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The Global Financial Crisis

Abstract

Our article will discuss the primary reasons, market components and mechanics of global financial crisis (GFC) in 2008, the changes of policy and regulations in response to it. This includes the in-depth analysis of mortgage-backed securities as one of the prime drivers of GFC. We also analyze Dodd-Frank Act as one of main responses from policy makers to discuss the intended and unintended consequences to financial industry after GFC.

Keywords

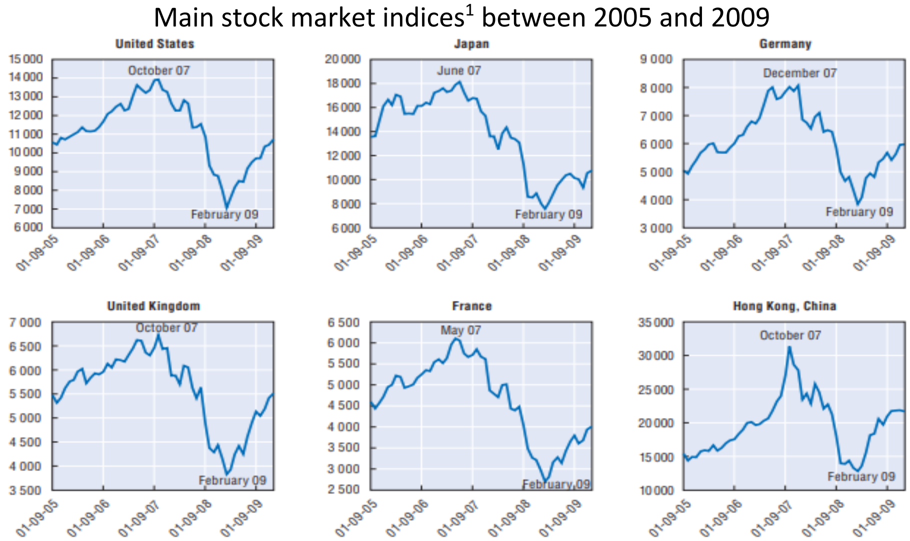
Global Financial Crisis, Dodd Frank Act, Mortgage-backed Securities, Derivatives, Banking Crisis, Financial Risk, Financial Regulation.

Global Financial Crisis 2008

Introduction

Financial crises are defined by asset prices experiencing sharp declines, debts spiraling out of control and institutions experiencing liquidity shortages. Often, they also include speculative financial bubbles and may either be limited to a single sector, or much like the 2008 Global Financial Crisis (GFC), can ripple through global economies. Other market features that presented themselves during the GFC include huge government bailouts, the introduction of more stringent regulation (e.g. Dodd-Frank) and the failure of many large financial institutions, such as Lehman Brothers. Market conditions also drastically changed during the GFC with global equity markets reversing their up trends (*Figure 1*), major liquidity issues for the banking sector and a sudden, sharp reduction in the amount of money/credit available from lenders. Here we explore the potential causes, mechanics and responses to the GFC.

Main stock market indices[1] between 2005 and 2009



1. United States: Dow Jones Industrial Average; Japan: Nikkei 225; Germany: DAX; United Kingdom: FTSE 100; France: CAC 40; Hong Kong, China: Hang Seng.

StatLink http://dx.doi.org/10.1787/837733674302

Stakeholders and Mechanics of GFC

Stakeholder	**Role & Motivation**	**Impact of increasing house prices**
Homebuilders	To build houses that sell for more than they cost to build	Increased income per property
Mortgage Lenders	Earn money through interest rate payments	Little impact, as benefit of higher mortgages may be offset with reduced demand
Mortgage-Backed Securities (MBS) Structurers	Securitize a pool or mortgages and sell tranches to investors	Little impact, more dependent on demand for mortgages
Realtors/Real Estate Appraisers	Earn commissions on selling houses/fees on valuing houses	Increasing commissions
Townships collecting local real estate taxes	Collect fees based on the value of properties in the town	Increased income on taxes
Homeowners using a mortgage	Pay regular interest payments in the hope of eventually paying off	Possibly more reluctant to take out mortgages

Causes and Responses

Factors such as deregulation, securitization, and the growth of the popularity of subprime mortgages clearly had a massive part to play. Firstly, the Gramm–Leach–Bliley Act, which repealed the Glass-Steagall Act, helped to remove restrictions on how banks could use people's deposits. This allowed them to use deposits to invest in riskier assets such as derivatives. Secondly, banks began increasingly utilizing securitization, pooling together various types of debt, such as mortgages, and selling their related cash flows on, concealing underlying risks in the process (in cahoots with rating agencies to end up misrepresenting the associated risk and quality). Finally, the Financial Institutions Reform, Recovery, and Enforcement Act helped enforce the Community Reinvestment Act, which encouraged banks to lend to lower income neighborhoods, by publicly ranking banks based on this (moral hazard – it will be in interest of banks to give more loans for better ranking while having low risk of loss as if people default the banks will still have the house to get the money back), leading to a boom of subprime mortgages. As the increase of adjustable rates and fall of home prices, homes were not good enough collateral for the mortgages either, leading to the housing bubble ultimately bursting.

In response, policymakers and regulators reformed regulation and passed acts into legislation to both control the damage and prevent future similar crises. In early 2008, President Bush signed the Economic Stimulus Act which provided tax rebates of more than $150 million in the hope of reducing financial pressure on business and averting an economic recession. Shortly after, the Fed reduced their nominal rate to 0% to encourage borrowing and ease the liquidity issues constraining financial markets at the time. In terms of regulation, the Dodd-Frank Wall Street Reform and Consumer Protection Act was passed into legislation.

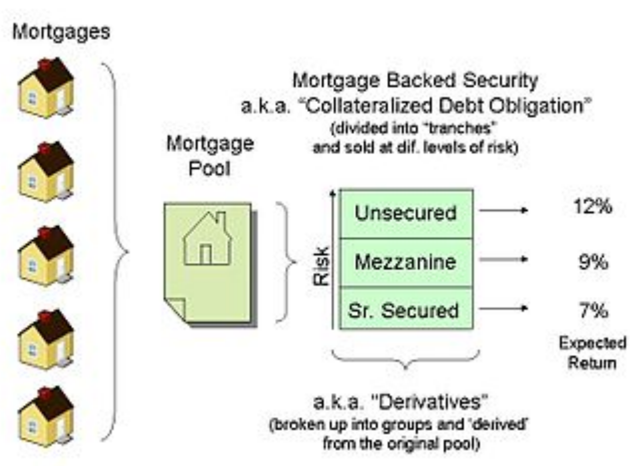
Risk and Regulations

Other than default risk, the housing market also contained a plethora of systemic risks, which can be defined as risks inherent to the market or a sector as a whole and hence cannot be diversified. Systemic risks within the housing market are widely thought to be one of the major contributors to the GFC. The US governments policy on residential housing encouraged banks to give out low quality mortgages and regulation allowed banks to have minimal reserves in the case that borrowers defaulted. This caused great strain on the lending. Also, the way these mortgages were securitized into MBS' led to a lack of transparency of the true risks inherent to these products and the further trade of exotic securities such as CDS' and CDO's between banks resulted in a large, interconnected web of dependencies within the financial system, meaning if one institution failed, it had massive ramifications on the system as a whole.
In the next sections, we will analyze in detail about Mortgage-backed Securities in the context of Global Financial Crisis.

Mortgage-backed Securities

Detailed and specific outline

In simple term, a mortgaged-back security is a financial security that is backed by a collection of mortgages. First a bank will lend money to borrowers in the form of a mortgage and in return the borrower will repay the bank overtime with interest via monthly payments. The bank will then bundle all these mortgages up into an MBS. Slices of these MBS' (called tranches), each of which has a different risk level and expected return, would then be sold on to investors who would then be entitled to a part of the pool of income coming in from the borrowers of the original mortgages. The higher risk tranches are the first to lose out on their income if the original borrowers begin to default on their mortgage payments.



https://upload.wikimedia.org/wikipedia/commons/thumb/6/66/Mortgage_backed_security.jpg/350px-Mortgage_backed_security.jpg

Usefulness of Mortgage-backed Securities

Mortgage-backed Securities can be useful instruments in financial industry for several reasons:

1. MBS allow investors to access to the mortgage market without the need to actually purchase/sell mortgages.
2. MBS help to reduce the risk to banks who are offering mortgages as they can sell on the risk to other investors. This means banks have more appetite to issue more mortgages, meaning home ownership is more accessible for the working class.
3. MBS offer historically better returns than US treasuries (of course with some added risk) and can act as a good security to help diversify an investment portfolio as it has a low correlation with other asset classes.

Roles of MBS in Global Financial Crisis

Subprime mortgages were being issued to borrowed with low credit ratings and these were subsequently being securitized into MBS'. This had the effect of hiding the risks of the original mortgages as they were all pooled together. Credit rating agencies were also rating these mortgages highly, further concealing the risks involved. As mortgage rates started to rise, some borrowers inevitably began to default and the MBS' that these mortgages formed the base of became highly overvalued. Losses started to mount as investors and institutions could not offload their MBS', meaning they had less money to invest/lend and credit tightened, causing the economy to lurch towards collapse.

MBS were not beneficial in Global Financial Crisis

There are a number of reasons why the benefits of MBS' did not manifest themselves during the GFC:

1. Risks were hidden and misrepresented. Credit agencies were incentivized to give higher ratings and thus making MBS' appear safer than they actually were.
2. Government encouraged banks to lend to people with poor credit ratings, hence making the foundations of the MBS' inherently riskier.
3. The rise of interest only mortgages, encouraged even more subprime borrowers to take out mortgages. Initial rates to attract new borrowers were low and often reset to higher rates a couple of years into the mortgages, making defaults even more likely to occur. The combination of all these factors only became apparent when defaults started to occur and by that time it was too late.

Tranches in Mortgage-backed Securities

Tranches are a tool for internal credit enhancement. It allows us to separate investors into different levels of senior and subordinate classes based on their investment and risk exposure. The idea here is that any lower class will function as credit protection for classes above it in case of default. That is, if there is default then it will first affect the lowest class followed by the one above it and so on till the highest class. This manner of distributing losses is called 'sequential distribution of losses'

Simplest example: Senior Tranche > Junior (Mezzanine) Tranche > Equity Tranche
In the other words, when going to deeper in class level, the risk level increases and the return level decreases.
We will analyze advantages and disadvantages of each class level of tranches.

1. Senior tranche

Advantage
The safest tranche as it is the first to receive cash flow [lowest credit risk- would only lose money if all the tranches below it have already lost all their investment]
Disadvantage
Lowest interest rate among all tranches [low rate of return]

2. Junior (Mezzanine) tranche

Advantage
Higher interest rate than senior tranche [paid after senior tranche but before equity tranche]
Disadvantage
Lesser safety than Senior tranche [it'll absorb loss after equity but before Senior tranche]

3. Equity tranche

Advantage
Offers highest rate
Disadvantage
Ranks last in terms of cash flow distribution priority [receives whatever is left after fulfilling the payment requirement of all tranches above Equity tranche less management fee]
It's also first tranche to absorb any loss.

Degree of default Correlation for Senior and Equity tranches

Low default correlation (close to 0).

It means that one individual's default is rarely accompanied other cases of default. i.e. all people don't default together at the same time. In this case, whatever few defaults occur at a given time they mostly effect lower level tranches, so, senior tranches are a relatively safe investment while lower tranches are relatively risky investment. Among the lower tier tranches, the equity tranche is most risk prone as it is the lowest tranche and it will always be relatively riskiest.

High default correlation (close to 1).

It means that one individual's default is accompanied many other cases of default. i.e. majority of people default together at the same time. In this case, if defaults occur then many will occur at the same time leading to all tranches losing money starting from lowest tranche and the

highest tranche which loses money depends on the degree of correlation and the overall size of default. If correlation is close to 1 then almost all borrowers will default at the same time leading to all tranches being risky investment
The table below summarize the degree default correlation for Senior and Equity tranches

Degree of Default correlation	Senior	Equity
Low(near 0)	Safe	Risky
High(near 1)	Risky	Risky

As mentioned before, several actions have been taken to address these issues of GFC. One key regulation put in place to minimize the systemic risks was the Dodd-Frank Wall Street Reform and Consumer Protection Act which is discussed in detail in next sections.

Dodd-Frank Act

Overview, Context and Intended Impact

Dodd-Frank Act came into being in 2010 under Obama's administration (Direct-Domestic-Governmental regulation. The wide spread impact of this act can be attributed to strong linkages effect between financial market and other industries (industry specific regulation-financial sector indirectly affects other sectors). This regulation is a combination of prudential regulation, Regulation of financial market and Regulation of investment product.
A few specific implications of this reform are as follows:

a. The Financial Stability Oversight Council (FSOC) was formed to administer systemic risk at national level. It regulated high profile firms more heavily, for example, more requirements in capital and liquidity, stress tests, leverage limits, etc. Financial institutions were further asked to prepare sparse money to be used in case of panic, to reduce the dependency on tax-payer' money. The basic idea is to prevent firms from "too big to fail". [Regulation of Financial Markets]
b. Volcker rules were composed to limit banks from taking too much risk with their depositors, minimize banks from investing in hedge funds and private equity, as well as complex derivative instruments like swaps. [Prudential Regulation]
c. Central Clearing houses and regulation of complex OTC derivatives trading was made more transparent. [Regulation of Investment Products]
d. Bureau of Consumer Financial Protection was established to protect individual consumers. This bureau has a broad area of jurisdiction involving financial unions ranging from banks to payday lenders and other financial institutions.
e. SEC's Office of Credit Rating was formed to monitor credit rating agencies.
f. Federal assistance to individual institutions was limited, even in emergency cases.

Above regulations are not only to help with current crisis but also aims to act (not react) as a guide in order to prevent future crisis.

Observed Impact and Comparison with intended target

Basically, all systems have flaws. So, maybe the reform has intended impact but there are also other unforeseeable impacts which can only be observed post implementation. Here are some of such impacts/downsides of this regulation itself or due to its functioning:

a. Volcker rule ended up reducing the liquidity of the markets due to the new capital constraints. As banks had to shrink their proprietary trading business, they also had to cut back on others, leading to more involve in shadow banking activities, which are much less regulated. This goes against the initial intention of the rule to stabilize markets and protect consumers. As Banks had to maintain higher ratio of cash in their assets, the ability to invest in market securities was decreased. It, in turn, affected the role as bond market-maker of these entities, hence sellers facing more difficulties when seeking for potential buyers in bond markets, thus worsened their liquidity.
b. Reserve and Capital related impositions on financial institutions were redundant as most financial institutes already used various risk mitigation techniques and maintained plenty of reserves as any issue with respect to their performance and credibility can have widespread impact on themselves and the whole market.
c. Regulatory Capture was crucial issue due to the degree of independence given to these agencies and regulatory authorities. Initially, these bodies were aimed at forming standards to avoid another crisis and to aide consumers whereas they later ended up crafting certain industry/group favoring regulations due to external influence.

Behavioral aspect and GFC

For this section we'll discuss the following behavioral aspects which led to GFC:

1. **Negligence/carelessness** – Banks and investors did not consider the effect that counterparty credit risk could have on derivatives they were trading and traded under the assumption that banks who were "too big to fail" would never default on their obligations.
2. **Bad Assumptions** – Generally believe that house prices would not crash nationwide, leading to underwriters and investors to consider a geographically varied real estate portfolio to have little risk.
3. **Ignorance** – Investors buying MBS' believed that they were investing in a low-risk product without scrutinizing/analyzing it themselves.
4. **Greed** – Homeowners wanted to get rich by profiting off real estate. Mortgage lenders were eager to increase the volumes of mortgages. Banks were paid hefty fees and commission to securitize subprime mortgages. Rating agencies were incentivized to class subprime mortgages as investment grade, as they were paid by banks to issue ratings. Politicians attempted to gain popularity by heavily incentivizing banks to lend to borrowers with poor credit worthiness.

5. **Fraud** – Banks often knew the risks that their securitized products carried but hid them from investors with the aim of securing more profit.

Even though we may believe that ethical training may curb aforementioned aspects of our behavior but it still can't purge them altogether. Except the common people who invest, most of banks' executives and politicians would have been extremely intelligent, well educated people who likely would have had some sort of ethics classes during their education. In the end human nature always dominates so no amount of ethics can purge the greed born in the moment of opportunity.

Regulation Impact and GFC blame

Dodd Frank regulation has helped deter companies from the certain actions that led to the crisis:

a. Oversees credit agencies and asks them to submit process and procedures, this stops them from inaccurately overrating the credit worthiness of certain institutions/securities as they did in the run up to the GFC.
b. Using Volcker rule banks were stopped from taking on too much risk with their depositor's money, helping keep depositors money safe and preventing bank runs like those that occurred at Bear Stearns in the lead up to the GFC

The issues that led to the GFC cannot be blamed on one single person/institution but instead are part of the systemic risk that existed in the market at the time:

a. Inadequate capital requirements for banks/large insurers such as Lehman Brothers/AIG meant that when any large institution started to lose money, they did not have enough reserves to come out the other end in one piece.
b. Counterparty risk that existed in the market was not accounted for. Investors believed that derivatives traded with large institutions were credit risk free and when it turned out they were not this risk led to many banks sustaining large losses as trades had to be unwound

Conclusion

Although there were many causes that could be linked to the GFC, we have identified deregulation, lack of transparency in exotic securities and the enablement of institutions to grow so large that their failure shakes the whole global markets as some of the primary causes for the GFC. We have also identified the main systemic risks inherent to housing market that allowed such a collapse to occur and how the response from policymakers and regulators helped minimize the repercussions and mitigate these risks to prevent such a crisis from occurring again. We further discussed Dodd Frank act in its detail (intended impact and actual impact) followed by analysis from behavioral and ethical aspect in GFC.

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