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**Fjármál fyrirtækja**

**The 2007-2009 Global Financial Crisis:**  
**A Research Synthesis**

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Leiðbeinandi Dr. Vigdís Bóasson

Viðskiptafræðideild

júní 2012



**HÁSKÓLI ÍSLANDS**

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Fríða Filipina Fatalla

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Leiðbeinandi: Dr. Vigdís Bóasson

Viðskiptafræðideild

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The 2007-2009 Global Financial Crisis

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## **Abstract**

The recent global financial crisis is considered by many economists to be the worst financial crisis since the Great Depression. A common view by experts is that the asset price bubble in the US triggered the crisis. This thesis is descriptive in nature and the main purpose is to determine whether the global financial crisis is largely due to the laissez faire or free market capitalism, which led to expansion of credit causing an unprecedented asset price bubble. The objective is to provide a descriptive analysis of the events and to give an overview of the instruments and institutions that were in the center of the financial turmoil, using previous research on the crisis as a framework. The author starts with an overview of the developments in the US mortgage market, the securitization process, the development of structured finance instruments, and the institutional settings surrounding the mortgage related financial instruments using Minsky's "Financial Instability Hypothesis" as a framework. Following the structural overview is a timeline of major events during the crisis, and a case study of the sovereign bankruptcy of Iceland. The case of Iceland is to provide an overview of the country's implementation of free market reforms in the 90s, which unleashed an unprecedented credit boom causing a collapse of the nation's entire economy. The information is gathered to provide an overview of the events and to help identify the causes of the crisis. The author argues that the financial crisis was not caused by a single factor but rather a combination of factors, with the government's laissez faire approach embedded in the system decades prior to the crisis as the main underlying culprit.

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I would also like to thank my family; words alone cannot express what I owe them for their encouragement and whose love enabled me to complete this thesis.

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## **1 Introduction**

The global financial crisis that started in 2007 has been labeled as the worst economic crisis in history. A common view by experts is that the global financial crisis has its origins in the asset price bubble in the US real estate market. The severity of the crisis, along with negative financial news that followed and the seeming incapability of policy responses, raised questions about the origins of the financial crisis. Just as the economic impact of financial market failures during the Great Depression remains an active academic subject, it is likely that this most recent crisis will be debated for decades to come.

The evidence indicates that risky complex financial instruments based on real estate mortgages, excessive leverage and loose regulatory framework for financial institutions among others have been said to be pivotal factors behind the global financial turmoil. The severe impact of the crisis is now also leading to a severe backlash against financial globalization, free trade and laissez-faire or a free market economy.

The lending and mortgage system in the US has gone through significant changes in the last few decades. Prior to securitization, banks would typically use customers' deposits and reissue those funds to other customers seeking out mortgage loans, as long as reserve requirements were met. Then came the "originate to distribute" model, in which banks pooled the mortgages and distributed the risk to investors globally. This allowed banks to expand their lending business without violating the lending limits placed by regulators. The process of securitizing mortgages added a number of intermediaries into the chain. The belief was that the risk was being diversified amongst many different players, which proved to be a major misconception. To provide safety, the mortgage instruments were hedged by buying insurance or credit default swaps, further increasing the distance between the asset and the investor. Since many of the mortgage instruments were AAA-rated, companies considered them low risk and were willing to sell insurance against their default. Financial institutions overextended themselves by using short-term funding to finance long-term assets and became highly leveraged. Overnight repos were a very important source of funding for financial

institutions; it grew from representing 12% of their liabilities to 25% in less than 6 years (FCIC, 2011). Investment banks were renewing their liabilities every night at approximately a quarter of their balance sheet. This worked as long as the world continued to experience a booming economy with relatively low interest rates. However, in 2007 more and more subprime lenders started to default on their loans and sooner or later, liquidity dried up sending shockwaves through the entire global financial system.

The lingering aggravation of the global financial crisis has made today's economy and the overall financial environment volatile and turbulent. The current global financial crisis could mean a new era for financial regulation and central banks. It is, therefore, very important that we analyze the causes of the crisis accurately in order to take correct measures in the long-term in order to prevent it from happening again. We must learn from our past otherwise we are unlikely to fully recover from it. How did it happen? The goal of this research study is to examine the causes of the financial crisis and answer the question on everybody's mind.

### ***What caused the Global Financial Crisis that started in 2007?***

In order to answer this question, I am proposing the following hypothesis: the main cause of the global financial crisis is largely due to *the uncontested laissez-faire or free market capitalism that led to the expansion of credit in the years prior to the global financial crisis, causing an unprecedented asset price bubble.*

## **1.1 Thesis Structure**

The structure of this thesis begins with section 2, "Theoretical Framework", which aims to describe the theory of an asset price bubble expressed by a few well-renowned researchers, Hyman Minsky and Charles Kindleberger. The research described will be used as a framework for the rest of the thesis with regards to the layout of the thesis and the different stages of the financial crisis. Section 3, "Pre-bubble (Stage 1- Displacement)" provides an overview of the beginning of the asset price bubble and what ignited the formation of a bubble. Section 3.1, "Shadow Banking" will talk about the emergence of the term and the important role it had during the crisis. Section 3.2,

“Subprime Lending” will provide a description of the US subprime mortgage market and its development during the years prior to the crisis, as well as the general development in the US real-estate market. Section 3.3. “ Regulation (or Lack Thereof)” focuses on the importance of regulation and how it was lacking before the crisis. Section 4 “Stage 2- Boom” will provide an overview of the credit expansion years before the crisis. Section 4.2 “Securitization” provides an introduction and an overview of the securitization process and different types of friction. Section 5, “Structured Finance Instruments” aims to give an overview of the several main types of structured finance instruments, providing the reader with an understanding of how mortgages and other assets can be transformed into financial products and end up in the portfolio of an investor anywhere in the world, far from the actual asset. The section focuses on ABSs (asset-backed securities), MBSs (mortgage-backed securities) and CDOs (collateralized debt obligations) in particular. The section will also provide an overview of Credit Default Swaps (CDS) Section 5.5, “Money Market Instruments”, provides a description of the money market instruments and how they are used by financial institutions to fund their operations. Section 6, “Institutional Structure”, gives an overview of the institutional structure in the financial markets, focusing particularly on institutions connected to the originating, securitizing, trading and holding of different types of ABSs. Section 7, “The Unraveling” will provide an overview of major events during 2007-2009. Section 8, “Case Study” will provide an overview of the collapse of Iceland following the credit squeeze in the US. In section 9 “Conclusions” I present my main findings from the materials reviewed.

## **1.2 Method**

The thesis is a literature synthesis research and therefore the method used to answer the thesis question will be mainly drawn from the literature review. The data used are academic literature, news articles, and video pod casts from trustworthy sources. The goal of this research brief is to provide the reader with a better understanding and provide a descriptive analysis of the global financial crisis that started in 2007.

## **2 Theoretical Framework**

Many experts would agree that the asset price bubble was the root cause of the global financial crisis. The media often describe the term bubble as a situation in which an economic cycle is characterized by a rapid expansion followed by a contraction, often times in dramatic fashion.

The efficient market theory (EMT) of financial economics states that the price of an asset fully reflects available information. Investors buying an asset in an efficient market should expect to obtain an equilibrium rate of return (Fama, 1970). Since the existence of a bubble would imply that valuations have departed from fundamental rational value, the bubble in an efficient market does not exist. Economists in favor of the EMT argued that bubbles were unlikely to occur in a sophisticated, well-regulated, modern setting and blamed them on immature, fraud-prone markets.

Robert Shiller (2006) put together an inflation-adjusted index of US real estate prices going back to 1890, and found that the rise of real estate prices since 1997 was by far the sharpest on record. From these data he drew the conclusion that the rise wouldn't go on forever and was likely to be followed by a sharp fall. But economists favoring the EMT disagreed with his conclusion and argued that high level of asset prices in a particular episode was justified by the fundamentals.



### **Stage Two: Boom**

Subsequent to displacement, prices start to rise in the displaced sector. In the beginning the increase in prices is barely noticeable. Most of time, the higher prices reflect an improvement in the fundamentals. As the price continues to increase and starts gaining a momentum, people start to notice. Increasing prices are not enough for a bubble. Every financial crisis needs fuel to get the fire going. In the asset price bubble's case, cheap credit was the fuel to the fire. Without it, there can be no speculation. The rise in easy credit can often be attributed to a new financial innovation. In most cases, a new type of financial instrument is created that mis-prices risk.

### **Stage Three: Euphoria**

Following the boom, banks and other commercial lenders start lending more and more to dubious borrowers, using a newly created financial instrument. This leads to an increase in the total money supply. Banks are more willing to take risks and have an urge to speculate. This leads to an increase demand for goods and financial assets.

### **Stage Four: Over-trading**

In this stage the market begins to accelerate as more and more have access to easy and cheap credit. This leads to overtrading and spot shortages emerge lifting up volume in the market. Investors are creating easy profits and prices start to increase. Investors unaware of the bubble before are now joining in. This leads to prices going out of control. This is the point where the foolish and the greedy enter the market. Fire needs three things to exist, fuel, oxygen and heat. A financial bubble needs cheap money, easy credit and more outsiders to keep going.

### **Stage Five: Profit Taking**

While the economy continues to boom with interest rates and prices continuing to increase, insiders start cashing out their profits as they realize that the future expected profits couldn't justify the high prices. Insiders are exiting while new speculators are entering balancing the top of the market. The speculative community is now becoming more and more aware that liquidity is drying up.

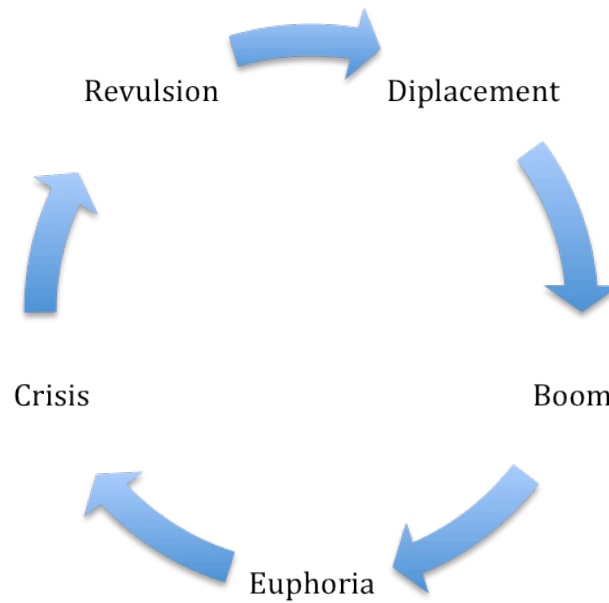
### **Stage Six: Panic**

This phase is characterized by bankruptcies and liquidations. People are starting to realize that the building is on fire and everyone starts to run. Outsiders are panicking and prices start to drop. The outsiders start to sell but there are no buyers. Credit dries up and investors are accumulating losses. This creates a domino effect and prices keep on falling until one of three things occurs. If prices fall low enough it can attract investors back to the less liquid assets, trading could be limited, or a lender of last resort steps in to provide liquidity.

### **Stage Seven: Revulsion**

Revulsion is the final stage of a bubble's life cycle. Investors are so terrified by the events they were part of that they can no longer bring themselves to participate in the market. This is usually where the government also known as the "lender of last resort" steps in. They are now responsible for preventing the crises from spreading to other sectors. Sellers have no choice but to sell at bargain prices or else risk losing their entire investments. This stage is often characterized by exceptionally cheap assets prices.

In his book, *Manias, Panics and Crashes*, economist Kindleberger (1996, p. 13) defines a bubble "as an upward movement over an extended range that then implodes". Kindleberger (1978) provides a comprehensive historical account of financial crises analyzed within Minsky's framework. He argued, that several common threads linked these different disasters over the centuries in almost all corners of the financial world. Manias or bubbles are typically followed by unexpected good news reflecting a progress of sorts. "New opportunities for profit are seized, and overdone." Once investors realize this, the financial system may experience distress and often panic. In **Figure 2**, Kindleberger outlined the following "anatomy of a bubble" drawing heavily on Minsky's work.



**Figure 2 Anatomy of a Bubble: The Kindleberger-Minsky Model**

**Source:** *"Manias, Panics and Crashes"* by Charles Kindleberger (1996)

According to Minsky (1982), new regulations and a more conservative culture should prevent another bubble in the financial industry. It is therefore necessary to analyze the stages in order to understand the asset price bubble that triggered the global financial crisis.



### **3 Pre-bubble (Stage 1 – Displacement)**

According to Minsky (1982), every bubble starts with a disturbance. The seed for the asset price bubble was planted during unusual times. In 2001, the U.S. economy experienced a mild, short-lived recession. Although the economy nicely withstood terrorist attacks, the bust of the dotcom bubble, and accounting scandals, the fear of recession really preoccupied everybody's minds. In a bid to keep consumers spending and help lessen the severity of downturn, the Federal Reserve cut interest rates 11 times from 6.5% in May 2000 to 1.75% in December 2001 (Federal Reserve of Bank of New York, 2008). This monetary policy of low interest rates injected enormous amount of liquidity into the global monetary system. It found easy prey in restless bankers - and even more restless borrowers who had no income, no job and no assets. These subprime borrowers wanted to realize their life's dream of acquiring a home. For them, holding the hands of a willing banker was a new ray of hope. More home loans, more homebuyers, more appreciation in home prices. It wasn't long before things started to move just as the cheap money wanted them to.

This environment of easy credit and the upward spiral of home prices made investments in higher yielding subprime mortgages look like a new rush for gold. The Fed continued slashing interest rates, emboldened, perhaps, by continued low inflation despite lower interest rates. In June 2003, the Fed lowered interest rates to 1%, the lowest level in 50 years (Federal Reserve of Bank of New York, 2008). Low return on traditional investments pushed investors and lenders to take bigger risks to get better returns. Financial intermediaries, in search of profits, extended their credit to families and companies with limited financial strength. Investors with varying degrees of expertise duly reallocated their portfolios towards more lucrative but riskier assets in an attempt to increase their wealth and preserve their purchasing power.

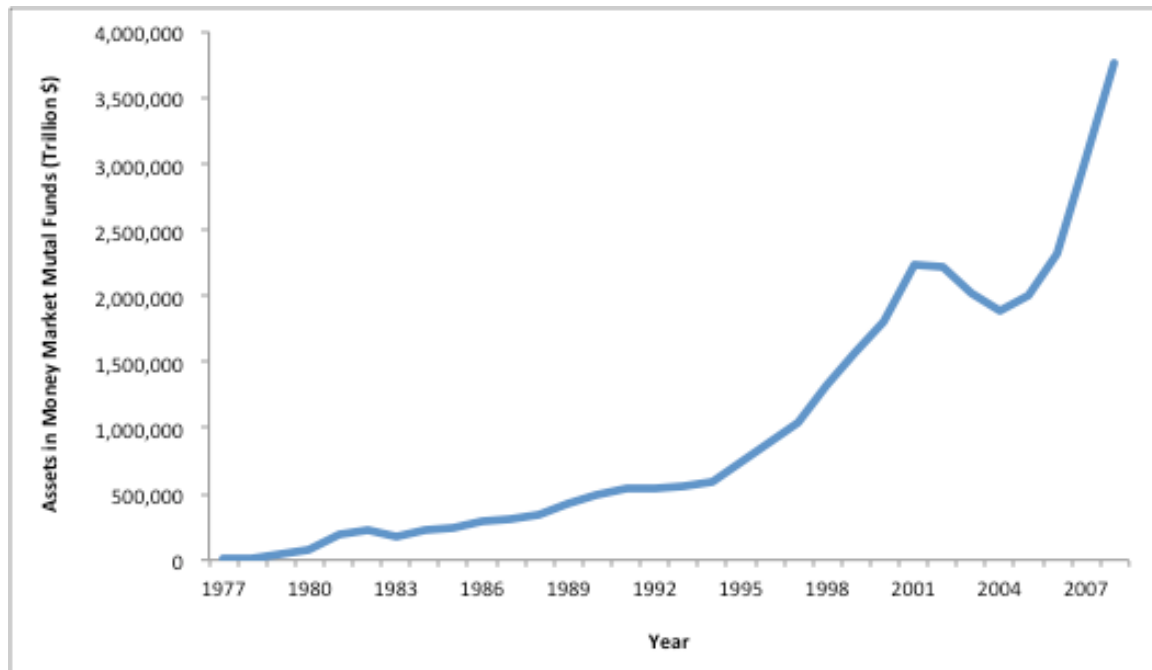
In addition the Securities Exchange Commission (SEC) in October 2004 relaxed the net capital requirement for five investment banks, Goldman Sachs, Merrill Lynch, Lehman Brothers, Bear Stearns and Morgan Stanley, which freed them to leverage up to 30-times or even 40-times their initial investment.

The financial crisis that started in 2007 was not caused by a single factor rather a combination of factors. The Levin-Coburn (2011) report issued by the United States Senate found “that the crisis was not a natural disaster but the result of high risk, complex financial products; undisclosed conflicts of interest; and the failure of regulators, the credit rating agencies, and the market itself to rein in the excesses of Wall Street”. The following chapters will focus on the basis of those risks as they developed in the financial system.

### **3.1 Shadow Banking**

Many experts believe that the stock market crash of 1929 and tight monetary policy that Federal Reserve instituted at that time were two of the major causes leading up to the Great Depression. The stock market crash led to unprecedented runs on banks, and by 1933, more than 11,000 of the nation’s 25,000 banks had failed (FDIC, 2009). In the aftermath, Congress implemented two important laws to protect the bank's customers, the Glass-Steagall Act and Federal Deposit Insurance Corporation or FDIC insurance. The FDIC was set up to insure bank deposits up to \$2,500 that limit rose to \$100,000 by 1980 and it was raised again in October 2008 during the crisis to \$250,000. Meanwhile, the Glass-Steagall Act separated investment and commercial banking activities. Commercial banking activities at the time were aggressively and destructively speculative which was considered the main culprit of the stock market crash. Furthermore, Federal Reserve implemented Regulation Q that, among other things, capped the interest rates commercial banks could offer on savings account deposits. The intent was to prevent bidding wars between banks trying to grow their depositor bases. This worked as long as interest rates remained relatively steady. However, in late 1960s, inflation started to increase and interest rates rose to unprecedented high-levels far beyond the ceiling rates permitted on deposits. The persistent high interest rate, led to the creation of the money market fund, which created a loophole around Regulation Q. Money market mutual funds invested depositors’ money in short-term, safe securities such as Treasury bonds and highly rated corporate debt. The funds paid higher interest and deposit institutions found themselves losing savings deposits. Assets in money market mutual funds grew from \$3 billion in 1977 and it reached a peak of

\$3.8 trillion in 2008 (Board of Governors of the Federal Reserve System). According to Paul McCulley (2007) of PIMCO, the development of money market funds gave birth to the term “Shadow Banking”.



**Figure 3 Assets in Money Market Mutual Funds (Trillion \$)**

**Source:** Board of Governors of the Federal Reserve System (2011)

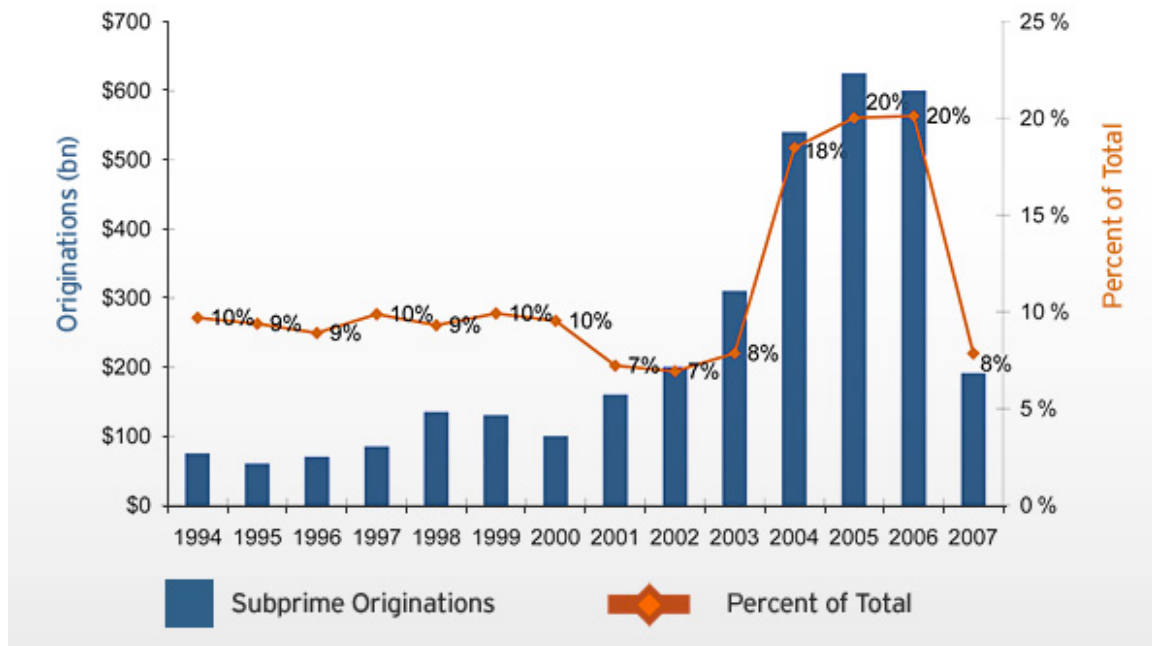
The recent financial crisis gave popularity to the term “shadow banking system”. The emergence of the term reflected recognition of the increased importance of entities and activities outside the regular banking system that performs bank-like functions with little or non-existent regulatory structure. These money market accounts work much like deposits that are held back by banks. The key difference in them is that money market funds were not protected by FDIC deposit insurance.

The shadow banking system, according to experts, played a critical role in creating the conditions that led to the global financial crisis. Moreover, financial transactions outside the banking sector can be complex and may evolve over time depending on factors such as financial innovation and regulatory changes. A flexible forward-looking perspective is crucial to capture mutations in credit intermediation that can pose risks to the financial system.

### **3.2 Subprime Lending**

Two decades ago subprime borrowers would typically have been denied credit, as laws restricted lenders from charging rates high enough to compensate them for the risk. However, the adoption of the Depository Institutions Deregulatory and Monetary Control Act of 1980 eliminated rate caps and subprime lending became more feasible for lenders (FDIC, 1980). Then in 1982, President Ronald Reagan signed into law the Garn-St. Germain Depository Institutions Act that deregulated the savings and loan industry and allowed banks to provide adjustable rate mortgage loans (ARM loans). The legislation essentially eliminated New Deal's restrictions of mortgage lending, in particular the ability of families to buy without putting a significant amount of money down. New Deal was a series of economic programs put in place by congress following the Great Depression in an effort to prevent another crisis. But by this time the Great Depression was a thing of the past. And so the precautionary rules were thrown out the window and the economy was set free. In addition, the Tax Reform Act of 1986 eliminated interest deductions on consumer and auto loans while allowing interest deductions on mortgage debt, thus making the latter a more attractive source of financing. These legislative reforms encouraged the development of technologies enabling lenders to deliver risk-adjusted pricing rather than shut the door on higher-risk mortgage borrowers altogether. Furthermore, Fannie Mae, the biggest underwriter of home mortgages in the US, under the increasing pressures from the Clinton Administration, in 1999 expanded mortgage loans among low and moderate-income people. The Department of Housing and Urban Development proposed that by the year 2001, 50% of Fannie Mae's and Freddie Mac's portfolio be made up of loans to low and moderate-income borrowers (Holmes, 1999).

As seen in **Figure 4**, starting in the mid-1990s, subprime lending soared from near zero to 8.6% of all originations in 2001, soaring to 20.1% by 2006 (Inside Mortgage Finance, Mortgage Market Statistical Annual). Although sub-prime lending has been concentrated in minority and low-income urban areas, it has spread to the middle-class suburbs.



**Figure 4 Subprime Originations as % of Total Originations**

**Source:** *Inside Mortgage Finance, Mortgage Market Statistical Annual (2008)*

Increasing home prices with low interest rate and little government regulation, mortgage finance companies developed high-interest, high-fee schemes to entice families to take loans that traditional banks would not make. This created a market for credit-risky people where lenders were willing to lend and borrowers willing to borrow at high rates of interest. In addition, huge corporations such as Countrywide found ways to gain extraordinary profits through unsavory means, called predatory loans. FDIC defines predatory lending as “imposing unfair and abusive loan term on borrowers”. These huge corporations not subject to government regulations bent the rules and lowered normal banking standards

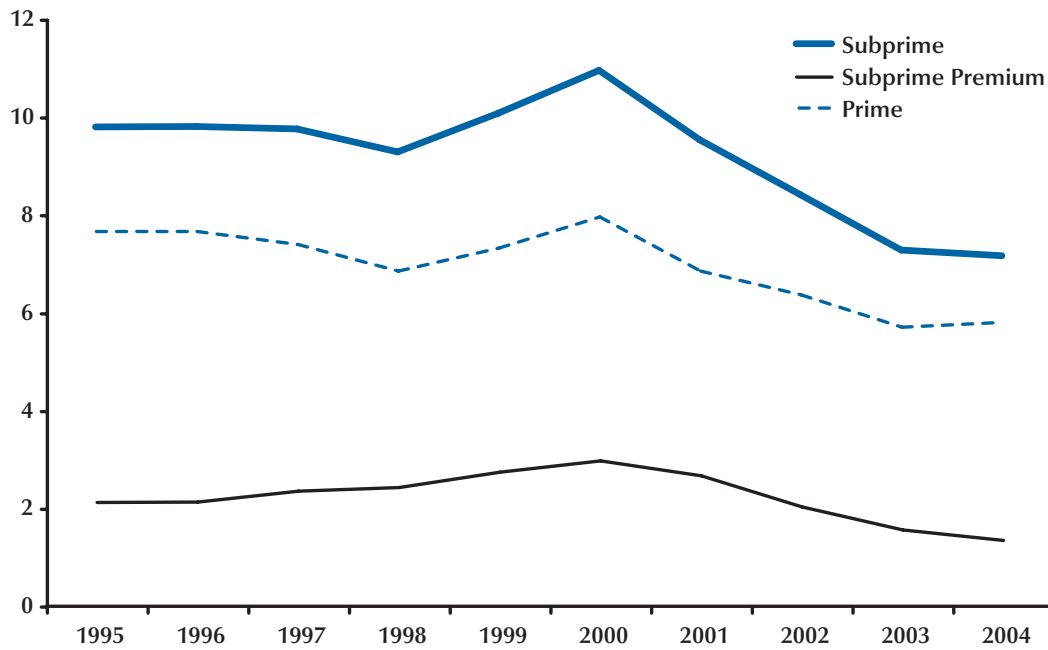
Instead of holding on to the loans, sub-prime lenders sold them and the risk to investment banks and investors who considered these high interest rate, sub-prime loans a goldmine. By 2007, the sub-prime business had become a \$1.5 trillion global market for investors seeking high returns. (Inside Mortgage Finance, Mortgage Market Statistical Annual, 2008)

In order for the whole scheme to work borrowers had to make their monthly mortgage payments but when borrowers couldn't keep up with the payments on these high interest rate loans, it turned into a national foreclosure crisis. This bonanza led to an international credit crisis. The American Dream of homeownership became a nightmare for millions of families.

The mortgage meltdown had serious domino effects. Foreclosed properties became unoccupied and deteriorated into eyesores, detracting from the neatness and feeling of well-being in neighborhoods. Vacant houses also attracted crime, which made it more difficult for neighbors to purchase homeowners' insurance. This made it harder for cities to provide good school, police protection and other services to neighborhoods with several foreclosed homes. This is due to lower property values, which in turn decreased property tax revenues.

### **3.2.1 What is a Subprime Loan?**

Subprime loan is a type of loan with an interest rate above the prime and is offered to individuals who do not qualify for prime rate loans (**Figure 5**). Usually, subprime mortgages were pumped-up versions of adjustable rate mortgages (ARMs). That is, the interest rates were very low or nonexistent in the early years but then were adjusted to a much higher rate later on. The effect was that monthly mortgage payments increased and some even doubled. According to Jay Brinkmann, MBA's (Mortgage Banker's Association) Vice-President for Research and Economics, subprime ARMs represented 6% of the loans outstanding in 2008.



**Figure 5 Interest Rate at Origination**

**Source:** *"The Evolution of the Subprime Mortgage Market,"* by Souphala Chomsisengphet and Anthony Pennington-Cross (2006)

Note: Prime is the 30-year fixed interest rate reported by the Freddie Mac Primary Mortgage Market Survey. Subprime is the average 30-year fixed interest rate at origination calculated from the Loan Performance data set. The Subprime Premium is the difference between the prime and subprime rates.

Borrowers who have strong credit history and have the capacity to repay their loans qualify for a prime rate loan. Subprime loans, on the other hand, are made to borrowers who are perceived as deficient on either or both of those grounds. In most cases, subprime borrowers are denied credit from traditional lenders because of low credit ratings or other factors that suggest that they have a reasonable chance of defaulting on the debt repayment. As seen in **Figure 6** subprime borrowers are more likely to default on their loans than borrowers in the prime mortgage market.



**Figure 6 Seriously Delinquent Rates for US by Product Type**

*Source: Mortgage Bankers Association (MBA) (2010)*

### 3.2.2 The History of Subprime

The financial crisis that started in 2007 has often been compared to the Great Depression, which has been noted to be the worst crisis of all time. In the aftermath of the Great Depression, the government created bank regulations and agencies, such as the Federal Deposit Insurance Corporation, the Federal Home Loan Bank System, Homeowners Loan Corporation, Fannie Mae, and the Federal Housing Administration, to protect consumers and expand homeownership.

After World War II and up until the late 1970s, this new system worked. The Savings & Loan industry responsibility was to take people's deposits and then provide loans for the sole purpose of helping people buy homes to live in. The S&L industry was highly regulated and Washington insured these loans through the FDIC, provided mortgage discounts through FHA and the Veterans Administration, created a secondary mortgage market to guarantee a steady flow of capital, and required S&Ls to make predictable 30-year fixed loans. This resulted in a steady increase in homeownership with few foreclosures.



Then in the 1970s, community groups discovered that lenders and the FHA were involved in a practice called “redlining”. Redlining is when lenders are engaged in racial discrimination against minority consumers and neighborhoods. The community groups joined forces and got Congress, led by Wisconsin Senator William Proxmire, to adopt the Community Reinvestment Act and the Home Mortgage Disclosure Act, which together have significantly reduced racial disparities in lending.

In the early 1980s, the lending industry wanted more freedom and pushed for fewer restrictions. Using its political clout to push back against government regulation they were able to get Congress to adopt the Depository Institutions Deregulatory and Monetary Control Act, which eliminated interest-rate caps and made sub-prime lending more feasible for lenders. Unable to compete with conventional banks engaged in commercial lending, Savings & Loans institutions got Congress to change the rules, allowing S&Ls to begin a decade-long orgy of real estate speculation, mismanagement, and fraud. Charles Keating, also known as the poster child for this era, used his political connections and donations to turn a small Arizona S&L into a major real estate speculator.

This newly found freedom and fewer restrictions of banks led to merger mania, with banks and S&Ls gobbling each other up and making loans to finance shopping malls, golf courses, office buildings, and condo projects that had no financial logic other than easy and quick profit. In the late 1980s, when the dust finally settled, hundreds of S&Ls and banks had gone under, billions of dollars of commercial loans were useless, and the federal government was left to bail out the depositors whose money the speculators had put at risk.

The highly regulated and stable Savings & Loan industry soon became obsolete. Banks, insurance companies, credit card firms and lenders were now part of a giant "financial services" industry, while the government walked away from its responsibility to protect consumers with rules, regulations, and enforcement. In the aftermath of the S&L crisis the federal government, starting with Reagan, slashed funding for low-income housing, and allowed the FHA, once a key player helping working-class families purchase a home, to drift into irrelevancy.

With minimal supervision, banks, mortgage lenders, and scam artists, looking for ways to make big profits took advantage of consumers desperate for the American Dream of homeownership. They invented new "loan products" to make quick-buck profits while putting borrowers at risk. Thus was born the sub-prime market.

In the middle of it all were the conservative free market ideologists whose views increasingly influenced American politics since the 1980s. They believe in laissez faire government and that government is always the problem, never the solution, and that regulation of private business is always bad. Lenders and brokers outside of federal regulations made most of the sub-prime and predatory loans.

But sooner or later greed kicks in, the bankers thought that it just wasn't enough to lend the candies lying on their shelves. Bankers wanting more profit decided they want to repackage the candy loans into collateralized debt obligations (CDOs) and pass on the debt to another candy shop. This leads to a development of a big secondary market for originating and distributing subprime loans called securitization. Securitization will be discussed in later chapters.

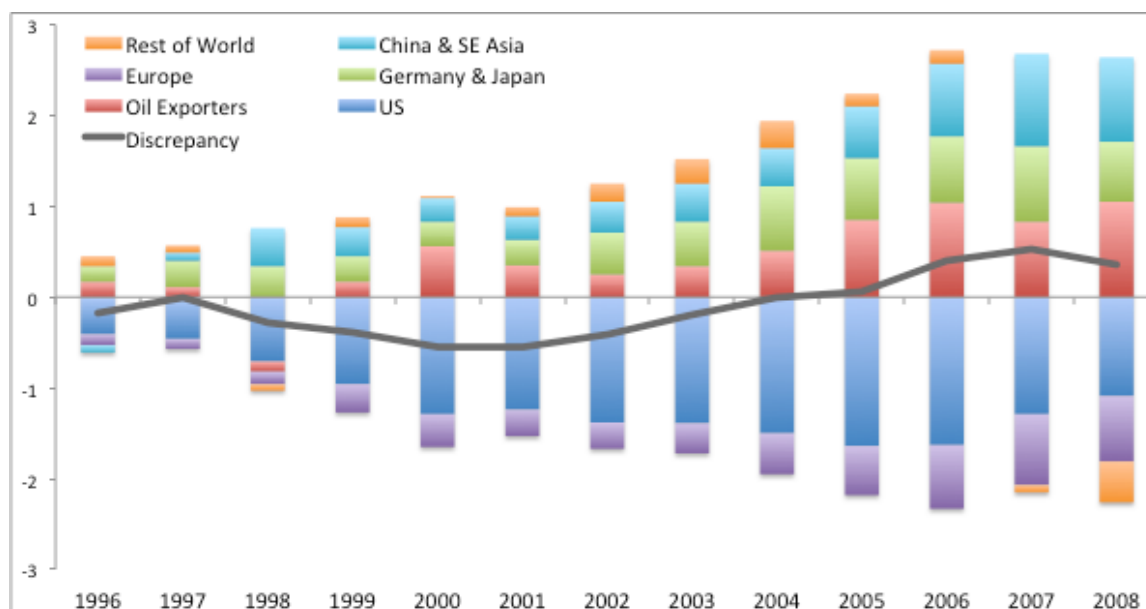
### **3.3 Regulation (or Lack Thereof)**

Following the financial crisis in 2008, the Obama administration proposed for regulatory reform in the financial industry. Obama based this notion on the fact that the financial crisis was caused by limited regulation. The administration claimed that too little regulation during the last twenty years allowed banks and other financial institutions to take risks that resulted in near-bankruptcy, while the large number of weak mortgages in our financial system is explained by failure to regulate brokers. In order to understand Obama's administration defense we must look at where regulation was lacking prior to the financial crisis.

#### ***Regulatory Failure Number One: Failure to Manage The Global Imbalances***

Many believe that the key cause of the global financial crisis is regulatory failure in the mortgage and finance industry. However, as seen in **Figure 7**, a large global imbalance between China and US caused, or at least worsened, the financial crisis. The influx of money from countries with high savings rates, such as China and the oil-producing

countries, came flooding into the US. This kept interest rates low and fueled the credit boom and the related boom in the prices of assets, such as houses and equity, whose collapse triggered the financial crisis. The figure shows the current account balances of different countries and it clearly explains this dichotomy.



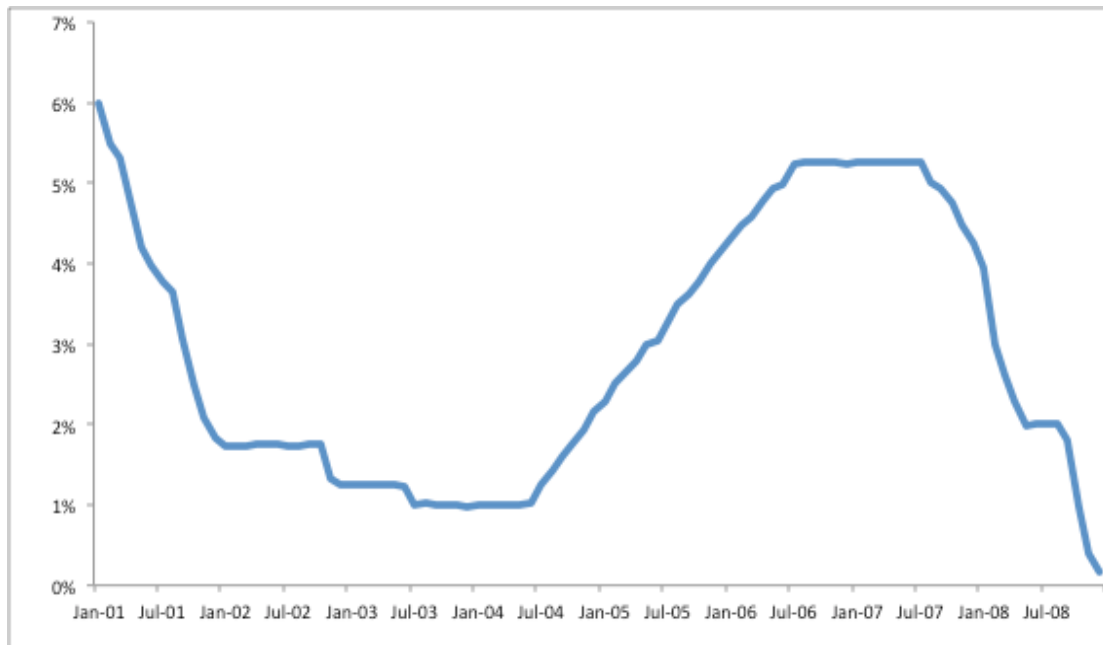
**Figure 7 Global Imbalances – Current Account Balance as % of World GDP**

**Source:** *Organization for economic co-operation and development (OECD) (2011)*

### ***Regulatory Failure Number Two: Failure to Respond to the Asset Price Bubble***

The low interest rate policies (Figure 8) by the U.S. Federal Reserve in the 2001-2004 are believed to have worsened the housing and commodities bubbles. Many seem to believe that there is evidence that financial institutions understood the risks that would arise if house prices fell, but assigned too low a probability to this potential outcome. Thus they were woefully unprepared to weather the consequences when price did indeed fall. This fits with the notion of a classic bubble. The main feature of a bubble is that investors are willing to pay higher prices not because of the asset's intrinsic value but because they believe some other investors will pay more for it in the future. All of this implies the important role of regulators in undertaking scenario analyses that would make clear the exposures to such risks, both for individual institutions and for the financial system as a whole. As economist Dean Baker and Mark Weisbrot (2004) of the

Center for Economic and Policy Research insisted at the time that by simply identifying the bubble and adjusting the public perception of the future of the housing market could have prevented or at least contained the bubble. Former Federal Reserve Chairman Alan Greenspan while testifying before Congress declined and even denied the existence of a bubble.



**Figure 8 Federal Funds Target Rate**

*Source: Board of Governors of the Federal Reserve System (2011)*

### ***Regulatory Failure Number Three: Failure of Market Discipline***

Regulation failed to keep up with the creative ability of financial institutions to develop new structures and instruments to cater to investors' demand for higher yields. These financial instruments often misunderstood by bankers themselves turned out to be more risky than they appeared. No one realized how bad the quality of the loans were or that huge numbers would go bad if and when the housing bubble popped despite the supposed sophistication of the investors involved.

#### ***Regulatory Failure Number Four: Lack of Regulatory Framework For Credit Rating Agencies***

According to an article by Lucchetti and Ng (2008), the subprime meltdown appears to have resulted from the sale and subsequent default of “investment-grade” mortgage bonds carrying artificial triple-A ratings. These bonds were lucrative to financial institutions including hedge funds since they carried the highest credit rating possible. Hedge funds were actually the main target induced into purchasing the bonds on the pretext of high credit ratings. The artificially high credit rating assigned by rating agencies concealed the true credit risk of the bonds and made them more appealing to investors. Many pension funds and mutual funds would have been barred from their own rules from buying the securities if they reflected the true risky rating they have today and would have been treated more cautiously. If there wasn’t a secondary market readily available, mortgage lenders might have even pulled back from making the loans in the first place. But wanting to remain in good relations with the investment banks, credit rating agencies failed to assess the risk of the bonds and give investors guidance on how risky they were.

#### ***Regulatory Failure Number Five: Failure to Regulate the Shadow Banking System***

The Shadow Banking System, including some of the largest global banks, became dependent on various forms of short-term wholesale funding and their reliance on short-term uninsured funds made them subject to runs, much as commercial banks and thrift institutions had been exposed to runs prior to the creation of FDIC. There were no regulatory body that restricted the leverage and liquidity policies of such entities, and few if any regulatory standards were imposed on the quality of their risk management or the prudence of their risk taking.

The failures of our regulators shouldn’t come as a surprise; after all, governments are made of imperfect humans also. The recent crisis like with other crises should be a reminder of individuals’ flaws and frailty of our institutions. The tug of war between financial market regulators and the private sector is profoundly uneven. The private sector has an unfair advantage and can offer essentially unlimited rewards to anyone who is skillful enough to manipulate the rules. Regulators are rarely paid for

performance, which has made it harder for financial regulators to keep up with the demand. Financial regulation is hard work and requires plenty of resources. Government should impose tighter regulations and provide plenty of support to financial regulators.

Furthermore, most bank executives had no incentive to be risk averse. Why would they? They made huge bonuses when things were good and when things went horribly wrong, they will get their bonuses, though a little lesser. This meant that there was only upside to taking risky decisions.

### ***Regulatory Failure Number Six: Failure to Protect Consumers***

The most important failure Krugman (2008) argued was that there was no one looking after the consumers. There is currently no central consumer protection body to oversee the acts of large banks. The Federal Reserve is supposed to keep a check on the system, but it already has too many other responsibilities like interest rate decisions. Krugman argued that it is very important to have an agency to look after the interests of the consumers and unless there is an agency that has the sole responsibility of protecting consumers, we will not be immune from similar crises in future.

## **4 Stage 2 – Boom**

According to Minsky (1982), every financial crisis needs fuel to get the fire going. In the asset bubble's case, cheap credit and excess liquidity was the fuel to the fire. Excess liquidity conditions produced an increase in the effective demand for certain assets increasing their price and fueling a speculative boom (bubble) in that asset. This led to an even greater demand for the asset mainly for short-term capital gains associated with anticipated increase in the asset price. In addition, higher asset prices translate into greater wealth providing the basis for increased spending and further credit expansion.

The rise in easy credit and financial market deregulation is often associated with financial innovation. Financial innovations have occurred throughout recorded history, and financial innovation without adequate regulation, have proven dangerous. This chapter will focus on the credit expansion prior to the crisis and the financial innovations that followed.

### **4.1 Credit Expansion**

Since the mid-1990s, the US has experienced two major financial bubbles: a stock market bubble and a real estate bubble. In both instances, the bubble was instigated and sustained by the policy of artificial credit expansion central banks permitted and orchestrated over the last fifteen years. As seen in Table 1, GDP grew 39 straight quarters from 1991 – 2000.

**Table 1. Quarterly Growth Rates of real GDP, change over previous quarter**

Q1-1991	-0.48	Q3-1993	0.53	Q1-1996	0.68	Q3-1998	1.32
Q2-1991	0.67	Q4-1993	1.32	Q2-1996	1.73	Q4-1998	1.73
Q3-1991	0.42	Q1-1994	0.97	Q3-1996	0.87	Q1-1999	0.89
Q4-1991	0.39	Q2-1994	1.37	Q4-1996	1.09	Q2-1999	0.78
Q1-1992	1.10	Q3-1994	0.64	Q1-1997	0.77	Q3-1999	1.27
Q2-1992	1.06	Q4-1994	1.11	Q2-1997	1.48	Q4-1999	1.80
Q3-1992	1.03	Q1-1995	0.25	Q3-1997	1.25	Q1-2000	0.26
Q4-1992	1.05	Q2-1995	0.21	Q4-1997	0.77	Q2-2000	1.95
Q1-1993	0.18	Q3-1995	0.84	Q1-1998	0.94	Q3-2000	0.08
Q2-1993	0.64	Q4-1995	0.70	Q2-1998	0.90	Q4-2000	0.59
						Q1-2001	-0.33

**Source:** Organization for economic co-operation and development (OECD) (2011)

Credit Expansion is the policy in which the central banks produce money in order to purchase debt from the government or the public sector, such as banks. Back in the old days, when gold was used as currency, a strict limit was imposed for money producers when it came to credit expansion, due to national scarcity of the precious metal. A nation was only allowed to print money equal to the gold they had in reserves. Our current monetary system also known as fiat system came into existence as a result of excessive public debt. In the 70s, the US government was unable to repay all its debt in commodities and decided to remove the last link between the dollar and gold. The only thing that gives money its value today is the faith placed in by people that use it and its relative scarcity. Once the confidence in value of money is gone the money is worthless. You're left with a piece of paper with no physical backing. In a fiat system, there is no restraint on the amount of additional money printed. This allows for unlimited credit expansion, which results in lower interest rate for additional credit transactions.

The policy of credit expansion has caused major credit booms and crunches in the form of asset booms and subsequent crashes and economic booms and subsequent recessions. This has been the case in the years of 1929, 1987, and 2001, and more recently in 2008.



## 4.2 Securitization

The aim of this section is to understand securitization's role in the financial crisis. It's essential that we comprehend how the securitization market has evolved over the years, in order to understand how we got here.

### 4.2.1 History

Prior to securitization, home finance typically involved a lender, a bank or savings institution, and a borrower. The lending institution would make the decision to grant credit, fund the loan and/or foreclose on the property. In most cases the lender establishes a relationship with the borrower, thus able to evaluate the individual borrower's risk. This simple relationship between the borrower and lender is illustrated in Figure 9.



**Figure 9 Home Financing – Old Model**

*Source: Author's Illustration*

Under this system, the retail banking business model was also primarily based on earning an interest margin. The bank would typically take in customer deposits, paying the customer a conservative interest rate based on rates set by the Federal Reserve. The bank would then reissue and distribute the majority of those funds to other customers seeking out loans at a higher interest rate, creating a positive net interest margin for the bank. The remaining amount of deposited funds would be held within

the bank as capital reserves. The amount needed to be held as reserves varied at different times, depending on regulation and the state of the economy. This, of course, is a simplification and does not represent each and every aspect of a typical retail banking business model. The bank could also earn commissions on various fee based products and services but the main income generation and purpose of the bank was to take deposits, lend out those funds to promote economic growth and sustain itself through a net interest margin. This model is also based on the assumption that underlying confidence for the banking system and housing, in general, is solid. But during difficult times such as the Great Depression, this model became especially fragile.

#### **4.2.2 Out of the Rubble**

With the banking system in utter ruins following the Great Depression, between 1933 and 1936, then US President Franklin Roosevelt implemented the New Deal initiative with the goal of easing life for Americans and promoting a return to economic prosperity. One of the many results of the New Deal was the founding of the Federal National Mortgage Association, commonly known as Fannie Mae, in 1938 (Alford et. al, 2008). The purpose of Fannie Mae was to provide banks with federal money to finance home mortgages with the goal of making home ownership and affordable housing more available. This was needed as investors had lost confidence and interest in investing in the housing market. In order to provide this liquidity, Fannie Mae had to issue debt. As the government founded Fannie Mae, its borrowings were at lower rates than any other banking institution. Fannie Mae then used those borrowed funds to provide liquidity to the housing market by buying certain types of mortgages from banks, in turn allowing them to provide more mortgages to their customers. This area of the market became known as the secondary market for mortgages.

As the government founded Fannie Mae, its debt was also placed on the government's balance sheet. By 1968, when Fannie Mae's mortgage portfolio reached more than \$7.2 billion, it represented a significant burden that the government wanted to take off its books. As a result, Fannie Mae was reorganized as a publicly held company. It became known as a government sponsored enterprise (GSE). This meant that, although in ownership of and operated by shareholders, Fannie Mae still had the

financial support of the Federal Government. Fannie Mae ultimately borrowed from the Federal Reserve as well as individual investors by issuing bonds.

While Fannie Mae was spun off into a public company, the Government National Mortgage Association (Ginnie Mae) was created to take over Fannie's subsidized mortgage programs and loan portfolio. The Federal Home Loan Mortgage Corporation (Freddie Mac) was founded in 1970 to further support the housing industry in the same fashion as Fannie. Fannie and Freddie were then allowed to buy conventional fixed-rate mortgages that were not FHA and VA sponsored.

As Ginnie took over the FHA and VA sponsored mortgages, Fannie and Freddie were now providing liquidity to the main mortgage segment. However, at inception of these organizations, in 1968 and 1970, they were legally authorized to pool their mortgage assets, issue securities backed by the respective pool of assets and sell to willing investors. This was a mortgage-backed security (MBS). This is when securitization officially came into existence.

Ginnie was the first to endorse securitization and issued its first MBS in 1970 with Freddie following soon thereafter in 1971. Fannie, however, didn't participate until 1981 after a sharp increase in interest rates hurt its traditional portfolio of mortgage holdings (Fabozzi and Modigliani, 1992). They would also go on to guaranteeing the underlying mortgages, generating vast amounts in fees.

The government proceeded to create a more optimal environment for the GSEs by relaxing on regulation and supervision while at the same time introducing more strict regulation for non-GSEs such as in the Reform, Recovery, and Enforcement Act of 1989 (FIRREA). Whereas Fannie and Freddie, during their earlier years, were only allowed to purchase mortgages insured by the Federal Housing Administration (FHA) and Veteran's Administration (VA), with less strict regulations they were able to also purchase conventional fixed-rate mortgages, which were not backed by the FHA or the VA. Coupled with this was Fannie's and Freddie's increasing role in the mortgage industry, they became too big to fail. Their combined debt obligations and outstanding MBS grew from \$759 billion in 1990 to \$1.4 trillion in 1995 (FCIC, 2011). By 2000, the two companies held or guaranteed more than \$2 trillion in mortgages, backed by only \$35.7 billion in shareholder equity, a capital reserve of less than 2%. The increasing usage and

profitability of MBS not only secured its existence but it also led to the concept being heavily applied elsewhere, namely by investment banks.

### **4.2.3 Investment Bank Endorse Securitization**

By the 1980's, investment banks began applying the lessons learned from Fannie and Freddie by creating asset-backed securities (ABS) composed of various asset classes. An ABS is essentially a debt instrument secured by assets such as mortgages, auto loans, credit card loans and equipment leases. Logistically, the process being executed by investment banks was the same as Fannie and Freddie. Lenders sold their mortgages to investment banks, the investment banks then pooled the mortgage loans with various types of illiquid<sup>1</sup> assets, or group of assets such as adjustable-rate mortgages (ARMs), student loans, auto loans, equipment leases and credit card debt through financial engineering, ultimately transferring them into a complex derivative called a collateralized debt obligation (CDO). A CDO is a structured ABS and is covered in detail in the next section. The underlying mortgages were then removed from the lender's balance sheet and transformed into CDOs that were sold to investors. The model paved the way to the "originate to distribute" model, in which banks essentially sold the mortgages and distributed credit risk to investors. The banks now had the ability of expanding their lending business without violating the lending limits placed by regulators. The banks could essentially repeat the process of selling its securitized loans to investors, generating lots of cash in the form of fees and then issue loans with that cash, minimizing their dependence on depositor funds.

With this, the banking business model changed from being based on making a net interest margin on loans to credit-worthy individuals and companies to simply issuing a high volume of loans, securitizing them and selling to investors. **Figure 10** shows the new system of lending. The process added two new entities to the chain. The belief was that risk was being diversified amongst many different players by mixing in high and low risk loans within each individual asset pool. However, the risk was not being diversified from the system itself and that was a major misunderstanding. As more high-risk loans were

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<sup>1</sup> Liquid is defined as "consisting of or capable of ready conversion into cash." Merriam-Webster Online Dictionary, <http://www.merriam-webster.com/dictionary/liquid> (last visited Dec. 22, 2010)

issued and securitized, the system was becoming more exposed to their high default risk.



**Figure 10 Home Financing – New Model**

**Source:** *Author's Illustration*

The main obstacle investment banks faced was selling the securitized assets to investors, as they were often very complex in nature and difficult to gauge their inherent risk profile. Investment bankers knew that investors needed to feel safe about investing in these types of assets, as they didn't have much history behind them. As a result, the main credit rating agencies at the time, S&P, Fitch and Moody's, were hired and remunerated handsomely to issue ratings on the securitized assets. Prior to securitization, the credit rating agencies had mainly helped investors evaluate the safety of various types of bonds and commercial paper. As investment banks hired crafty quantitative analysts to construct securitized assets, they became increasingly sophisticated and difficult to understand and value, solidifying the role of the credit rating agencies.

With investor confidence in securitized assets, investment bankers and credit ratings agencies were ready to exploit and profit from their position, and they did. By 1999, \$900 billion in securitizations were outstanding, excluding securities underwritten by Fannie and Freddie. This included \$114 billion in auto loans, over \$250 billion in credit card debt and almost \$150 billion in mortgages that did not meet the credit standards of Fannie and Freddie (FCIC, 2011).

All the pieces for a perfect storm began aligning together when the Clinton administration in 1995 made it an agenda to boost home ownership for the middle class. The Bush administration took the initiative to another level by introducing a “Zero-Down Payment Initiative”, allowing first-time homebuyers to forego the typical 3% down payment rule. Now a large consumer segment without the standard down payment would have access to credit and, with investment bankers hungry to generate more fees, the boom in housing was about to become euphoric.

The 1990s brought about deregulation while at the same time advances in technology led to an explosion of complex financial products, called derivatives. Using derivatives, bankers were able to gamble on virtually anything, bet on the rise and fall of oil prices, bankruptcy of a firm and even the weather.

#### **4.2.4 Overview of the Securitization chain**

The process of securitizing a mortgage loan is very complex, which involves a number of different players. **Figure 11** provides an overview of the key players, their responsibilities, the important frictions that exist, and the mechanism used in order to minimize these frictions. One key friction that exists among all the players is asymmetric information. Asymmetric information is when one party has more information about the asset than another. In order to understand how securitization of subprime works, we must understand these frictions and how they work. This should help us comprehend the importance of subprime and its effect on the financial crisis. Ashcraft (2008) of the Federal Reserve Bank of New York blames five key frictions of seven as causes of the recent financial crisis. The following sections will analyze these frictions using Ashcraft’s theory on the Securitization chain.



## **2. Mortgage Fraud**

The mortgage loans are then pooled together creating an asset-backed security (ABS) and it's sold to another institution known as the arranger or issuer, who are often agents for the ultimate investors. The face value of the ABS is usually less than what the arranger pays for it because of future interest payments

The arranger can be a commercial bank, investment bank or another financial that is both originator and arranger. The arranger is responsible for bringing together all the elements needed for the deal to close. The next step is for the arranger to set up a bankruptcy-remote trust (i.e. a special purpose vehicle or entity) to finalize the transaction. The reasoning behind a remote trust is that the assets and liabilities of the ABS must be separated from the institution's other assets and liabilities in case of a default. In this stage the arranger typically consults a credit rating agency to finalize the details about the deal structure, make necessary filings with SEC, and underwrites the issuance of securities. Note that the asset pool that is being securitized might consist of other assets other than mortgages, (e.g. corporate bonds, credit card debt or student loans), making the pool more diversified.

The second friction in the securitization process is mortgage fraud, which occurs because of information advantage. The originator usually has an information advantage over the arranger in regards to the quality of the loans. The originator whose incentive is to make a profit might collaborate with the borrower who is in desperate need of the loan to misrepresent information on the loan application.

## **3. Adverse Selection**

The third friction is adverse selection or information asymmetry between the arranger and third parties concerning the quality of the mortgage loans. Information asymmetry is when one party has more information than the other. In the securitization process the arranger has more information about the quality of the mortgage loan and can decide which loans to securitize, creating an adverse selection problem. This friction affects the relationship that the arranger has with the warehouse lender, the asset manager and the credit rating agency (CRA).



The next step in the securitization process is finalizing the securitization deal. While it is being finalized the arranger is responsible for funding the mortgage loan and for a depository institutions, this can be easily done with internal funds. However, this is not the case for mono-line arrangers. Mono-line arrangers typically require funding from third-party lender for loans kept in the books or “warehouse” until they can be sold. Since the third-party lender is unsure about the value of the mortgage loans used as collateral, the lender must take steps to protect him/herself against overvaluing their worth. According to Stanley Street (2007) president of Street Resource Group, warehouse financing is a crucial part of the mortgage process since 20-30% of all mortgages in 2007 were warehouse loans, an \$800 billion market no one knew about. This friction is very important as it can bring an originator to its knees because an adverse change in the warehouse lender’s views of the value of the underlying loans can make a big impact. The increased demands for collateral by warehouse lenders and the inability of mono-line originators to respond was the main cause of dozen of mono-line originators failure in 2007. (Sichelman, 2007)

The arranger then underwrites the sale of securities and sells it to an assets manager. Another adverse selection problem occurs here since the arranger can provide a credit enhancement to the securities with its own funding. Next step in this process is for a credit rating agency to assign a credit rating on the mortgage-backed securities issued. The credit rating is determined using publicly available rating criteria, which map the characteristics of the pool of mortgage loans into an estimated loss distribution. Since the arranger knows more about the security than the credit rating agency creates information asymmetry.

#### ***4. Moral Hazard – servicer and mortgagor***

Once the deal is finalized, i.e. the security is sold to asset managers; the trust appoints a servicer who administers the mortgages. The servicer is responsible for collection of loan payments, provide customer service to the mortgagors, contact delinquent borrowers, supervise foreclosures and etc. The servicer is paid through a periodic fee from the trust. The friction here is the changes in behavior in response to redistribution of risk, which leads to moral hazard. The mortgagor has unobserved costly effort that

affect the distribution over cash flows, which are shared with the servicer with the mortgagor having limited liability. A mortgagor struggling to make a mortgage payment is unlikely to pay for insurance and property taxes, which can result in foreclosure of the property. The servicer on the other hand has the incentive to work in investors' best interest, to manage delinquent loans in order to minimize losses.

### ***5. Moral Hazard – servicer and third-parties***

The quality of the services can have a significant positive or negative effect on the losses realized from the mortgage pool. Fitch Ratings estimated that servicer performance affects loss severities by 30 percent (Eggert, 2004). This leads to moral hazard in the securitization chain as where one party (servicer) has unobserved costly effort that affects the distribution over cash flows shared with other parties. Friction occurs between the servicer and the asset manager. The servicer is paid a flat percentage of the outstanding principal balance of the mortgage loans. Since the income of the servicer increases in the amount of time that the loan is serviced, it would prefer to keep the loan on its books for as long as possible. The servicer might prefer to adjust the terms of a delinquent loan to delay foreclosure. Another moral hazard problem is between the servicer and the credit rating agency. The security issued by the arranger is vulnerable to the use of low quality servicer and since the impact of servicer quality on losses the rating given by the credit rating agency has to be very accurate.

### ***6. Principal-agent***

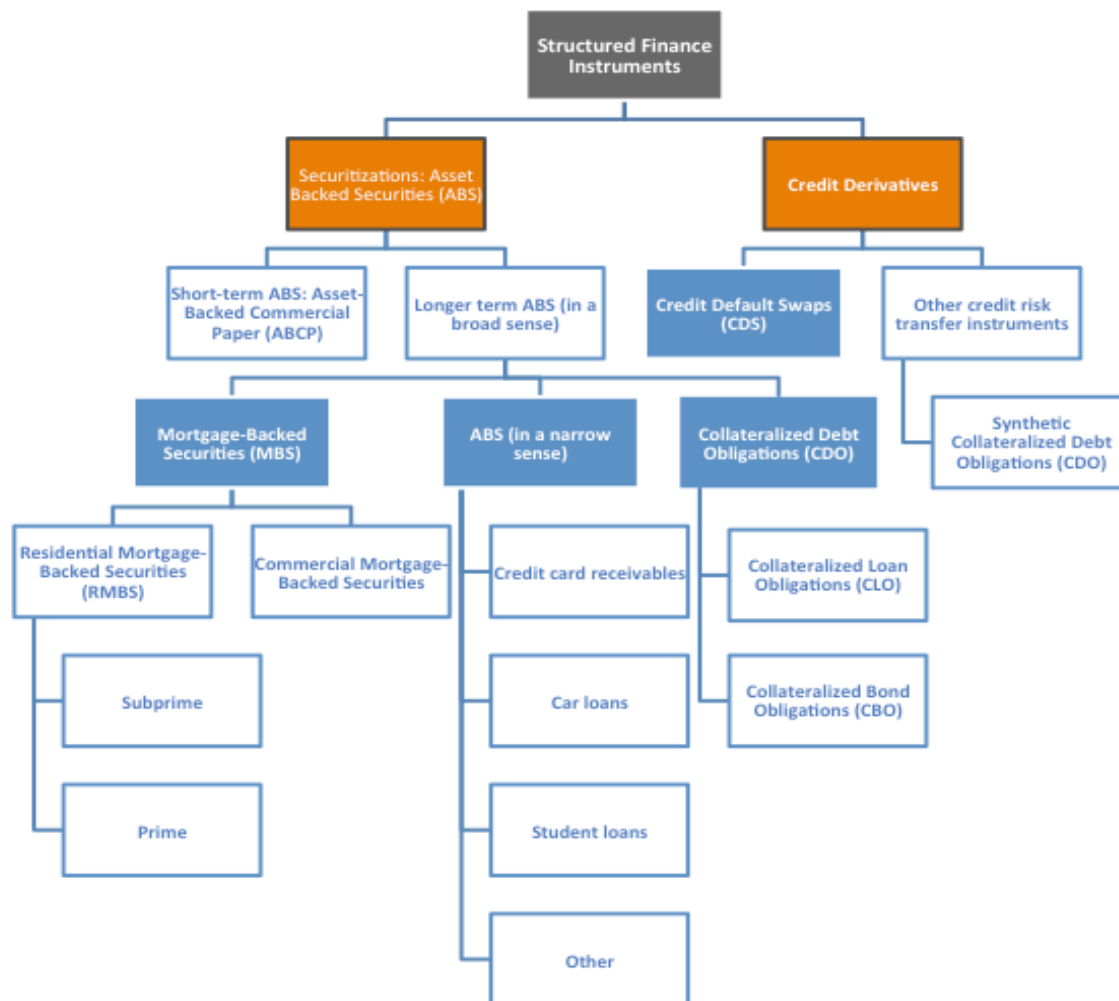
The investor (principal) who is typically financially unsophisticated usually hires a manager (agent) to prepare an investment strategy to find the best investment options. Because of the varying degree of financial sophistication between the parties, a principal-agent friction occurs. Moreover the agent who is supposed to act in the interest of the principal might not have the incentives to do so.

## **7. Model error**

The last friction in the securitization occurs between the investor and the credit rating agency. Credit rating agency (CRA) presents an opinion on the riskiness of the security in order to capture the expectations about its long-term performance. The opinion of a CRA is a crucial part of securitization since investors make a decision whether to invest in a security based on their credit rating. Many critics claim that conflicts of interest were involved, as credit rating agencies are paid by the issuers whose securities they rate (The Economist, 2007). Moreover, credit trading agencies that are publicly traded have a pressure to grow and increase profits which can detract the quality of work they perform creating an inherent conflict of interest. Both Moody's and S&P are publicly traded with S&P being part of the publicly traded McGraw-Hill Companies (Bogle, 2005). I will discuss credit ratings in more detail in Section 6.3.

## **5 Structured Finance Instruments (Stage 3 – Euphoria)**

As boom leads to euphoria, Minsky states, banks and other lenders extend credit to ever more dubious borrowers, often creating new untested financial instruments to do the job (Cassidy, 2008). This enlarges the total money supply but also introduces heightened risk to the system. With access to capital that previously wasn't available, there is an increasing urge to speculate which translates into increased demand for goods and/or financial assets. Based on the founding principles of economics, supply and demand, this increased demand pushes up the price for those assets. During the 1980's, junk bonds played this role. More recently, it was securitization, which enabled banks to provide massive amounts of loans, repackage them and sell them for profit to investors. This ultimately had the effect of exponentially increasing the amount of money generated by a simple house transaction. The success of this led to the concept being applied to other financial instruments based on sophisticated quantitative financial engineering. This led to lower underwriting standards for these financial assets, which helped give rise to the inflationary credit bubble and the financial crisis that soon followed. **Figure 12** shows several main types of structured finance instruments, which will be discussed in more details below.



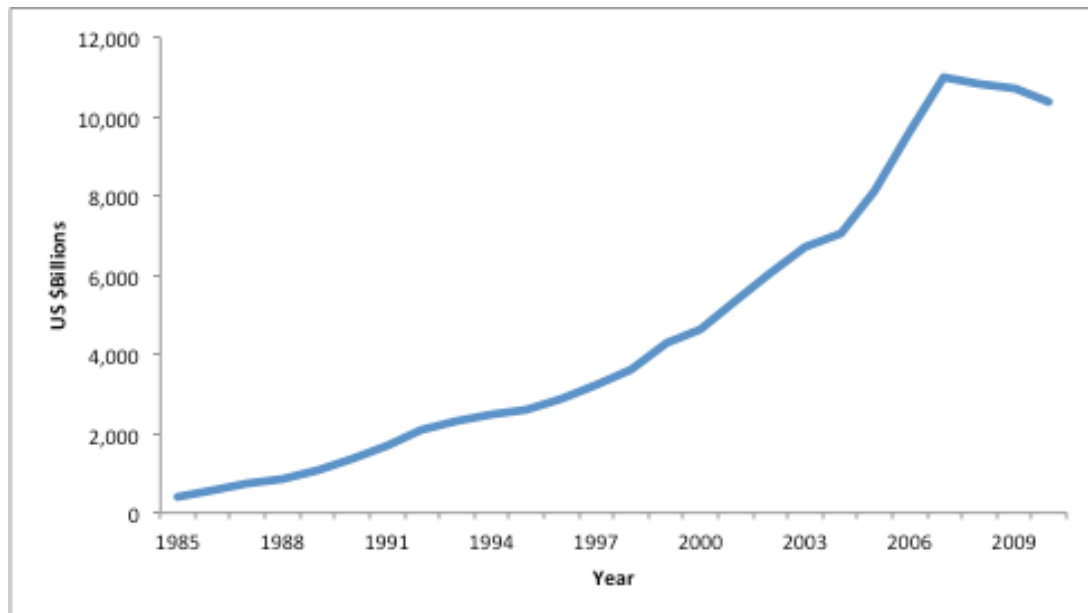
**Figure 12 Structured Finance Instruments**

*Source: Authors' illustration*

## 5.1 Asset Backed Securities (ABS)

As described in the previous section, Asset-backed securities (ABS) are bonds or notes pooled together backed by financial assets such as mortgages, auto loans, credit card loans to form instruments known by the general umbrella term ABS. Asset-backed securities were first developed in the mid-1980s and are the main form of securitization. The amount of ABSs outstanding has increased rapidly during previous years, implying that the phenomenon of securitization has grown in popularity. Asset-backed securities and mortgage-debt outstanding grew from \$1,066 billion in 1989 and it reached a peak of \$11,963 billion at the end of 2007 (Securities Industry and Financial Markets Association (SIFMA)). The size of this market has shown substantial growth

during the last decade – since 1996 the outstanding amount has increased by approximately 300% as shown in **Figure 13**.

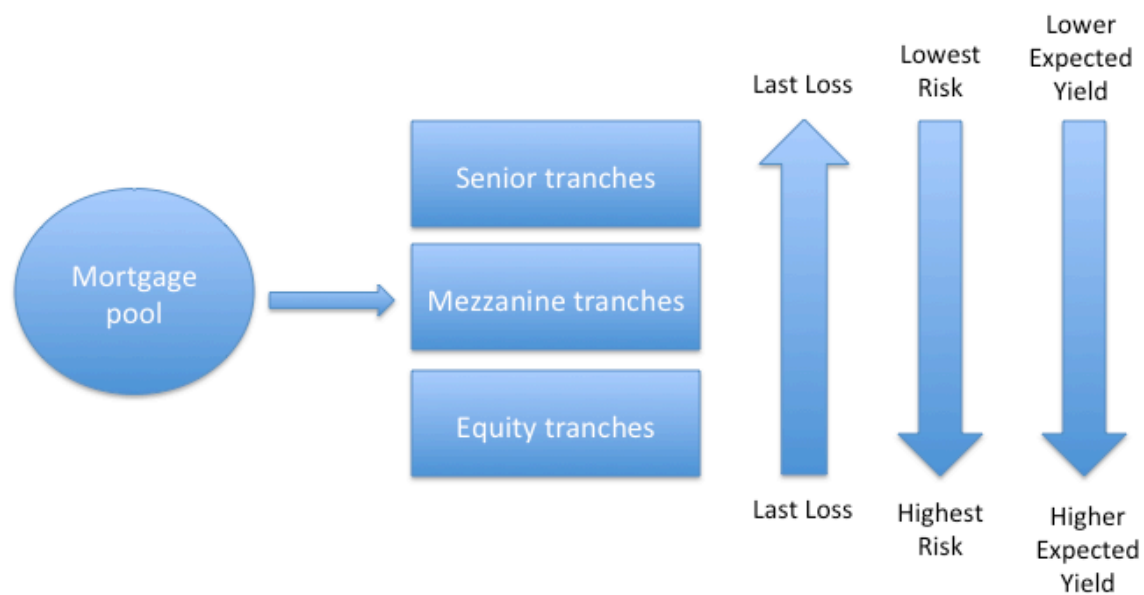


**Figure 13 ABS & Mortgage-related Debt Outstanding**

**Source:** *Securities Industry and Financial Markets Association (SIFMA) (2011)*

Most asset-backed securities are often structured into different classes or tranches, which have different risks and yields. The tranches have different ratings and the highest tranche, has the highest credit rating, usually triple A and is designated as class A. Asset-backed securities is usually divided into 3 tranches, with classes A, B and C. Class B and C have a lower credit rating but they pay a higher yield. In some occasion, Class C tranche may not have a credit rating and may not even be offered to the public. The C tranche is usually, kept by the issuer or sponsor of the ABS.

The lower the class the larger the loss as losses are absorb by the lowest tranche first, unless the loss is large enough class A tranche will have to take in loss, as well. ABSs are structured in a way that the senior tranche is the largest tranche, which will have an investment grading so it can be sold to institutional investors. Institutional investors are the main buyers of ABSs and in most cases only allowed to buy investment grade securities, especially securities that comply with the Employee Retirement Income Security Act (ERISA).



**Figure 14 Different Risk and Return for Different Investors**

**Source:** *Author's illustration*

Most ABS structures are based on sequential pay tranches, which means the highest tranche receives all of the payments of principal until all investors of the tranche have been paid off, then the next tranche receives the principal payments, then the next, and so on, until all investors have been paid. There are also some ABS structures that receive a pro rata share of the payments of principal but this is not as common as sequential pay method. Sometimes when a credit-related event occurs, that may jeopardize the full repayment of senior tranches, a tranche using a sequential pay method will switch to a pro rata distribution at a specified date, or tranches that were originally receiving pro rata distributions of principal may switch to a sequential pay distribution in order to protect senior investments.

The repayment of the principal depends on whether the ABS is based on amortizing debt or revolving debt. ABSs based on amortizing debt pay investors both principal and interest in each payment, since the loan payments of the underlying assets consists of both principal and interest. Revolving debt uses controlled amortization to repay the principal, the ABS holder receives only interest for a specified time, then in the final period, which is the controlled amortization period, the payments consists of the return

of principal. In some cases, if the issuer is having difficulty paying the principal, the issuer can extend the controlled amortization period, sometimes for up to 3 years.

There are many different types of structured finance instruments – their names are dependent on the collateral on which they are based, for example, CLOs (collateralized loan obligations) are primarily backed by leveraged bank loans.

In this paper CDOs (collateralized debt obligations), and MBSs (mortgage-backed securities) are given further attention since these types of securities or ABSs (in the broad sense) played a crucial role in the development and propagation of the financial turmoil (Criado and Rixtel, 2008). It also has been shown that another credit derivative, i.e. credit default swaps (CDS), played a much more indirect role and has been of particular use in monitoring the spreading of the financial turmoil.

## **5.2 Mortgage Backed Securities (MBS)**

As stated in the previous section, ABSs that have securitized a pool of mortgages are denoted MBSs. A RMBS (residential mortgage-backed security) is backed by mortgages on residential property, and a CMBS (commercial mortgage-backed security) is backed by mortgages on commercial property. The mortgages securitized in an MBS, under the assumption that real estate prices are less correlated as the geographical distance between the real estates grows, are often dispersed geographically in an attempt to create diversification. The collateral for MBSs are sensitive to fluctuating prices of real estate and as the US real estate prices started to decline in 2007 so did the MBSs. This increased the probability of default on mortgages as real estate prices declined and borrowers were having a hard time selling their estate at or above the mortgage value, thus increasing the risks and lowering the value of MBSs holding the mortgages as collateral.

The collateral mortgages backing the MBSs are of different qualities, i.e. prime, Alt-A<sup>2</sup>, and subprime. As with all securitizations, the portfolio of mortgages is structured

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<sup>2</sup> Alt-A mortgages are generally prime borrowers but non-conforming in a way, often lower documentations (this might also be a vacation home).



into tranches with different risk and yields. The tranches are then sold to investors with different risk and yield preferences.

There are additional risks associated with MBSs that are unique to the product, prepayment risk and default risk. Prepayment risk is the risk that the borrower will unexpectedly pay off the mortgage loan before maturity ends. If interest rates are lower more mortgage holders are likely to pay off their loan. Since the mortgage has been paid off, the interest rate that was being paid is no longer paid and is removed from the cash flow. In order to receive a return, the investors must reinvest the prepaid capital. This is called reinvestment risk since there is no guarantee that the investor can reinvest at the same rate. The other risk associated with MBS is default risk, risk that the borrower will not repay on time and in full. The default risk is calculated using FICO scores of the borrower, which is the method, accepted by financial firms and their regulators as valid when measuring default risk. By definition, the default risk of MBSs that holds subprime mortgages as collateral is higher than MBSs holding prime mortgages as collateral. Prepayment risk on the other hand is harder to measure since it is a function of market risk such as interest rates and there is no industry standard on how to measure it.

### **5.3 Collateralized Debt Obligation (CDO)**

The financial crisis was the result of a really complex configuration of interconnected securities and derivatives contracts primarily with housing as the underlying asset. In this realm, collateralized debt obligations (CDOs) played an integral role.

Collateralized Debt Obligations, or CDOs, as previously mentioned, were structured ABS that purchased and pooled various financial assets. There are different types of CDOs and the most common one is cash flow CDOs, the trust (special purpose vehicle) owns the underlying debt posted as collateral in the CDO. Then there is synthetic CDO whereby the trust does not own the underlying debt, and instead invests in credit default swaps (CDSs) to synthetically track their performance. Another type is hybrid CDO which combines cash flow CDOs and artificial CDOs. ABS CDO is another; also known as structured CDO, which refers to a securitization of another securitization, using the

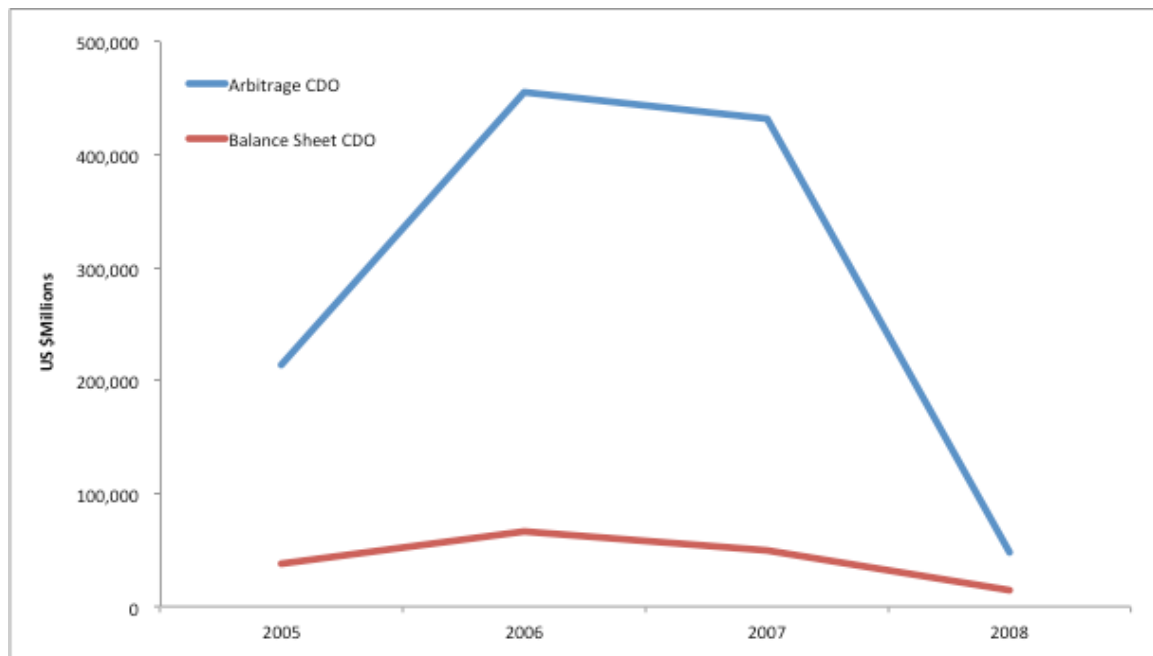
tranches of another ABS as collateral. There is also CDO squared (CDO<sup>2</sup>), which is a CDO that has securitized the tranches of another CDO.

The first CDO was created in the late 1980s but the CDO market didn't take off until the early 2000s when MBS were spreading like wildfire. CDOs were most often employed to facilitate a market for the riskier tranches, or risk profiles, of various MBS. Similar to corporate bonds, other financial assets receive a rating based on their inherent risk. Like a senior bond, the top rate assets carry the lowest interest charge and the highest credit rating and least amount of risk. Regardless of the underlying asset, investors preferred the low risk profile or AAA rated assets. This presented problems for investment banks trying to sell less than AAA rated assets. Although they carried higher potential returns, they also were inherently riskier for the investor. Investment banks created CDOs to purchase less than AAA assets.

A CDO manager would essentially purchase MBS rated less than AAA and pool them with other unrelated assets or other MBS from different regions of the country to create a new financial security, a CDO. By diversifying the composition of the CDO, and thereby lowering risk, most CDO managers were easily able to garner AAA ratings from ratings agencies despite the fact that the underlying assets carried higher risk. By diversifying the composition of a CDO, the risk or likelihood of many underlying assets defaulting at the same time was significantly decreased. However, determining a CDO's inherent risk also became increasingly difficult and unclear as CDOs purchased other CDOs to create CDOs squared. Criado and Rixtel (2008) argue that this collateral diversity makes the risk of CDOs harder to assess. A credit ratings agency previously accustomed to analyzing corporate bonds and commercial paper was now issuing ratings for a vast variety of assets in which it perhaps did not have expertise. But that didn't seem to matter as each participant just wanted to make money on the increasingly popular transactions.

Cash and synthetic CDOs are also classified in terms of the goals of the sponsor. Balance Sheet CDOs allow the issuer, to lower risk by moving the asset away from its balance sheet. Arbitrage CDOs allow the issuer to make an arbitrary profit from the difference between the returns from the collateral and the yield that issuer pays to investors. In addition, the issuer also collects fees from managing the CDO, which are

usually around 45-75 basis points. As seen in **Figure 15** CDOs global issuance peaked in 2006, which was roughly around \$521 billion and arbitrage CDOs accounted for 87% of the total.



**Figure 15 Global CDO Issuance**

**Source:** Securities Industry and Financial Markets Association (SIFMA) (2011)

The main participants in the creation of CDOs included securities firms, CDO managers, the ratings agencies, investors and financial guarantors, with Merrill Lynch, Goldman Sachs and Citigroup accounting for more than 30% of the CDOs structured between 2004 and 2007 (FCIC, 2011). Each one added their fee to the transaction and there was considerable money to be made. This led to an explosion in the number of and amount earned by CDO managers. It's estimated that CDO managers overall earned at least \$1.5 billion in management fees between 2003 and 2007, representing only one of the five participants typically involved in a CDO transaction (FCIC, 2011). CDO managers also earned more when transacting a CDO with riskier assets as opposed to AAA rated assets, further accentuating the demand for more underlying risk. As seen in Table 2, MBS as collateral in these CDOs increased from 35% in 2002 to accounting for more than 60% by 2006. Sales of CDOs also more than doubled every year, increasing from \$30 billion in 2003 to \$225 billion in 2006 (SIFMA).

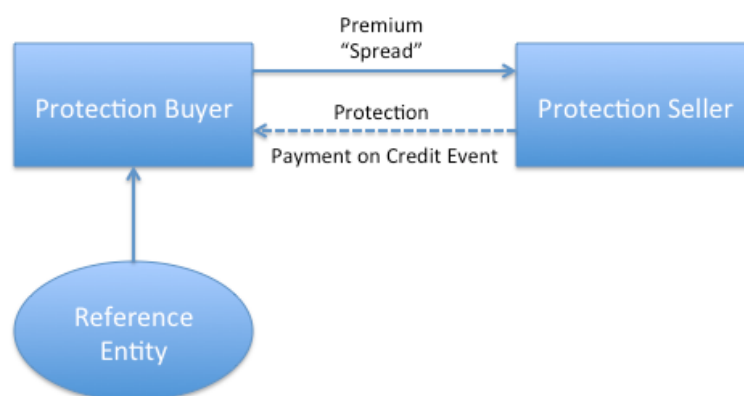
**Table 2. Global CDO issuance by collateral**

<b>Collateral</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
High Yield Bonds	5.1%	0.6%	0.2%	0.4%	0.0%
High Yield Loans	20.4%	27.6%	33.0%	28.8%	44.4%
Investment Grade Bonds	7.4%	1.5%	4.8%	16.3%	25.8%
Structured Finance	52.8%	62.7%	59.1%	53.8%	29.8%
Mixed Collateral	0.7%	0.4%	0.0%	0.0%	0.0%
Other Swaps	4.3%	0.9%	0.1%	0.2%	0.0%
Other	9.4%	6.3%	2.8%	0.4%	0.0%
<b>Total (\$Million)</b>	<b>\$157,821</b>	<b>\$251,265</b>	<b>\$520,645</b>	<b>\$481,601</b>	<b>\$61,887</b>

**Source:** *Securities Industry and Financial Markets Association (SIFMA) (2011)*

## 5.4 Credit Default Swaps (CDS)

A credit default swap is a type of derivative contracts in which one party (protection buyer) pays a periodic fee to another party (protection seller) in return for compensation against default. CDS is like an insurance policy, where one pays a premium and the other assumes the risk. The premium paid by the buyer to the seller is called a “spread”. It is expressed as a percentage fraction of the notional amount. In theory the spread of the CDS is a measure of probability that the reference entity will default. In the event of default or “credit event”, the seller of protection pays compensation to buyer and the contract is terminated. A reference entity is often a corporation or government and more recently mortgage-backed securities and other asset-backed securities CDS were also being traded (Parkinson, 2008).

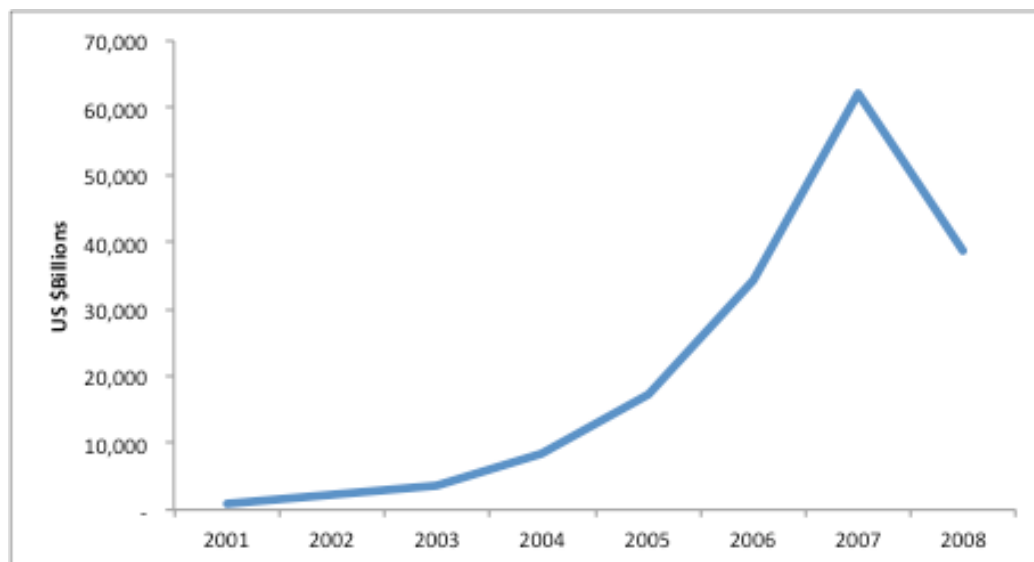


**Figure 16 Credit Default Swaps Payment Summary**

**Source:** *Author's illustration*

CDS contracts have been compared with traditional insurance, however there are some important differences between the two. The differences are; the buyer of CDS does not need to own the underlying security, the seller does not have to be a regulated entity and is not required to maintain any reserves to pay off buyers, a CDS can be bought for speculative reasons, a strategy that is far off from the CDSs original purpose, namely to transfer credit exposure of commercial loans from commercial banks to a third party (Zabel, 2008).

CDS instruments are traded over-the-counter (OTC) in the open market and can be traded directly as a single corporation or ABS (single-name CDS) or more commonly as an index, DJ CDX (for North America and emerging markets) and DJ iTraxx (for Europe and Asia) composed of many single-name CDS (Amato, 2008). The OTC market is large and prior to the crisis the rise of the CDSs market had been remarkable. Swaps, options, and forwards had been used to hedge interest rate, foreign exchange, and market risk for quite a while before CDSs entered the stage. At its peak in 2007, CDSs gross notional amount outstanding reached \$62 trillion from \$632 billion in 2007. (International Swaps and Derivatives Association (ISDA)). The growth of the CDS market is shown in **Figure 17**. The demand for protection against default on financial products increased comparably to increase in securitization during the same years. The figure also goes to show that there was more demand for insurance against default during the downturn in the general capital markets in 2007.



**Figure 17 Credit Default Swaps Outstanding**

**Source:** *International Swaps and Derivatives Association (ISDA) (2011)*

Exposure to CDSs played a big role in AIG's failure. AIG provided insurance on AAA tranches in securitization on an extremely large scale. Since AAA-tranches had extremely low probability of default, AIG thought that there was little risk involved in selling these protections. According to data from 1970-2007 compiled by Moody's, the probability of default on AAA-rated corporate debt over five years is 0.09% (Moody's, 2008). When the US experienced a major downturn in the US housing market, these AAA-rated tranches lost their value and AIG's liability became very large. AIG did not have the financial strength to support its many commitments as the crisis progressed and was taken over by the government.

Many have argued that CDSs contributed significantly to the subprime crisis. One concern in particular is that CDSs are traded in an unregulated OTC counter as bilateral contracts involving counter-party risk, which facilitates speculation involving negative views of a firm's financial strength. Others conclude that the OTC derivatives were not caused by derivatives. Some economist have claimed that derivatives increase economic welfare by facilitating risk sharing, by improving price discovery and by allocating capital more efficiently (Stulz, 2009). Parkinson (2008) argues that OTC derivatives are essential to the smooth functioning of today's financial markets, and with appropriate oversight and prudent risk management, derivatives can provide significant benefits.

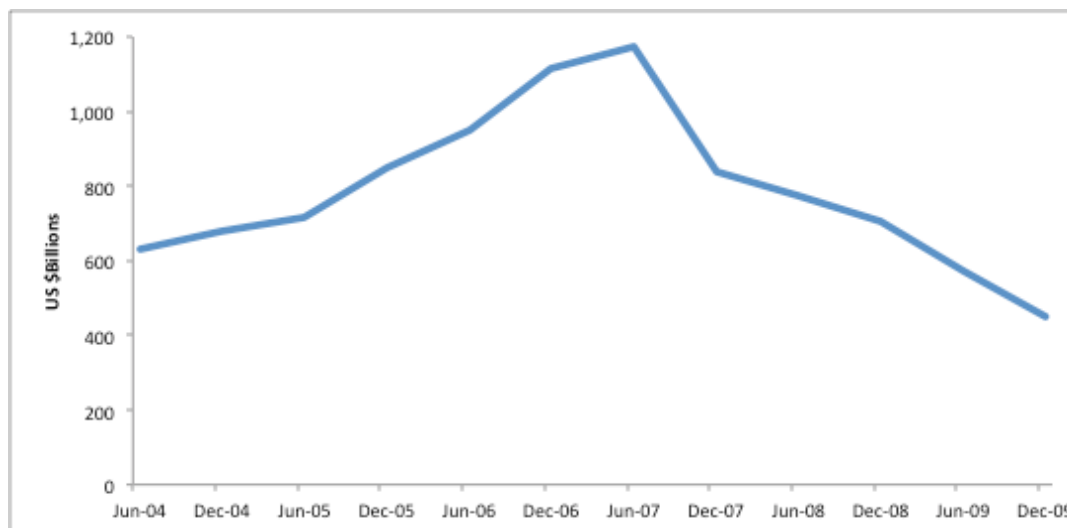
## **5.5 Money Market Instruments**

The main purpose of the financial markets is to transfer funds from one party to another. The money market refers to the borrowing and lending of funds between two parties with maturity of one year or less. The following are the types of money market instruments that played a critical role in the crisis.

### **5.5.1 Asset Backed Commercial Paper**

An ABCP (Asset Backed Commercial Paper) program is comprised of a bankruptcy remote special purpose vehicle (SPV), which issues a commercial paper and uses the proceeds to obtain interests in various assets. An ordinary CP (Commercial Paper) is an unsecured promissory note with a fixed maturity of 1-270 days. AN ABCP is a short-maturity promissory note issued by banks or other financial institutions with maturity that is typically between 90-180 days. The notes are used for short-term financing and are backed by physical assets. In case of a default, the owner of the ABCP has the right to seize and sell the underlying collateral. The mismatch between the long-term assets using short-term funding exposes the investor to rollover risk since the issued short-term papers must be renewed (rolled-over) frequently. To protect investors against this risk, the financial institutions managing the SPV provides credit guarantees to outside investors.

ABCP outstanding grew from \$632 billion in 2004 until reaching a peak of \$1,187 billion in 2007. ABCPs accounted for 55% of the total commercial paper market (totaling \$2,161bn in July 2007) (SIFMA).



**Figure 18 ABCP Year-end Outstanding**

**Source:** *Securities Industry and Financial Markets Association (2011)*

The strategy of buying long-term assets by using funding from issuing highly rated short-term paper (e.g. ABCP) was very popular years prior to 2007, and was successful as long as the commercial paper market is liquid (Brunnermeier, 2008). The fact that the issued papers have shorter maturity than the bought assets means that funding must be renewed as the maturity expires which requires functioning money markets. This strategy was executed by off balance sheet conduits or special purpose vehicle. Conduits with the weakest credit guarantees had the largest difficulties in rolling over maturing ABCP. From July to December 2007, total ABCP issued by structured investments vehicles decreased from \$84 billion to \$15 billion (Covitz et al. (2009).

ABCP played a special role in the housing boom and the financial crisis that followed. Instead of banks selling the mortgage backed securities back into the financial markets, some banks created firms to hold the loans and financed the loans by issuing a commercial paper, which resulted in an unparalleled increase in ABCPs. This off balance sheet approach is one of the practices banks used to boost leverage and take risk at a lower cost. The rollover risk was a key trigger at the early stage of the financial crisis. When two of Bear Stearns's hedge funds that had invested in subprime mortgages filed for bankruptcy followed by BNP Paribas halting withdrawal from its three investment funds, investors in ABCP became anxious that the underlying collateral of the commercial paper they were holding had larger probability of default. Within two days,



the spread on overnight asset-backed commercial paper over the federal funds interest rate increased from 10 basis points to 150 basis points (Kacperczyk et. al, 2010). Since financial institutions had credit guarantees on the commercial paper, they had to step in and provide liquidity to pay off maturing ABCP. This obligation raised concerns about counterparty risk causing a spike in interbank lending rates. Since commercial papers were view as low risk security, the sudden awareness led to sudden halt and trading in ABCP dried up (Cecchetti, 2008). This followed the downgrading of several ABS and a sharp decrease in ABX indices. The crisis in ABCP quickly spread across the financial sector and affected banks worldwide.

### **5.5.2 Repurchase Agreements Repos**

A repurchase agreement, or a repo, is a secured loan where securities are used as collateral. The seller (borrower) commits to buy the same security at a higher price (repurchase price) on a later date. The repurchase price includes interest also known as repo rate, the premium that the seller pays the buyers (lender). A repo is similar to a traditional collateralized loan where the collateral is the securities used in the transaction. Repo agreement can have any maturity, if the length of the repo is one day it is referred to as overnight repo and if it is longer than one day it is referred to as a term repo. From the lender's perspective the same repo transaction is referred to as a reverse repo. Treasury securities, MBSs and other balance-sheet assets can all be used as collateral in repos.

Repurchase agreements are an important instrument in the financial markets as they allocate capital efficiently. Used by dealers to finance market making and risk management activities, they also provide a safe and low-cost way for mutual funds, depository institutions, and others to lend surplus funds.

Like other financial markets, repo markets are subject to risks; counterparty credit risk, market risk and operational risk. The risks can be minimized but not eliminated through a variety of risk management tools. Counterparty credit risk or risk that one party to a transaction will default can be minimized by posting securities as collateral. If the seller (borrower) is unable to repurchase the securities the buyer (lender) keeps the collateral which might increase/decrease in market value, or if the market value of the

collateral decreases during the length of the repo the seller (borrower) might be subject to a margin call and will have to post more collateral or cash.

Market risk is the main risk in a repo agreement. It arises from price volatility and the ease with which the value of the collateral can be realized in a sale. A decline in the price of the security serving as collateral can result in insufficient collateralization of the repo. To minimize market risk; repos feature initial margin, called “haircut”, which is the difference between the original market value of the collateral and the amount borrowed, intended to serve as a cushion should the market value of the collateral decrease. In addition, the collateral is marked to market every morning and the margin updated based on the closing price from previous day (Hördahl and King, 2008). The size of the haircut reflects the market risk of the collateral and is generally 1-3%, but might be much higher for borrowers of lower credit worthiness or for less liquid collateral. The haircut specifies the possible leverage that an institution might have on its assets (through the use of repos); for example, if the haircut is 2% the institution can borrow \$98 for every \$100 worth of securities pledged implying that it must provide \$2 of equity to hold securities worth \$100. Increases in haircuts are especially prevalent in times of financial stress and that the potential outcome of such events, raising new equity or cutting assets, is extremely difficult in the same market conditions (Shin, 2008). Table 3 shows the haircuts in secured lending transaction at two dates in April 2007 before the crisis and in August 2008 in the midst of the crisis (IMF, 2008).

The possible leverage ratio is also affected if the market value of the collateral changes. If the value of the collateral decreases the borrower must provide the difference between the old market value (less the haircut) and the new market value (less the haircut). This is referred to as a margin call.

**Table 3. Typical “Haircut” or Initial Margin**

	<b>Apr-07</b>	<b>Aug-08</b>
U.S. Treasuries	0.25%	3%
Investment-grade bonds	0-3%	8-12%
High-yield bonds	10-15%	25-40%
Equities	15%	20%
Investment grade CDS	1%	5%
Senior leveraged loans	10-12%	15-20%
Mezzanine leveraged loans	18-25%	35%+
ABS CDOs:		
AAA	2-4%	95%
AA	4-7%	95%
A	8-15%	95%
BBB	10-20%	95%
Equity	50%	100%
AAA CLO	4%	10-20%
Prime MBS	2-4%	10-20%
ABS	3-5%	50-60%

**Source:** *Global Financial Stability Report (IMF, 2008)*

In addition to credit and market risk, repo markets are also subject to operational risk, related to the transfer of the collateral. Either party to a repo agreement may fail to deliver and a security does not settle on time. The security provider is exposed to movements in the price and can lose interest that could have been earned if the cash had been invested overnight. Since financial institutions are now closely linked to each other, the whole chain will be affected if one defaults.

Overnight repos were very important source of funding for investment banks before the crisis; repo share of total investment banks assets grew from 12% in 2001 to over 25% in 2007. This means that in 2007, investment banks were renewing their liabilities equivalent to a quarter of their balance sheet daily (Brunnermeier, 2008).

In the summer of 2007, increasing demand for liquidity and heightened concerns about counterparty credit risk led to significant disruptions in credit and money markets. Sharp swings in asset prices led to greater uncertainty about the value of the underlying collateral particularly less liquid collateral. As a result, repo markets quickly

began to show signs of volatility and it became problematic to obtain funds at maturities longer than one month. As seen in Table 3, the “haircut” or the initial margin during the crisis increased tremendously making it even harder to renew liabilities.

The near default of Bear Stearns in 2008 was a good example of frequent use and over reliance on the overnight repo market. Bear Stearns had \$395 billion in assets and a leverage ratio of more than 35 to one. Furthermore \$98.3 billion, or approximately 25% of their balance sheet was funded by collateralized borrowing, of which approximately \$75 billion was renewed daily. \$38.2 billion of Bear Stearns total long positions that could be pledged as collateral consisted of mortgages and MBS, which implies that its assets were sensitive to factors related to the mortgage market and thus were less liquid than its competitors (Boyd, 2008).

## 6 Institutional Structure

This section will provide an overview of the institutional structure in the financial markets in relation to securitization.

### 6.1 Banks Capital Requirements

Banks and other depository institutions are subject to standardized requirements, which determine how much capital is required to be held in relations to total assets. These requirements are put in place to ensure that these institutions have enough capital to sustain operating losses while still honoring withdrawals. The Basel Accord or Basel II (which is being replaced by Basel III), published by the Basel Committee on Banking Supervision at the Bank for International Settlements, sets the framework on how these institutions calculate their capital. The primary capital ratio used is the Tier 1 capital ratio, which, simplified, is calculated as follows:

$$\text{Tier 1 capital ratio} = \frac{\text{Tier 1 capital}}{\text{Risk weighted assets}}$$

where;

$$\text{Tier 1 capital} = \text{Shareholders equity} + \text{retained earnings}$$

and

$$\text{Risk weighted assets} = \text{Value of outstanding debt} \times \text{Risk weight}$$

Risk weighted assets are total of all assets (outstanding debt) weighted by credit risk according to a formula determined by the Regulator (country's central banks). The weight is dependent on several factors such as expected loss, probability of default, loss given default and exposure at default. Logically, riskier debt has higher risk weight and thus lowers the Tier 1 capital ratio. When calculating the weights the bank might either use a standardized approach where all assets of a certain type are given the same risk weights or the internal models approach where all risk weights are calculated

individually. Most countries follow the Basel Committee on Banking Supervision (BBS) guidelines in setting formulas for asset risk weights.

The Tier 1 capital ratio requirement varies by country but the general consensus is that Tier 1 capital ratio has to be greater than 6%. Banks in the US are required to have a Tier 1 capital ratio of 6% in order to be considered well capitalized under federal bank regulatory agency definitions.

Prior to the financial crisis, banks used off-balance sheet vehicles or structured investment vehicles (SIV) to bypass these capital requirements. In order to do so, banks would set up SIV as a limited purpose operating company separated from the bank. The SIV would purchase long-term, illiquid, high yielding assets (e.g. MBSs) from the sponsoring bank and the portfolio was funded by issuing short-term, liquid, commercial paper backed by the assets and a collateral guarantee from the sponsor.

SIV was popular amongst banks and investors years before the crisis as an arbitrage tool used in capital requirements, market liquidity and/or credit ratings. When Sigma Finance, the last surviving structured investment vehicles (SIV), collapsed in October 2008, it marked the end of an era of structured investment vehicles (Euroweek, 2008).

## **6.2 Investment Banks vs. Commercial Banks**

The banking sector is divided into two fundamental divisions, investment banks and commercial banks. Institutions that have mixed the two activities have come under scrutiny and have been accused of being a major contributor to the financial crisis.

Commercial banks are in business to do two main things: accept deposits and make loans. Investment banks on the other hand facilitate the buying and selling of stocks, bonds and other investments, as well as helping companies to go public with initial public offerings (IPO). Since commercial banks hold deposits from the public, they are subject to more regulation than investment banks. Commercial banks need significant capital requirement and are required to back their loans with a larger share of equity than do investment banks. Investment banks are not subject to the same regulatory oversight. Therefore, these institutions hold lower capital ratios than commercial banks, enabling them to take on more leverage. Commercial banks are federally insured to protect depositors and are highly regulated by a number of federal authorities,

including the Federal Deposit Insurance Corporation (FDIC) and the Federal Reserve. Investment banks are only loosely regulated by the Securities and Exchange Commission (SEC), which allows for more flexibility in their strategic decision-making.

Prior to the financial crisis, if commercial banks were experiencing a liquidity crisis to meet withdrawals and contractual obligations they can borrow from the Federal Reserve also known as the “lender of last resort”. The Federal Reserve Discount Window was confined to commercial banks. Since investment banks are not regulated by the Fed, it did have no responsibility to act as “lender of last resort” to investment banks. This all changed in late March of 2008, when giant investment bank Bear Stearns was on the verge of bankruptcy, the Fed stepped in to help JP Morgan Chase, a giant commercial bank, to purchase Bear Stearns at a bargain price. In addition, the Fed put some of its own money at risk in order to seal the deal and agreed to buy some of Bear Stearns toxic assets JP Morgan Chase did not want. Bear Stearns collapse would have had caused a complete meltdown of the US financial system (Mosley, 2009).

Following this the Federal Reserve decided to open the discount window for investment banks and brokers by creating the Primary Dealer Credit Facility (PDCF). The PDCF is an overnight loan facility that would provide funding to primary dealers in exchange for a collateral including “investment-grade corporate securities, municipal securities, mortgage-backed securities and asset-backed securities for which a price is available” (Federal Reserve Bank of New York, 2008).

The Federal Reserves had two main objectives in creating PDCF and lending directly to primary dealers. The first objective is to ensure short-term funding for investment banks. Since the Bear Stearns experience, the Fed realized that lender of last resort needed to be more extensive beyond commercial banks. Bear Stearns sustained a sudden loss of short-term funding but looks to have remained solvent. The second objective is to reduce interest-rate spreads between the asset-backed securities that can be used for collateral in these loans and U.S. Treasury securities, thereby improving the ability of investors to buy and sell asset-backed securities in financial markets Cecchetti (2008).

### **6.3 Credit Rating Agencies**

The three primary credit rating agencies (CRAs) that assign credit are Moody's Investors' Service (Moody's), Standard & Poor's (S&P) and Fitch Ratings (Fitch). Credit rating agencies assess the financial health and creditworthiness of the entity issuing the security and the probability that a security it issues will default. The security issued gets assigned a credit rating by the rating agencies before being sold on Wall Street, which is an indicator of the level of risk of default. Investors use the rating to evaluate whether or not the security meets their risk tolerance when considering it for purchase and adding it to their portfolio.

The three rating agencies use statistical models based on Monte Carlo simulations when calculating the probability of defaults. Prior to the crisis, CRAs used input data in the models consisting of information on the characteristics of the mortgage pool when rating instruments. The characteristics used were, credit scores of the borrowers, cumulative loan to value ratio, income documentation, information of whether the mortgages were the borrowers' primary residence and historical default rates on similar mortgages. The historic default rates were largely collected during the years 1992 until the early 2000s, during this period home prices were increasing and default rates were low, which indicates that the input data used might have been corrupt in terms of reliability (Ashcraft et al, 2008).

Investors put trust and faith in the ratings assigned by credit rating agencies. Their analysis on a security has a major impact on issuers and puts forth a view on how the financial market as a whole will view the security. Due to lack of transparency in the CDO and MBS market investors are dependent on the ratings from CRAs and its importance only compounds as the complexity of the security increases. The structure of CDOs was too complex to understand even for sophisticated investors; consequently the reliance on credit rating only increases (Benner & Lashinsky, 2007). The SEC found that growth and complexity of structured finance products proved too much for some CRAs.

CRAs played a significant role in adding to the growth of subprime mortgage securities going beyond just rating the CDOs and MBOs. CRAs were paid to give investment banks advice on how to structure the deal to obtain an investment grading.



CRAAs helped issuers prioritize the tranches of CDOs and MBSs in order to squeeze the maximum profit from a security by maximizing the size of its highest rated tranches. CRAAs played an active consulting role to the issuers, the issuer would refine the deal according to the comments they received from CRAAs and then fine tune it to the CRAAs standards to get an investment grade. The CRAAs would then “switch hats” from consulting on the financing to providing a written “objective” opinion (Redmon & Schewe, 2007). This relationship led to conflict of interest in the rating process. If issuers did not receive the rating they wanted, they would turn to another credit rating for the advice service an act sometimes referred to as “ratings shopping”.

Credit rating agencies works weren’t examined for accuracy and consistency over time. The CRA methodologies differ from each other and there was no indication that the securities they were rating were overrated until the housing market fell. Investors thought they were complying with their investment policies, which required them to invest in safe products, in which they were not. The consulting and assigning credit to subprime products contributed and became a critical part of CRAAs earnings (Redmon & Schewe, 2007). Moody’s and S&P generated almost 50% of their revenue from a category of business known as “structured finance” (Farrell, 2008). Moody’s net income increased to \$705 million in 2006 from \$159 million in 2000, the increases came from fees consulting and rating structured finance products (McLean, 2007)

In addition to CRAAs role in inflating the bubble, they also had hand in accelerating the crash. CRAAs are typically stubborn in changing their ratings on a frequent basis, so when changes occur they tend to be late, extensive and big. Following the burst of the housing bubble between mid-2007 and mid-2008, CRAAs collectively downgraded the credit ratings on nearly \$1.9 trillion in MBSs (Fortune Magazine, 2008). From 2005 until the third quarter of 2007, 66% of all CDO ABSs were downgraded, 44% of which went from investment grade to speculative grade, including default. Of all RMBSs, 17% were downgraded, 10% of which went from investment grade to speculative grade, including default (Crouhy et al (2008)). Some securities went from having AAA rating to CCC. Financial institutions holding those securities were forced to write down their value and as a result financial institutions had to acquire more capital. Some institutions were

prohibited from owning too many low-rated securities led to force selling which only magnified the situation.

Investors trusted the CRAs to warn the public about instruments that were not creditworthy but too often this turned into overreliance. Investors started to treat ratings as buy/sell recommendations without performing their own due diligence. In addition, the government support of ratings only added to the trust of CRAs, (i.e. Base II Accord encourages banks to use credit ratings when calculating net capital reserve requirements). Following the crisis, investors have realized that ratings can be inaccurate, untimely and are affected by CRA conflict of interest. Many market participants no longer trust the ratings that CRAs produce which makes it difficult for investors to determine the creditworthiness of an instrument or issuer.

## **7 The Unraveling**

### **7.1 Stage 4 – Crisis**

In early 2007, it became clear that home prices were falling. According to a report by Standard & Poor, home prices fell 8.9% in 2007, the largest decline in 20 years. As more and more families were unable to make their mortgage payments especially those with subprime loans, subprime lenders started to default. During the first quarter of the year, more than 25 subprime lenders filed for chapter 11. Then in April, New Century Financial Corporation, a leading subprime mortgage lender in the US files for bankruptcy protection. Subprime defaults started hitting the news and more and more people started noticing.

It wasn't clear at the time, how the housing crisis would affect the financial system that had helped inflate the bubble. Because in theory, securitization and over the counter derivatives were supposed to distribute risk efficiently among investors. As we know today, that theory would prove to be wrong.

As the fear and panic sets in, insiders who were originally involved start to sell and prices start to fall. Speculators are realizing that prices can no longer rise and everyone is running for the door. The bubble has burst and the crisis is set off. Section 7.3 will outline the major events of the 2007-2009 financial crisis.

### **7.2 Stage 5 – Revulsion**

This is the final stage of a bubble's life cycle. Individuals who overstretched themselves during the bubble scrambled to unload whatever they can for cash. At this point cash is king.

In the aftermath of the crisis, companies realized that cheap and easy credit is no longer readily available. It was tougher to borrow and meet payrolls, which lead to more layoffs. Still today credit is tighter than it was before the crisis. A lot of people lost their jobs and without income, millions of families entered foreclosure. Foreclosures

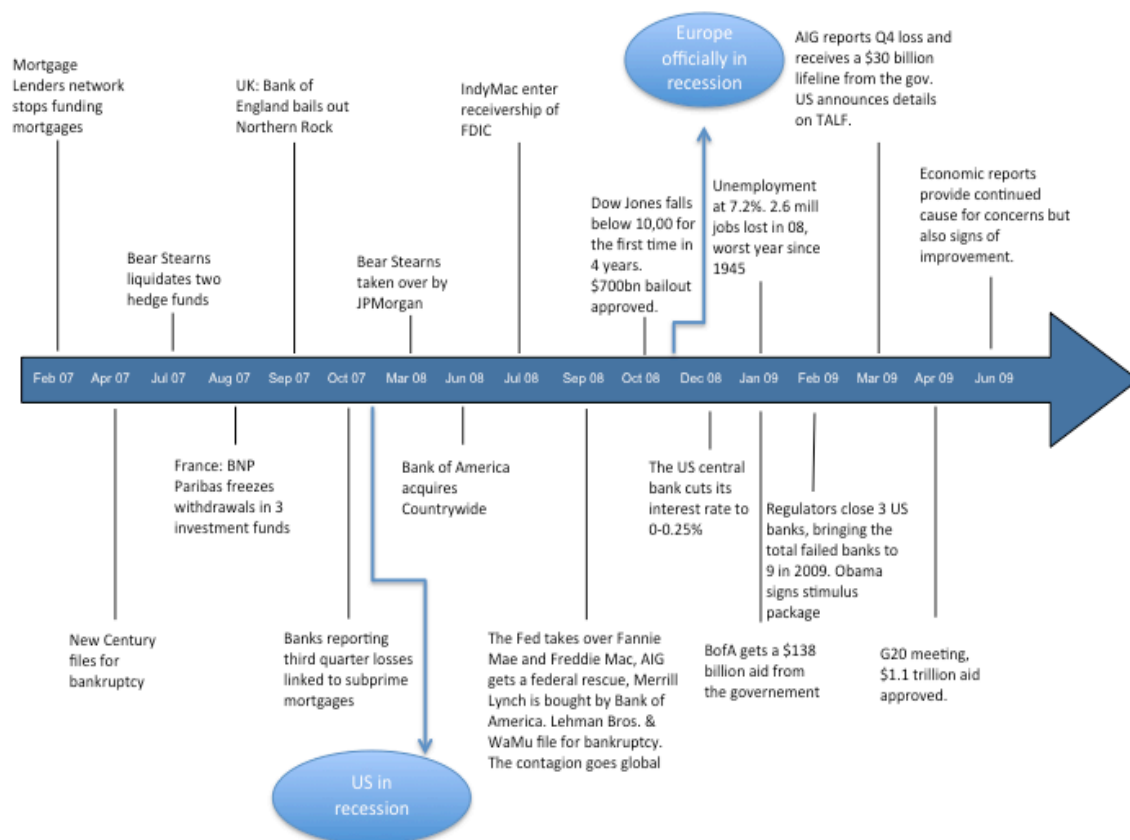
and abandoned properties dragged home prices down, depressing the value of real estate in neighborhoods across the country.

Since the housing bubble burst and through June 2010, about 2.4 million families have lost their homes to foreclosure. In addition there have been 3.5 million default notices and 3.5 million scheduled foreclosure auctions (RealtyTrac, 2010).

"This has been the worst financial crisis since the Great Depression. There is no question about it, but at the same time we have the policy mechanisms in place fighting it, which is something we didn't have during the Great Depression." (Gertler 2008)

### 7.3 Timeline

Figure 19 illustrates the timeline of major events during 2007-2009.



3

Figure 19 Timeline of events

Source: Author's Illustration

<sup>3</sup> The timeline is sourced from news flows from various online sources such as Cnn.com, Wall Street Journal and some information were obtained from the Federal Reserve Bank of St. Louis' website.

### ***Events during 2007***

One of the first sparks that ignited the financial crisis came in February 2007 when Freddie Mac announced it would no longer buy the most risky subprime mortgage and mortgage related securities. Soon after in April, New Century Financial Corporation, a leading subprime mortgage lender in the US files for Chapter 11 bankruptcy protection. The filing made it clear that New Century's problems were not its alone. Its lenders including major financial institutions (Bank of America, Morgan Stanley, Citigroup, Barclays Bank and UBS) can demand \$8.4 billion in loan repayments that it can't repay. (CNN Money, 2007).

Then in the summer of 2007, two hedge funds managed by Bear Stearns collapsed under the weight of heavy investment in subprime securities. In August, BNP Paribas, France's largest banks, told investors that they would not be able to take money out of their funds because it couldn't "fairly" value their holdings after US subprime mortgage losses roiled credit markets (Boyd, 2007). The global economy started to experience a liquidity crunch and in an attempt to stabilize the turmoil, central banks across the world started to take actions. The European Central Bank quickly provides more than €200 billion to boost liquidity and inter-bank lending. The US Federal Reserve Board votes to cut the primary discount rate by 50 basis points to 5.75%.

The troubles intensified in September as The Chancellor of the Exchequer authorized the Bank of England to provide liquidity support facility to Northern Rock (UK's fifth largest mortgage lender. During the third quarter, banks began to report losses linked to subprime mortgages. UBS, one of the world's largest investment banks, announced in October that they would have to make write downs of \$3.4 billion mainly related to the US subprime mortgages. The same month, the Dow Jones Industrial Average reached an all time high of 14,164. Just sixteen months later on February 23, 2009 the Dow closed at 7,114, a decrease of almost 50%. Towards the end of 2007, financial market pressures intensified as liquidity in interbank funding markets diminished. The Bush administration reacted to the downturn in the housing market by freezing interest rates on subprime mortgages that are scheduled to rise in the coming months. Treasury Secretary Henry Paulson who led the negotiations with the mortgage industry

acknowledged the effort but added that it's "not a silver bullet" and that US was facing a difficult problem.

In December, the Federal Reserve Board announced the creation of a Term Auction Facility (TAF) in which fixed amounts of term funds will be auctioned to depository institutions against a wide variety of collateral. The Bank of England, the Swiss National Bank, the European Central Bank and the Bank of Canada, along with the US Federal Reserve announced measures designed to address the current pressures in the short-term funding markets.

The Federal Open Market Committee authorizes temporary reciprocal currency arrangements (swap lines) with the European Central Bank (ECB) and the Swiss National Bank (SNB). The US Federal Reserve will provide up to \$20 billion to the ECB and \$4 billion to the SNB, for up to 6 months.

### ***Events during 2008***

In the beginning of the year, Ambac Financial Group Inc., the second largest bond insurer in the world, had its rating downgraded two levels from AAA to AA by Fitch Ratings after the company changed the plan to raise new equity. This raises doubt on the ratings of \$556 billion in municipal and structured finance debt guaranteed by Ambac. Following the downgrade, Bloomberg reported that seven AAA rated bond insurers on the market at the time had \$2.4 trillion outstanding guarantees of which \$100 billion was CDOs linked to subprime mortgages. If those bonds lose their ranking, it could cost borrowers and investors as much as \$200 billion.

It became evident in the beginning of March that the repo market was instable, when rumors started swirling about Bear Stern's financial troubles. Counterparties refused to lend to Bear Stearns against anything but the highest quality collateral due to the risk of holding a collateral that could only be sold at fire sale prices in the event of a bankruptcy. Since half of Bear Stearns financing is done through the repo market the withdrawal of credit was disastrous. In addition, Bear Stearns did not have the liquidity necessary to meet its short-term obligations. Bear Stearns was so indebted to so many companies that their failure to repay their debt would cause a cascade of other failures. Bear Stearns interconnection with other banks on Wall Street and of the world, could

lead to “systemic” risk. It was clear that Bear Stearns had to be contained. The Fed decided to give a loan to JPMorgan, indirectly lending Bear Stearns using JPMorgan as a conduit. Then on March 16th, JPMorgan agreed to buy Bear Stearns for the fire sale price of \$2 a share or about \$236 billion (compared to \$30 a share two days earlier) with the Fed guaranteeing the deal with a \$30 billion credit to cover Bear Stearns’ toxic asset. JPMorgan later raised the offer for Bear Stearns to \$10 a share in an effort to calm angry Bear Stearns shareholders.

The International Monetary Fund released new projections in April; estimating losses stemming from the US subprime mortgage crisis may reach \$945 billion and may approach \$1 trillion citing a “collective failure” to predict the breadth of the crisis. The Federal Reserve continues to slash the federal funds target rate in order to stabilize the market and was down to 2.25% at the end of April.

In May 2008, Fitch Ratings estimated that losses by banks on subprime RMBS and ABD-CDO exposures to be \$165 billion. According to Fitch in the last three years (2005-2007) the subprime market is estimated to have originated as much as \$1.4 trillion and Fitch estimates total losses for the market to be in the region of \$400 billion. Approximately \$200 billion, or 50% of these losses were estimated to reside within the banking sector, and the remaining 50% was distributed between financial guarantors, insurers, monolines, asset-managers and hedge funds. Four banks accounted for approximately 60% of the losses and more than 50 banks account for the remaining 40%.

**Table 4. Estimated Bank Losses per Region**

Institutions	Total Losses (\$bn)	Region	Total Losses (\$bn)
Citigroup	21	Europe	77
Merrill Lynch	28	Asia	10
UBS	38	US	78
IKB	12		
	<b>99</b>		<b>165</b>
% of Total Losses	<b>60%</b>		

**Source:** *Fitch Ratings (2008)*

On June 5th, Standard & Poor's downgraded the world's two largest monoline bond insurers, Ambac and MBIA to AA from AAA rating. Three banks (Citigroup, Merrill Lynch and UBS) are said to have the most exposure to the insurance companies and are looking to further write down \$10 billion in losses because of the downgrade. The same day, the Federal Reserve announced the approval of the notice of Bank of America to acquire Countrywide, making Bank of America, the biggest mortgage lender and loan servicer in the US.

Lehman Brothers reported a second quarter loss of \$2.8 billion – the first loss in the company's 14-year history as a public company. AIG, the insurance company, also reported a first quarter loss of \$7.8 billion, mainly due to write-downs on their CDS portfolio.

On July 12th 2008, IndyMac (US mortgage lender) was taken over by federal regulators making it the second biggest bank in the US history to fail. The failure was due to the IndyMac's inability to meet demands for withdrawals by customers. Two weeks later the US House of Representatives passed a housing bill, which contained a rescue plan for Freddie Mac and Fannie Mae along with a giving the government a power to guarantee up to \$300 billion in mortgages refinanced through the Federal Housing Administration.

On September 7th, the US government had to seize Fannie Mac and Freddie Mac, the nation's two largest mortgage companies, in what would become the world's largest financial bail out. In an extraordinary intervention, the Fed provided aid of \$100 billion to each company to backstop any shortfalls in capital. The government also said it would buy mortgage bonds backed by the companies starting with \$5 billion and unlimited liquidity until next year. The companies are required to shrink their portfolio by 10% a year until they reach \$250 billion. The two institutions, owned \$5.4 trillion in outstanding liabilities or about half of the US mortgage market. Due to the size of these two companies and the importance for the economy as a whole, the Fed was forced to bail them out to avert a total collapse of the financial system.

In the wake of Freddie Mac and Fannie Mae, the investment banks Lehman Brothers, Merrill Lynch and the insurance company AIG struggled after losing more than half of their market values. Following the Bear Stearns bailout in March, Paulson issued a



warning to Wall Street that a bailout by the Fed would never happen again. Concerned about the “moral hazard” of bailing out Lehman, the Federal Reserve made it clear that Lehman would not receive any federal money and instead encouraged other institutions to buy Lehman. If the Fed bailed Lehman out it would only encourage financial firms to engage in increased reckless behavior because they know the government would rescue them.

On September 15th 2008, a day of reckoning for the US economy, Lehman Brothers filed for bankruptcy after all attempts of finding a buyer failed. Lehman Brothers was far more interconnected than what the Fed believed. A “Systemic” risk was now a reality. The banks were afraid of lending each other even though inter bank lending is the core of the banking system. The credit markets started freezing up and commercial banks stopped lending causing the financial crisis of modern history. On the same day it was announced that Bank of America would be acquiring Merrill Lynch for \$50 billion. The stocks plummeted and Dow Jones industrial average lost 504 points or 4.4%. This was the biggest one-day decline since the aftermath of 9/11.

The next day, the US Federal Reserve decided to take over AIG fearing the repercussions of AIG filing for chapter 11, stepped in with an \$85 billion line of credit from the New York Fed, which would eventually cost taxpayers \$182 billion. Moral hazard was out the door and they didn’t have an option but to intervene.

Following the turbulence and falling stock market, the US Treasury Department submits draft legislation to Congress to buy toxic assets. Soon after Congress passes and President Bush signed into law the Emergency Economic Stabilization Act of 2008 (Public Law 110-343), which establishes the \$700 billion Troubled Asset Relief Program (TARP).

Later on in the month, US regulators seize the assets of Washington Mutual (WaMU) the sixth largest bank in the US, making it the largest bank failure in US History. WaMu tried to auction itself to potential buyers but due to its large exposure to the US mortgage market, nobody showed interest.

By the end of the month, Citigroup agrees to buy the banking operation of Wachovia, the sixth largest lender in the US, Citi later on abandons that deal and Wells Fargo acquires Wachovia. Goldman Sachs and Morgan Stanley, two last big independent

banks announced they would transform into banking holding companies subject to greater regulation to be able to participate in the bailout packages.

Top policymakers and bankers meet at the World Economic Forum in China to discuss a need for international accounting standards, policing of the credit default swap market and greater international cooperation between regulators. They all agreed that more governmental regulation of financial markets is necessary in the wake of the credit crisis.

The wave of consolidation and restructuring in the financial sector had now come to Europe. The European Central Bank (ECB) along with the government of the Netherlands, Belgium and Luxembourg agree to nationalize Fortis, the European banking and insurance company giant. One of Germany's biggest lenders, Hypo Real Estate (HRE), had to be rescued by the German government and other banks after a EUR 50 billion liquidity crisis.

The government of Iceland takes control of all three of the nation's major banks. The case of Iceland will be discussed in further detail in Section 8.

Sigma Finance, the last surviving structured investment vehicles (SIV), collapses and marks the end of the era of structured investment vehicles. In an effort to reinforce stability of the financial system, reduce risk exposure and improve the supervision of banks that operate in more than one European Union country, the ECB proposed a revision to the Capital Requirements Directive which controls the capital requirements of banks operating within the European Union.

Despite the Fed's attempt to inject liquidity in the market, investors sell because of fears of a recession and uncertainty. The Dow Jones Industrial Average falls below 10,000 for the first time since 2004. UK, Canada, Sweden, Switzerland, US and the European Central Bank coordinate efforts and cut interest rate in an attempt to halt the economic damage from the financial shock of the credit crisis.

In the second week of October, the UK government launches a GBP 400 billion rescue plan to help restore confidence in the financial markets. Yamato Life, Japanese company, files for bankruptcy becoming the first direct casualty in Japan from the fallout of the US subprime mortgage crisis.

The Dow Jones caps its worst week ever and with record low levels of consumer confidence, October 2008, was the most volatile month in Wall Street history. S&P500 posted its worst month since the 1987 crash and for the first time in 17 years consumer spending fell. European leaders meet in Paris to coordinate efforts to combat Europe's credit crisis while the US taps into the \$700 billion available from the Emergency Stabilization Act and announce injection of \$250 billion into the US banking system. The form of the rescue will include the US government taking an equity position in the banks that choose to participate in the program. This is the most sweeping government intervention since the Great Depression.

On October 17, the European Union 27 leaders sign off a joint \$2.7 trillion bank bailout plan.

In November, the European Central Bank dropped the euro zone interest rate by 50 basis points to 3.25%, following a similar move by other European central banks and a much more spectacular 150 basis points move by the Bank of England. To further boost the confidence, Bank of England announced a temporary 2.5 percentage points VAT cut in an effort to save the country from deep recession.

In November, European central banks continued to cut interest rates. The European Central Bank dropped the euro zone rates by 50 basis points to 3.25%. Then on November 14th, euro zone officially entered into recession following third quarter GDP figures showing a 0.2% decline. Later on in the month, the European Commission proposed a €200 billion economic stimulus plan in order to bolster growth and employment. On December 1st, the US National Bureau of Economic research declared that the nation had been in recession since December 2007.

With no end in sight, S&P downgrades the credit rating of eleven of largest banks in the world in both US and Europe, including J.P. Morgan Chase, Bank of America, Wells Fargo, Citigroup, Morgan Stanley, Goldman Sachs, Barclays, Credit Suisse, Deutsche Bank, Royal Bank of Scotland and UBS saying the global crisis could last longer than expected. With a frozen credit market, worldwide mergers and acquisitions (M&A) activity plunged, down 29% from 2007 due to financing difficulties, unpredicted volatility and risk aversion. Estimated 1,300 M&A deals were abandoned worldwide.

Worried about a depression, the US Federal Reserve decides to lower its benchmark interest rate virtually to zero.

### ***Events during 2009***

Although 2008 was a challenging year for the world, 2009 looked even gloomier. The Bank of England decided to cut interest again to a 315-year low of 1.5% to help ease the flow of credit to companies.

In the first week of 2009, Germany takes a 25% stake in Commerzbank, Germany's second largest lender, in return for a 10 billion capital injection. The bailout is to help Commerzbank shore up its finances and complete the takeover of rival Dresdner Bank.

Unemployment in the US jumps to 7.2%, its highest in 16 years, it was at 4.4% before the crisis. 2.6 million jobs were lost in 2008 making it the worst year since 1945. The US government continued to carry out their bailout programs for troubled financial companies and extended a \$138 billion bailout to Bank of America (BoFA). The bailout included a \$20 billion in capital injection and a guarantee on \$118 billion of potential losses on remaining toxic assets. In return, BoFA will issue the government preferred stocks and take responsibility for the first \$10 billion of losses associated with the pool of risky assets. The Treasury and FDIC will pick up the next \$10 billion in losses and with the remained to be absorbed through a Federal Reserve Loan. BoFA was in the process of acquiring Merrill Lynch, which had reported a record loss in the 4th quarter of 2011.

Reports show that the global crisis continues to deepen in China. China announces the slowest growth in seven years; Japan reduces economic forecasts for the next two years and South Korea reports for the first decline in the quarterly economic growth since the Asian financial crisis. Forecasters put China's GDP growth rate at 5% down from 11.9% in 2007. In an effort to restore China's high growth rate, the People's Bank of China cuts interest rates to 5.31%, the fifth cut in the last three months and reduce capital reserve requirements by 50 basis points. Japan announces a \$16.7 billion stimulus package to help businesses that have been devastated by the global financial crisis, in addition to plans to inject capital into the markets by buying corporate debt.

Citigroup sells \$12 billion of government guaranteed bonds in an attempt to strengthen its capital. This is the largest bond issue guaranteed by the Federal Deposit

Insurance (FDIC) since the crisis and marks the second time that Citigroup has taken advantage of the government backed facility.

The International Monetary Fund announced it would significantly adjust its forecast for global economic growth downward. IMF has contributed \$50 billion to member countries in response to the global financial crisis and more member countries are expected to come to the IMF for help.

On February 6th, regulators close three additional US Banks, bringing the total number of failed US bank to nine in 2009. 25 banks failed in 2008 and were put into receivership compared to 3 that failed in 2007. Job losses in the US reach 3.5 million in the last 12 months, including 500,000 in January alone and unemployment reaches 7.6%. To jump start the economy and create more jobs, President Barack Obama signs a \$787 billion economic stimulus package into law.

The Boston Consulting Group estimated publishes a study showing that the global financial crisis has depleted the market value of the world's banks by \$5.5 trillion or equivalent to 10% of the world's GDP.

Fears of nationalization cause US Bank stocks to fall to their lower level since 1992 pushing the Dow Jones Industrial Average to its lowest point in six years. Credit card defaults in the US rise to the highest level in the last 20 years. Citigroup and American Express, two of the largest issuers, reported default rates of around 9%.

At the end of February Royal Bank of Scotland (RBS) reported £24.1 billion for 2008 in losses, the largest corporate loss in Britain's history. The government releases plans to inject £25.5 billion into RBS.

In March, AIG announces a fourth quarter loss of \$61.7 billion. This loss equaled \$465,000 a minute, was a record for a US corporation. The US government decided to extend a \$30 billion lifeline to AIG and in return the government will gain controlling stakes in two of AIG's largest divisions. The government lifeline prevented AIG from getting downgraded, a move that could force AIG to come up with billions of dollars.

The next day the US Treasury announced the details on the Term Asset-Backed Loan Facility (TALF). TALF will accept AAA asset-backed securities (ABS) as collateral for loans in an attempt to generate lending by unfreezing the ABS market.

For the first time in long time, few financial institutions start to see some positive signs. Citigroup's CEO, Vikram Pundit, announces that Citi has achieved \$19 billion in revenue over the first two months of 2009. Citigroup is expected to have its best profit performance since the third quarter of 2007. Bank of America's CEO, Kenneth Lewis, reports that the company was profitable in January and February. The fourth quarter of 2008 was the bank's first quarterly loss in 17 years but Lewis expects BofA to be profitable in 2009 without governmental aid.

Updated commerce department data shows that the US economy fell at its fastest rate since 1982 in the fourth quarter. GDP in the US shrank by 6.3% and global M&As fell by \$444 billion in the first quarter of 2009. The organization for Economic Co-operation and Development announced projection that world trade will decline by 13.2% in 2009. On April 20th, G20 leaders meet in London to combat the financial crisis. The leaders pledge \$1.1 trillion to fight the crisis with \$750 billion in additional funding for the IMF, \$250 for world trade financing and \$100 for multilateral development banks. The leaders also planned measures for cracking down on tax havens, regulating hedge funds, tougher pay rules for financial institutions and regulation of credit rating agencies.

The first quarter economic reports provide signs of improvement. The US, reports an increase in new factory orders while real GDP remains in decline, though now falling at a slower rate than in the final quarters of 2008. Fed officials cite rising US debt as problematic.

## **8 Case Study: Iceland**

Before the global financial crisis, Iceland was once a stable democracy with high standard of living, low unemployment and relatively low government debt. Iceland became a good example of success stories of globalization and financial deregulation. A country up until 1973 was listed as a “developing country” by the United Nations became one of the wealthiest countries in Europe in a matter of decade.

This all changed on September 29th 2008, when Glitnir, the country’s third largest bank was taken over by the government. In an effort to revive the bank, the government injected €600 million of equity into the bank. The regulators blamed the credit squeeze and Glitnir’s inability to obtain short-term financing. David Oddson, the former Central Bank Governor of Iceland, said that without intervention, Glitnir would have ceased to exist in the next couple of weeks. Then a week later, Iceland nationalizes the second largest bank in the country, Landsbanki. The Icelandic Financial Supervisory Authority dismissed the bank’s management and appointed a receivership. Just days later, a third casualty, Iceland’s largest bank, Kaupthing was nationalized. The Icelandic króna plummeted by almost half and the Icelandic stock exchange lost 90% of its value, including a 77% drop in a single day in October. In an effort to stabilize its economy, Iceland seeks \$6 billion rescue package from the International Monetary Fund (IMF). Iceland was tethering on the edge of bankruptcy.

### **Iceland’s Financial History**

Prior to 2000, Iceland’s banks were publicly owned and run with a conservative approach in regards to issuing loans. Credit was not readily available and it was hard for individuals to get a loan. The interest rates were low and sometimes negative, given into account Iceland’s relatively high inflation. In 2000, under Prime Minister, David Oddsson, and under the pressure of the capitalist class, Iceland’s government started a broad deregulation and employed free market reforms. The government implemented program of privatization, tax cuts, reductions in spending and deficits, inflation control and free trade. The Icelandic banking system was privatized in a politically driven

process. Ownership went to individuals with limited experience in modern banking and with ties to the conservative coalition government. The move unleashed an unprecedented credit boom. The result was a system of cross holding, with liquidity needs met within the group which would turn out to be one of the purest experiments of deregulation ever conducted.

The banks were operating mainly as domestic clearing banks started extending their operations to investment banking. Deregulation allowed individuals, companies and banks to borrow huge sums of money and credit was freely available which led to a massive bubble in Iceland. This bubble was created by what is known as “carry trade”. Icelandic banks borrowed heavily in places like Japan, where interest rates were effectively zero, exchanged it to krónur and lend it to individuals, banks and companies in Iceland at a higher interest rates. The difference between the two interest rates was pocketed as a profit by the banks. The Icelandic banks and companies expanded aggressively overseas by borrowing heavily to fund investments. They went into an overdrive buying stakes in Europe including many leading British companies. In an effort to control inflation caused by the financial boom, the Icelandic Central Bank increased interest rates as high as 18%. This led to an increase in the carry trade, which led to a greater influx of foreign capital. The growth affected the entire economy, companies and even households started to adopt the banks’ business models of extreme leverage, buying assets with borrowed funds.

The banks relied heavily on wholesale funding to fuel their growth. They issued debt securities in the capital markets with short maturities to obtain the funds necessary to make loans to their customers. Since the loans to their customers had longer-term maturities than their debt securities, Icelandic banks were extremely vulnerable if their credit ratings were lowered or turbulence in the capital markets prevented them from issuing debt securities. Iceland’s small size and sparse population made it difficult for the banks to collect domestic retail deposits. Thus, to feed their insatiable appetite for capital, the banks started to look elsewhere for deposits and ultimately opening online savings branches across northern Europe most notably in the UK and the Netherlands. In a 5-year period the banks’ were able to accumulate liabilities of 10 times the GDP or \$120 billion and by 2008 the banking sector was responsible for over 80% of staggering



external debt. Supporters of the laissez-faire market proclaimed Iceland as a model for the future.

All three banks had the same business model and to a varying degree dependent on the same macro-economy and were perceived by the international capital markets as being highly related and tightly interconnected. This means that a difficulty in one bank can affect confidence in the other banks, which could lead to bank runs. The three main banks were responsible for 85% of Iceland's financial system and with no doubt their failure would have a catastrophic effect on the economy.

As the interbank lending markets dried up in 2008, following the collapse of Lehman Brothers, Icelandic banks found themselves unable to borrow to cover their short-term financing and it was a matter of days before their collapse.

### **Iceland's Lack of Regulation**

An article published by Danielsson and Zoega in 2009, blames the Icelandic economy crash on deregulation of the financial system. The banks were privatized without adequate supervision and there was insufficient knowledge on how to run and regulate a modern banking system. The article goes on to state that when the banks headed for failure the government opted for gambling for resurrection instead of closing the banks and consequently creating a systemic crisis. Likewise, Paul Thomsen, IMF mission chief, commented in an interview that the root problem in Iceland was unregulated environment that allowed an oversize banking system to develop (Andersen, 2008).

There were warning signs, and components for the Icelandic crisis were readily apparent to anyone who cared to review them. However, Iceland was in denial when it came to foreign criticism. Many Icelanders owned shares in the banks and looked the other way and as long as the prosperity continued, no one was willing to face the inevitable.

Increased regulations and limits were antithetical to growth and thus the government was not inclined to slow it down once it had grown to several times the size of the country's GDP, no matter how shaky the foundation upon which it rested. In addition, the Central Bank and the financial supervisory authority were lacking in size, expertise and resources to deal with the mounting problems.

The case of Iceland is one of a kind due to the size of its financial sector compared to the size of the economy. While other countries have their share of failed banks, they were able to confine the problem, as they had the adequate resources to contain the fallout from individual bank failures. This means that ultimately the blame for bank failures lies at home. In Iceland's case the government failed to act, if they just had tighter regulations and acted prudently the economy would have been left in a much better shape. Iceland's collapse also showcases the inadequate cross-border banking regulations. The banks were authorized to open online savings branches at a rapid rate without having enough collateral. This goes to show a serious failure in the decision making process in Iceland and at the host countries.

## 9 Conclusion

The objective of this thesis is to provide a clearer understanding of the global financial crisis that started in 2007 and the factors that caused it. This paper also introduces the proposed hypothesis that the main cause of the crisis was largely due to *the laissez-faire or free market capitalism that led to the expansion of credit years prior to the global financial crisis, causing an unprecedented asset price bubble.*

The evidence show that many different factors can cause an asset price bubble to inflate and it can build up over time and, if left unchecked, can pose a substantial risk to the financial system, i.e. systemic risk. There were clear warning signs before the meltdown, some of which included an upswing in risky subprime lending and securitization, unprecedented rise in home prices and reports of widespread predatory lending practices. The current state of the economy is a reminder that materialization of such risk can have great economic costs.

Many agree that the asset price bubble was the root cause of the global financial crisis. Those who favor the laissez-faire capitalism, which is based on the theory of rational expectations and the efficient market theory, would disagree with this conclusion. This perspective is based on the belief that a bubble cannot exist in an efficient market. The recent financial bubble is proof that refutes the efficient market theory. The crisis revealed asset-pricing failure, which contradicts with the efficient market theory's hypothesis that the market is efficient and all available information is reflected in the price.

The financial crisis uncovered a number of holes in the government's ability to monitor systemic risks. The government's laissez faire approach, heavily influenced by Wall Street, failed miserably. Iceland was a good example of the free market gone wrong. The Icelandic banks became so large, with liabilities at approximately 11 times the country's GDP, that the country's central bank was ultimately unable to rescue them. And the irony of it all is that banks wanted less regulation and no government interference but when the financial crisis hit in 2008, they not only desperately needed the government's assistance, they fully expected it.

One very important aspect that is typically overlooked is that capitalism, the main tenet of the laissez faire principle, in its purest form, is inherently flawed. Based on the ideals of competition and self-regulation, pure capitalism places self-interest and self-preservation above all, including doing the “right thing” or what is best for the greater good. But adhering to one’s self-interest and doing what’s best for the community are two mutually exclusive principles. In order to ensure one’s own self-interest, one may have to be selfish and unfair. It essentially becomes a balancing act, where someone in the chain has to give some of what they are after. Of course a mutual agreement does occur but it really incentivizes selfish acts such as cheating, cutting corners, or worse, fraud. It inevitably leads to capitalism’s true inherent principle and the polar opposite of the greater good; greed. All of these ingredients were not only present but rampant in the financial services industry leading up to the crisis. The goal was simple; make as much money as possible from as many angles as possible with no regard to the impact on other parties involved or the greater system that is shared by everyone. This is pure capitalism. It works in redistributing wealth from the counterparty(ies) to the individual at hand, creating what is commonly known as wealth inequality. Capitalism does not preserve the common good. It does not distribute wealth to the community so that, as a group, everyone is better off. It does not elect to impose regulations on itself to limit its profiteering. It does not stop itself from taking on risks by any means unless it is told to do so. Capitalism simply cannot exist in its current form without regulation.

The goal of preventing another financial crisis and eliminating regulations imply two drastically different paths and end results. To prevent similar crises and asset bubbles, capitalism needs regulations to abide by, so as to restrain its profiteering schemes and routes. To eliminate regulations further would only make it easier to get right back to where we were and facilitate wealth inequality. The most vocal proponents of this route are the ones who will profit the most from it and those who have taken a stance based on an outdated and unrealistic political ideology. Regardless of which proponent, when the crisis hits, both are quick to look to the government for a bail out.

In terms of what course of action was the best, the world’s top economists tend to be in agreement.

“The conclusion suggests that the best response to the housing bubble would have been regulatory, not monetary. Stronger regulation and supervision aimed at problems with underwriting practices and lenders' risk management would have been a more effective and surgical approach to constraining the housing bubble than a general increase in interest rates” (Bernanke, 2010).

After analyzing the government's role and the major causes of the financial crisis, I suggest the following improvements to our economic policy going forward. First, we need to improve and closely monitor swings in asset price developments. The identification and ability to measure excessive credit creation can help discover possible build up of financial imbalances in the economy. Second, money and credit should play a greater role in central banks' monetary policy strategies, to ensure financial stability. Central banks should adopt a strategy in identifying and attempting to control asset bubbles, as they occur in the system. Furthermore, central banks should continue to reach out and increase cooperation in order to effectively address future cross-border crises. Lastly, in addition to strengthening our micro regulatory framework through liquidity and capital provisions, we must also build a strong macro regulatory framework. Prior to the onslaught of the crisis, regulation was designed to ensure safety of individual financial institutions, controlling the risks within intermediaries in an effort to reduce the possibility of failure. Yet as the financial crisis unfolded, this framework proved to be insufficient in preventing systemic risk. In January of 2011, the European Union established the European Systemic Risk Board (ESRB) with an aim in identifying and prioritizing systemic risks. The ESRB is responsible for issuing early warnings signs and issuing policy recommendations for remedial action. The ESRB closely resembles the Financial Stability Oversight Council in the US, which was created by the Dodd-Frank Act. The Dodd-Frank Wall Street Reform and Consumer Protection Act was signed into law on July 21, 2010. The goal is to create new financial regulatory processes in order to prevent another major financial crisis and enforce transparency and accountability while implementing rules for consumer protection.

The recent regulatory reforms by the EU and the US are all steps in the right direction but if we are to prevent the recurrence of similar crises in the future depends on

abandoning the laissez faire or free market capitalism all together, which has been embedded in our system over the last decades.

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