

Conflict and Resolution: The 2007-08 Financial Crisis

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Abstract

The 2007-08 global financial crisis was the severest economic catastrophe since the great depression of 1929 - the crisis had triggered a global economic recession and led to many far-reaching social problems. This paper is a review of the literature on the 2007-08 financial crisis, beginning with an introduction to the key concepts and relevant background information. Then, the paper explains how the crisis was generated and spread under the influence of credit rating agencies and globalization and the consequences it brought to us. Next, the paper analyzes and compares how a capitalist developed country, the U.S., and a capitalist developing country, Brazil, responded to the financial crisis through different monetary and fiscal policies. In addition, the paper compares the policy differences between developing countries: China (socialism) and Brazil (capitalism). Finally, the paper summarizes the overall financial crisis and proposes policy recommendations.

Keywords: financial crisis, globalization, credit rating, economic policy recommendations

Conflict and Resolution: The 2007-08 Financial Crisis

The U.S. subprime mortgage crisis¹, which caused the global financial crisis, is called the “Great Recession of the 21st Century.” As the most serious post-war recession, the U.S. experienced its worst financial crisis since the Great Depression of 1929. The outbreak of the crisis severely disrupted the U.S. financial system and quickly spread to global financial markets, causing intense credit crunches and exposing systemic risk. Before the eruption of the crisis, as a series of contractionary policies had punctured the housing bubble, the housing and stock prices fell significantly. As a result, financial derivatives¹ such as subprime mortgages experienced a fund shortage, leading to the collapse of a large number of financial institutions that exacerbated the crisis. After the outbreak, although the Federal Reserve and the U.S. Treasury adopted a series of monetary and fiscal policies, such as quantitative easing (QE), zero-interest-rate policy (ZIRP), and troubled asset relief program (TARP)¹, the global economy has not yet completely shaken off the shadow of the financial crisis.

Although many experts have done profound studies and given comprehensive explanations of this crisis, further research and reflection are indispensable. This paper, a review of the literature on the 2007-08 financial crisis, begins with an introduction of the background of the crisis. Next, this paper examines in detail the causes of the financial crisis and explains how the financial crisis emerged. Among the reasons, this paper mainly focuses on three aspects: subprime mortgages, rating agencies and financial fraud, and economic globalization. Although many people believe that the default on subprime mortgages led to a shortage of funds and the shortage of funds that triggered the crisis, this paper purports that it is the mutual influence of the three areas that led to the crisis. Then, this paper analyzes the impacts of the financial crisis in the U.S. and other relative

¹ See Glossary for complete definitions.

countries. Additionally, this article explains the U.S. resolutions toward the crisis and compares how the U.S., a capitalist developed country, and Brazil, a capitalist developing country, responded to the financial crisis through different monetary and fiscal policies. At the same time, this paper compares the policy differences between two developing countries: China (socialism) and Brazil (capitalism). Finally, this paper summarizes the financial crisis and proposes some relevant policy recommendations for further research.

Causes of The Crisis

Subprime Mortgage

Introduction of subprime mortgage, financial derivatives, and CDO & CDS.

Most people believe the 2007-08 Financial Crisis was mainly caused by subprime mortgage. Subprime mortgage is the property loan to borrowers who have low credit levels or inadequate income. Due to their low level of credit, they cannot directly borrow from commercial banks; therefore, in theory, these low-credit borrowers have a high risk of defaulting (World Book, Inc., 2018). In order to reduce their own risk, financial institutions frequently sold subprime loans on the secondary mortgage market². Specifically, the financial institutions repackaged and issued the securities they held and resold them to other institutions and individual investors.

However, subprime mortgage does not necessarily trigger a crisis, and financial derivatives are key to the crisis. Excessive innovation and overreliance on financial derivatives have sharply increased the default risk of subprime mortgage loans. Among them, one of the financial derivatives that caused the crisis was asset-backed security (ABS). ABSs are bonds supported by cash flows of several receivable loans that were first introduced in 1970 to help businesses reduce risk. These products securitize existing assets and allow banks to trade their packed assets freely.

² See Glossary for complete definitions.

For example, financial institutions can use ABSs to sell their credit card loans, car loans, and mortgages to other individuals or organizations directly (Agarwal, Barrett, Cun, & Nardi, 2010). By selling these ABSs, financial institutions can increase liquidity, giving them more available cash on their hands. However, when scrutinizing these ABS products, the essence of ABS is the transfer of the risk of loan fraud: it passed on the risk of default to the ABS purchasers³.

A successful transaction in ABS shows that if a bank provides a \$300,000 mortgage to a borrower and promises that the loan will be repaid within 20 years with an interest of 16.7%, assuming the interest is paid off after the contract expires, the borrower will refund a total of \$350,000. Thus, the bank can sell the loan to other financial institutions through ABS with a price of less than \$350,000 so that the bank can get new cash to undertake the risk of borrowers defaulting on the loan⁴. The way of selling ABSs enables banks to receive flowing cash in the short term; therefore, they increase liquidity. For the buyers, they can also buy the ABSs at lower prices and wait for sellers to return the principal and interest, making the transaction profitable. Although these financial transactions did not create wealth directly, resources (funds) were more desirably allocated - customers obtained loans and banks shifted risk to many ABS purchasers.

There are more factors that make financial derivatives risky. Collateralized debt obligations (CDO), similar to asset-backed securities (ABS), are structured financial instruments backed by a pool of loans and other assets (Lepke & Card, 2014). People who invented CDO are smart about it. They knew that these CDOs are toxic assets, and they even called these assets “pieces of crap” in the mail. For this reason, they invented insurance for CDO - CDS (Credit Default Swap) to

³ For example, if the low-income Smith family obtains a subprime mortgage on their dream home from investment bank A, then investment bank A can package and sell the loan to a third-party investor, thereby transferring the risk of the loan that the Smith family is not able to pay.

⁴ ABS products allow banks to obtain cash. When banks have enough cash, they will be able to return users' deposits and pay them interest.

ensure that even if the credit default occurs, the insurance company is responsible for repaying the investor's return.

Imbalanced capital flows and borrowing.

Subprime mortgages were the trigger of the 2007-08 financial crisis; imbalances in capital flows and borrowing also contributed to the crisis. More specifically, the customer habit of American households was the main reason why they were unable to repay their house mortgages. For many years, lots of Americans borrowed money from banks for overspending on household products such as furniture, electronic devices, and vehicles. Nevertheless, these behaviors were encouraged by the Fed because they could stimulate the economic recovery of the 1970s depression and later the 2001 dot-com bubble. Moreover, a series of expansionary policies, such as lowered interest rates and reduced taxes, attracted many foreign investors. Most of these investors were holders of financial derivatives and the U.S. treasury securities.

The figure below lists the major countries that held the majority of the U.S. treasury securities. As shown in the figure, by 2019, Japan held 1145.8 billion U.S. dollars in the U.S. treasury securities, which ranked first. China (Mainland) was the second-largest securities holder with a total value of 1102.4 billion U.S. dollars.

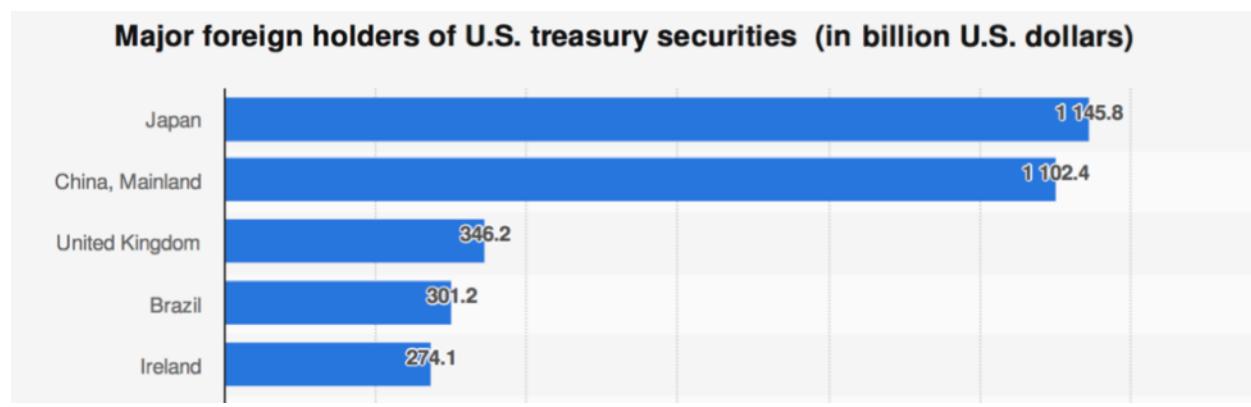


Figure 1. Major foreign holders of U.S. treasury securities from Statista (2019), this figure shows that Japan and China became the largest treasury securities holder of the U.S.

As Jules Henri Poincaré said: “A small mistake in the former produces a huge mistake in the latter.” A large number of capital flows and borrowing imbalances will sweep the financial system through the “butterfly effect⁵.”

The outburst of subprime mortgages.

The collapse of the U.S. dot-com bubble in 2001 and the “911” tragedy hit the U.S. economy hard. Therefore, the Federal Reserve adopted various expansionary monetary policies to facilitate the economy. From 2001 to 2003, the Fed lowered the federal funds⁵ rate to 1% thirteen times (Statista). Figure 2 is a line chart of the federal funds rate. According to the chart, the Fed significantly reduced the federal funds rate several times from 2001 to 2002. Until the end of 2004, the federal funds rate was still slightly reduced. After economic stimuli via a series of expansionary monetary policies and tax incentives for home mortgage loans, the overall expansion of credit in the U.S. led to a rapid rise in leverage ratio in various sectors. As a result, a large amount of funds poured into the real estate market and boosted house prices.

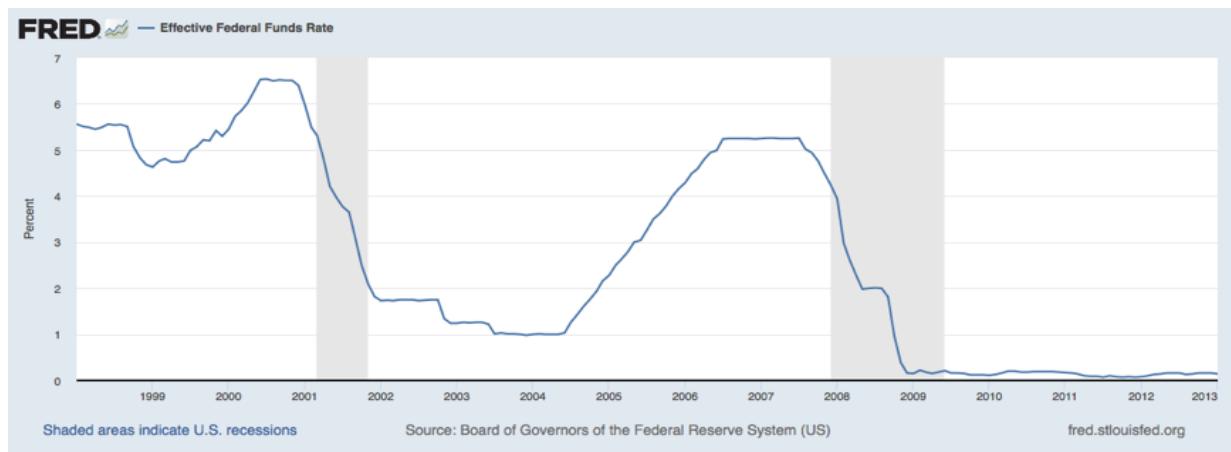


Figure 2. Effective Federal funds rate from FRED, this figure shows that the Federal funds rate declined dramatically between 2001-2003. The decrease in rate reduced the cost of borrowing between banks and increased the number of loanable funds to individuals.

⁵ Butterfly Effect says a small localized change in a complex system can create significant impacts elsewhere.

According to *Real Estate Cycle*, under such a profitable prospect, many banks and financial institutions had continuously lowered their lending requirements: they provided a large amount of funds to high-risk groups with no income, no jobs, and no assets. At the same time, they used financial derivatives such as asset securitization (ABS and MBS) and credit default swap (CDS) to strip a large number of bad debts from their balance sheets. In order to obtain further profits, some MBS issuing institutions even carried out a new round of securitization based on the original asset-backed securities, that is, collateralized debt obligations (CDO), and they packaged them and sold them to other investors in the financial market again (Ren, Xia & Xiong, 2017). At the same time, with the unprecedented prosperity of the mortgage market, a variety of interlaced and complex financial products continued to emerge, leading to the rapid accumulation of financial risk.

With the overgrowth of the U.S. economy and the rising of inflation pressures, the Fed increased the federal funds rate seventeen times from 2004 to 2006, significantly growing it from 1% to 5.25% (Statista). Meanwhile, as a series of contractionary policies punctured the housing bubble, housing prices fell sharply. When the real estate market trended downward, the interest on subprime mortgages increased since financial institutions wanted to maintain their profits. The increase in interest put pressure on borrowers, and, therefore, the default rate of mortgages started increasing. When borrowers defaulted, their houses would be taken away by financial institutions based on the contracts. However, since the price of houses kept declining, the houses they took could not be sold at an expected price to cover their losses, causing all buyers and sellers to suffer considerable losses in the financial market.

Due to the plummeting housing prices at the end of 2007, the loss of commercial loans increased significantly, resulting in enormous risk for the mortgage market. The surge in mortgage

defaults led to a rapid contraction of credit, a lack of market liquidity, and heavy losses for deposit insurance companies, putting them into technical bankruptcy. Furthermore, the underwriting strategies of the U.S. insurance agencies also contributed to the outbreak of the crisis. Generally, financial insurance is only sold to people who have assets. This means that, if someone wants to buy housing insurance, the house must legally belong to him/her. However, U.S. insurance companies are allowed to sell other's insurance. For instance, if person A buys a new house, then person B, an investor, can buy insurance for A's house. When A's house is damaged, the insurance purchased by B can be used to pay back to both A and B as compensation⁶. Similarly, when investment banks knew that there would be a large-scale CDO default, they started purchasing CDS from the insurance company so that they could get financial compensation from the insurance after the default. This type of investment carries a high degree of risk, making insurance companies liable to bankruptcy.

Therefore, we witnessed that when the U.S. government approved a \$ 700 billion bailout plan, a large amount of money was directly transferred to the accounts of investment banks after they were on the insurance company's account (Lawder, 2008). In this context, when a large number of defaults on home loans occurred, financial institutions broke down. The most famous example would be Lehman Brothers. Lehman Brothers' funds were redeemed in large areas, and the market also appeared to run against Lehman Brothers - the stock price plummeted. The principle of this is a liquidity crisis, which means there is no cash holding in hand. Because financial institutions own assets from each other, if one of them goes bankrupt, none of these assets can be recovered.

⁶ Before buying insurance for someone else's property, the property holder usually signs a contract with the insurance purchaser. This contract includes the proportion of the insurance ownership.

Credit Rating Agencies and Financial Fraud

The “big three” of credit rating agencies.

Standard & Poor’s (S&P), Moody’s, and Fitch Group, known as the “big three” credit rating agencies, are crucial to the global financial institutions and securities markets. Essentially, their function is to assess the financial health of an entity. They give every entity a rating, from a company to a country based on their abilities to pay back their debts (Sorina, 2014). For foreign investors, credit ratings could be used to reflect the risk of a country’s business environment. In general, a relatively low rating indicates that the company or the country has a high risk of bankruptcy, and vice versa. Credit rating is also significant to financial supervision institutions - the ratings help institutions control reserves. Because credit ratings have a significant reference value on market behaviors and investors’ confidence, it is necessary for credit rating agencies to have integrity, transparency, and responsibility to ensure that their results are authentic and objective. With this rating, people can evaluate assets and decide whether to invest. Although there are several rating agencies around the world, in general, investors only focus on the “big three,” because they account for almost 95% of the market (Sorina, 2014). All these credit ratings are given on a scale of letters and numbers.

The following figure displays the credit rating mechanisms for the “big three” agencies. The “big three” agencies apply both long-term and short-term rating mechanisms, corresponding to long-term investment ratings and short-term investment ratings. Short-term rating refers to those assets with a maturity of one year or less; assets with a maturity of more than one year are considered long-term assets. Generally, assets rated A and above are considered high-quality assets, and assets rated below B usually carry higher risks. Therefore, investors can make corresponding purchases according to their situations. In addition, assets with lower scores have better returns

due to higher risks. Before the crisis, many investors took risks and bought many troubled assets, but these trends soon shifted significantly.

Moody's		S&P		Fitch		rating description
Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	
Aaa	P-1	AAA	A-1+	AAA	F1+	Prime
Aa1		AA+		AA+		
Aa2		AA		AA		High grade
Aa3		AA-		AA-		
A1		A+	A-1	A+	F1	
A2		A		A		Upper medium grade
A3	P-2	A-	A-2	A-	F2	
Baa1		BBB+		BBB+		
Baa2		BBB		BBB		Lower medium grade
Baa3		BBB-	A-3	BBB-	F3	
Ba1	Not prime	BB+		BB+		
Ba2		BB		BB		Non-investment grade speculative
Ba3		BB-	B	BB-	B	
B1		B+		B+		
B2		B		B		Highly speculative
B3		B-		B-		
Caa1		CCC+	C	CCC	C	Substantial risks
Caa2		CCC				Extremely speculative
Caa3		CCC-				Default imminent with little prospect for recovery
Ca		CC				
C		C				
/		D	/	DDD	/	In default
/				DD		
				D		

Figure 3. Rating description from Lawscl.org (2019), this figure shows the different levels of credit, using “AAA” to “D” to distinguish the quality of assets.

Credit rating illusion.

The credit rating agencies played an important role during the 2007-08 financial crisis.

These rating agencies rely primarily on “issuer payment” to earn revenue. According to Sorina

(2014), the total amount paid by issuers for the ratings represents almost two-thirds of their income. However, this system in which financial product issuers pay for their rates is hazardous. Because the primary source of income of credit rating agencies is the amount paid by issuers, agencies tend to overestimate the credibility of issuers to maintain good relationships. Also, those companies must retain high credibility in the market; otherwise, their ratings will have no market value. Thus, in order to maintain good reputations, big companies will come to rating agencies, paying them a large amount of money to obtain a higher rating.

This scoring model had been controversial and even strongly criticized by many people. Before the crisis, they had given the highest rating to eleven significant financial institutions that later either failed or had serious problems. For example, the “financial giant,” American International Group (AIG), kept receiving AA rating even if the company had severe problems. Lehman Brother maintained its rating (AA) until a few days before bankruptcy. “Although the employees did not recommend overrating, the management of the rating agencies rated certain products with the best rate (AAA), because they wanted to keep their client” (Ekins & Calabria, 2012). Moreover, in the housing market, after being split into MBS and CDO and repackaged together, many mortgage securities received higher ratings, and a large number of AAA-rated securities appeared. Before bundling them together, however, most securities received only AA or BBB ratings (Gupta et al., 2010). Hence, investors could not make effective judgments based on the current rating information, and funds flowed to the wrong places causing irreparable losses to the financial market.

Figure 4 shows the results of the rating before and after default for the main investment banks. Before the crisis, the average original score for the banks was about BBB; however, when

investors realized the risk, the ratings started declining. After more and more borrowers choosing to default, the ratings fell to the bottom.

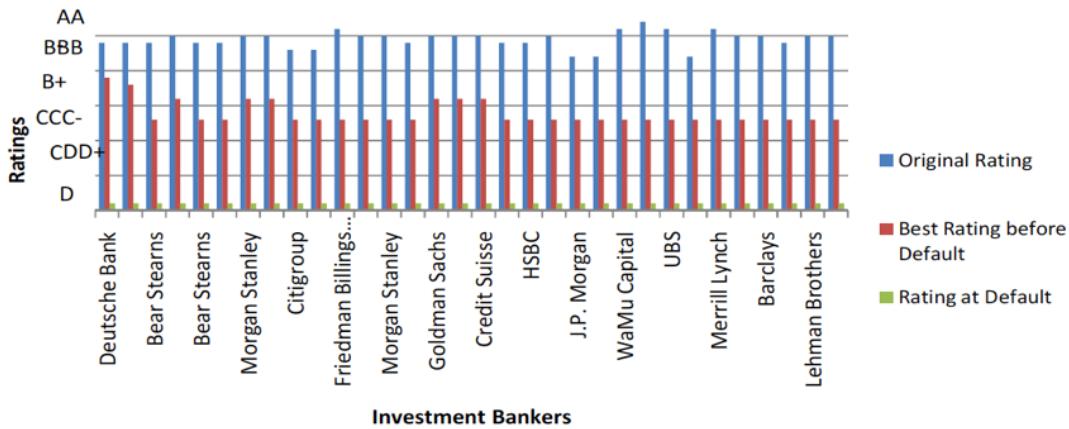


Figure 4. Trends in ratings (before and after crisis) from Bloomberg (2008), this figure indicates that most of the companies were overrated before the crisis.

At the same time, during the financial crisis, rating agencies misinterpreted an essential financial derivative - mortgage bond securities (MBS). Although rating agencies use sophisticated computer models to calculate ratings determined by the probability of default, the results of these models are unreliable because the data they obtain is based on inaccurate ratings from other agencies. Before 2007, large amounts of credit ratings were AAA level. However, when the housing demand market began to fluctuate, the three giants downgraded many credit ratings. Moody's, in particular, downgraded 83% of AAA-level credit in 2006 and spread panic to the world (Benmelech & Dlugosz, 2009). It is the rating agencies that miscalculated this systemic risk and then caused investor fear.

How did mortgage bond aggravate financial fraud?

In addition to the reasons mentioned above, another essential cause leading to the 2007-08 financial crisis is widespread fraud. Financial fraud is defined as an intentional act of deception

that contains financial trade for the purpose of personal interests. More importantly, this is illegal. Most of the fraud in the 2008 financial crisis is related to mortgage bonds.

A mortgage bond is a type of license and permits surety bonds required by a state agency for licensure pertaining to mortgage activities (Ignatowski, 2018). In short, it is an IOU in which a mortgage company borrows money from the individual. After the bond expires, the company will return the principal plus interest to the lender. Mortgage bonds can provide firm protection to investors because investors do not need to worry about the company's inability to return their funds. Since the mechanism of mortgage bonds is that the investor is secured by valuable assets, these assets can be sold out if the companies fail to pay off. Mortgage bonds seem to be very safe, but they turned into financial fraud and affected the financial crisis in 2008.

Research provides many shreds of evidence that loan companies frequently engaged in financial fraud during the housing boom. In *House of Debt* (2014), Sufi (from the University of Chicago) and Mian (from Princeton University) explained a unique form of fraud that was very common during the 2007-08 financial crisis: for some mortgage companies, they tried to help borrowers overclaim their incomes to get bigger loans. Theoretically, this would help companies make more money because the more money they lend to the borrowers, the more profits they would earn at the same interest rate. Also, they did not need to worry that the borrows would be unable to pay them back or choose to default, because the companies could sell the mortgage loan to other people through ABS, and the house price was boosted. According to Sufi and Mians' research, there was a large amount of income falsification in low-documentation loans. For example, residents of the poorest neighborhoods of Englewood and Garfield Park were experiencing declining incomes between 2002 and 2005. Notwithstanding, between 2002 and 2005, the annualized income growth rate for home mortgage applications reported in these regions was

+ 7.7%, which indicates that the borrower's income was overvalued by the mortgage companies (Sufi & Mian, 2014). As shown in Figure 5, under this trend, the defaulted rate increased from 4.5% in 2005 to 9.4% in 2009 for the mortgage borrowers (Statista), and a large number of defaults harmed the social economy and catalyzed the financial crisis.

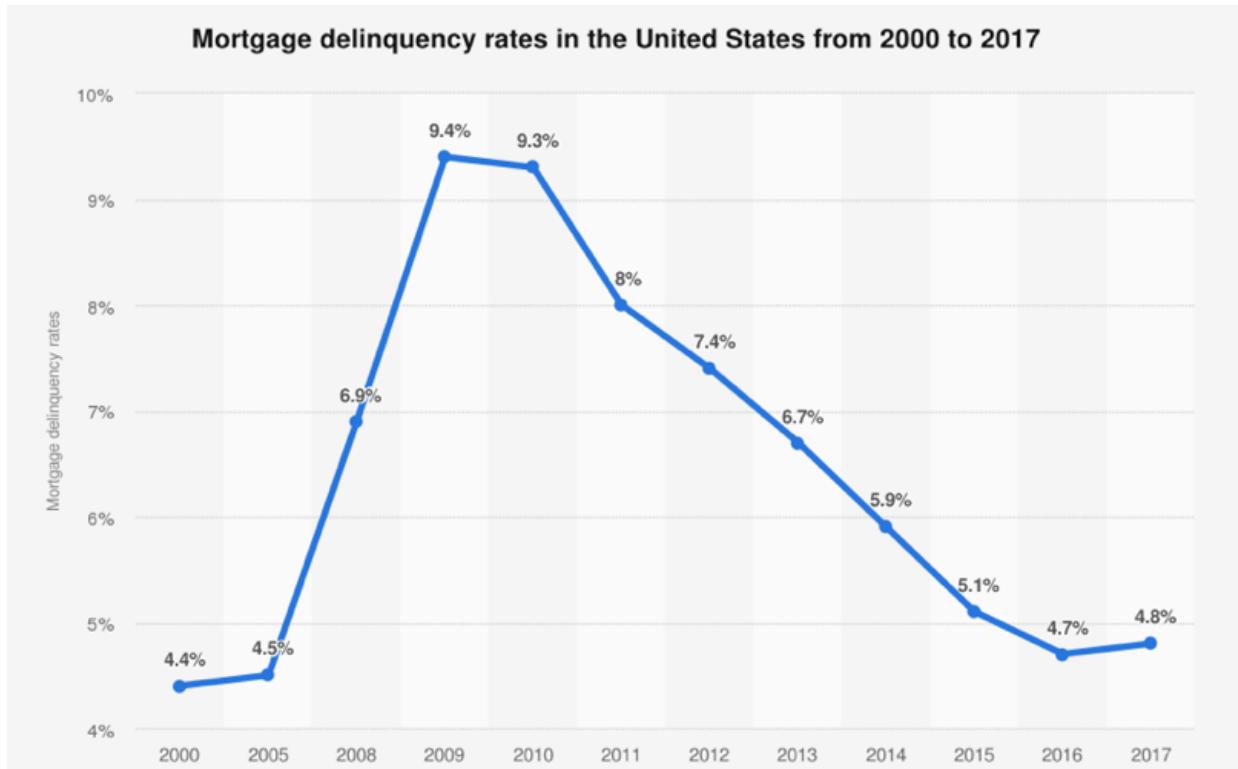


Figure 5. Mortgage delinquency rates in the U.S. from 2000 to 2017 from Statista (2018), this figure shows that the delinquency rates of mortgages increased significantly during 2005-2009.

Economic Globalization

Introduction to economic globalization.

It is undeniable that the 2007-08 financial crisis should not overshadow the achievements of economic globalization. After the establishment of the World Trade Organization (WTO) in 1995, global markets gradually eliminated borders and significantly increased liquidity (Bourguignon, 2006). As a result, trade cooperation between countries became more frequent.

The figure below shows that global liquidity gradually increased after WTO was founded in 1995. The increase in liquidity accelerated capital flows and enabled rapid economic development.

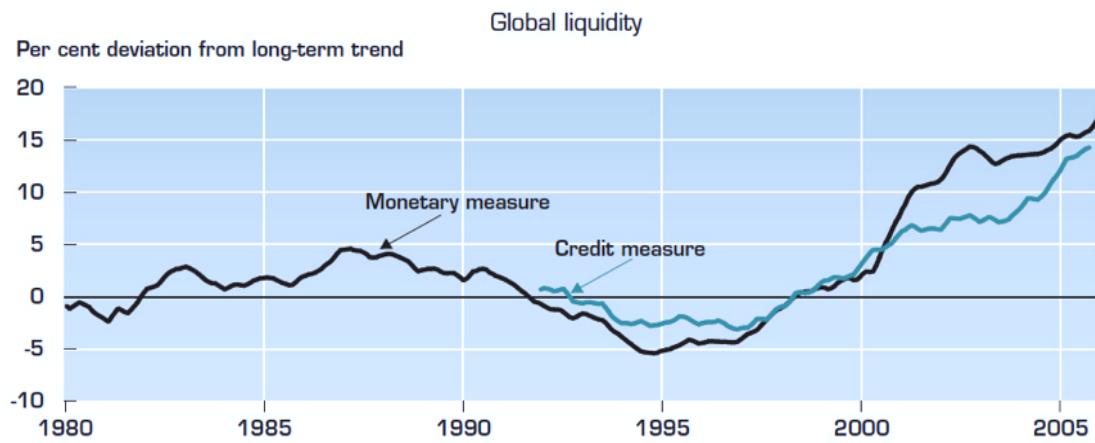


Figure 6. Global liquidity measures from World Bank (2006), this figure shows that global liquidity increased after 1995.

Before the crisis, capital flows in the global markets and the interconnectedness between banks had increased dramatically. Countries involved in economic globalization had accelerated the free flow of goods, capital, services, and technology. As an irreversible trend, economic globalization reflects the expansion and integration of different markets. Specifically, in recent years, the spread of economic globalization is mainly based on the rapid improvement of communication and transportation technology and the rapid development of the global economic system.

Economic globalization has many positive effects. First, global free trade (importing foreign goods and exporting domestic goods) reduces poverty by significantly decreasing the cost of production. In order to reduce costs, many countries will cooperate: each country will focus on producing only a few parts of the product based on their comparative advantages, but not all parts of the entire product. In this way, limited resources will be used to produce the largest number of products at the lowest cost. Take Ford as an example: Ford Motor are designed in Germany, and

their gear systems are assembled in South Korea; their pumps are produced in the U.S.; and the engines are from Australia. Also, for Apple Inc., although Apple products are designed in California, most of the product assembly is done at Foxconn in China (Rawson, 2012). In addition, economic globalization can help promote domestic job transformation. Many people claim that the free-market destroys domestic jobs; however, according to *The Choice*, although the agricultural employment was falling to a half, fifty million jobs were created in the U.S. at that time, meaning that the total employment in the overall economy doubled (Robert, 2007).

While these trends could bring substantial benefits to the world, as mentioned above, they also increased risk. Economic globalization led to a high degree of dependence between countries, making them increasingly vulnerable to the effects of changes in global financial markets. Due to a market panic caused by the U.S. subprime mortgage crisis, in September 2007, one of the top 5 British mortgage companies, Northern Rock Bank, fell into a serious “crowding effect,” with many customers withdrawing deposits from the bank within a few days⁷. On September 15, 2008, with the collapse of Lehman Brothers, one of the largest well-known investment banks, American Bank and American International Group (AIG), struggled to purchase Merrill Lynch. The former “invincible” Wall Street companies went bankrupt, and U.S. stocks collapsed as a result. The downturn in the U.S. stock market also caused a systemic financial crisis around the world.

Risk dispersion: the connection between banks and intermediaries.

As “laissez-faire” economics theory became prevalent among politicians, like George W. Bush (President 2001-2009), in late 2005, the U.S. governments began to encourage trading different financial products on the market to promote economic growth. As countries begin to reduce the requirements of foreign companies, financial borders disappeared. At the same time,

⁷ In 2007, due to the influence on the U.S. subprime mortgage, a crisis occurred with reduced circulation of market funds, which also caused a “crowding effect.”

more and more banks became globalized: individual banks - including commercial banks and investment banks - began to set up foreign business. Many banks developed their services in other areas through mergers and acquisitions. For example, The Hongkong and Shanghai Banking Corporation Limited (HSBC), a tycoon in the bank industry, acquired Crédit Commercial de France and became the 10th largest global bank. As a consequence, the percent of global banking transactions rose from 6% of the global GDP in the 1970s to nearly 40% in 2000 (Bourguignon, 2006).

However, the potential risk also rose with the expansion of the banks. Financial institutions began to smartly use loopholes in the financial system and adopt “high-risk but high-return” strategies to participate in various financial transactions. They even invented many complex financial instruments, so-called financial derivatives (subprime mortgages are one of them), to hedge risk. Later, some “bad banks” emerged in the financial markets. These “bad banks” sold a large number of toxic assets to third parties, including private individuals, enterprises, and insurance institutions, posing massive risk to financial markets. In fact, economic globalization is not the leading cause of the crisis, but the spread of risk exacerbated the outbreak of the crisis.

Consequences of The Crisis

The subprime mortgage crisis broke out in 2007-2008 and quickly developed into an international financial crisis. This financial crisis not only had a wide-ranging impact, but it was also far more severe than previous crises over the past few decades. In the past, the financial crisis mainly affected the banking industry, but the 2007-08 crisis affected almost all financial institutions, including banks, hedge funds, insurance companies, pension funds, government-backed financial enterprises, and so on (Ren, Xia & Xiong, 2017; Mei, 2011; Poole, 2010).

Direct Influence

The decline of financial institutions.

According to *Causes and Consequences of The Financial Crisis of 2007-2009*, after the crisis erupted, financial institutions that provided subprime mortgages were unprecedently hit by subprime defaults. Subsequently, more than 30 subprime mortgage companies have ceased operations. Table 1 lists the events of major financial institutions in 2007-2008. In Feb 2007, HSBC Holdings plc (HSBC) added \$ 1.8 billion in bad debt provisions to its U.S. subsidiary's subprime loan business. In April 2007, New Century Financial Corporation (NCFC), the second-largest subprime mortgage company in the U.S., filed for bankruptcy protection. Next, a world-renowned investment bank Lehman Brothers went bankrupt; Merrill Lynch was acquired; and large European banks such as commercial bank giant Royal Bank of Scotland (RBS) were nationalized.

Important Financial Institution Events in the 2007-08 Financial Crisis

Dates	Institutions	Descriptions
Feb 2007	HSBC Holdings plc	HSBC added \$1.8 billion in bad debt.
Apr 2007	NCFC	NCFC applied for bankruptcy protection.
Oct 2007	RBS	RBS were nationalized.
Sep 2008	Lehman Brothers	Lehman Brothers went bankrupt.
Sep 2008	Merrill Lynch	Merrill Lynch was acquired.
Sep 2008	AIG	AIG's assets and liabilities were seriously imbalanced.

Table 1. Important Financial Institution Events in the 2007-08 Financial Crisis, this table shows the big events of the major financial institutions (Investment banks) during 2007-2008.

The crisis not only affected investors buying hedge funds, MBS, and CDOs, but also investors involved in funds and insurance. For example, American International Group's (AIG)

assets and liabilities were seriously imbalanced and eventually taken over by the U.S. government. The reason why the U.S. subprime mortgage crisis escalated into the international financial crisis is that the U.S. housing loan assets were derived by investment banks into other financial products and resold to global investors. Such financial innovation closely linked the U.S. real estate market with the global financial market in an unprecedented way.

Unemployment and house price.

The subprime mortgage crisis not only severely damaged the financial markets in the U.S., but also caused a severe recession in its real economy. In 2009, the U.S. real GDP fell 2.63% year-on-year, and the unemployment rate reached 9.3% (see Figure 7) (Statista). In this situation, the U.S. took a series of market rescue measures in an attempt to save the economy in crisis.

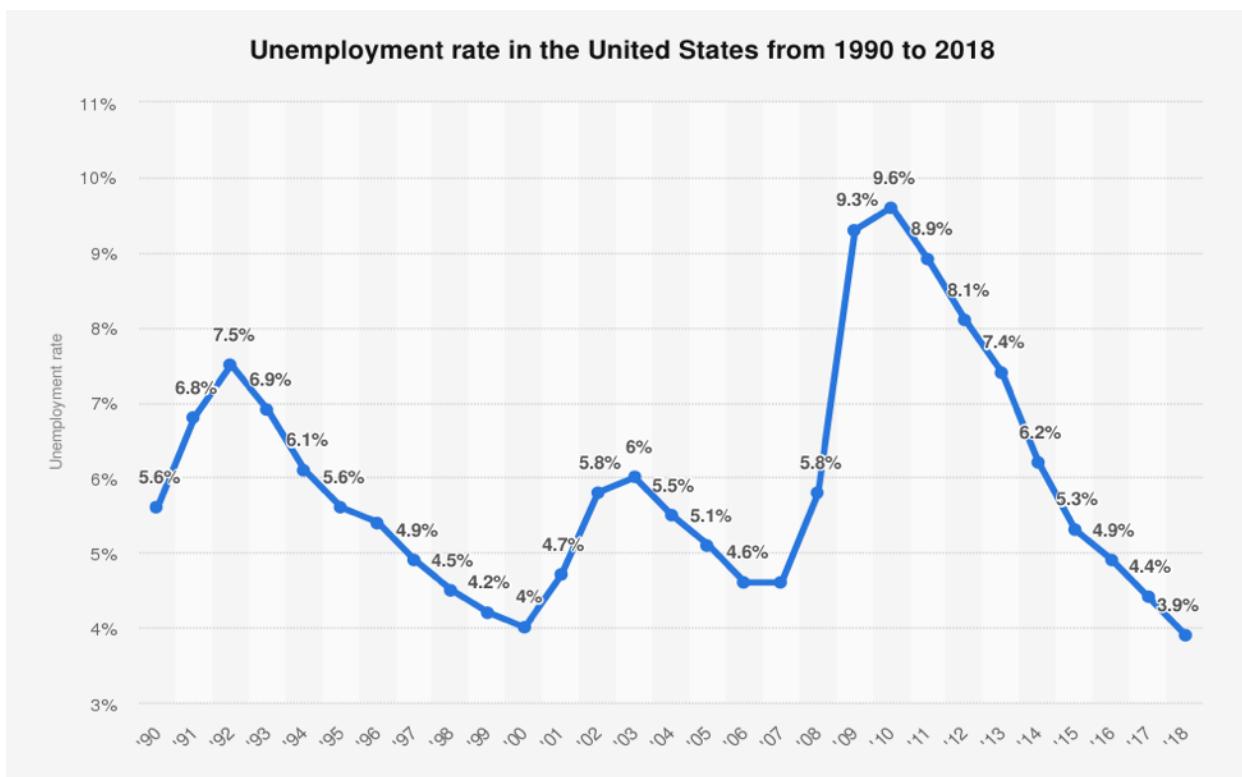


Figure 7. Unemployment rate in the U.S. from 1990 to 2018 from Statista (2018), this figure shows that the unemployment rate increased dramatically from 2007 to 2009, which was mainly influenced by the financial crisis.

Affected by interest rate hikes, the U.S. real estate industry began to cool down in early 2006, and house prices began to fall in early 2007. The rising of interest rates and the falling of house prices rapidly deteriorated the U.S. subprime mortgage market. Many real-estate investors were insolvent by keeping their houses - they were unable to pay the mortgages' principal or to refinance (Ren, Xia & Xiong, 2017; Adam et al., 2012). At the same time, with the discount ended, house investors were under pressure to repay other loans at high market interest rates. Since 2006, the subprime mortgage market experienced a sharp increase in defaults (Statista), and subsequently, a large number of financial institutions fell into trouble or went bankrupt. In 2008, this subprime mortgage crisis broke out and quickly spread across the globe, leading to an international financial crisis.

Indirect Influence

In addition to financial institutions, unemployment, and housing prices, the outbreak of the crisis also affected many essential industries, including crude oil, metals and tourism. As one of the prominent representatives, the oil industry is closely related to economic development.

Impacts on crude oil after the crisis.

The fluctuation of financial markets had a vital impact on oil prices. As one of the most important industrial raw materials, when the economy is booming, as investment increases, the demand for oil will also increase, and prices will rise accordingly. On the contrary, when an economic recession occurs, especially the financial crisis, the demand for oil from enterprises will decrease, resulting in a drop-in oil price. Figure 8 shows the annual average oil price in the U.S. from 1975 to 2018. After the 2007-08 global financial crisis broke out, the price of crude oil fell dramatically by 66.89% from \$ 94.04 per barrel to \$ 56.35 per barrel (Statista).

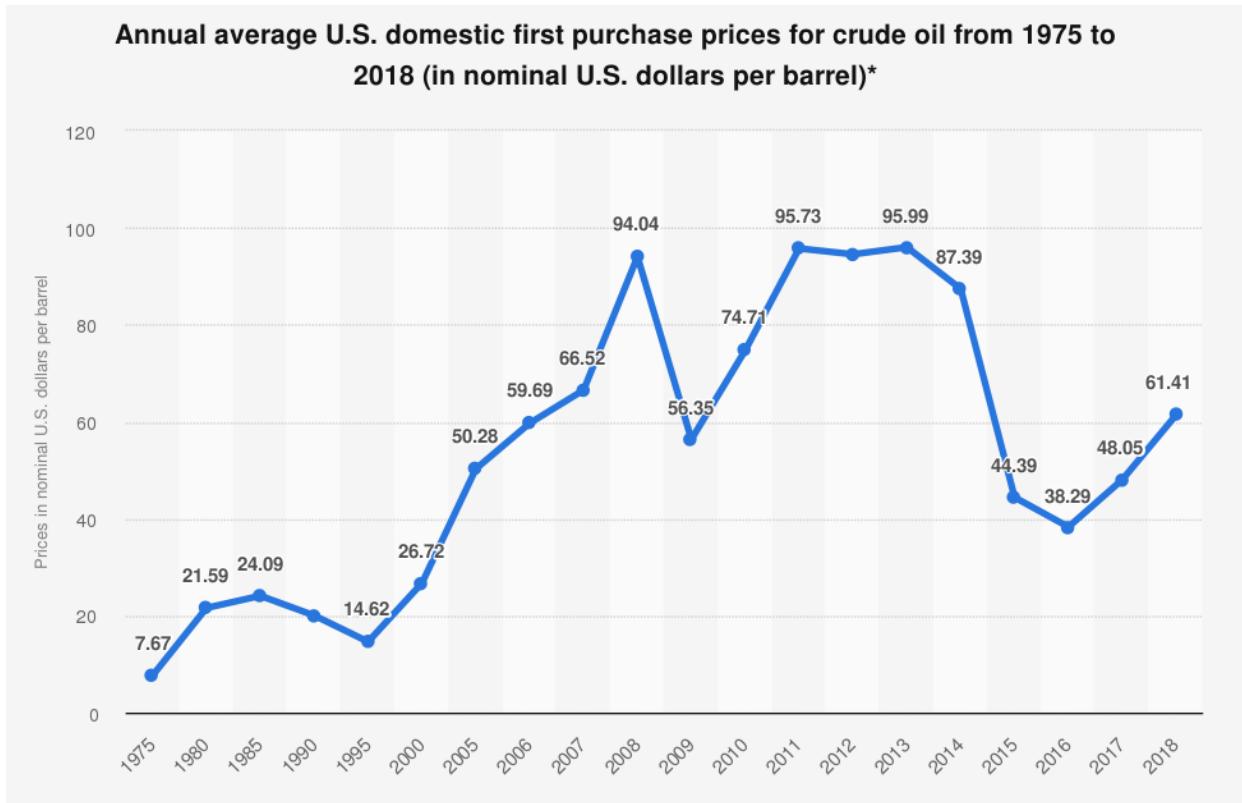


Figure 8. The U.S. average crude oil price from 1975 to 2018 adapted Statista (2018), this figure shows the crude oil prices per barrel from 1975 to 2018. The oil price declined sharply when the financial crisis broke out in 2008.

Moreover, a plummet of oil prices will hit oil producers. Overall, there is an inverse relationship between the oil price and the oil demand. When the price of crude oil drops, if the company keeps producing at the previous level, their profits will decrease, and even leads to a loss. Under this situation, the supply of crude oil will decrease. As the world's largest oil export organization, the Organization of Petroleum Exporting Countries (OPEC) plays an essential role in the production of crude oil. Figure 9 shows the amount of oil imported by the U.S. from OPEC between 2000 and 2018. In 2001, the demand for oil in the U.S. fell due to the effects of the 9/11 terrorist attacks. Similarly, when the economic crisis led to a drop-in oil prices in 2008, OPEC's oil output also fell significantly, ultimately impacting the world economy.

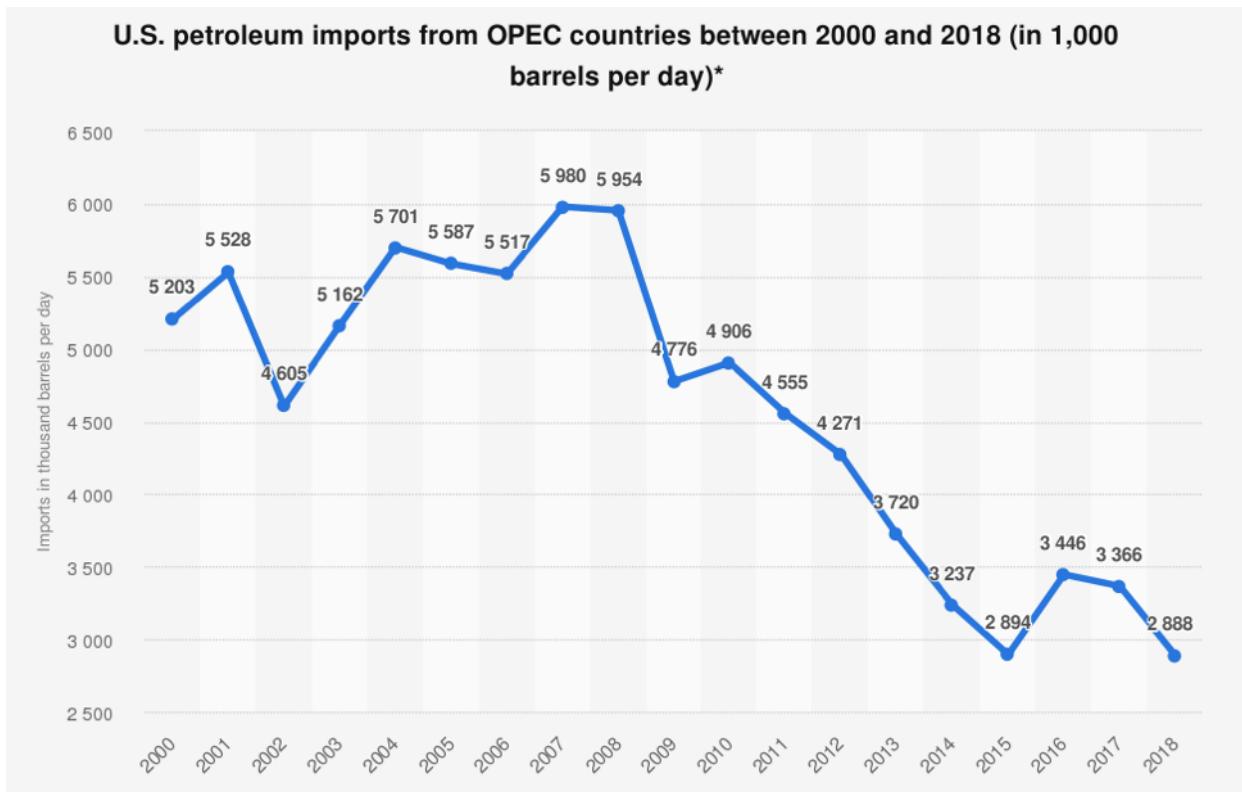


Figure 9. U.S. petroleum imports from OPEC from 2000 to 2018 from Statista (2018), this figure illustrates a rapid decline in oil demand after the 9/11 accident and the 2007-08 financial crisis.

The 2007-08 financial crisis brought considerable damage to the U.S. and the rest of the world. For the U.S., the outbreak of the crisis severely affected the U.S. market, leading to the collapse of a large number of banks and financial institutions. Furthermore, the crisis caused high unemployment and a sharp decline in housing prices, which increased the burden on society. For other industries, the crisis panicked investors and reduced investment, which affected the demand for crude oil. The low demand for oil led to a drop-in oil prices; thus, it influenced the economy of many countries that rely on oil exports.

Resolutions

It has been 11 years since the subprime crisis broke out in 2007-08. Alleviating the damage caused by the crisis, the U.S. economy began picking up after three rounds of quantitative easing

(QE) and zero interest rates policy. However, even with the introduction of quantitative and qualitative monetary easing (QQE) and negative interest rates in the European and Japanese economies, these countries were still at the “downside.” The crisis also brought the Chinese economy to an end of the high-growing era⁸. Moreover, countries such as Latin America and Australia, which mainly rely on exporting resources, suffered a sharp economic fall, falling into a long-term downturn. Nevertheless, the global impacts of the subprime crisis have not yet been completely eliminated.

Asset Reconstruction of The U.S.

U.S. Fiscal Policies.

In terms of fiscal policy, in order to save the financial industry, the Bush and Obama administrations respectively proposed the Troubled Asset Assistance Program (TARP) and the Financial Assistance Program (FSP), with a total amount of \$ 2.3 trillion. 35% of the Obama economic stimulus plan fund, with a total of 275.5 billion, was used for tax release. At the same time, tax cuts, tax rebates, the increase of government spending, and transfer payments were used to stimulate the economy (Ren, Xia & Xiong, 2017).

The subprime crisis also exposed various problems in the U.S. regulatory system. In 2009, President Obama proposed a reform plan, Volcker Rule, for the financial supervision system. This system was aimed at strengthening the security of the existing financial system. The essence of the Volcker Rule⁹ is to prohibit banks from engaging in speculative transactions that are not related to customer financial services and especially prohibit banks from engaging in self-operated investment businesses (Cai, 2011). When the financial crisis occurred, the risk of bank proprietary

⁸ Affected by the crisis, from 2009, China's real GDP growth rate started decreasing. (2007:14.2%, 2008:9.7%, 2009:9.4%, 2012:7.9%, 2016: 6.7%, 2018: 6.6%)

⁹ See Glossary for complete definitions.

trading was concentrated on a large number of financial derivatives such as MBS, CDO, CDS. Most of these derivatives had ten times or even hundreds of times leverage, which caused immense colossal risk to the market. Therefore, banning proprietary trading was essentially a large-scale “deleveraging” of the market by the government.

After the subprime crisis broke out, the U.S. government authorized the Federal Housing Finance Agency (FHFA) to take over \$200 billion to acquire Freddie Mac through purchasing preferred stock, which transferred non-performing assets to government departments for processing. Meanwhile, they used the exchange stabilization fund (ESF) to solve the commercial banks and monetary funds' debt problems and propose innovation based on traditional tools. These innovations include: expanding the types of rescued companies, increasing the types of collateral, and extending the rescue period (Ren, Xia & Xiong, 2017; Griffith et al., 2019).

U.S. Monetary Policies.

On the other hand, the Federal Reserve adopted a series of monetary policies to improve economic conditions. Before 2007, the Fed's assets and liabilities were relatively stable, and the national debt held by the Fed accounted for more than 80% of the total assets. After the 2007-08 financial crisis, the Fed added new items such as mortgage-backed securities (MBS) with toxic assets (mainly mortgage assets in housing and commercial real estate) as the collateral on the balance sheet.

Additionally, the Federal Reserve increased its holdings of federal agency bonds and mortgage securities. By the end of 2016, the balance of mortgage-backed securities (MBS) on the Fed's balance sheet reached \$ 1.74 trillion, accounting for 39% of total assets (FRED). Therefore, how to deal with the complex toxic assets in its balance sheet without creating too much influence on the financial market was the coming challenge for the Fed.

Last but not least, the continued turmoil in the financial markets and the substantial economy¹⁰ (opposite the fictitious economy⁹) forced the Fed to lower the federal funds rate since September 2007 continuously. By the end of 2008, the federal funds rate had fallen to 0 - 0.25%, which became the lowest level in history (Statista). Notwithstanding, when the federal funds rate is about to fall below 0% or cannot be lowered any more (also called liquidity trap), the Fed will adopt quantitative easing (QE) to expand the operation of the open market further. The Fed implemented three rounds of QE in March 2009, October 2010, and September 2012 separately and expanded the balance sheet significantly.

Comparing Resolutions to Other Countries

The global financial crisis triggered by the U.S. subprime mortgage crisis severely affected the economic development of countries around the world. Net exports, consumer spending, and stock markets in major countries experienced varying degrees of decline. Confronting the most challenging economic situation since the 1930s, countries around the world have taken various measures to stimulate economic recovery. Among them, Brazil (developing) and the U.S. (developed), as capitalist countries, had significant differences in strategic goals and policy implementation. On the other hand, Brazil (capitalism) and China (socialism), which are developing countries, applied different policies due to different national systems.

Brazil (developing capitalism) vs. the U.S. (developed capitalism).

As one of the most important countries in Latin America, Brazil develops the economy by exporting large quantities of raw materials. When the financial crisis broke out and quickly spread to the world, because of the relatively fragile economic system and highly dependent market, Brazil suffered a considerable shock and fell into recession. Unlike the U.S., Brazil was not hit by

¹⁰ See Glossary for complete definitions.

turbulence in the domestic financial system but was hit by the downturn of the international market. As a result, the Brazilian government adopted a series of fiscal and monetary policies to respond to the crisis.

First of all, in order to cope with the financial crisis and stabilize the employment rate, the Brazilian government implemented a tax reduction plan in December 2008, with a total of 10 billion Brazil Real (4.2 billion USD). This plan includes reformulating personal income taxes and reducing production taxes on specific products. The implementation of tax reduction measures reduced product prices and effectively stimulated domestic consumption demand. Among them, in January 2009, the prices of industrial products fell by 5% - 7%, the inventory of the automotive industry fell by 10%, and the sales of household appliances increased by 20% (Zhang & Xu, 2010). At the same time, tax cuts created nearly 60,000 new jobs in Brazil.

Similarly, the U.S. government introduced new tax cuts after the crisis. This policy extended (or even perpetuates) previous tax cuts for low- and middle-income groups (up to 35%). In addition, the tax reduction policy also reduced corporate investment tax, limited the amount of U.S. citizens' inheritance exemptions, and extended the time limit for receiving benefits for the unemployed (Zhu, 2011). All these tax cuts lowered the unemployment rate and stimulated economic recovery to a certain extent but caused the government to run a fiscal deficit.

Second, both the Brazilian and U.S. governments increased budgets. The difference is that most of the U.S. government spending went to TARP— purchasing “problematic assets,” while the Brazilian government used government spending to support transportation, energy, society, and infrastructure. As a major exporter, Brazil’s agricultural exports account for about 20% of its total exports (Liu, 2010). Therefore, in the credit strategy, the government focused on the development of agriculture and animal husbandry. To stimulate the economic recovery, the

Brazilian government provided preferential loans to small and medium-sized enterprises in husbandry and increased the loan amount of related industries. On October 22, 2008, the Brazilian government also authorized Banco do Brasil (BB) and Caixa Economica Federal (CEF), two national banks, to acquire the affected financial institutions to solve the problem of farmers' credit difficulties. In addition, on April 16, 2009, the Comitê de Política Monetária (COPOM) also approved a proposal to provide a 10 billion Brazil Real loan to support the beef, lamb, pork, poultry, and eggs industries (Zhang & Xu, 2010).

Last but not least, Brazil's central bank also reduced its reserve requirements and Interest Rate Benchmarks¹¹ to help companies overcome the crisis. In order to reduce borrowing costs and increase liquidity, Banco do Brasil, the Brazilian central bank, reduced bank reserves and injected 100 billion Brazil Real (about 54.95 billion USD) into the market. In addition, Banco do Brasil cut the interest rate three times between October and December in 2008 and made four significant reductions in the Interest Rate Benchmarks in 2009 (from 13.75 to 8.75%). Similar to Brazil, the U.S. Fed began to reduce the federal funds rate at the end of 2007 and conducted three rounds of quantitative easing (QE) in 2008, 2009, and 2010. Both countries adopted expansionary policies to facilitate economic recoveries.

The main reasons for the policy differences between Brazil and the U.S. are:

- 1) Brazil is a developing country relying on raw material exports, and it focuses on a substantial economy such as agriculture and animal husbandry.
- 2) Brazil did not trigger a crisis due to problems in its internal financial system. The problem it faced was the decrease in export demand for products.

¹¹ See Glossary for complete definitions.

The Brazilian government carefully analyzed domestic issues, formulated clear plans, and effectively implemented policies, helping the economy recover quickly. In particular, tax cuts were focused on special groups that effectively stabilized domestic employment and increased production. In addition, the increase in government spending and the reduction in interest rates made it easier for people to take out loans. As a result, small and medium-sized enterprises developed rapidly, adding new strength to the economy.

China (developing socialism) vs. Brazil (developing capitalism).

In general, although the impact of the financial crisis on China's economy is far less severe than that of western countries led by the U.S., it cannot be ignored. Specifically, the most obvious is the decline in export growth rate. Thus, China's crisis response strategy focused on three areas: stimulating exports, expanding domestic demand, and rebuilding communities.

First of all, in order to stimulate exports, the Chinese central government announced that it would increase the export tax rebate rate for 3770 export products on November 12, 2008 (Wang, 2009). The increase in the export tax rebate rate dramatically reduced the pressure on export companies and helped restore their confidence. Secondly, because the insufficient domestic demand had been restricting China's economic development, since the second half of 2008, the Ministry of Finance of China (MOF) proposed a structural tax cut. Tax reductions, rebates, and credits are used to reduce the tax burden and promote business investment and household consumption. In addition, in November 2008, the State Council of China launched a “4 trillion-yuan investment plan” (58.6 million USD), including the reconstruction of infrastructure and disaster areas. In terms of monetary policy, in the first half of 2008, The People's Bank of China (PBOC) raised interest rates five times and raised the reserve rate eight times to ease inflationary pressures (Wang, 2009). However, due to the impact of the financial crisis, China's monetary

policy was changed (from contractionary policies to expansionary policies). Thus, on November 24, 2008, the People's Bank of China announced a substantial interest rate cut.

When comparing Brazil (capitalism), and China (socialism) - both developing countries - in a general way, the differences between the problems they faced and the policies they adopt are not very obvious. This article argues that today's mainstream countries have broken the traditional market model: non-pure capitalism or socialism. Most capitalist countries, including the U.S., Brazil, and all Western European countries, have adopted a series of socialist macro-economic control¹² to maintain economic development. Different from the free market economy of traditional capitalism, the macro control, including tax cuts, interest rate cuts, and increased government spending, is a unique means of socialism. Thus, when confronting the crisis, most of the countries had government interventions and macro control. On the other hand, China had introduced a market economy since Economic Reform and Opening Up in 1978. The introduction of the market economy broke the traditional mode of planned economy¹⁰ implemented by the central government and thus improved China's socialist system.

However, this article finds that Brazil and China still had some differences on some particular items. Among them, the share of Chinese government spending on enterprise is much higher than Brazil's. This is because China, as a socialist country, is far more nationalized than Brazil. According to the 2018 Fortune Global 500, there were 120 Chinese companies on the list (115 in mainland China). It is worth mentioning that only 24 of them were private enterprises (non-state-owned enterprises), and state-owned enterprises accounted for 80% (SASAC¹³). Therefore, during the financial crisis, a large number of state-owned enterprises were directly funded by the

¹² See Glossary for complete definitions.

¹³ Short for Chinese State-owned Assets Supervision and Administration Commission of the State Council.

government. In contrast, the U.S. and Brazil, as capitalist countries, are far less nationalized than China. Therefore, when the crisis broke out, governments only protected a small number of essential enterprises, causing many small businesses to fail. Also, unlike the developed countries, China and Brazil, as developing countries, rely on the substantial economy that is dominated by product exports (corresponding to the fictitious economy that is dominated by financial products). Therefore, both China and Brazil have taken expanding domestic demand and stimulating exports as their primary goals. Furthermore, compared with Brazil, China also experienced inflation and several severe natural disasters in 2008, including earthquakes and snow disasters, which caused significant losses to the real economy. Different from China, Brazil did not experience inflation and natural disaster during the crisis, so it only adopted a monetary expansion policy.

In response to the crisis, the U.S., Brazil, and China formulated plans based on their conditions and adopted effective measures in time to recover their economies. For the U.S., finding its problems promptly and solving them creatively¹⁴ was the key to ending the crisis. Although Brazil and China were not the initiators of the crisis, they were able to realize the seriousness of the crisis and take timely measures to avoid further spread of the crisis. All in all, due to the differences in social systems in each country, when the crisis comes, governments should proceed from its actual situation, understand the essence of the problem, and create targeted strategies to solve the problems in the most effective way.

Conclusion and Recommendations

Conclusion

Although it has been eleven years since the financial crisis erupted, people have not stopped studying and reflecting on it. This literature review reveals the leading causes of the 2007-08

¹⁴ After the crisis broke out, the United States adopted a series of new macro-control tools to solve the problems. These new tools include Quantitative Easing (QE), Troubled Asset Relief Program (TARP), Asset Auctions, etc..

financial crisis. First, this paper asserts that the global financial crisis was caused by three main factors, namely overdependence on financial derivatives, fraud by credit rating agencies, and the widespread economic globalization. The overuse of financial products increased investment risk in the U.S.; the “virtually high” institutional ratings and the fraudulent information caused misallocation of financial assets; and the high degree of economic interdependence dispersed the risk but also accelerated the spread of the crisis. Second, the negative impacts of the crisis were that: a large number of financial institutions closed down, housing and oil prices plummeted, and unemployment rose rapidly. Then, for economic recovery, the U.S. adopted fiscal policies including: the implementation of the TARP, the reduction of various taxes, and the prohibition of banks from engaging in self-operating investment businesses. TARP was used to purchase toxic assets and transfer risks from the U.S. market. Various tax reductions stimulated economic recovery, and the prohibition of self-employed businesses successfully helped the market “deleverage¹⁵.” In monetary policies, the Fed stimulated the economy through adopting quantitative easing (QE) and lowering the federal funds rate, but it also expanded the balance sheet. Last but not least, when comparing to other countries, there are many policy differences between the U.S., Brazil, and China. Among the capitalist countries, unlike the U.S.’s internal financial system problems, Brazil was mainly facing a decline in international market demand. On the other hand, unlike the fictitious economy in the U.S., Brazil, as a developing country, mainly develops a substantial economy. Therefore, the Brazilian government stimulated exports, strengthened infrastructure construction, and implemented tax reduction policies for agriculture, animal husbandry, and small and medium-sized enterprises. In developing countries, similar to Brazil, China adopted a series of tax reduction measures to stimulate domestic demand and expand exports.

¹⁵ See Glossary for complete definitions.

In terms of interest rates, before the crisis erupted, China adopted contractionary policies due to the pressure of inflation; however, when the crisis broke out, China was forced to adjust to expansionary policies, while Brazil maintained contractionary policies through out.

Recommendations

In order to avoid the recurrence of the crisis, this paper proposes some recommendations. First of all, excessive financial innovation is one of the biggest problems of the crisis. Therefore, the U.S. governments should learn from China, which strengthened the supervision of financial institutions and established a complete management system for financial products. Second, fabricated credit ratings also contributed to the outbreak of the crisis. Therefore, credit rating processes should be transparent and objective. Third, when comparing the U.S. and Brazil, this article found that the U.S. also had an imbalance between the development of the fictitious economy and the substantial economy. Thus, while developing the fictitious economy in the future, the U.S. should also focus on the construction of the substantial economy industry and infrastructure. Finally, the subprime mortgage crisis was not caused by insufficient consumption but excessive irresponsible consumption. Excessive consumption rose housing prices and eventually created an economic bubble. Therefore, the U.S. government should appropriately reduce the use of expansionary policies such as tax cuts and interest rate cuts.

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Glossary

Term	Definition
Interest Rate Benchmarks	Interest rate benchmarks, also known as reference rates or just benchmark rates, are used to reflect the cost of borrowing money in different markets.
Crowding Effect	Crowding occurs when increased government borrowing in the market economy sector seriously affects the rest of the market.
Deleverage	The process or practice of reducing the level of one's debt by rapidly selling one's assets.
Federal Funds Rate	Federal funds rate refers to the interest rate that depository institutions (banks and credit unions) lend reserve balances unsecured to other depositors overnight on an uncollateralized basis.
Fictitious Economy	Fictitious economy (or virtual economy) refers to all activities of fictitious capital mainly based on a financial platform.
Financial Derivative	Financial derivatives refer to securities or contracts between two or more parties that used to buy or sell underlying assets. The most common financial derivatives are stocks, bonds, currencies, commodities, interest rates, and market indexes.
Macro-economic Control	Macro-economic regulation and control is usually abbreviated as “macro-economic control” or “macro control.” It refers to the use of direct government intervention by the government to cool down the overheated economy.
Planned Economy	The planned economy, also known as a command economy, is an economic system in which a central authority, such as a government, makes economic decisions regarding the manufacturing and the distribution of products.
Quantitative Easing (QE)	Quantitative easing, also known as QE, is an unconventional monetary policy in which the central bank purchases government securities or other securities from the market to increase the money supply and encourage loans and investments.
Secondary Mortgage Market	The secondary mortgage market is a market where mortgage originators, mortgage aggregators (securitizers), and investors buy and sell mortgage loans and service rights.
Substantial Economy	Substantial economy (real economy) refers to all real or non-financial elements of an economy, that can be described using just real variables. In such an economy system, all goods and services are purely represented in real terms.
The U.S. Subprime Mortgage Crisis	The U.S. subprime mortgage crisis was a domestic financial crisis, which contributed to the outburst of the 2007-08 global crisis. It was triggered by a tremendous decline in housing prices after the collapse of a real-estate bubble, leading to mortgage default, foreclosures, and the devaluation of housing-related securities.
Troubled Asset Relief Program (TARP)	Troubled Asset Relief Program (TARP) is a program initiated and implemented by the U.S. Treasury Department to stabilize the

	country's financial system, restore economic growth, and ease foreclosures after the financial crisis.
Volcker Rule	The Volcker Rule is a federal regulation that generally prohibits banks from using their accounts for certain investment activities and restricts their transactions with hedge funds and private equity funds.
Zero-interest-rate Policy (ZIRP)	Zero interest-rate policy (ZIRP) is a macroeconomic concept describing conditions with a meager nominal interest rate, such as in contemporary Japan and in the U.S. from December 2008 to December 2015.