coming, it will be first given to these people those who are is owning triple A products, for them the rate of interest will be low.

Low rate of interest will be given to them, and then if there is no default because here the default risk is high. So, here if they are paying back, then these people will be getting, but here they will be getting high interest income if they are paying, that is the condition. Then further what is happened that among this group, the high risk attracted, it was made into new products called CDOs.

This again, look at here, the point again, within the mortgage loans this high risk is further made into a new financial product called CDO, this again. how further within that again, there is highly rated and low rated products CDOs again.

So, here you can see that here the risk will be very high for these people, but they will be getting high expected return, but during financial crisis 2007–8, what happened that those whoever owned this CDOs they didn't get back their return and the banks who gave these loans began to suffer.

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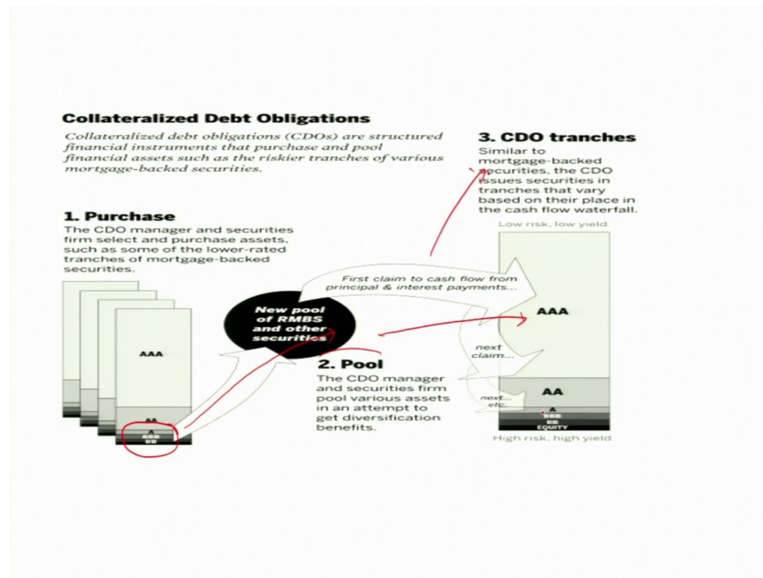

So, this is another illustration of this one, that is the CDOs, this is from the low rated component of the RMBS is transformed into CDOs, then this is converted into CDOs. CDOs. The CDO managers and securities firm pool various assets to get diversification benefits and this one further made into triple A, double A kind of products. So, that means, CDOs transits have been made.

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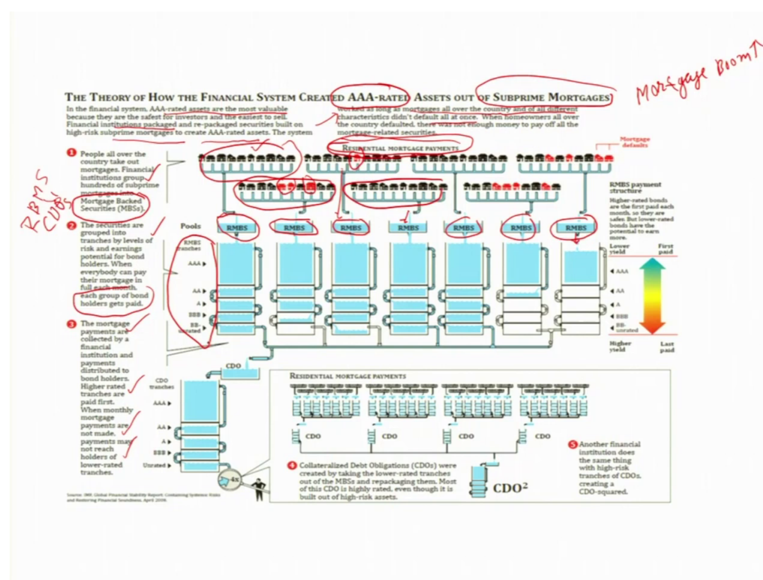

This is the full illustration of this one, the theory of how the financial system created triple A rated asset out of subprime mortgage. Actually, in this triple A rating, that means, you know

the low default risk with high quality asset, this has been generated out of subprime mortgages. So, in the financial system the triple A rated assets are the most valuable because they are the safest for investors and the easiest to sell.

And financial institution packaged and repackaged – first they packaged into residential mortgage pay securities that is residential backed mortgage securities, first they made into like that, then they further repackaged into CDOs, that is further they did it. So, repackage securities built on high-risk subprime mortgages to create triple A rated assets.

The system worked if the mortgages will all over the country and of all different characteristics did not default at once all at once. That means, what we can see that initially there is housing prices boom, because of the increased demand for houses, you can see that initially there is mortgage boom in the country, but that was the boom obviously, you know that it must burst over time.

So, though in the short run, you can see that there was increase in the stock price. Those whoever had bought these securities, they all started benefiting in the beginning. So, what we can see that people, all over the country take mortgage loans, then financial institutions group hundreds of subprime mortgages into mortgage-based securities, that is first stage.

Then the securities are grouped into tranches by levels of risk and earning potential for bond holders. When everybody can pay their mortgages in full each month, each group of bonds holders get paid, that is in the initial phase. This is the initial phase of mortgage boom, then the mortgage payments are collected by a financial institution and payments distributed to bond holders.

So, higher rated tranches are paid first, when monthly mortgage payments are not made payments may not reach holders of lower rate tranches. So, this is the initial situation. So, in this case, let us look at this figure how things move on further.

So, this part, you can see that this one is residential mortgage payments; that means, these are the individual borrowers, mortgage borrowers. So, we can see here is that this tranche has been grouped into a group of borrowers. Suppose this one is group made into one RMBS group one group, another group of borrowers have been grouped into another group of resident mortgage-backed securities, then this one is made into another group and then here, you can see like that.

But you see here is a red colour; that means, default risk is very high here, that means, different groups of residential mortgages based on their pay were made into different RMBS, in that way different RMBS has been created. And, then the payments from this one, because it has been made into different products that the payments from this RMBS have been made into different groups that you can see that triple A, double A, A, BBB, BB minus and unrated like that.

Let us continue this discussion in the next session, we need discuss some more aspects to in this 2007–8 crisis. See you in the next session.

thank you.

Keywords: financial crisis, he great depression 1929-30, stock market crash, financial crisis 2007-2009, financial innovations, structured credit products mortgage markets, subprime mortgage, mortgage-backed securities-MBS, collateralized debt obligations-CDOs, housing price bubble