The Background of 2008 Financial Crisis and the Financial Derivates Involved

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Introduction

As a finance student, the first and most frequent thing that I hear throughout the study of the major is the 2008 subprime financial crisis – almost every finance class mentions it but not spending much time talking about it. Hence, I have always had the curiosity wanting to learn it better, as I think it will be the foundation for me to understand and absorb what is yet to happen in the finance world. This course has really helped me get a sense of what happened in detail. Both the lecture topic on debt securities and the 2008 financial crisis inspired me to research on this topic. Therefore, I took the opportunity for this paper and will try to get a broader and more systematic understanding with this unprecedented crisis throughout the finance history. I will mainly focus on the background of the crisis, the structure and significance of the financial inventions such as the process of financialization, asset backed securities, collateralized debt obligations, credit default swaps, and synthetic CDOs. Also, in this paper, I will describe who the major buyers and sellers were, the role credit rating agencies played, and the factors (focused on structured finance products and rating agencies) that caused these smartest people on Wallstreet oversaw the underlying risks that led to one of the worst financial crises in finance history.

2008 Subprime Loan Crisis Background

The fell in US real estate prices was the starting point of the 2008 US financial crisis. The mild 33% decline in real estate prices in the United States was somewhat hugely different in scale from the decline in real estate prices during the Japanese economic bubble in the early 1990s and the Asian financial turmoil encountered by Hong Kong in 1997. Therefore, many people thought at the time that this would only be a mild economic recession. In its periodic reports titled "*The Budget and Economic Outlook: An Update*", the Congressional Budget Office said, "*According to CBO's updated forecast for the rest of 2008 and for 2009, the economy is about halfway through an extended period of very slow growth…*" (Frederis, 2011). However, this mild decline surprisingly made the 2008 US financial crisis the most serious economic crisis

since the Great Depression in 1930. As the result, the global financial markets experienced the overall market panic, stock markets crashed, and the U.S. economy plunged into the longest duration since the 1930s Great Depression. Not only that, but many financial institutions went bankrupted, and most of the rest had to get supported by the federal reserves and the government.

One of the greatest features of the 2008 financial crisis was the wave of financial innovation in the United States before the crisis (Gorton, 2009). Asset securitization products and financial derivatives emerged during a fairly short period in large numbers, and the significant number of undiversified risks behind them was concealed through complex financial engineering. The real estate boom in the United States before the crisis led to low rates of borrowings, leading to a large number of the issuance of subprime loans, which became investment products through securitization and re-securitization to become mortgage-backed securities and collateralized debt obligations. It was also proved that it was some of these financial derivatives that accelerated and even led to this financial crisis. The below graph indicates the dramatic fluctuation in cost of borrowing prior and post the crisis, from which we can see the great impact the crisis caused to the financial world.

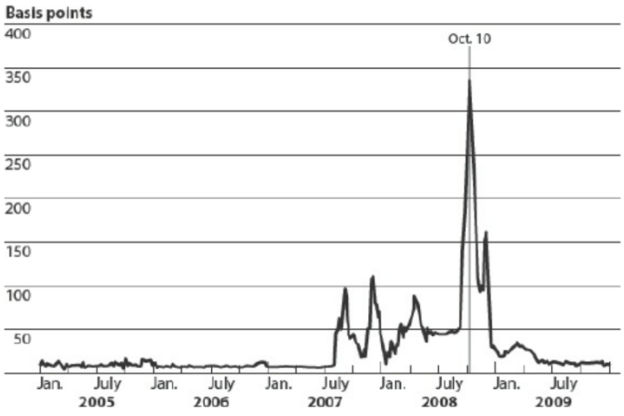


Figure 24. Cost of Interbank Lending, 2005-2009
Note: London Interbank Offered Rate (LIBOR) minus overnight index swap rate Source: Bloomberg

The Process and Significance of Securitization

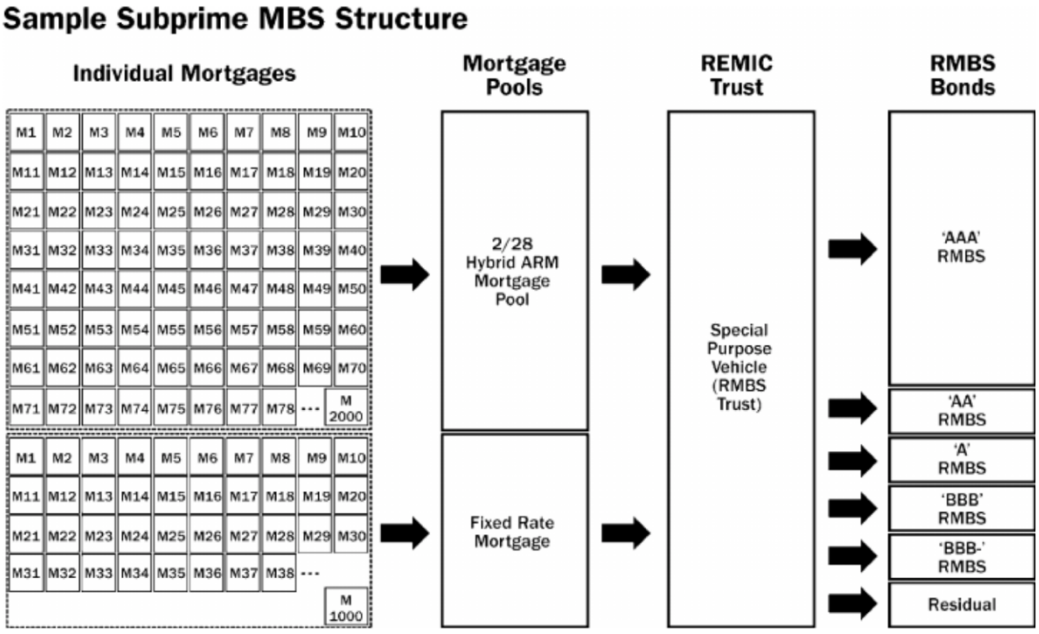
The business model of traditional banks is to absorb deposits and issue loans. But with the increasing demand for housing loans, American banks had found that the

traditional model had been unable to meet market demand. At the same time, traditional bank depositors were increasingly inclined to invest in bonds, funds or insurance with higher interest rates than bank savings deposits. Therefore, these two demands had led to the development of asset securitization. In Efraim Benmelech and Jennifer Dulgosz's paper, *The Credit Rating Crisis*, their definition for securitization is, "*a broad term that encompasses several kinds of structures where loans, mortgages, or other debt instruments are packaged into securities*" (Benmelech, 2009). Under the broad term, there are specifically two kinds of securitization, which are pass-through securitizations and tranched securitizations. Since the 1970s, Ginnie Mae and Freddie Mac have been structuring pass-through mortgage securities (Benmelech, 2009). These are the securities where cash flow generating assets are pooled together then get sliced into proportions, then the investors get the proportional return that is generated by the asset pools. Later in the paper, we will discuss the structures and underlying assets for the latter securitization type, that is the tranched securitizations. The significance of pooling and tranching is that it not only allows the sellers of the securities to maximize their revenues, but also it allows the investors to invest in the senior tranche, which is the most part of the security, hence greatly lower the underlying default risks (Benmelech, 2009).

Asset securitization products can have specific names. For example, housing loan-backed securities, corporate loan-backed securities, real estate investment trust funds, etc. Some other securitized products, such as auto loans, credit card accounts receivable, etc., are commonly referred to as asset-backed securities (Hull, 2010). The value of the securitized assets is based on the cash flow created by the asset pool rather than the value of the collateral, as is the case with secured lending (Fabozzi, 2008). The securitization of these loans can thus, without the existence of commercial banks as intermediaries, enhance the overall efficiency of the public capital market (Fabozzi, 2008).

From an economic point of view, asset securitization can reduce the financing cost of enterprises, because during the process of securitization, the credit rating of the financial institution itself can be isolated from the credit rating of the bonds issued,

thereby reducing financing costs through high ratings. In addition, asset securitization can also solve the problem of mismatch in maturity of assets and liabilities. Banks usually finance long-term assets with short-term liabilities. Therefore, by selling securitized products, banks can match the maturity of their long-term assets. In addition, asset securitization can also enable banks to reduce capital reserves by selling such assets to special purpose vehicle (SPV), thereby obtaining a higher return on equity for shareholders (Benmelech, 2009). Another big reason is to mitigate risks, banks can hence make profit without bearing the entire risks (Fabozzi, 2008). The following diagram simplifies and illustrates this process (Gorton, 2009).



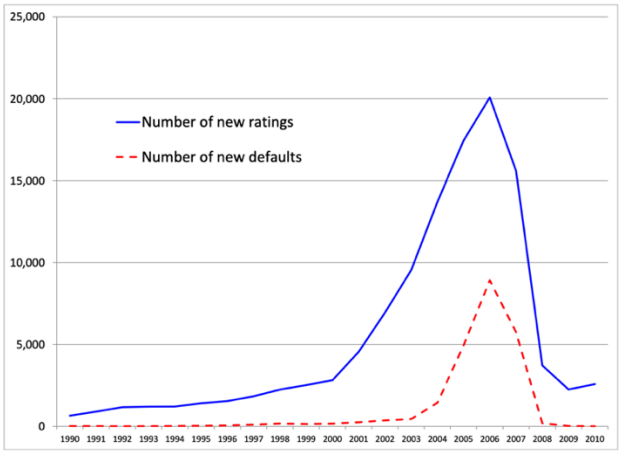
It is important to illustrate the shadow banking system when describing securitization as it is essential to the process. While bringing liquidity to the market, asset securitization was also being abused. In 2007, when the financial crisis began, the market began to use the term “shadow banking” to describe the drawbacks of asset securitization. The term “Shadow banking” could imply the disadvantages of structure finance products that were not under the supervision of the government. With the system, banks and financial institutions were able to package the loans into ABSs and CDOs, and tranche them based on their riskiness and eventually sell them to investors looking for different risk level investment opportunities. The securities, derivatives, and

off-balance sheet vehicles' underlying risks, however, could not be determined by most investors in the financial system (Gorton, 2009). The shadow bank contributed to the overall leverage of the financial system (Hannoun, 2008).

When the financial institutions (known as the asset originator) were securitizing the assets from their balance sheet, they first arrange these assets, which were mostly loans and other cash-generating assets, into asset pools. From there they transferred these pools to an issuing agent, mostly the special purpose vehicle (SPV) that was registered offshore. The advantage of this process is that, even if the initiator goes bankrupt or insolvent, it will not affect the transferred assets (Jobst, 2008). Then through these SPVs, the asset pools go through tranching and get sold to different investors (Jobst, 2008).

Since 1978 when the first securitization was invented, it experienced steady growth. However, during 1990 – 2000 period, the securitization market experienced rapid growth contributed by the trend in mortgage securitization (Hull, 2010). Between 2000 and 2006, there was an increasing number of new tranches being rated ever year at a rate about 39% (Hull, 2010). Based on the following plot (3), we could observe the rapid growth in the number of new tranches rated by S&P, then after 2008, these new tranches experienced a sharp drop in numbers.

Figure 2: Number of New Tranches Rated By S&P 1990 to 2010



(3)

Source: Hull, 2010

Credit Rating Agencies – Moody's, S&P, and Fitch

Credit rating is an important aspect in the bond market. Asset securitization transactions are generally rated by three credit rating agencies: Moody's, Standard & Poor's, and Fitch. In 1909, John Moody first published the bond ratings focusing on railroad bonds. No longer after the publishing, in 1916 Poor's Publishing Company published their ratings, and short followed by the Standard Statistics Company publishing theirs in 1922, and Fitch Publishing Company in 1924 (White, 2010). In 1941, the two leading companies Standard and Poor merged, and these companies became now the three rating agencies taking up about 95% of the market. The existence of these credit rating agencies is meant to help the money lenders to overcome the market asymmetries for the borrowers' information side and save the lender costs of investigating by themselves. Therefore, the trust of investors and the market in them is the most important intangible asset of these rating companies.

Prior to 1975, there were potential problems, however, existing within the rating business in bond market. The rating agencies gave out their letter grades such as AAA, BBB and so on to individual bonds through manuals at the time. The ratings of Standard & Poor's and Fitch are almost identical. The highest rating is AAA, followed by AA, A, BB, B, and the lowest rating is default rating including C and D (Hull, 2010). Financial institutions and investor usually regard BBB as the boundary between investment and speculation grades. BBB grade and above are considered by these institutions as investment level, while any bond grades below BBB are considered the speculative grade or known as the junk grade. According to the standard, the bonds are divided into two main categories: the investment grade and the speculative grade. In 1934, the Securities and Exchange Commission (SEC) was established and started regulating over the bond market. Only a few years post the great depression, SEC wanted banks to invest in only safe bonds with AAA grade and issued a set of regulations that prohibited banks from investing in bonds with the speculative grade in 1936 (White, 2010). The regulations in fact, gave these credit rating agencies the excessive power when giving out ratings because essentially their decisions were tied to the regulations that determines how the banks could act. SEC was worried this excessive power would lead to credit agencies only giving out AAA ratings to those companies who paid and

DDD ratings to those companies who didn't pay.

To deal with the potential conflict of interest, SEC established a new category named "nationally recognized statistical rating organization" or "NRSRO" which only included the three big rating agencies in 1975 and incorporated their rating results into the U.S. securities trading regulatory system (White, 2010). This act established the leading position and the central importance of the three rating agencies in bond markets. As the significance of this act, large conservative financial institutions such as banks, insurance, and pension funds that are not allowed to invest in lower rated bonds could thereafter simply consider the ratings when investing, rather than having to go through their own evaluations of the risks of the bonds.

Mortgage Types

There are mainly four kinds of mortgages which are the prime mortgage, the jumbo mortgage, the Alt-A mortgage, and the infamous subprime mortgage. The target customers of the prime mortgage are high-quality customers with high 700+ FICO credit ratings, stable income source, and reasonable debt burdens (Gorton, 2009). When they buy a house, the down payment ratio is usually 30%. Most people with stable jobs belong to this level of customers. The credit risk of Alt-A is higher than the former. Its target customers are those with unstable income, such as freelancers. Therefore, the instability of income has affected their credit rating. This type of loan requires a lower down payment ratio for the borrower and a higher tolerance for the Loan-to-value ratio. But the loan interest rate is higher than that of high-quality customers. Borrowers of subprime loans usually face four difficulties, they have hard time paying the down payment on the property; they have credit issues; they have unstable income; and they lack the necessary market information and understanding (Gorton, 2009). But they are willing to pay higher interest, so subprime financial institutions are willing to lend them money as well. The chart below illustrates the common market description of these mortgage categories.

Market description of mortgage categories.

Attribute	Prime	Jumbo	Alt-A	Subprime
Lien position	1st Lien	1st Lien	1st Lien	Over 90% 1st Lien
Weighted average LTV	Low 70s	Low 70s	Low 70s	Low 80s
Borrower FICO	700+ FICO	700+ FICO	640–730 FICO	500–660 FICO
Borrower credit history	No credit derogatories	No credit derogatories	No credit derogatories	Credit derogatories
Conforming to agency criteria?	Conforming	Conforming by all standards but size	Non-conforming due to docum-entation or LTV	Non-conforming due to FICO, credit history, or documentation
Loan-to-value (LTV)	65–80%	65–80%	70–100%	60–100%

Source: Gorton, 2009

To limit the subprime mortgage lenders' risk exposure, these mortgages were designed to cover shorter periods. This way, the lenders can still profit over short investment periods. Most subprime mortgages are also adjustable-rate mortgages (ARMs), meaning they have floating rates based on LIBOR (Gorton, 2009). Normally, this kind of structure would have its first or first two years when the borrowers pay a fixed rate, then the rate started to "float", or be depended by the updated interest rate plus the LIBOR rate at that time. However, the change in rates is limited by the caps the mortgages specify, the caps work in a way such that it limits the caps of rate could be in the first year the floating rate is imposed, the yearly rate change after that, and the accumulative lifetime floating rate change (Gorton, 2009). Other designs of the subprime mortgages led to the incentives of refinancing on them later in the payment period because these mortgages could only require the serious payments later in the period (Gorton, 2009). Since the subprime mortgages market was competitive prior to the crash, borrowers could refinance their current subprime mortgages with other similar subprime mortgages at similar or even lower front costs since they would accumulate these subprime liabilities (Gorton, 2009). Borrowers can thus, utilize this model to invest in properties, and get easy money as long as the property prices keep increasing.

Asset-backed Securities

Asset-backed securities, as mentioned above, are bonds made by combining various types of credit assets, such as housing loans, with these objects as self-holding assets, and sold to investors (Benmelech, 2009). These bonds will be graded to obtain different risk-return attributes and this process is known as “tranching”. Regarding the distribution of cash flow, the cash flow generated by the underlying asset will first be paid to the tranche with low risk and low return; then the remaining cash flow will be paid to the tranche with higher risk and return, and so on (Asset-Backed Securities). Asset-backed securities generally have three levels of tranches, and they are, according to the priority of cash flow distribution, senior tranche, mezzanine tranche, and equity tranche, from high to low gradings.

The issuance share of senior tranche generally accounts for typically 70~85% of total assets and has the highest AAA credit rating (Benmelech, 2009). Because of its relatively high reliability, its bond yield is also the lowest among the three tranches. The second is mezzanine tranche and this type of tranche generally accounts for 10% of the total assets. Its credit rating span is relatively large, including investment grade AA, A, and BBB grades, as well as speculative grade BB. Because of its relatively high risk of default, its bond yields are also high. The issuance of equity shares generally accounts for 5% of total assets (Hull, 2010). This type of tranche is generally not rated, and its characteristic is known as high risk and high return.

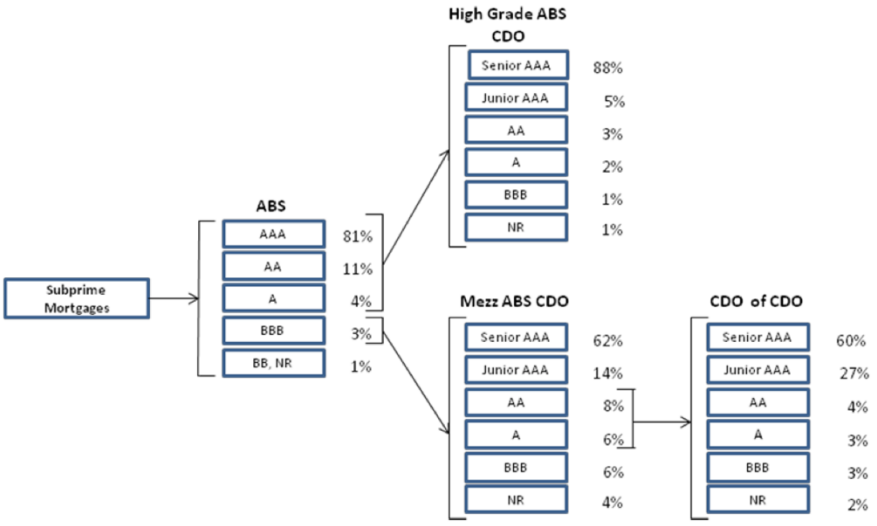
Complex multiple-layer Securitization (ABS CDO)

Collateralized debt obligations (CDOs) are structured finance securities that are pooled and tranched (Benmelech, 2009). CDOs can have many forms, in which the most common ones are the cash and synthetic (Jon, 2014). We will be discussing cash CDOs in this part, and synthetic later in the paper. The structure of the collateralized debt obligation (CDO) is exactly the same as the asset-backed securities (ABS) mentioned above, but the attributes of the underlying assets and the motivation of the issuers led to the completely different characteristics of the two. Like ABSs, CDOs first transfer the underlying assets to a special trust institution. These assets would then be converted into bonds through tranching and credit enhancement (Gorton,

2009). The underlying asset of CDO is different from ABS in a way that it includes securitized assets such as high-yield corporate loans, CDSs, ABSs, and CDOs (Jon, 2014). This process is called re-securitization. Basically, it takes these securitized assets' senior part and bundle them again to form new securities known as the high-grade ABS CDO (Hull, 2010). The utilization of CDOs allowed banks to achieve "regulatory arbitrage" (Jon, 2014). Then these asset pool gets sliced again into senior, mezzanine, and equity tranches with corresponding ratings. The structure becomes clear when comparing it with the diagram below.

Before the financial crisis, financial institutions believed that the real estate market was an easy-to-understand market. Therefore, they began to turn attention to the ABSs backed by subprime mortgages and use them as the subject matter to create new CDOs. It is the complex structure of CDOs that made it difficult and nearly impossible for investors to precisely access the underlying risks, because that would require the investor to go over the multidimensional loss distribution for the underlying portfolio (Jon, 2014). Furthermore, the significance of CDOs to the capital market remains questionable, as it was not providing any additional liquidity, in a way that, its underlying assets are liquid themselves. Gary Gorton (2009) thinks the motivation of the CDOs is for arbitrage (Gorton, 2009). As learned later, this financial product brought unprecedented risks to the market. As the result, main CDO players including banks, rating agencies, and investors all suffered from the loss during the crisis.

Figure 3: Example of Subprime Securitizations taken from Gorton (2009)



Source: Gorton, 2009

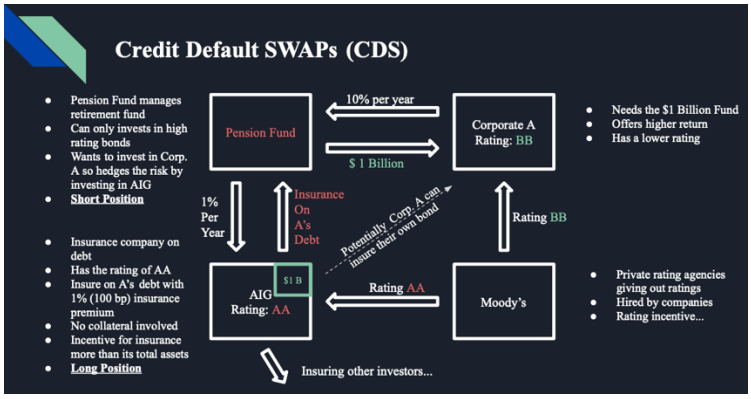
The distinction between High-grade ABS CDO, Mezz ABS CDO, CDO, $CDO^{2,}$ and even CDO^3 is the number of times it gets re-securitized and their underlying assets. Mezz ABS CDO, as its name suggests, takes the subprime mortgage-backed security's mezzanine trance as its underlying asset. CDO^2 (also known as CDO squared) and CDO^3 refer to the number of times the CDO gets re-securitized, as well as their underlying assets which are the mezzanine tranche of the former CDO (Gorton, 2009). It then got tranched again into three tranches: the senior grade, the mezzanine, and the equity. The high profit margin of CDOs attracted financial institutes to repeat the process to get rid of the mezzanine tranche so that the new CDO^2's senior tranche can again be sold to conservative investors such as market mutual funds when they were really the mezzanine tranche as indicated in the above diagram (Hull, 2010). This worked prior to 2006 because one of the big evaluation matrices for the underlying credit worthiness is the cash flow they generate. Since these subprime mortgages are likely to be refinanced over and over again, their cash flow was large and stable, which contributed to their high ratings (Gorton, 2009). As the result, CDO^2 and CDO^3 were invented for the purpose. The leverage and risks increased as the layers of re-securitization increase despite the AAA grades they had. This structing later caused the large amount of down gradings during the crisis since many people defaulted and the cashflow became unstable.

CDS (Credit Default Swap)

The investment banks that invented various types of CDO products knew the credit risks behind these AAA bonds, hence, credit default swaps (CDS) were invented as a tool to hedge the default risk. When these AAA-rated senior shares default, the CDS insurance companies would be responsible for compensation. CDS made the investment in these AAA bonds seem risk free. However, it is worth noticing that once the systematic default in these bonds happens, since now all the credit risks were transferred to those insurance companies, they would be exposed to the risk of

bankruptcy, which would lead banks to go bankrupt as well. We saw this happened during the 2008 crisis.

From the structure flowchart that I put together for the earlier presentation in class below, we can get a better sense of how credit default swaps work. There are four main bodies involved in a credit default swaps, the buyer of the CDS, as they are required to invest in only investment grade assets; the seller of the asset, they could be companies or investment banks who need to raise funds for various reasons; the insurance company who offers the CDS contract, which in this example, the American International Group (AIG); and the rating agencies that give out ratings to bonds.



The CDS issued by American International Group provided insurance services for the AAA-level shares of CDOs held by financial institutions and other investors. If the AAA bond defaults, AIG would compensate the financial institution or the investors. In the below example, we assume a pension fund who wants to invest in corporation A with a credit rating of BB. Due to the Investment Company Act of 1940, the pension fund and other money market funds are only allowed to invest in the investment level (AAA, AA+, and AA) (Benmelech, 2009). Hence, they would go through an insurance company, which in this case would be AIG with the credit rating of AA. AIG happily offers the credit default swaps that backs up corporation A's fund and receives the insurance premium paid by the pension fund. As the result, the pension fund gets to invest in corporate A since now the grade, being back by AIG, changes to AA. This process is called the credit enhancement. Assume that they get paid 10% as the return for investing in corp. A's bond and pays 100 basic points or 1% to AIG, they would still make a net of 9% return on this investment while transferring the risk of default to AIG.

The corporate A also gets the fund they need.

CDS is very similar to insurance. But when an insurance company sells insurance, the insurance regulatory agency will require it to set aside a reserve for compensation payments. Since CDS was not a regulated insurance contract, but a financial derivative, it was not limited to such a requirement. AIG gets the insurance premium payment, and they can repeat the process repeatedly for other pension funds to collect premium payments. The credit rating agencies, paid by the bond sellers, also gets profit. The high leverage nature and the gambling characteristic nearly brought the biggest CDS issuer at the time AIG to bankruptcy, if not later bailout by the government (Hull, 2010).

Synthetic CDO

The underlying assets of synthetic collateralized debt obligation (synthetic CDO) do not include any entity's asset securitization assets but those financial derivatives CDSs (Gorton, 2009). They work similarly to other financial derivatives in a way that the investors who invested in the highest quality AAA tranche are the first to claim the receipt of the mortgage payments. On contrary, the investors who invested in the lowest quality tranche are the first to loss their investment principles when default (Hamidieh, 2011). Synthetic CDOs are like most financial derivatives or gambling activities, and their leverage is extremely large. It was invented around 2006 after AIG realized they might be bearing too much credit risks from the CDSs they issued and stopped issuing more CDSs. Essentially, by investing in these synthetic CDOs, investors became the insurance offerors similar to AIG.

2008 Financial Crisis

Pre-Crisis U.S. Real Estate Market

Before the financial crisis, the entire US real estate market was frenzied. Investors expected that asset prices would continue to rise, so they continued to buy assets and asset securitization products to obtain profits. The policies played a big role in the process. In early 2001, affected by the bursting of the Internet bubble, US economic

growth began to slow down. In order to stimulate the economy, the Fed sharply lowered short-term interest rates. This relatively loose monetary policy on the one hand eased the economic recession, on the other hand, it also reduced the cost of housing contributions, allowing more people to get housing loans, especially those who was ignored before by banks as subprime mortgage borrowers with low FICO scores between 500-660 but typically below 640 (Gorton, 2009). These subprime borrowers mainly faced the following issues: they had hard time paying the down payment on the property; they had credit issues; they had unstable income; and they lacked market information (Gorton, 2009). In 2004, the Bush Administration's "American Dream" zero equity mortgage became active, enabling low-income families to obtain mortgages (Blundell-Wignall, 2008). In the meantime, the Office of Federal Housing Enterprise Oversight (OFHEO), who regulates the two government-sponsored mortgage securitization entities Fannie Mae and Freddie Mac, imposed more strict capital requirements and balance sheet controls on the two, which limited their ability to issue more mortgages and allowed banks to get into the business (Blundell-Wignall, 2008). As it turned out, the two entities issuance and outstanding amount of the mortgages fell from 80% to about 67% of the market since 2000 (Gorton, 2009). These factors worked together for banks to increase their issuance of mortgage securitizations to both drive the revenue and their return on equity (Blundell-Wignall, 2008). The subprime and Alt-A combined mortgage amount grew 800% over 2000-2007 (Gorton, 2009). Therefore, the US real estate market entered a period of rapid growth.

As housing prices soared, so did house sales. At the same time, the amount of new housing loans approved each year had also increased significantly. Investors refinanced to earn cash as long as the housing prices kept growing. During this period, various financial institutions such as banks, investment banks, and even insurance companies also participated and made money. They generally transferred risks through asset securitization and various financial derivatives mentioned above. Asset-backed securities were sold to the investors after being rated by three major credit rating agencies. Bonds of BBB level and below were sold to investment banks for re-securitization to become CDOs, and then sold to investors later. These investment banks

include Lehman Brothers, Bear Stearns, Merrill Lynch, etc. In order to achieve the purpose of credit enhancement, these investment banks usually purchased CDSs from insurance companies to maximize the proportion of AAA-level tranche. These insurance companies include American International Group (AIG). Finally, the investment grade portion of these ABSs and various types of CDOs were sold to the conservative investors such as pension funds and risk-averse individuals.

The Crisis

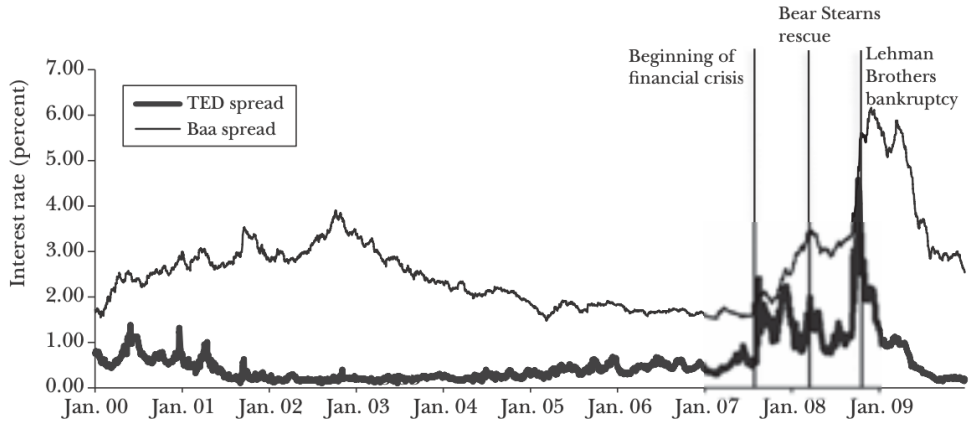
The cause of the 2008 financial crisis was the rapid depreciation of subprime mortgages in the United States. When housing prices began to fall, a large number of subprime mortgages defaulted, and the risk of asset securitization products quickly magnified with the number of times of them being re-securitizations. The shadow banks experienced runs due to market panic (Frederis, 2011). During a typical bank run, the bank depositors would suddenly, because of market panic, all require converting their deposits into cash, and these requirements cannot be satisfied because banks cannot convert its long-term liabilities and assets into short-term liabilities in such short time.

Shadow banks had their short-term liabilities in the form of short-term borrowing. A well-known short-term borrowing is the repurchase agreements, or repos. These repos are backed by MBSs and due to the potential price fluctuation, they require what is known as the "haircut" – the percentage between the amount a borrower gets and the value worth of MBSs they would have to put down as the collateral (Frederis, 2011). During the crisis, the value of MBSs fell dramatically, which led to the uncertainty in their future values as well. Thus, the haircut increased to as high as 50% which decreased the borrowing power of those financial institutions since now the same amount of MBSs can borrow fewer amount (Frederis, 2011). Therefore, they needed to "fire sale" their assets to repay these investors, and this formed a vicious loop that caused the property price to drop further (Frederis, 2011).

In Frederic S. Mishkin's paper, *Over the Cliff: From the Subprime to the Global Financial Crisis*, the credit spreads between 2000-2009 is discussed. The figure is in below. The "TED spread" is the interest rate spread between the risky financial

instruments, which in this case, the LIBOR interest rate on three-month Eurodollar deposits; and the safe financial instruments, which in this case, the interest rate on three-month U.S. Treasury bill (Frederis, 2011). The figure shows the TED spread rapidly went up during the crisis, from an average of 40 basis points before August 7, 2007, to 240 basis points by August 20, 2007 (Frederis, 2011). Such runs and the credit market disruptions led to the collapse of Bear Stearns in March 2008, for example.

Figure 1
Credit Spreads 2000–2009



Source: FRED, Federal Reserve Bank of St. Louis, and British Bankers' Association.
Note: The TED spread is the difference between the 3-month LIBOR rate and the constant maturity 3-month Treasury bill rate. The Baa spread is the difference between the constant maturity Baa rate and the 10-year constant maturity Treasury bond rate.

Blundell-Wignall, in the journal *The Current Financial Crisis: Causes and Policy Issues* also states that, "*Most of the early disasters in the crisis occurred where investment banks were involved*". Each level of re-securitization expanded the leverage and underlying risks within, causing many investment banks such as Bear Stearns, Merril Lynch, Citi, and AIG to suffer huge losses, and even leading to the bankruptcy of financial institutions such as Lehman Brothers (Blundell-Wignall, 2008). Re-securitization had also successfully turned the mezzanine tranches of most ABSs to AAA level. However, the credit quality of the underlying assets of these CDOs was not as high. This led to these CDOs being bought by those conservative investors and brought them huge losses.

Another potential main contributor to the 2008 financial crisis is the misconduct

among the three leading credit rating agencies. Lawrence J. White, in his paper *Markets: The Credit Rating Agencies*, described the roles these credit rating agencies played in the 2008 financial crisis. We have discussed the origins of the three credit rating agencies: Moody's, S&P, and Fitch. Prior to 1970s, they gave out their ratings though printed manuals to customers and earn money through customer purchases (Hull, 2010). The business model was soon affected by the emergence of highspeed photocopy machines which caused the agencies to worry about their products being photocopied (White, 2010). On the other hand, both the rating agencies and the bond issuers soon realized the fact that the sales of the bonds depended on the ratings these agencies give out, regulated by the mentioned SEC regulations. Hence, these factors combined led to the business model of these credit agencies shifted from investors pay to issuers pay (White, 2010). It was later discovered that this business model has contributed to the financial crisis of 2008.

As mentioned, the biggest intangible assets that these credit rating agencies own is the trust from investors (Hull, 2010). There is also little room for them to manipulate ratings of bonds since that will potentially be spotted by investors, and harm their creditworthiness. Beginning in the late 1990s, the transactions of subprime mortgage lending increased, and the mentioned financial derivatives were emerging and backed by these subprime mortgages. Given the high return from selling these financial derivatives, the financial securitizers started pressuring the rating agencies for them to give out favorable ratings (White, 2010). Since these subprime mortgages backed securitizers such as big investment banks were large in volume, giving out low ratings would result in them turning to other rating agencies. Hence, the bargaining power of the issuers were large.

In the meantime, these institutions had close communications with the credit rating agencies and their evaluation models, which allowed them to communicate their potential structure to the agency and see what rate the structured product would get (White, 2010). If the rate the products got were not desirable, then these institutions would redesign their products based on these evaluation models until they get the investment grade, which in other words, different from bonds, structured products were

designed in a way to produce the good ratings (Hull, 2010). Another factor was that these financial derivatives were unprecedently complex compared to government bonds, which created asymmetric information, that it was even something new to these rating agencies; the potential rating errors thus, were also less likely to be spotted by investors (White, 2010) (Gorton, 2009). Investors, on the other hand, lacked sufficient understanding to these complex financial derivatives but purely trusted these agencies (Hull, 2010). The overall optimistic in ratings didn't last long. In the fall of 2007, many of the securitization products got downgraded and caused market panic (Hull, 2010). All these factors combined resulted in overall optimistic ratings for these financial derivatives, with added to the reason why these financial derivatives were bought by larger pension funds and individual investors.

Conclusion and Takeaway

Asset securitization is a structured financing method used by people to transfer default and credit risks and implement credit enhancement. Learned from the 2008 financial crisis, it could both be a useful tool to bring the market liquidity and a powerful financial weapon if misused. If applied well, it can bring innovation and efficiency to the capital market as in the early 2000s; When we are dealing with asset securitization, we must comply with the economic patterns and the characteristics of asset securitization to utilize it carefully. On the other hand, financial institutions and governments should strengthen and maintain the control and supervision of the market utilization process, maximize securitization's strengths while avoiding its corresponding weaknesses, and allow the market to implement safe financial innovations based on the current financial expertise and models. The subprime mortgage crisis in the United States demonstrates that the capital market is not as simple and straightforward as financial institutions and investors thought. Any abuse of financial derivatives and future financial engineering products can lead to severe consequences, thereby triggering a crisis.

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