The Analysis of Financial Crisis in 2008

Haichuan She[1a*], Jie Lei[2b]
*Corresponding author. Email: 1006059113@qq.com

[b]e-mail: chloe2005727@gmail.com

[1]Department of Economics and Finance, Hong Kong Shue Yan University, Hong Kong, 999077, China

[2]Changjun High School International Department, Hunan, 410013, China

Abstract—The 2008 financial crisis brought huge losses to the global financial market. This article will analyze the financial crisis. This article first outlines the beginning and end of the financial crisis, and points out that the core factor is the outbreak of the subprime mortgage crisis. Afterwards, it will explain and analyze the core financial instruments, such as MBS, CDO, CDS, that appeared in this financial crisis. Then it analyzes the multi-faceted impact of the crisis on China and the United States. The coming examples illustrate the rescue plans of the United States. The U.S. plans are: US Federal Reserve Rate Cut and Emergency Stabilization Act of 2008, Mortgage Loan Adjustment Program and Quantitative easing and Rescue Financial Institutions. Finally, it is concluded that the cause of the financial crisis is the outbreak of the subprime mortgage crisis, which can also be understood as a large number of interests driving financial institutions to deceive the market. And the core of this crisis is credit bankruptcy.

Keywords: Financial crisis, financial instruments, subprime mortgage crisis

1. Introduction

The financial crisis in 2008 brought a huge impact on the global financial market. The reason is the subprime mortgage crisis and the bursting of the housing bubble in the United States. This article will analyze the role of some financial instruments in the financial crisis, including MBS, CDO and CDS, and analyze the impact of the financial crisis on the United States and China. Finally, this paper explains how China and the United States mitigated the impact of the financial crisis.

The main purpose of this paper is to analyze and generalize the core part of the 2008 financial crisis. This paper uses literature analysis, content analysis, case analysis and comparative analysis to analyze the financial crisis. Before us, due to the great influence of the financial crisis, many scholars have already done related papers. This paper may provide an overall overview of the beginning and end of the financial crisis based on previous research, and focus on the role of financial instruments in the financial crisis. For, the credit collapse of financial instruments and financial derivatives is one of the reasons for the financial crisis.

BDEIM 2022, December 02-03, Zhengzhou, People's Republic of China
Copyright © 2023 EAI
DOI 10.4108/eai.2-12-2022.2328857

2. Overview of Financial Crisis 2008

The 2008 financial crisis originated from the subprime mortgage crisis in the United States. After the September 11 attacks and the collapse of the Internet bubble, the US stock market was depressed and the economy was in recession. In order to stimulate the economy, US President George W. Bush delivered a speech, proposed the "home ownership" plan, lowered the federal funds rate and promulgated related laws to stimulate banks to provide subprime loans for low-credit groups.

In order to reduce borrowing risk and speed up financing, banks provide subprime loans and then sell these loans to financial institutions. Financial institutions then group these loans into mortgage-backed securities and sell them to other investors and financial institutions. At the same time, in order to give these wealth management products a good reputation and promote sales, financial institutions look for rating agencies to give these bonds a AAA rating. (Some critics argue that rating agencies conflict with their own interests because they are paid for by investment banks and other corporations that organize and sell structured securities to investors.) After purchasing these financial products, buyers go to insurance companies to insure their financial products in order to reduce the purchase risk. Insurance companies take advantage of the situation to package insurance contracts and launch new wealth management products.

These financial structures and wealth management products are interlocked and connected layer by layer. As long as housing prices do not fall, they can all make money.

Under this stimulus, the share of subprime mortgages soared from 7.2 percent in 2001 to more than twenty percent in 2005 and 2006, which is shown in Figure 1. Americans' enthusiasm for home buying rose, and in 2004 the home ownership rate of American households reached the highest level in history was 69.2% [1].

In 1936, the famous modern British economist John Maynard Keynes put forward in the book "The General Theory of Employment, Interest and Money". He believes that economic development will inevitably appear a cyclical movement that starts upward, then downward, and then upward again, and has obvious regularity, that is, the economic cycle [2]. The Federal Reserve has cut interest rates on federal funds to stimulate the economy. But a prolonged rate cut would have some negative effects. For example: The inflation rate of U.S. rose from 1.6% in 2002 to 2.3% in 2003, stated at 2.7% in 2004, 3.4% in 2005 and peaking at 4.2% in 2006, but has remained steady [1]. After a period of rate cuts, the interest rates were raised by the Fed from 1% to 5.25 %. Banks also raised floating interest rates, and the United States entered an interest rate hike cycle.

However, the rise in interest rates caused subprime lenders to fail to repay their loans, subprime loan defaults were high, and the number of foreclosures surged from 885,000 in 2005 to 1,259,118 in 2006, 2007 2,203,295 in 2008 and 3,157,806 in 2008. At the same time, the bank will conduct foreclosure of the repossessed houses. Data shows that nearly 1.3 million real estates were foreclosed in 2007, an increase of 79% compared with 2006 [1]. The number of homes on the market has soared, and an excess of housing inventory has led to a drop in house prices which is shown in Figure 2. Wealth management products that rely on housing prices to make a difference have also been negatively affected, and financial institutions have been hit

and unable to refinance mortgages. The cash flow of subprime mortgages has declined, and the domino effect has fermented, causing shocks.

There are different opinions on the cause of the subprime mortgage crisis. Commonly considered: speculative lending, high-risk mortgage lending and borrowing practices, asset securitization, inaccurate credit ratings, and moral hazard.

Eventually, the crisis spread to the whole world, and many countries in the world faced severe financial crisis. In response to the crisis, the U.S. government has come up with many remedies. These include the nationalization of financial institutions, the 700 billion bailout plan, the Federal Reserve cut interest rates, and more. These will be described in detail in the following part.

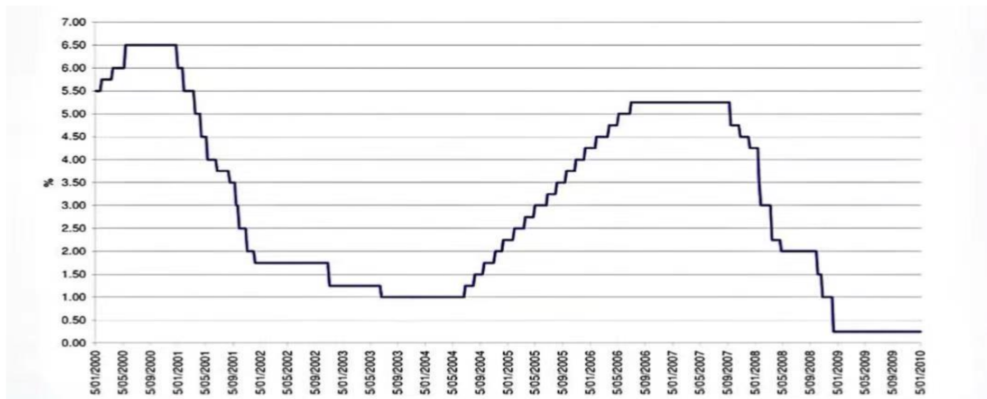

Figure 1. US Federal Reserve Funds Target Rate [1].

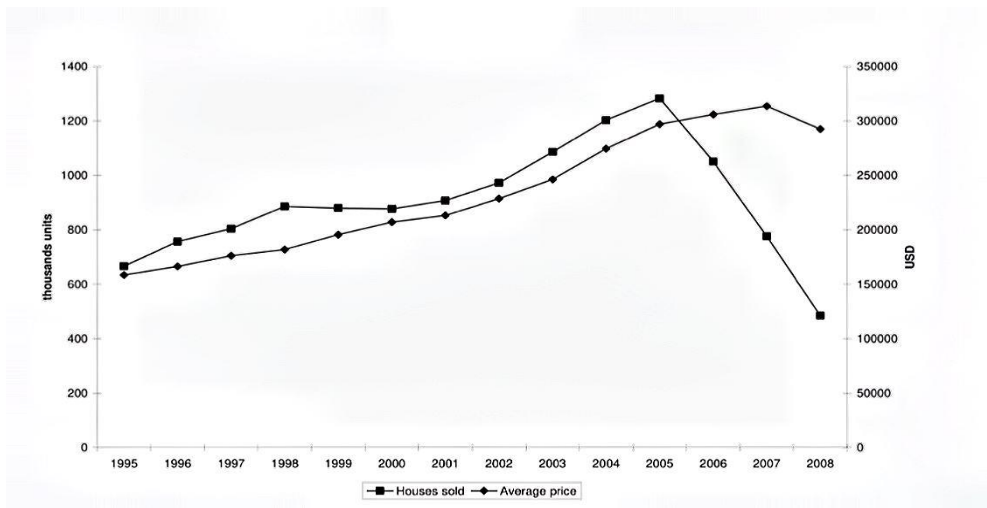

Figure 2. Home sales and prices of U.S [1].

3. The Role of Financial Instruments in the Financial Crisis

As mentioned above, the financial crisis was triggered by a combination of events. The 2008 financial crisis arose from the overexpansion of mortgages to vulnerable borrowers, repackaging them, and then selling them to willing lenders attracted by the erroneous risk ratings of those mortgage return securities [3]. In the 2008 financial crisis, the main financial instruments involved are: MBS, CDO and CDS and the operation of CDO and MBS is shown in Figure 3.

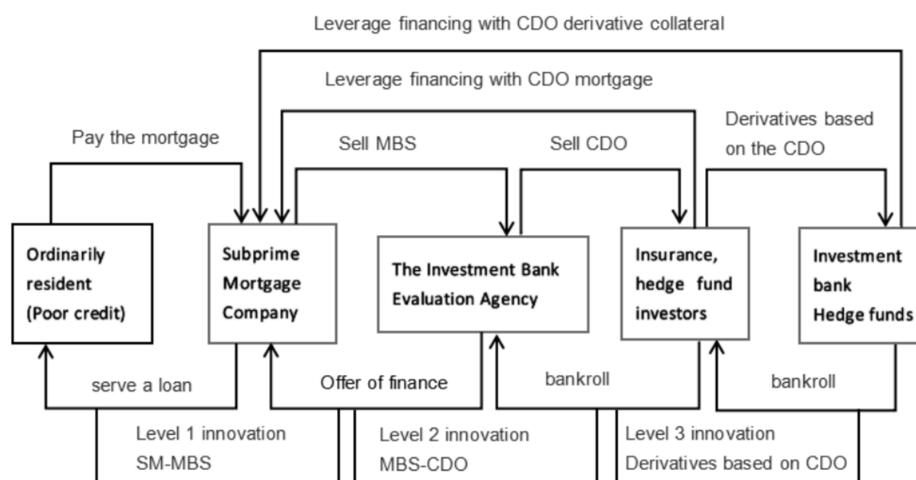

Figure 3. MBS and the CDO operating in the financial crisis [4].

3.1 SPV and Rating System

1) *Freddie Mac and Fannie Mae:* Fannie Mae and Freddie MAC are federally backed home mortgage companies created by Congress. Neither agencies initiate nor offer their own mortgages. Instead, they buy and guarantee mortgages issued by lenders through the secondary mortgage market. Everyone buys a mortgage from a lender. The two companies either hold their own portfolios or are repackaged as marketable mortgage securities. In turn, lenders use the money they earned from selling their mortgages to make even more loans [5].

2) *SPV:* Before discussing financial instruments, SPV (Special Purpose Vehicle) has to be mentioned. It is an integral part of this crisis. The core design of the operation mechanism of asset securitization is its risk isolation mechanism, and the most typical design of risk isolation is the establishment of a special purpose institution Special Purpose Vehicle.

It is a high credit institution specially set up for asset securitization and plays a central role in asset securitization. The basic operation process is to purchase securitized assets from the original owners (sponsors) of the assets, and then issue asset-backed securities in their own names for financing. Finally, the funds raised will be used to repay the sponsor for the purchase price of the underlying asset. SPV not only reduces the cost of securitization and solves the problem of financing difficulties through a series of professional means, but also reduces the risks in se-

curities transactions through risk isolation. Actually, Freddie Mac and Fannie Mae are SPVs in MBS trading.

3.2 Financial Instruments in the Crisis

1) *MBS(RMBS):* Classical housing loan industry chain is that the buyer finds a bank to make a loan. After the bank's credit department has reviewed and approved, the loan is paid to the developer in one lump sum, and then the buyer repays the loan to the bank. However, this slow way of returning funds will limit the development of more mortgage business by banks.

So there was the first financial innovation - MBS came into being. MBS stands for Mortgage-Backed Bonds or Mortgage Securitization. Asset securitization products such as MBS are, in essence, very useful financial tools for improving the asset adequacy ratio of financial institutions, improving bank asset-liability balance, and enhancing bank liquidity. However, when people use it in a wrong way, it can cause crisis.

The commercial bank asked Fannie Mae and Freddie Mac to act as the general underwriter of MBS, and the investment bank as the distributor to sell the bond to investors. Because of the government's credit endorsement, the security was rated AAA. The bank solved the problem of slow fund collection.

In the past, the bank lent its own money out, and now it lent the investor's. Once a bad debt occurs, the bank had to take the risk, but now the bank and the investor share the risk, and the investor's risk is even greater. Due to the policy of the United States: the government does not intervene in the market, there is a big loophole in the supervision of this aspect, especially the credit supervision of lenders. Figure 4 shows the mortgage rate in the U.S. from 1970 to 2020. From figure 4, it can be found that the mortgage rate has fluctuated considerably during the financial crisis. Because of this, the borrower could not afford the high rate of their debt and the crisis was coming.

Figure 4. Mortgage rate [6].

2) CDO: After the invention of MBS, banks had more money on their hands, but there was no more demand for loans, leaving only some people with low credit ratings. So Wall Street carried out the second financial innovation - the invention of CDO.

(Collateralized Debt Obligation), which is to package some bonds that cannot be sold and bonds with high-quality loans. For example, bonds rated AAA and below, such as student loans, credit card loans, business loans are packaged with the previous housing loan bonds, in order to hide the high risk of housing loan bonds. Finally, through some means, the three major credit rating agencies make a AAA credit rating for CDO. Beautify the CDO into the second MBS in the eyes of investors. The “new” model of “MBS” (CDO)attracted more investors and boomed for a period of time.

In a true sale (or cash-funded, or traditional) CDO securitization, the ownership of the underlying asset being securitized and its associated financial risks, through a true sale operation, legally transferred from the transaction originator to the bankruptcy remote SPV [7]. And the securities issued by the SPV support the distribution of these (transferred) assets to institutional investors.

Under the credit rating system, CDOs can be divided into three parts which are rated “AAA” primary bonds, “AA” to “BB” intermediate bonds and equity securities with no credit rating [7]. Normally, primary bonds account for about 70%-93% of the total issuance of a CDO and the proportion of intermediate bonds is about 5%-15%, secondary bonds and equity securities (in practice, these two categories are usually classified into the same category in the market) accounting for 2%-15% of the total circulation.

When CDOs default, losses in interest and principal are usually absorbed by bonds with lower credit ratings. The order of damages is equity securities, intermediate bonds and primary bonds. Conversely, when CDOs generate yields, the distribution of income is first obtained by the main rank bonds, followed by the middle rank bonds, and then by the equity securities. Such products are inherently deceptive, and once a problem occurs, it will cause serious situations in which high-quality assets are pulled down by junk assets.

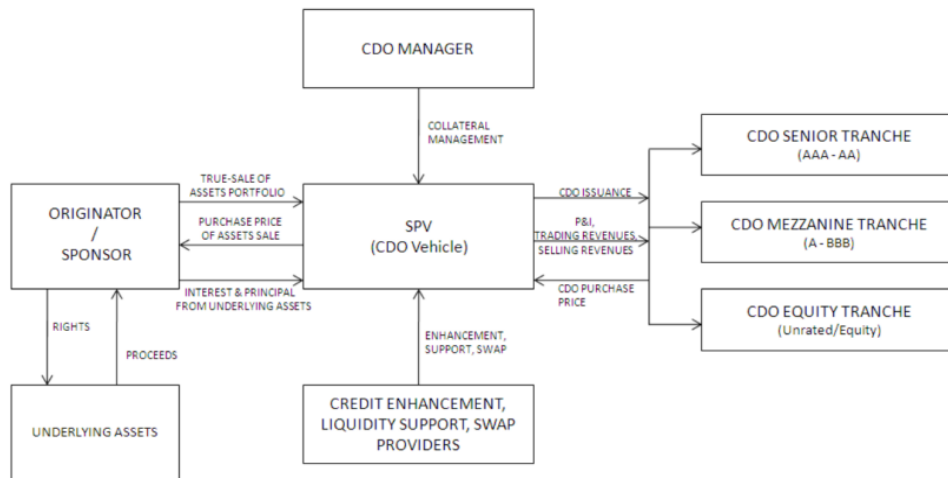

Figure 5. CDO Transaction Process [7].

3) CDS: A credit default swap (CDS) is actually a contract that swaps the risk of a specific credit event for a certain period of time. Figure 6 presents the general operation of CDS. The buyer of credit risk protection periodically pays the seller the cost of a reference entity credit event within the period or prior to the credit event in exchange for payment after the credit event occurs.

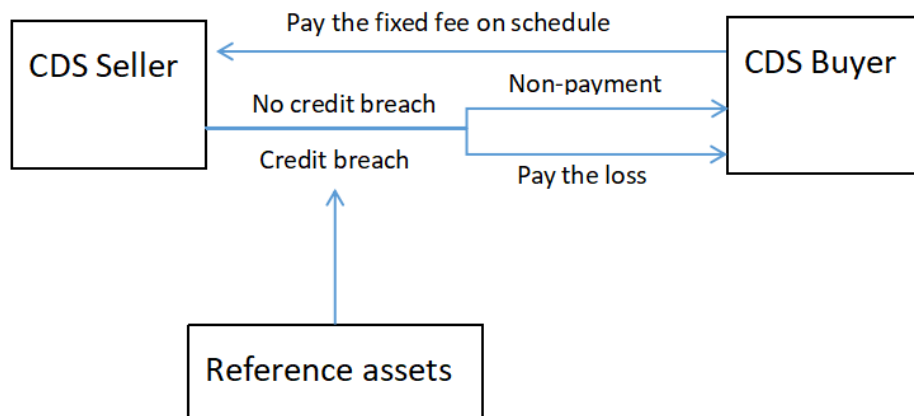

Figure 6. CDS Operation [8].

In the bond market, there are two risks which investors faced when they buy bonds. First, entities that default on subsidiary bonds, such as bankruptcy or debt restructuring, resulting in its inability to repay the principal and interest within a certain period of time. The second is a fall in bond prices caused by a rise in benchmark interest rates in the market. To avoid risk, one of the solutions is to buy insurance and be compensated after the event through an upfront premium.

A CDS is similar to insurance because the buyer of the CDS pays after the credit risk of the reference entity has occurred. But in operation, they are different. In terms of regulatory requirements, CDS are less regulated than insurance companies. In terms of the underlying asset, the CDS can be separated from the asset and it means that the buyer of credit risk protection can trade the CDS without holding the real bond. CDS are mainly used for risk transfer.

The first effect of CDS in the crisis was to embosk who was really exposed to the risk. Because CDS are not visible on the balance sheets of financial institutions. This means that investors do not have full access to the true risks posed by financial institutions.

A second significant effect of the wide spread of CDS was that they made the density of CDS sellers too high and therefore collapsed because of the failure of the weakest sellers [9].

Insurance companies were not only unprepared for MBS downgrades, but also reduced capital when accumulating MBS, as if the acquisition of MBS should improve the overall quality of the portfolio [10].

CDS has three main functions: 1. Insurance (risk hedging, credit protection). 2. Guarantee (credit enhancement function, risk transfer). 3. Securities (liquidity function, shorting function).

4. The Impact of the Financial Crisis on the United States

4.1 The Liquidity Crisis

To stimulate the economy, the Federal Reserve lowered the federal funds rate. But a prolonged rate cut would have some negative effects. For example, commodity prices increase. So after interest rates was being cut for a period of time, the Fed raised the federal funds rate, and the United States entered a cycle of interest rate hikes. After the Federal Reserve increased interest rates and bank floating interest rates rose, the subprime mortgage default rate in the United States rose sharply, resulting in more and more houses on the market, and housing prices began to fall after reaching their peak. Wealth management products that rely on housing loans to make money have been negatively affected, and then insurance companies and large investment banks have also been hit, causing a liquidity crisis.

From February to March 2007, more than 25 subprime loan companies went bankrupt one after another. In August of the same year, two hedge funds of Bear Stearns, the fifth largest investment bank in the United States, went bankrupt. In March of the following year, Bear Stearns was acquired by JPMorgan. In September 2008, Lehman Brothers, one of the five largest investment banks in the United States, filed for bankruptcy. The industries that depended on it for survival were devastated. More bank funds were exhausted, causing turmoil. A large number of people took out their savings from the bank, causing a run on the bank.

4.2 The Stock Market

S&P500 is a stock index that records the 500 publicly traded companies in the U.S. On September 29, 2008, after the bailout plan was not approved by the House of Representatives, the stock market was hit hard. The Dow Jones Industrial Average fell three hundred points in a few minutes and ended down 777.68 points; the Nasdaq fell 199.61 points and fell below the 2,000-point mark; the S&P 500 also fell 8.77% which is shown in Figure 7 [11]. Finally, the Dow Jones Industrial Average had its biggest drop in history on the day [12].

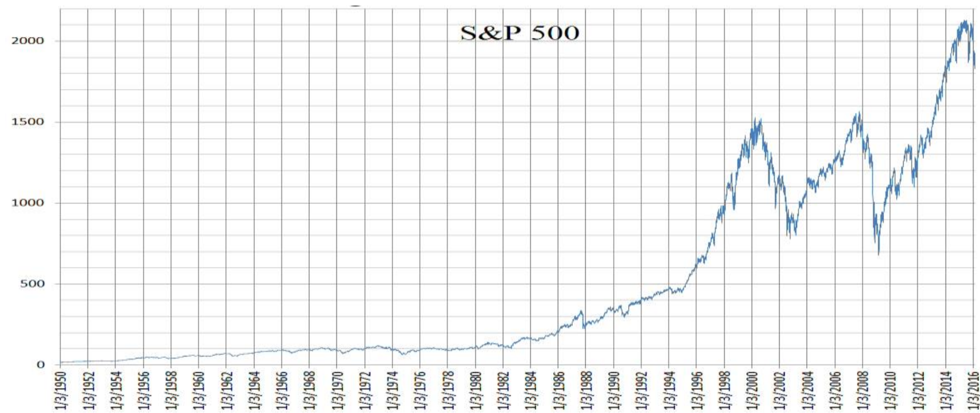

Figure 7. S&P 500 [13].

4.3 GDP Decline

Consumer spending, investment spending, net exports and Government spending are all factors affecting GDP.

From the second quarter of 2008 to the fourth quarter of 2008, private consumption data declined significantly. Capital spending declined significantly from the third quarter of 2008 to the first quarter of 2009. Investment in non-residential construction declined sharply from the first quarter of 2008 to the first quarter of 2009.

Also, real GDP fell by $650 billion and did not return to its early level of $15 trillion until the third quarter of 2011. In general, the financial crisis has reduced America's GDP which is shown in Figure 8 [14].

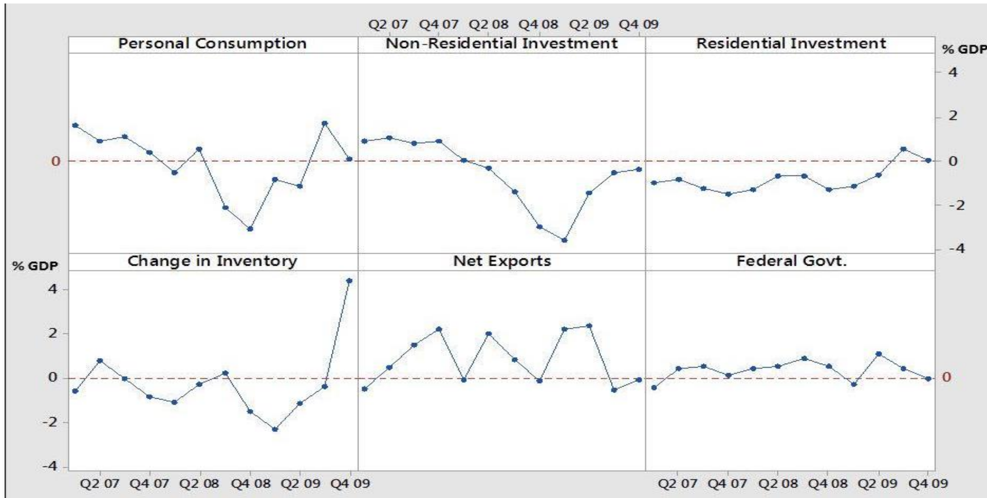

Figure 8. U.S. GDP: Contributions to Percent Change 2007-2009 [15].

4.4 CPI

The Consumer Price Index (CPI) is an index that reflects price fluctuations of goods and services related to the lives of residents. This is one of the main indicators of inflation. In order to cope with the liquidity crisis, the United States implemented quantitative easing policy, a large amount of money flooded into the market, causing CPI rises which is shown in Figure 9.

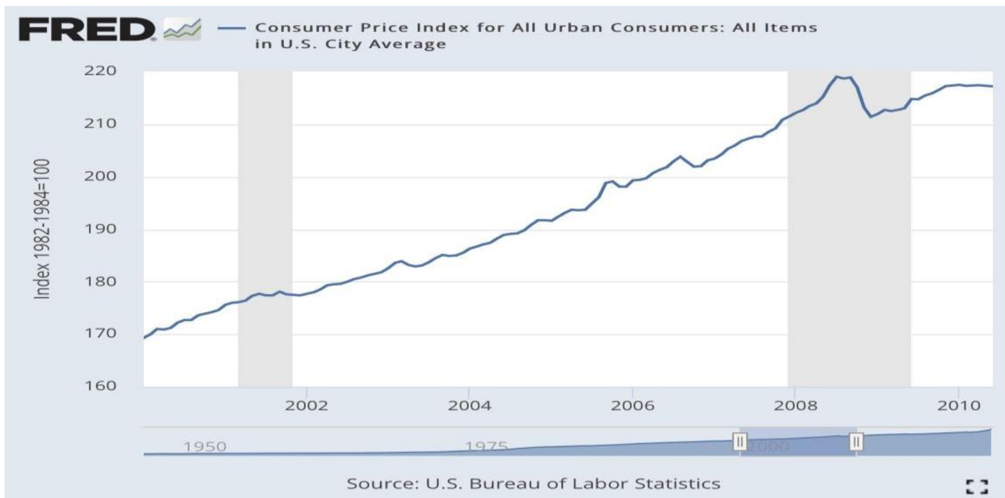

Figure 9. US Consumer Price Index [16].

4.5 The Impact on the Family and Society of the United Stated

After the 2008 economic crisis, the United States entered a great recession. The collapse of plenty of financial companies and small and medium-sized enterprises has caused a substantial increase in the number of unemployment in the United States. The U.S. unemployment rate

peaked at 10% in October 2009 and did not recover to 4.7% which was the unemployment rate before the Great Recession, until May 2016 which is shown in Figure 10 [17].

Americans, because of their enthusiasm for real estate investment, mostly invest their savings in real estate or the stock market. The recession in the real estate industry and the crash in the stock market have negatively affected household net worth in the United States. Beginning in 2007, household net worth in the United States fell by $11.5 trillion, only to recover in 2009, and to return to pre-recession levels in 2012 [18]. Between 2007 and 2010, the average household net worth in the United States fell by 40%.

In addition, the gap between rich and poor in the United States has widened. Federal Reserve surveys show that the net worth of the top 10% of the wealthy increased from $180,000 to $1.2 million between 2007 and 2010. However, according to the U.S. Census Bureau, the median household income in the United States dropped from $126,000 to $77,400 between 2007 and 2010 [19].

The huge gap between the rich and the poor has caused dissatisfaction among the American masses. On November 16, 2011, riots broke out in Succot, New York Park, on Wall Street. Hundreds of U.S. citizens occupied the park to express anger that they had no money, houses, or even jobs [19].

At the same time, the crime rate in the United States is also increasing. In 2009, there were at least five murders per 100,000 people, according to U.S. police. Those numbers increased to 10 in 2010 and 14 in 2011 [19].

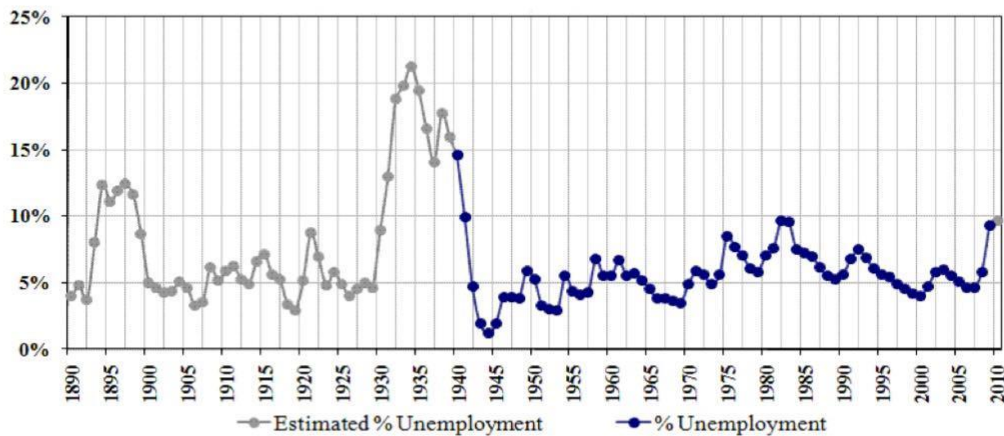

Figure 10. United States-Unemployment Rate (1890-2009) [20].

5. Recovery from the Financial Crisis

5.1 US Federal Reserve Rate Cut and Emergency Stabilization Act of 2008 ($700 billion bailout plan)

First, in response to the financial crisis, the Federal Reserve lowered the federal funds rate and the discount rate. The data showed that the federal funds rate fell from 2% in September 2008

to 1.5% in October 2008, and the discount rate fell from 2.25% in 2008 to 1.75% in October 2008, both down 50 basis points.

In addition, in September 2008, the US Treasury Department Paulson proposed the Troubled Assets Solution, which would allow the US government to purchase distressed assets from financial institutions. After many consultations, US President George W. Bush announced a bailout plan, allocating $700 billion to purchase illiquid real estate-backed securities to reduce possible losses of financial institutions and increase liquidity in the subprime loan market.

Finally, the $700 billion bailout plan was revised to $100 billion in tax incentives and increased deposit protection caps by $250,000, which became the Emergency Economic Stabilization Act of 2008, and received a positive response from stock market investors [21].

5.2 Quantitative Easing and Rescue financial Institutions

In the first round of quantitative easing, on November 25, 2018, the Federal Reserve purchased $300 billion in long-term government bonds and MBS, releasing base currency for the market and heling large companies. The Treasury Department spent $200 billion to pick up Fannie Mae and Freddie Mac, $85 billion to rescue American International Group (AIG), a minimum fof $29 billion for JPMorgan Chase and $87 billion for Bear Stearns loans and Lehman Brother financing, which injects broad liquidity into the market. In addition, the Fed also purchased $1.725 trillion in assets during the first round of quantitative easing.

In the second round of quantitative easing, in November 2010, the Fed purchased $600 billion in long-term treasury bonds from the market. The implementation of quantitative easing policy has brought a large amount of capital into the market, resulting in inflation [22].

6. Conclusion

During the 2008 financial crisis, Wall Street carried out three financial innovations, creating financial instruments and financial derivatives such as MBS and CDO, and raising the leverage ratio of the US financial market to an excessively high level. As the U.S. real estate bubble grows, bad credit loans and high default rates lead to problems with MBS and CDOs, triggering systemic risks and detonating the square of CDOs. The financial instruments with a large number of capital pools are complex in form and are the hidden bombs of the financial market in 2008. In this financial crisis, executives of Wall Street and some investment companies profited from it, relying on CDO and CDS to deceive the market and induce people to buy. The high turnover rate resulted in high service fees. Ultimately, in this crisis, investment firm executives walked away safely with their gains.

This crisis was driven by high interest rates, and in this crisis, credit is the most important factor. Credit bankruptcy was a major factor leading to the financial crisis. This crisis has had a major impact on many countries in the world, not only economically, but also politically and militarily. In the end, after many countries followed the U.S. to carry out quantitative easing operations, the financial crisis was alleviated.

References

[1] Hemmelgarn, T. & Nicodème, G. (2010) The 2008 financial crisis and taxation policy. Available at SSRN 1546973.

[2] Maynard, K.J. (2007) The General Theory of Employment, Interest and Money. Palgrave Macmillan, London.

[3] Ospina, J. & Uhlig, H. (2017) Mortgage-Backed Securities and the Financial Crisis of 2008: a Post Morte. USA. University of Chicago.

[4] Lei, L. and Wei, Y. (2009) The transmission mechanism of the American subprime crisis. World Economic Research (Shanghai). No.1, 2009: 24-31.http://www.cssn.cn/jjx/jjx_lljjx/jjx_sjjjx/201310/t20131024_516060.shtml

[5] Folger, J., (2021). Fannie Mae and Freddie Mac: An Overview. https://www.investopedia.com/articles/economics/08/fannie-mae-freddie-mac-credit-crisis.asp

[6]Freedie Mac. (2022) Primary Mortgage Market Survey. https://www.freddiemac.com/pmms

[7] Dinca, S.E. (2015) Cash vs Synthetic Collateralized Debt Obligations.

[8] Chuanhe, Y., Wangbin, L. & Xiaojun, Z. (2007) Pricing model and empirical analysis of credit default swap. Financial Economics. 24: 3.

[9] Buffet, M. (2016) How do CDOs and CDSs influence the crisis of 2008. Lingnan Journal of Banking, Finance and Economics, 6. http://commons.ln.edu.hk/ljbfe/vol6/iss1/2

[10] Baranoff, E.G. and Sager, T.W. (2009) The Impact of Mortgage-Backed Securities on Capital Requirements of Life Insurers in the Financial Crisis of 2007–2008. USA. The Geneva Paper.

[11] Grynbaum, Michael. (2008) For Stocks, Worst Single-Day Drop in Two Decades. http://www.nytimes.com/2008/09/30/business/30markets.html.

[12] Twin, Alexandra. (2008) Stocks crushed. http://money.cnn.com/2008/09/29/markets/markets_newyork/index.htm?postversion=2008092916.

[13] Overjive. (2016) File:S and P 500 daily linear chart 1950 to 2016.png. https://commons.wikimedia.org/wiki/File:S_and_P_500_daily_linear_chart_1950_to_2016.png#mw-jump-to-license.

[14] U.S. Bureau of Economic Analysis. (1947) Real Gross Domestic Product. https://fred.stlouisfed.org/series/GDPC1.

[15] Farcaster. (2014) U.S. GDP Contribution to Change 2007-2009. https://commons.wikimedia.org/wiki/File:U.S._GDP_Contribution_to_Change_2007-2009.png#mw-jump-to-license.

[16] U.S. Bureau of Labor Statistics. (2022) Consumer Price Index for All Urban Consumers: All Items in U.S. City Average. https://fred.stlouisfed.org/series/CPIAUCSL.

[17] FRED. (2019) Civilian Unemployment Rate. https://fred.stlouisfed.org/series/UNRATE.

[18] FRED. (2019) Net Worth, Level. http://www.federalreserve.gov/.

[19] Awan, A. G. (2015) Analysis of the impact of 2008 financial crisis on the economic, political and health systems and societies of advanced countries. Global Journal of Management and Social Sciences, 1(1): 1-16.

[20] Peace01234. (2010) US Unemployment 1890-2009. https://commons.wikimedia.org/wiki/File:US_Unemployment_1890-2009.gif#mw-jump-to-license.

[21] Herszenhorn, D.M. (2008) House Approves Bailout on Second Try. http://www.nytimes.com/2008/10/04/business/economy/04bailout.html.

[22] Zhibenshe0-1. (2019) their trump monetary theory, the fed into dilemma. https://zhuanlan.zhihu.com/p/391453047.