

# **The International Financial Crisis of 2007-2009**

日本人学生のための英語の金融危機入門

by

Kenichiro YAMADA

Jiao TONG

Marc BREMER

## **1. Introduction**

The American subprime loan crisis ignited the world's worst financial crisis since the Great Depression of the 1930s. More than 20% of American home loans are in serious trouble and 140 U.S. banks failed in 2009.<sup>1</sup> What at first seemed to be a conventional real estate bubble and bank crisis largely confined to the United States spread around the world to have a devastating impact on people and businesses with little apparent connection to the American economy. The current market prices of homes are significantly lower in many countries. Unemployment is close than 10 percent in many parts of the world. Corporate profits and stock prices are far lower too. Even the mightiest of Japan's companies, Toyota Motor Corporation, reported the largest deficit in its history. The crisis, while similar to many of the financial panics that have troubled the world in the past, is closely related to the development of "structured finance".

Structured finance means that the cash flows from one kind of security (for example, a home loan) are separated and re-combined to create new securities. Structured finance is one of the most important innovations of the last thirty years. It has grown a great deal. By one measure, structured financial products of about \$100 billion were created in first three months of 2007.<sup>2</sup> Much of this was for American home loans. Yet, the market for structured financial products collapsed as the crisis exploded to be only \$5 billion in the April to June period of 2008.

This paper describes the crisis and how structured finance made the crisis far worse. Although much of the terminology and logic of structured finance is complex, its basic intuition is not difficult. This paper is an attempt to explain it at a level that is accessible and serves the interests of Japanese students who would like to improve their English skills.

## **2. Structured Financial Products**

Traditional banks accepted deposits from individuals and businesses. The banks then lent this money out to people and industry. These loans were typically short-term for businesses. Loans to individuals were both short-term and long-term. Longer term loans were to finance major purchases such as a car. These loans had terms of three to

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<sup>1</sup> Williams, 2010.

<sup>2</sup> These statistics and others below, unless noted to the contrary, are from Brunnermeier, 2009, Coval, Jurek and Stafford, 2009, and Mayer, Pence and Sherlund, 2009.

five years. Mortgage loans to purchase houses typically had much longer terms—as long as thirty years. Banks usually held these loans to maturity; the borrower would simply repay the bank. This business model is called, “originate and hold”. “Originate” means that the bank found the borrower, made sure the borrower would repay the loan and then finally lent the money while following all appropriate laws and procedures. Because banks wanted to be sure to be repaid, they collected detailed information about the creditworthiness (信用度<sup>しんようど</sup>) of borrowers and the collateral (担保<sup>たんぽ</sup>) or guarantees that secured the loans. The “hold” portion of the term means that the bank would collect all payments from the loan, including the final repayment of the loan. Because they held the loans for a long time, banks had strong incentives to continuously monitor the ability of borrowers to repay the loan. In an accounting sense, the loan was an asset on the bank’s balance sheet for its entire life.

Changes in regulations and business practices in the United States that started in the 1980s permitted banks to gradually adopt a new business model. There was a separation of the “originate” and “hold” functions. Banks began to “originate”, “securitize” and “distribute”. Banks still originated in the sense that they found borrowers and lent money. Yet, once these loans were made, the banks created a new security from the promised cash flows on these loans; it was called a Collateralized Debt Obligation (CDO) (債務担保証券<sup>さいむたんぽしょうけん</sup>). These CDOs were similar to bonds. Like bonds, the CDOs represented a promise to receive money in the future; the CDO payments were actually the repayments of the loans that the bank originated. The CDO’s value came from the promised future cash flows and also from the value of the collateral that was connected to the loan. The banks would then sell these CDOs to investors—this is the “distribute” part of the business model. These investors buy the CDOs to earn a higher interest rate and also because they believed that the CDOs were safe. When interest rates were very low in the early 2000s and there seemed few high profit, safe opportunities, investors from all over the world were eager to buy these CDOs. Once the CDOs were sold, the banks were only involved with the loan to collect the payments and pass these payments on to the investors who owned the CDOs. In an accounting sense, the banks no longer held the loan on their balance sheet. The banks made a profit by charging fees to borrowers and investors in the CDOs.

In the new bank business model, banks no longer felt it necessary to be quite as careful when originating loans because they planned to “securitize” the loans and sell them to investors. Similarly banks were less concerned with the long-term ability of borrowers to repay loans because they did not intend to keep the loan. They were less concerned with the value of the collateral for the same reason.

Also from the 1980s in the United States, many firms entered into the banking business. These firms were not conventional banks; they did not accept deposits from

individuals, nor were they closely regulated (規制される) by the government. Yet they were banks when it came to making loans. Some were traditional investment banks; others were parts of industrial corporations. Some specialized in making home loans.<sup>3</sup> These firms are part of a class of financial firms called “shadow banks” (非銀行金融機関). In some cases these shadow banks were extremely aggressive in the way they originated loans, sometimes making loans to people and businesses that were not likely to pay the loans back. Some shadow banks were actually connected with the United States government. These included the Federal National Mortgage Association {a U.S. government sponsored business similar in some ways to Japan’s Jusen (住専) and often called Fannie Mae}, the Federal Home Loan Mortgage Corporation (another U.S. government sponsored business nicknamed Freddie Mac) and the Government National Mortgage Association (Ginnie Mae). These shadow banks played a major role in the production of CDOs.

Although CDOs can be constructed from almost any kind of debt, the most important type of loan that banks used to create CDOs was American home mortgages. A mortgage is loan to an individual American to buy a house. The collateral for this loan is the house itself. The originating banks would combine the mortgage loans for many houses into Mortgage Backed Securities (MBS) (不動産担保証券). These MBS would be sold to investors. Of course, there is always a risk that a loan will not be repaid. The borrower might lose his job, or perhaps have a serious health problem. In the United States, when the borrower cannot make the promised payments on his home loan, the lender can take the home, and sell it to recover the borrowed amount. The risk of an MBS will therefore depend on both the creditworthiness of the borrower and the value of the home as collateral. Of course, the investors who owned the MBSs were concerned about these things, but could not effectively monitor the risk of the loans because they did not have detailed information about the borrowers. The investors relied on private credit rating companies to evaluate the risk of non-payment. In addition, investors who were concerned that the promised payments of their CDOs might not be made could buy Credit Default Swaps (CDS) which are insurance against non-payment.

In response to the enormous demands of investors and the apparently high profits that could be earned, the banking system aggressively expanded the amount of structured finance products that it produced. Initially, most MBS were based on high quality, low risk residential mortgages, many of which were effectively guaranteed by the companies associated with the American government. Eventually banks started to increase the number of higher risk residential mortgages in the MBS that they created. This was accomplished through a process of combining different kinds of debts. The first step is to form diversified portfolios (有価証券一覧表) of mortgages and other

<sup>3</sup> Alternative Mortgage Transaction Parity Act, 1982.

types of loans, corporate bonds, and other assets like credit card receivables. The next step is to slice these portfolios into different tranches (French for slice). These tranches are then sold to investor groups with different preferences for risk. The safest tranche—known as the “super senior tranche”—offers investors a (relatively) low interest rate, but it is safest because it is the first to be paid out of the cash flows of the portfolio. Note that it is safe only in the sense that it has a prior claim on the payments from the home loans. It has no protection against loss of liquidity (市場の流動性), early repayment by borrowers, changes in interest rates or declines in market value. In contrast, the most junior tranche—referred to as the “equity tranche” or “toxic waste”—will be paid only after all other tranches have been paid. The mezzanine (French for middle) risk tranches are between these extremes. Figure 1 shows the logic of the originate, securitize and distribute business model.

\*\*\*\* Figure 1 about here \*\*\*\*

A very clever thing about slicing the cash flows into payment priorities for the debt instruments was that different risk level MBSs can be made from the same securities. With the cooperation of the rating agencies, a portfolio of relatively risky mortgages could be structured into securities that seem extremely safe (and receive the very high credit safety rating of AAA) and other more risky securities. Among the most risky of American residential mortgages are subprime loans and ALT-A loans. These mortgages have a fairly high chance of default. Yet, with the right structure of cash flows, these mortgages can be turned into a combination of apparently safe MBS and other more risky securities.

### **Subprime Loans**

Generally, subprime loans are mortgages given to borrowers with poor credit records. Poor credit records result from paying debts late or not paying debts at all. Because subprime borrowers have a high risk of not paying, their loans usually have substantially higher interest rates. So, for example, while a creditworthy borrower could get a home mortgage at 5 percent interest, the same home mortgage might cost a subprime borrower 7 percent interest or more.

Subprime lending started to become popular in the U.S. in the middle 1990s, with outstanding debt increasing from \$33 billion in 1993 to \$332 billion in 2003. As of December 2007, there was an about \$1.3 trillion in subprime mortgages outstanding. A substantial proportion of all the mortgages that originated in 2006 were subprime. Figure 2 shows the increase in subprime lending. This increase was because banks and other lenders discovered that they could make large profits from origination fees, bundling mortgages into securities, and selling these securities to investors.

\*\*\*\* Figure 2 about here \*\*\*\*

**Alt-A Loans**

A classification of home mortgages where the borrower's creditworthiness falls between prime and subprime is Alternative A (Alt-A). The borrowers of these mortgages usually have good credit records, but the mortgage itself might have some features that mean greater risk. These could include high loan-to-value and debt-to-income ratios or inadequate documentation of the borrower's income. High loan to value means that the size of the mortgage is close to the value of the house. High debt-to-income means that the promised payments on the mortgage are a large proportion of the borrower's annual income. Alt-A loans are more risky than prime loans and typically have higher interest rates.

**NINJA Loans**

NINJA is a term for loans extended to borrowers with "no income, no job and no assets". Whereas most lenders require the borrower to show a stable stream of income or sufficient collateral, a NINJA loan ignores this verification process. Most NINJA loans offer the borrower a low initial interest rate; later this interest rate may be increased. The NINJA borrower may hope that the value of their house will appreciate significantly, allowing them to repay the loan. However, if house's value does not increase, NINJA borrowers may have great difficulty making the mortgage payments. This makes NINJA loans very risky for lenders.

**Adjustable Rate Loans**

Yet another risky type of home loan is an adjustable rate mortgage (ARM). Borrowers would initially pay a relatively low interest rate on their home loans. Later, the interest would increase. The increase meant that borrowers have to make larger monthly payments on the loans. This could be difficult for borrowers and consequently, these loans also were more likely to experience default. In early 2007, as much as 80 percent of subprime loans had adjustable rates.<sup>4</sup>

**There Was a Massive Demand for Structured Finance Products**

Extremely high savings rates by developing countries, middle-east oil exporters and export focused countries such as China and Japan created a huge demand for AAA-rated debt. Figure 3 shows how much higher the interest rate was for MBS compared to safe government and company bonds in 2003. Strong demand for AAA-rated debt encouraged investment banks to create too much AAA-rated debt from their portfolios of home loans causing newly issued AAA-rated MBS to actually be much more risky than in the past. Larger proportions of subprime, Alt-A and ARM mortgages were in these portfolios. Investors demanded safe, higher interest rate investments and were willing to "pay" for these investments. The American banking industry supplied these investments, except that they could not actually provide "safety". Safety was

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<sup>4</sup> Dodd, 2007.

manufactured by structuring the cash flows of these mortgages and also by providing credit default insurance by selling CDS.

\*\*\*\* Figure 3 about here \*\*\*\*

### Underwriting (引受業務) Quality Declined

Banks aggressively expanded their lending to capture more fees and supply the enormous demand for CDOs. More loans were given to borrowers with little or no documentation of their income and assets. More loans were given to borrowers who were investing in houses, not living in the houses. These investors were speculating that the price of the house would increase. These investors are more likely to abandon the house if its market value falls below the mortgage value. More mortgages had low initial interest rates or did not require repayment of principal. These mortgages could thus have negative amortization (負の割賦償却) meaning that the mortgage balance could increase over time. There was evidence of increased borrower misrepresentation in many home loans. There was an increase of NINJA loans. Of course, there was concern that many of these loans were not as safe as they should be. Yet, bank officers felt that the profits from continued lending were justified. In 2007, the president of one of America's largest banks admitted that at some point the rapid increase in lending and fees would end, but also said, "When the music stops, in terms of liquidity, things will get complicated. As long as the music is playing, you've got to get up and dance. We are still dancing."<sup>5</sup>

Even though the risk of the mortgages actually rose due to the substantial increase in the proportion of subprime loans included in the portfolios that backed the MBS, bankers believed that the risks of subprime loans could be managed as long as home prices continued to rise. Yet the rapid rise in home prices was not sustainable. American home prices actually started to fall in 2006. As home values started to decline, many borrowers realized that the value of their home was exceeded by the amount they owed on their mortgage. These borrowers began to default on their loans, which drove home prices down further and ruined the value of mortgage-backed securities forcing companies to formally recognize losses because the underlying assets behind the securities were now worth less.

### 3. The Credit Ratings Agencies (格付け会社)

The key to the development of the market for structured financial products was the ratings agencies. In the recent past, economists argued that banks had a unique ability to evaluate the creditworthiness of borrowers. This ability was based on bank's intimate knowledge of borrowers and their superior analytical skills. Investors in structured finance products such as MBS really cannot evaluate the creditworthiness of individual borrowers or determine the collateral value of particular pieces of real estate. Structured finance products can only be sold when investors have reasonable confidence in the safety of the cash flows promised by the CDOs. Investors will not completely

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<sup>5</sup> Nakamoto and Wighton, 2007.

trust the originator of the CDO; these originators will naturally be tempted to overstate the CDOs safety to earn higher profits for themselves. The solution was provided by an independent third party whom investors thought they could trust to make an objective and accurate evaluation of the risk of the CDO. This third party was a credit rating company—the same companies that had long evaluated the safety of corporate and government debt for investors.

There are three big credit ratings agencies in the United States: Moody's, Standard & Poor's, and Fitch IBCA. They assign credit ratings to institutions that issue debt and the debt itself. CDOs were assigned credit ratings. It is important to understand that these credit rating companies are profit seeking companies—not government agencies. They provide credit ratings for fees that are paid by the debt issuers, or in the case of CDOs paid by the originating banks. Fitch IBCA and Standard & Poor's use a system of letter grades ranging from the safest rating at "AAA" to "D" for debt that is already in default. Table 1 shows credit ratings for Fitch IBCA. Generally, the interest rate (yield) of a CDO will depend on its risk. A low-rated/high risk security will have a high interest rate. Conversely, a high-rated/low risk security ranked as AAA rating will have a lower interest rate. The idea is that securities with higher risk of non-payment will have a higher interest rate.

\*\*\*\* Table 1 about here \*\*\*\*

Unfortunately the credit rating agencies did not do a good job of measuring risk. CDO securities with safe credit ratings actually had much more risk than investors realized. The agencies made poor guesses about the probability of borrowers failing to pay their loans back. This was especially true for borrowers of subprime loans. The rating agencies did not understand that the risk of default on the loans was highly correlated; they assumed that default risk on the home loans was similar to the default risk on corporate debt.<sup>6</sup> The ratings agencies made significant mathematical errors in their rating calculations.<sup>7</sup> They also assumed that house prices would *constantly increase at 5%*.<sup>8</sup> This was wildly optimistic and extremely wrong.

In addition to misunderstandings, errors and very incorrect assumptions, there is concern that the rating agencies were not genuinely objective. The agencies worked closely with the originating banks. The tranches of the MBS were designed with the cooperation of the rating agencies. Rating agency' profits depended on rating fees and

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<sup>6</sup> Similarly, most investors also did not understand the high systematic risk of these securities. Traditional assumptions about corporate debt, especially the assumption of independence, do not apply to MBS. For example, the risk that General Motors Corporation will fail to pay its debts was not highly related to the risk that General Electric Company will fail to pay its debts. On the contrary, the risk of non-payment on an MBS based on loans made to buy homes in Michigan *was* highly related to the risk of non-payment on an MBS based on loans made to buy homes in New York. See Coval, Jurek and Stafford, 2008, for more about this.

<sup>7</sup> Jones, Tett and Davies, 2008.

<sup>8</sup> Rodriguez, 2007.

the selling of credit rating data. These fees were paid by the originating banks. Hence, the rating agencies may have been influenced by the originating banks. This is a conflict of interest (利益相反<sup>りえきそうはん</sup>) because safer ratings, perhaps unrealistically safe ratings, would earn greater profits for the rating agencies.<sup>9</sup> The rating agencies may have been too generous when they granted high/safe credit ratings.

#### 4. The Collapse of Structured Finance and the Financial Crisis of 2007-2009

American home prices increased rapidly from the late 1990s until about 2007. Robert Shiller (2006) estimated that this increase was about 83 percent, far higher than the historical average increase. There were several causes; among the most important were very low interest rates and easy to get home loans made possible in part by structured finance. However, the rapid increase in home prices was not sustainable. Interest rates started to increase and gradually home prices began to fall. This was the trigger of the subprime crisis. At the same time, default rates on subprime loan and adjustable rate mortgages (ARM) began to increase quickly. However, once interest rates began to rise and housing prices started to drop during 2006–2007 in many parts of the U.S., refinancing became more and more difficult. And falling prices also made homes worth less than their mortgage loans providing a big financial incentive to enter foreclosure (ていとうながい<sup>ていとうながい</sup> 抵当流れ). Home owners would not want to pay more for the house than it is worth, so they stopped making payments on their mortgages.

The fall in house prices was mainly in the United States, though a similar pattern appeared in some other countries as well. Foreclosures and mortgage loan delinquencies started to rise in 2005, becoming quite large by 2007. The share of subprime mortgages that were seriously delinquent increased from about 5.6% in the middle of 2005 to more than 23% in September, 2008. The default rates on Alt-A mortgages which had increased from 0.6% of all mortgages in 2005 to more than 11% by September, 2008 also began to increase. Home prices began a rapid fall. This was the first country-wide decline in American home prices since the 1930s. Other recent home price declines had been regional.

As American home prices fell and defaults on mortgages increased, the market value of structured finance products collapsed. MBSs and CDOs were no longer eligible to be used as collateral. Indeed their complexity and increasing doubts by investors about the validity of their credit ratings made it almost impossible to determine the value of CDOs. The country-wide nature of the home price decline meant that a diversified package of home loans in a MBS was *not* a safe investment, as many investors had thought. The market values of even the safest AAA-rated MBS fell.

Investors in CDOs were not the only ones to suffer substantial losses. Banks and shadow banks also held large portfolios of home loans and CDO. Banks did not

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<sup>9</sup> United States Security and Exchange Commission, 2008.

hold only risky MBS (which might have suggested to investors that the banks had faith in MBS as an investment). Banks held far more MBS than might be necessary to hold as “inventory” while they are combining home loans into different tranches and packages to resell as MBS. Banks seem to have invested in MBS because they thought that AAA-rated MBS were good investments. But as the crisis developed, AAA-rated MBS actually had a *greater* decrease in their market values than lower rated MBS. The losses on CDOs experienced by American banks were so large that the banks started to fail.

### **American Banks Loved Risk**

Bank managers seem to have changed their thinking to take more risk, or perhaps, bank managers did not understand the risks they were taking. Bank chief executive officers may have taken excessive risks to “keep up” with other apparently more profitable banks even though they understood that these risks were not genuinely creating value. Flawed internal controls and rewards may have allowed and encouraged lower-level bank officers to take risks.

Banks and shadow banks developed a dependence on short-term finance. They changed the way they raised money to invest in their business. Formerly, banks would borrow for relatively long periods with instruments such as certificates of deposit (CDs) (譲渡可能定期預金証書). Banks shifted to very short term borrowing over the period from 2000 to 2007. This was in part because interest rates were very low due to American central bank policy. Bank managers may have felt that the chairman of the American central bank would automatically increase the money supply if there were a credit crisis or economic downturn. This is an example of moral hazard.<sup>10</sup> Furthermore, large banks may have believed that they will always be rescued if they get into trouble. They are “Too Big To Fail”. Hence they were encouraged to take greater risks by borrowing more as well as borrowing for shorter periods.

Banks were able to borrow a large portion of their liabilities at very low rates of interest for periods of months, weeks and even days. Each month, week or day, the banks would have to re-pay the maturing claims and borrow again. This exposed the banks to liquidity risk. They might not be able to get new loans if market conditions became bad, or investors had doubts about the bank. As the subprime crisis got worse banks and non-banks became illiquid—they could not borrow at all—they could not renew their short-term loans. The large New York investment bank, Bear Stearns lost so much money on its investments in CDOs that it could not borrow anything from other banks and investors. Bear Stearns was rescued with the help of the American

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<sup>10</sup> Moral hazard is similar to something you might remember from the old Superman movies you saw when you were a child. Consider the case of Superman’s girlfriend, Lois Lane. Lois knew that Superman would always rescue her if she got into trouble. Consequently, she was never careful; she always took big, foolish risks because she knew that she would be saved. She was always falling off of tall buildings and bridges as well as getting caught by the bad guy in those movies.

central banks. In September of 2008, the giant investment bank, Lehman Brothers failed. But Lehman's failure was different from Bear Stearns; Lehman was *not* rescued. The failure of Lehman Brothers was the prime note in this disaster although other large financial institutions were also at great risk. The spreading difficulties of banks meant a collapse in lending, triggering a world-wide financial panic and recession that even hit Japan. Unemployment increased in the United States and around the world as consumers stopped buying expensive items (especially cars). Consumers found it difficult to get loans from banks and then worried about whether they would even have jobs in the future.

### **Loss Spirals**

As banks recognized the extent of their losses on CDOs and faced greater difficulty borrowing money, they aggressively sold assets. Yet these sales greatly pushed down asset prices which seemed to make the value of the assets that the bank still owned less. So the initial CDO losses induced selling, which lowered values, which induced more selling. It was a vicious cycle that made banks very reluctant to make loans to other banks or businesses. Similarly, investors grew concerned that their deposits and loans to banks might be in danger. These investors withdrew their deposits, refused to renew their certificates of deposits and even demanded that the securities they had let banks borrow be returned. The result was a massive world-wide contraction in the availability of credit to banks, businesses and individuals. Even good businesses and individuals with excellent credit histories could not borrow. While a vicious cycle was happening in the U.S. residence market where declining home values caused mortgage defaults which caused foreclosures which caused distressed home sales which caused declining home values. A similar terrible cycle was happening in the banking system. The result was a world-wide financial panic.

### **Credit Default Swaps**

Investors in CDOs and debt in general can purchase insurance to protect against the risk of the debt's payments not being made. This insurance is called a CDS. Many investors also purchased this insurance for their MBS. Among the largest sellers of CDS was American International Group (AIG).<sup>11</sup> AIG received insurance premiums to guarantee that investors would not lose on their MBS investments. As the subprime crisis worsened in the late summer of 2008, the CDS insurance contracts required that AIG deposit very large amounts of money in a safe form to protect the MBS investors from loss. The required amount was so large that AIG could not pay it, nor could AIG borrow this amount. AIG was on the verge of failure. It was rescued at the last moment the American government.

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<sup>11</sup> AIG's managers actually thought that there was zero risk that the MBS would default. See Morgenson (2008).

## Broader Consequences

As the crisis developed, U.S. home prices continued to fall (See Table 2 for a list of the major events that occurred in the crisis). By September of 2009, about 15% of all American home mortgages were in trouble. Up to 9 million home foreclosures could happen by the end of 2012.<sup>12</sup> The American stock market fell by about 45 percent between July 2007 and November 2008 (although the stock market had recovered a great deal by January 2010). Businesses and individuals could not get loans; investment and consumer spending collapsed causing huge losses to auto makers and other producers of expensive items. American car makers General Motors and Chrysler were forced into bankruptcy.

In the financial sector, banks and shadow banks were devastated. Most American mortgage origination companies failed, closed or were taken over by other firms. About 165 American banks failed between 2008 and 2009. Several giant investment banks have been in great distress; Lehman Brothers failed; Bear Stearns and Merrill Lynch were taken over by other banks while on the verge of failing. The bosses of Bank of America, Merrill Lynch and Citigroup have resigned. Losses on MBS lowered bank capital so much that the American government was forced to take emergency measures to increase bank capital. This was done by buying bank equity {something similar to nationalization (国有化)}, through loans to banks, and purchases of troubled assets (such as MBS) from banks.<sup>13</sup> The giant insurance company AIG was rescued by the American government as it was about to fail. Gigantic mortgage companies Fannie Mae and Freddie Mac were taken over by the government as they were about to collapse. The commercial paper market where most large U.S. businesses borrow for short periods collapsed and required help from the American government. The rescue of the financial system will cost hundreds of billions of dollars.

Other countries were hit by the financial panic too. Housing bubbles in Britain, Iceland, Spain and other countries collapsed with huge losses. Non-American banks also faced substantial losses. Some even failed. The impact of the panic was less direct but just as real in Japan.<sup>14</sup> Major exporters, such as Toyota and Sony experienced sharp decreases in sales in the United States and other parts of the world. The lowering of interest rates in the United States contributed to a strengthening of the yen which reduced Japan's exports. Japanese firms cut back on the number of workers they employed and reduced investment. University graduates had great difficulty finding jobs. Japan's economy went into a recession and there is now a real possibility of price deflation.

## Conclusion

The financial crisis is not over. Bank failures, bankruptcies and home foreclosures are still happening, so it is premature to reach conclusions. Still, it is clear that Americans

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<sup>12</sup> Center for Responsible Lending, 2009.

<sup>13</sup> Emergency Economic Stabilization Act of 2008.

<sup>14</sup> This was not the first time an American real estate bubble had an impact on Japan. See Bremer and Futagami, 1991.

borrowed far too much money on terms they could not honor. Similarly, foreign investors put far too much money into CDOs with inaccurate expectations about the safety of these investments. In part this overwhelming tide of foreign investment was a consequence of foreign government policies that sought to build up dollar holdings from trade imbalances. These dollars had to be invested somewhere; the apparent safety and apparent high profits of MBS brought these dollars to uncreditworthy Americans with the help of short-sighted, fee-obsessed bankers. Banks had changed to an “originate, securitize and distribute” business model. They were far less concerned with the ability of borrowers to repay their debts. The credit rating agencies proved incapable of monitoring the repayment ability of these borrowers.

In addition, banks changed the way they raised money to operate their businesses. They became extremely dependent on short-term funds. They also invested heavily in MBS. When the American real estate bubble burst, their MBS investments lost so much, so fast that they became insolvent. They were unable to borrow new short-term funds because investors feared they would not be repaid. It seems clear that bank managers, especially managers of shadow banks, did not understand the risks they took by relying so much on short-term funds. Nor did they understand the risks of MBS. They may have assumed that they would simply be rescued by the government. This is the problem of moral hazard. It is likely that future changes in the regulation of banks will attempt to reduce the moral hazard problem while making banks less risky. Regulation of shadow banks may become more like the regulation of conventional commercial banks. Nevertheless, structured financial products such as CDOs and MBOs will continue to play an important role in world finance. Hopefully investors, bankers and regulators will have a better understanding of the risks and complexities of these products.

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Figure 1

## Structured Finance: Creating a CDO

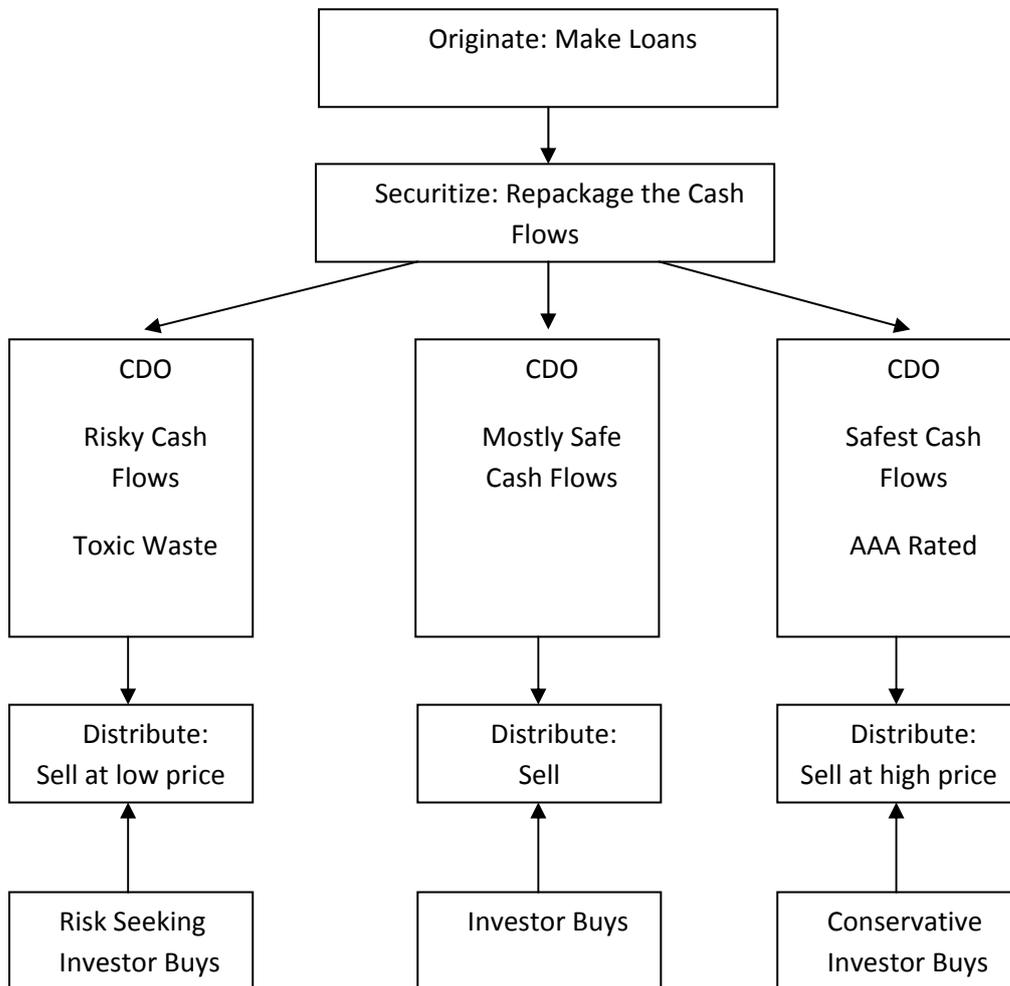
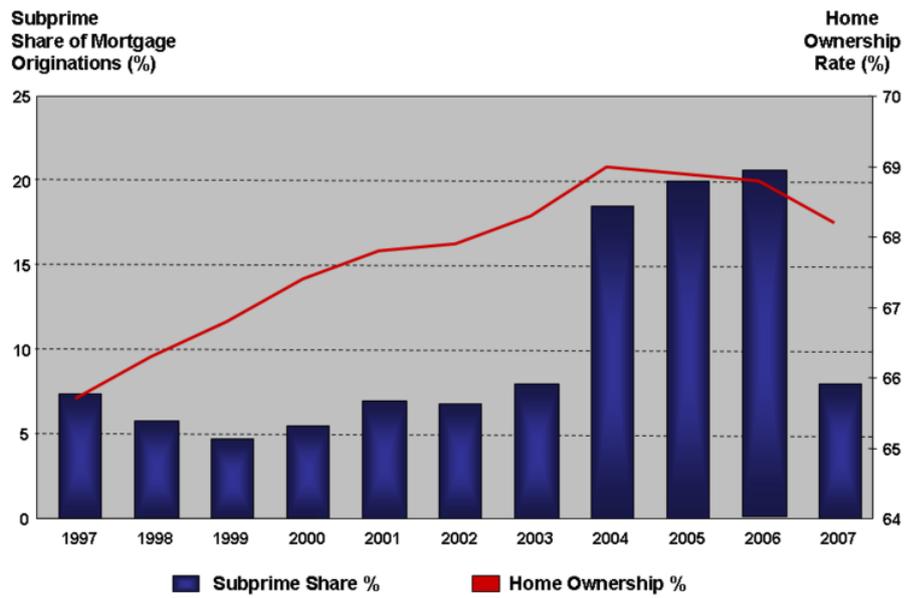


Figure 2  
Subprime Share and Home Ownership

U.S. Subprime Lending Expanded Significantly 2004-2006



Sources: U.S. Census Bureau; Harvard University- State of the Nation's Housing Report 2008

Figure 3  
Comparative Interest Rates

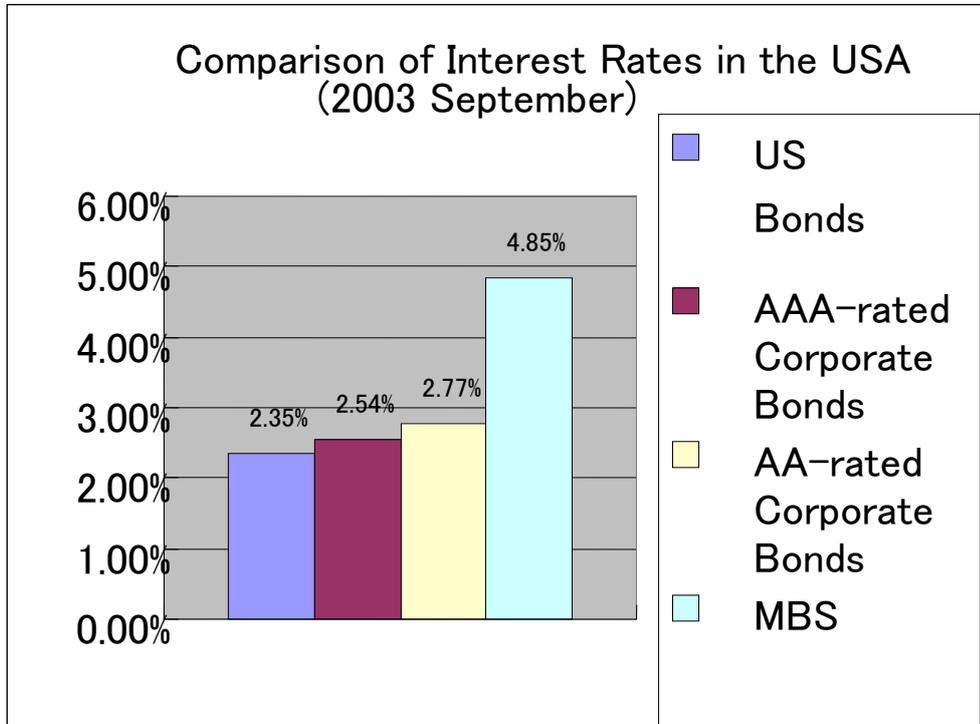


Table 1  
Credit Ratings  
(FITCH IBCA)

#### Investment Grade

- **AAA** : the best quality companies, reliable and stable
- **AA** : quality companies, a bit higher risk than AAA
- **A** : economic situation can affect finance
- **BBB** : medium class companies, which are satisfactory at the moment

#### Non-Investment Grade

- **BB** : more prone to changes in the economy
- **B** : financial situation varies noticeably
- **CCC** : currently vulnerable and dependent on favorable economic conditions to meet its commitments
- **CC** : highly vulnerable, very speculative bonds
- **C** : highly vulnerable, perhaps in bankruptcy or in arrears but still continuing to pay out on obligations
- **D** : has defaulted on obligations and Fitch believes that it will generally default on most or all obligations

Source: Wikipedia: The Fitch Group (2010).

Table 2  
Major Events During the World-Wide Financial Crisis 2008-2009

Date	Events
May 4 2007	UBS closed its internal hedge fund, Dillon Read, after losing about \$125 million on subprime investments.
May 2007	Moodys put 62 tranches across 21 U.S. subprime deals on warning for a rating downgrade.
June 20 2007	Two Bear Stearns hedge funds could not meet margin calls and required an injection of capital from Bear Stearns
June 25 2007	FDIC Chair Shelia Bair cautioned against the more flexible risk management standards of the Basel II international accord and lowering bank capital requirements generally: "There are strong reasons for believing that banks left to their own devices would maintain less capital—not more—than would be prudent. The fact is, banks do benefit from implicit and explicit government safety nets ... In short, regulators can't leave capital decisions totally to the banks."
July 19 2007	Dow Jones Industrial Average closes above 14,000 for the first time in its history.
July 2007	The market for short- term, asset-backed commercial paper collapsed.
August 6 2007	American Home Mortgage Investment Corporation (AHMI) declared bankruptcy. The company expected a \$60 million loss for the first quarter of 2007.
August 16 2007	Countrywide Financial Corporation, the biggest U.S. mortgage lender, narrowly avoids bankruptcy by taking out an emergency loan of \$11 billion from a group of banks.

August 17 2007	The Federal Reserve cuts the discount rate by half a percent to 5.75% from 6.25% while leaving the federal funds rate unchanged in an attempt to stabilize financial markets.
September 17 2007	Former Federal Reserve Chairman Alan Greenspan said "We had a bubble in housing" and warns of "large double digit declines" in home values "larger than most people expect."
September 18 2007	The Fed lowers interest rates by half a point (0.5%) in an attempt to limit damage to the economy from the housing and credit crises.
October 5 2007	Merrill Lynch announces a US\$5.5 billion loss as a consequence of the subprime crisis, which is revised to \$8.4 billion on October 24, a sum that credit rating firm Standard & Poor's called "startling".
October 31 2007	Federal Reserve lowers the federal funds rate by 25 basis points to 4.5%.
March 16 2008	Bear Stearns is acquired for only \$2 a share by JPMorgan Chase. The deal is backed by the Federal Reserve, providing up to \$30 billion to cover possible Bear Stearns losses.
July 11 2008	IndyMac, a large private mortgage broker, was put in conservatorship by the Federal Deposit Insurance Corporate (FDIC).
July 30 2008	President Bush signs into law the Housing and Economic Recovery Act of 2008, which authorizes the Federal Housing Administration to guarantee up to \$300 billion in new 30-year fixed rate mortgages for subprime borrowers if lenders write-down principal loan balances to 90 percent of current appraisal value.
September 7 2008	American government takeover of Fannie Mae and Freddie Mac, which at that point owned or guaranteed about half of the U.S.'s \$12 trillion mortgage market, were put into federal government conservatorship.
September 14 2008	Merrill Lynch sold itself to Bank of America.
September 15 2008	Lehman Brothers files for bankruptcy protection.
September 17 2008	The Federal Reserve lends \$85 billion to American International Group to avoid bankruptcy
From September 15 2008	<p>A world-wide credit crisis started</p> <ul style="list-style-type: none"> <li>➤ Bank and shadow bank runs started</li> <li>➤ Interbank lending stopped</li> <li>➤ Businesses and individuals could not borrow</li> <li>➤ Massive intervention by central banks and a re-capitalization of major banks</li> <li>➤ Major decrease in all economic activity all over the world—even Japan experienced the decrease</li> <li>➤ Massive fall in stock markets</li> </ul>