Available online at: http://journals.rsfpress.com/index.php/ijmesh
**International Journal of Management, Entrepreneurship, Social Science and Humanities (IJMESH)**
ISSN 2580-0981 (online)
Volume 3 Number 1 (2020): 24-33

# U.S. Sub-Prime Crisis: Origin and Causes

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## Abstract
The purpose of this paper is to explain the boom and bust of the housing market in the U.S. and how the sub-prime mortgages gave birth to new securitized products in the global economy. The majority of the researches conducted previously to explore the reason for the sub-prime crisis and its impact on the volatility on the stock market of the home country (U.S.) and the other developing countries. This paper also contributes to the literature about causes, timeline, and major crisis events during the crisis period. The literature on the Subprime crisis revealed many causes of the Sub-prime crisis. These were Imprudent Mortgage Lending, Housing Bubble, Global Imbalances, Securitization, Lack of Transparency and Accountability in Mortgage Finance, Rating Agencies- The credit rating agencies gave AAA ratings to numerous issues of subprime mortgage-backed securities, many of which were subsequently downgraded to junk status. Deregulatory Legislation, Government-Mandated Sub-prime Lending, Complexity of certain financial instruments, Failure of Risk Management Systems, Excessive Leverage and Relaxed Regulation of Leverage were the most discussed reasons of Subprime Crisis.

**Keywords**: *Sub-prime Crisis; Securitization; Housing Bubble*



## INTRODUCTION

This part discussed the U.S. sub-prime crisis into two terms: the meaning of Sub-prime lending and the origin of the Sub-prime crisis.

### Sub-prime Lending

Sub-prime stands for sub ordinary to the primary. The term sub-prime lending means lending loans to borrowers who do not normally meet the criteria for such loans due to various risk factors - low-income level, little or no down payment, bad credit history, and unsure employment status. Sub-prime lending has been practiced in different countries of the world. The risk of sub-prime lender is higher because sub-prime borrowers do not have good credit ratings. Sub-prime lenders increase the interest rates on borrowing to manage their credit risk. Sub-prime lending is used for a home loan, car loans, credit cards, etc. sub-prime lending is also known as second chance lending.

#### *Risks related to Sub Prime Lending*

Following Risks are related to sub-prime lending:

a. Credit Risk: This risk is borne by financing Institutions in case the borrower does not pay the loan. The solution to this type of risk is discovered by introducing Mortgage-backed securities (MBS).
b. Asset Price Risk: This type of risk arose at the time of the revaluation of MBS to hedge the credit

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DOI: https://doi.org/10.31098/ijmesh.v3i1.139 Research Synergy Foundation

risk. Revaluation is based on assets market value and chances to recover the lending amount. When the market value of mortgage assets starts declining asset price risk starts increasing.

c. Liquidity Risk: Due to credit risk and asset price risk, a reduction in liquidity starts in the market. This is known as liquidity risk. Financial firms always prefer short term loans against commercial papers but in the situation of sub-prime crisis valuation of mortgage asset decline which creates a liquidity risk in the market.
d. Counterparty Risk: This risk is related to all the parties affected by the sub-prime crisis. These parties are banks, investment companies, and other financial institutions which provide finance to government and invest in the market.

*Why Sub-Prime lending? Why sub-prime lenders provide loans to those who have a bad credit history?*

The answer to this question is to earn money. Yes, it's related to money. The banks were also keen to earn more money. The reason behind this was the banks forecasted the rising trend in the housing market shortly. So, they charged a higher interest rate from the borrower which was higher than the prime lender's rate. Banks cover their credit risk of non- payment by charging higher interest and by selling the mortgaged assets with an increase in price. To hedge the risk and to provide more loans, banks need money which they earn through the investment of collected mortgage into different securities. Many financial firms at the global level provide sub-prime funds to needy countries. Further, banks also issue sub-prime loans to young people who are not able to make down payment and who suffer from financial problems.

Origin of Sub-prime Crisis

The sub-prime crisis originated in 2006 caused by subprime lending in the US market. The two main reasons, raising interest rates and declining property prices, affected the market, leading to the sub-prime mortgage crisis. Property prices start increasing during the year 2000 to 2005 and the rate of interest on the home loan was very low. That was the reason; NINJA borrowers were capable to repay the loan by selling the houses with increasing prices and borrow another loan with a low-interest rate. But in the middle of the year 2007, these financial institutions that provide sub-prime lending started to collapse due to the failure of the payment obligations by the borrowers. This condition gave birth to a credit crunch which means a strict shortage of money in the market. As a result, major banks lose their trust in each other to provide funds. Large exposure to the securitization of mortgage instruments was the main reason for lack of confidence in these financial institutions. Obviously, after the situation of the credit crunch, it was impractical for the companies to borrow funds from the banks and financial firms, which led to unemployment by job retrenchment, block further investment, and nonpayment of old debts. Securitization means collecting a large number of principal assets that generate cash flows into a fund which is continuously fed by the respective cash flows. These asset collections, therefore, consist of receivables from any number of consumer asset types, including credit cards, auto loans, and home equity loans, as well as other non-users' asset types such as equipment leases and loans, utilities, aircraft leases, and royalties. Additionally, funds generated by this technique promote the birth of other types of instruments called asset-backed securities or ABS which were issued and sold to investors. Likewise, when the principal assets are used for home mortgages, then these instruments generated by securitization are called MBS (mortgage-backed securities). Furthermore, mortgages which take the guarantee of some agencies such as Fanny Mae or Freddie Mac, do not meet the criteria for insurance of these agencies – these were the so-called "sub-prime loans". When a rising number of houses were bought only from a desire making a safe investment, houses' price has far exceeded the basic value; then a reverse trend was expected. Ultimately, investment in the housing market becomes loss-making, resulting in higher buyers defaulting - especially those who had previously an uncertain financial condition and therefore received only a sub-prime credit.

As a result, these sub-prime lenders were the primary to default in payment when the housing market declined. This situation created more reduction in housing prices and an increase in borrowers defaulting, even by the insured loans. Big financial institutions and investment banks, which had a large exposure on securitized instruments (MBS), were affected most. These include Lehman Brothers or the agencies Fanny Mae and Freddie Mac, causing a sign of doubt between banks, which in turn brought more bankruptcies and further improvements in the financial sector. As per the report of the Federal Reserve's flow of funds data, total debt in the US economy, increased 97.6% in 2007 in comparison to 1997. Debt enlargement was highest in the household and financial sectors. Household debt rose from 66.1 percent of GDP to 99.9 percent of GDP over the year 2007. The debt percentage also increased in loans taken by banks and other financial entities. A High credit rating given to most junior companies was the other reason for the crisis. The figure for total mortgage loans was $ 881milion, out of which $ 699 million (79% of total) was in the senior category of MBS and received an AAA credit rating. Only $58 million (6.5% of the total) received a low credit rating BBB.

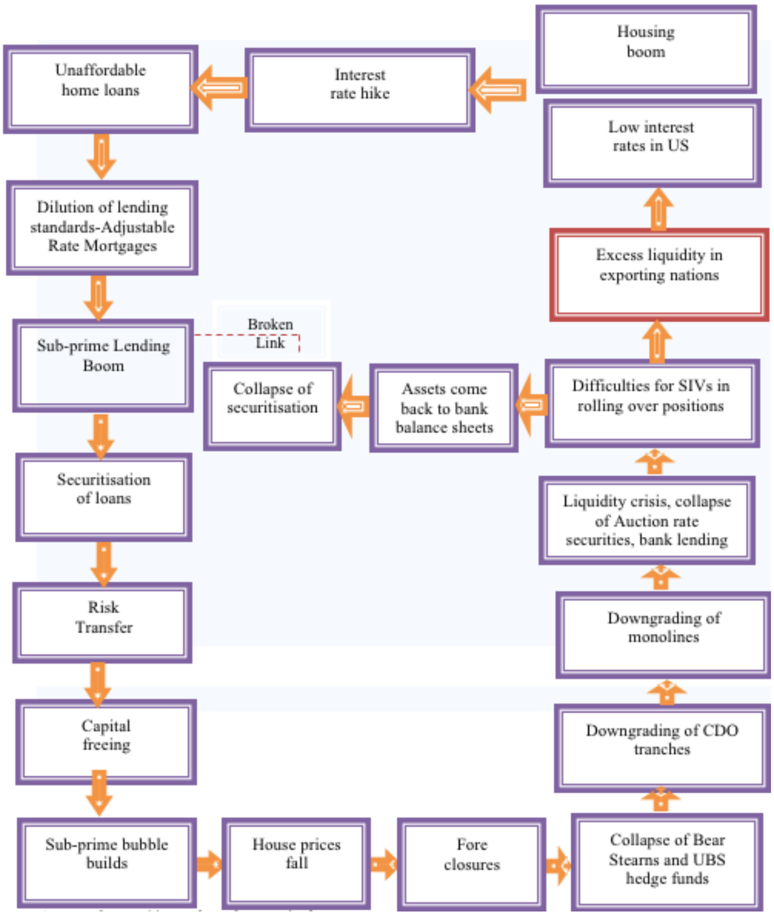


Fig.1 The Sub Prime Crisis at a Glance

*Source: https://en.wikipedia.org/wiki*

**LITERATURE REVIEW**

Case and Shiller (2003) investigated the reasons for the housing market collapse. The study explained the change in housing prices with the help of change in selected macro indicators for the period 1985 to 2002. The correlation matrix was applied to study the relationship between housing prices and change in macro indicators. The study found a positive significant relationship between house prices and income levels. Zhang et al (2005) investigated the impact of regulative activities on the SSE Composite Index of Shanghai. Daily return data was analyzed through the CUSUM test and Markow-Switching ARCH model. Results indicated that in the mid of 1997 regulative activities were improved which affected the volatility of returns in positive manners. Volatility always declined with improvement in the stock trading system. Rogers (2007) conducted the study to measure the effects of foreclosures of housing properties in Sacramento County, California between January 2008 and July 2009. Secondary data was used from the US census records. An OLS regression method was adopted to measure the relationship between foreclosure and selling price of housing properties. Results showed that a 20% decrease in the selling price of housing properties was due to the foreclosure of properties which was 0.50% per unit change in the foreclosure rate. Tong and Wei (2008) examined the transmission of the financial crisis in 45 countries. Non-financial firms were selected to measure the impact of financial bad news events on the performance of firms. The objective of the study was to examine whether a change in the financial system, changes in monetary and foreign exchange policy during the pre-crisis period affected the spillover effect of the sub-prime crisis in different countries. Results showed that the stock market follows a declining trend during pre-crisis credit expansion. Olofsson (2008) discussed the sub-prime crisis in deep sense and comparison was made between the current and past financial crises. The study explained the origin and causes of the sub-prime crisis. The yield curve was used as an analytical tool for forecasting future crisis besides the past and current crisis. It was concluded that future crises may arise if the banking system does not follow the regulatory amendments made during the time of crisis. Bank deregulations were the reasons for the bursting of the housing bubble. Mizen (2008) discussed the events adjoining the sub-prime crisis of 2007-08. Reasons for the crisis include extreme leverage in the economy, less interest rate, and the introduction of securitization Process. The sub-prime crisis began when the housing market decline and sub-prime lending increased. Low-interest rate encourages borrowers with poor credit history to refinance their loan by selling off their properties, which cause bankruptcy situation. The further study described the deregulation in the financial system as the main cause of the crisis. Whalen (2008) explained the causes, effects, and consequences of the sub-prime crisis. The study described the three basic causes of the crisis. First, was a public policy partnership generated in Washington including many firms, financial agencies to increase the accessibility of reasonable housing by the introduction of new financial products (MBS). Second encouraged the growth of over-the-counter (OTC) derivatives and securities by all types of financial institutions by the federal bank. And third was fair value accounting by the Securities and Exchange Commission (SEC) and the Financial Accounting Standards Board. Crouhy et al. (2008) discussed the different events that form the part of Sub-prime lending crisis. Imprudent Mortgage Lending, Housing Bubble, Global Imbalances, Securitization, Lack of Transparency and Accountability in Mortgage Finance, Rating Agencies- The credit rating agencies gave AAA ratings to numerous issues of subprime mortgage-backed securities, many of which were subsequently downgraded to junk status. Deregulatory Legislation, Government-Mandated Subprime Lending, Complexity of certain financial instruments, Failure of Risk Management Systems, Excessive Leverage, and Relaxed Regulation of Leverage were the most discussed reasons of Subprime Crisis. Eichengreen (2008) discussed the roots of the US sub-prime crisis. The study found the financial deregulation and increased number of subprime loans were the main reasons for the crisis. The study suggested that there should be different agencies for different types of activities instead of one agency who regulate all the type of activities. In this way, the risk would be accessed easily and effectively. Murthy and Deb (2008) studied the reasons for the sub-prime crisis. US crisis began due to excess in subprime lending. The low-interest-rate increased housing price and securitization were the beginning factor of the subprime crisis. Three main reasons for the crisis were financial deregulation, excess leverage in the market, and poor valuation process of securitized products. Mody (2009) published a qualitative paper on the causes of the subprime crisis. The study described that the main two reasons were sharp increase successive decline of housing prices in the US, together with a bad lending process generated huge losses for big financial institutions. The crisis period was the worst time for the worldwide economy. Viswanathan (2010) described the causes of the global financial crisis and found that it affected most the advanced economies in comparison to the world's other economies. The methodology was based on the IMF's data. Results of multiple correlations revealed that the US and other European countries' macro indicators affected badly and showed a negative trend in comparison to India. Xie and Li (2010) analyzed the intraday volatility of the S&P 500 stock index future product and basic on the high-frequency trading strategy. The study used the asymmetric model of volatility which includes GARCH (1, 1), EGARCH, and IGARCH. Among these model results from the EGARCH model were preferred for estimation of intraday volatility S&P500 stock index future product. Xu and Sun (2010) compared the two financial crisis and their effects on short term and long term relationship between the stock market of the US and China. Findings indicated that the stock market of China was not co-integrated with the US and Hong Kong in the long run. In the short run, the returns were affected due to the spillover effect of the financial crisis. Volatility in the Chinese stock market increased during the sub-prime crisis period. Zhang and Zhao (2010) studied the leverage effect in stock returns of Shanghai's index returns. ARCH family models were applied and results indicated that there was a significant relationship between high returns and high volatility. ARMA regression equation was used in modeling. The leverage effect was found in the domestic market returns. Among the volatility models, the EGARCH model displayed the best results. Yazicioglu (2010) analyzed the growth and the burst stages of the 2007 subprime mortgage turmoil, in two interconnected segments. The study was divided into two periods. The first part was concerned about the forming of the housing bubble and the second part was concerned about the bursting of the housing bubble. During recession periods many facts came out in front which was responsible to increase the volatility in the market but investors do not react to them and made bad investing decisions. Macro indicators variations in the recession period increased the sub-prime mortgage lending defaults. Sen (2011) contributed literature on the sub-prime crisis. The study described that the sub-prime crisis has spillover effects on the financial and real economical area in developed and developing economies. Policies framed by bad evaluated model together with the deregulation of the financial system, global imbalance, easy credit rating, and excess leverage in-market leads to a shortage of finance in the economy. Corrective measures taken by the financial authorities in the US have also been not effective to heal unemployment, low growth, the loss in financial sectors in developing countries, and grief in Europe. Sakthivel (2012) presented a comprehensive view of the sub-prime crisis on the Indian stock market through an analysis of the various impact of the Indian stock market. The study described the effects of the US market crash on the Indian Economy. Recession exists for a long period which affected the Exports, Imports, and banking sectors of the Indian economy. The stock market also follows a declining trend during the recession time because the stock market


ISSN 2580-0981 (online)

performance was interlinked with macroeconomic Indicators. Wen and Dexin (2013) studied the investor's behavior in the stock market. The study found stock market return prediction may be based on the change in discount rates and changing decisions of investors about investment. Investor's decision to invest in big projects depends on fluctuated discount rates and cash flow. It was concluded that the investor's decision.

## RESEARCH METHODOLOGY

This paper is an increase in conceptualization to understand the roots and origin of the sub-prime crisis. This paper is accompanied by the support of earlier readings, cases, and literature contributed by various researchers to understand the U.S. sub-prime crisis in depth.

Research Objectives: The objective of this paper is to highlight the roots and causes of the U.S. sub-prime crisis.

## TIMELINE OF SUB PRIME CRISIS

2001: Federal Reserve decreases the interest rates by 4.75% in 2001.
2002: Housing prices increase by 10% in near countries of U.S
2003: Interest Rates decline to 1%.
2004: 25% excessive growth in the real estate market.
2005: Housing bubble Boomed in the U.S market.
2006: Housing prices were less, sales also decline.
2007: Real Estate market was continuously falling. Bankruptcy situation arises due to the collapse of mortgage lending.

- February–March: 25 large financial firms declared bankruptcy.
- June 28: Federal Reserve remains the interest rate at 5.25 percent.
- August 6: US Housing finance lenders file chapter 11, Chapter against bankruptcy protection.
- August 31: Declaration of the bailout of U.S borrowers not in the condition to repay the loans due to increasing rates.
- October 31: Federal Reserve cut the interest rate to 4.5%.
- November 1: Federal Reserve increases the money supply for banks.
- December 11: Federal Reserve declines the interest rate from 4.5% to 4.25%.

2008

- January 30: Federal Reserve again reduces the interest rates from 3.5% to 3%.
- February 13: President Bush signs the Economic Stimulus Act of 2008 into law.
- March 11: Federal Reserve issue short term securities of $200 billion in the money market.
- June 5: AMBAC and MBIA insurance bond downgraded from AAA to AA.
- August 6-8: Fannie Mae and Freddie Mac reduce dividends due to quarterly losses.
- September 19: US money market got assurance of mutual funds.
- September 25: Takeover of Washington Mutual by JP Morgan Chase.
- September 29: Announcement of Fortis's bailout by the governments of Belgium, Netherlands, and Luxembourg.
- October 29: The interest rate is a further decline of 1%
- November 23: Announcement of support to Citi by the US authorities.
- November 25: Introduction of the term Assets Backed Securities lending facility in the money market.

- December 16: Decline in the bank interest rate due to the deflation situation.

2009

- January 8: Reduction of bank Rate by 0.5 percentage points to 1.5% by the Bank of England.
- February 27: Conversion of preference shares into equity shares of US $ 25 billion of Citigroup by the US Treasury.
- March 19: Support for the Automotive Industry by the US Treasury of $5 billion.
- April 22: Warning by the IMF for the global economy about the decline of 1.3% in 2009.
- May 6: Poland's economy got approval for credit line by IMF worth US$20.6 billion.
- July 21: Ben Bernanke testifies the extreme risk aversion to the congress.
- September 14: Winding up of programs started to remove the systematic failures by US authorities.

2010

- April 27: Clearance of Greek debt.
- November 28: Ireland got the help of worth €85bn by European ministers.

2011

- July 21: Greece bailed out for being a failure to get its house in order.

2012

- February 12: Greek economy suffers from heavy losses.
- March 12: The unemployment rate increase in Europe.
- June 12: Spain borrows the highest fund in records.

Causes of Sub-Prime Crisis:

It is difficult to pin down the exact cause of the financial crisis, but the majority of the experts and economists are of the view that sub-prime loans in the housing sector were one of the most important causes of the financial crisis of 2008. The following are the reasons for the occurrence of the sub-prime crisis:

a. Careless Mortgage Lending: Due to low-interest rates and increasing house prices financial institutions and banks were relaxed because they thought that borrowers were able to repay loans by selling their properties. But when the real estate market starts to decline banks and other financial institutions suffer from nonpayment of loans by the borrowers.
b. Housing Bubble: The prices of properties increased due to low-interest rates. At the peak point when housing prices start falling then the bubble burst and impacted the whole economy.
c. Worldwide Imbalances: Surplus and deficits in the global economy create an imbalance. Some developing economies reported large surpluses and some economies run a deficit. This imbalance leads to a crisis.
d. Securitization: Mortgage-Backed Securities (MBS) were created/ originated and distributed by the Financial Institutions and other banks after the introduction of securitization. Freddie Mae and Fannie Mac (a quasi-government agency) were first agencies who issue MBS, but later private agencies also started issuing MBS on sub-prime loans. This competition increased the sub-prime mortgage lendings.
e. Lack of Transparency and Accountability in Mortgage Finance: During the sub-prime lending period, many investment firms and banks through the securitization process created bad mortgages. They felt that they would not be held liable for bad securities. Borrowers enjoy easy lending and lenders speculate for their gain.


ISSN 2580-0981 (online)

f. Rating Agencies: AAA rating given by credit rating agencies to mortgage-backed securities which were low grade and bad financial prediction models was the other reason for the sub-prime crisis.
g. Off-Balance Sheet Finance: Banks sell off their collected debt into SIVs to earn profit from risky borrowing. In this way, banks provided more loans and on the other hand, they increased their contingent liabilities which created a bankruptcy situation.
h. Government-Mandated Sub-Prime Lending: Federal reserves policy to help low-income borrowers obligated banks for careless mortgage lending.
i. Failure of Risk Management Systems: Collective market and credit risk analysis creates a situation of crisis. But some firms studied both the risks separately.
j. Financial Improvement: During the recession period to overcome the depressed situation many firms introduce new financial instruments rapidly, but the market was not prepared for these instruments. The shortage of time for related parties was the main reason for not adopting these instruments.
k. Complexity: The new instruments were complex, mainly for three reasons: 1) Investing parties were not capable to judge the profitable investments. 2) The market risk was hidden. 3) Regulatory authorities were also confused.
l. Bad Computer Models: Complex models for the calculation and prediction were based on a few years' mortgage data which was not sufficient. Historical events were not considered for forecasting.
m. Excessive Leverage: After the year 2000 Federal Reserve's decreased the rate at 1% from 6.5%. So, financing firms generate low yields. To offset the loss Federal Reserve provided funds in the market to increase the returns on capital. This caused a decline in housing prices and an increase in interest rates.
n. Relaxed Regulation of Leverage: In 2004 the SEC liberalized its net capital rule. According to rule now financing banks and organizations can manage very high leverage ratios.
o. Split Regulation: Management of the US financial structure was split between different agencies based on a particular type of institution. That is why; any agency was unable to predict the crisis.
p. Short-term Incentives: Income of many brokers and managers depend on the commission and annual bonus. So, to increase their amount they play the speculation game and provide customers to banks and financial institutions for loans against their large part of the incentive..

**RESEARCH LIMITATIONS**

This Paper explains the causes of the sub-prime crisis only. Steps taken by the U.S. government to control the crisis were not discussed in this paper.

**LIMITATION , CONCLUSION & SUGGESTIONS**

This paper highlighted the causes of the sub-prime crisis and contributes to the literature regarding the influence of the global financial crisis on stock market performance. Failure of a credit rating system and bad prediction model was the cause of the sub-prime crisis. So, if this type of situation arises shortly there should be clarity about the data sources to provide a correct rating based on the financial positions of the companies. During the sub-prime crisis, the incorrect valuation of securitized assets products was a big problem. The valuation process should be stringent to give a fair valuation of the assets. The valuation process should not be complicated and products should be simplified and standardized. Next, the lack of transparency was the main issue at the time of crisis. So, in the future banking system strictly focuses on transparency about the nature of instruments financed by the financial institutions, especially for those instruments with the complicated valuation process.

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