CHAPTER - II
Contents

CAUSES OF SUBPRIME CRISIS .............................................................................1
The subprime crisis of 2007-2008 .....................................................................1
Rates of both banks and homeowners have been low .....................................6
Initial signals ......................................................................................................6
Formation of the Housing Bubble .....................................................................7
Sub Prime Lending Expanded Significantly between 2004-06 .......................8
The Crisis ...........................................................................................................11
Ten essential causes of the financial and economic crisis .............................13
I. Credit bubble .................................................................................................13
  1. The credit bubble: .......................................................................................17
The housing bubble ..........................................................................................20
Turning bad mortgages into toxic financial assets .........................................26
Other causes for the Financial Crisis ...............................................................32
Credit Rating Agencies (CRAs): ....................................................................42
Role of other entities in the financial crisis .....................................................45
Subprime crisis vis-a-vis The Great Depression: ..........................................49
The evolution of the US banking system before the crisis ............................53
List of Figures

Figure 1: FED Fund Rate & Mortgage Rates 2001-2008 ..................................2
Figure 2: Bank Borrowing and Mortgage Interest Rates ..........................6
Figure 3: Housing Bubble Formation .........................................................7
Figure 4: Sub Prime Lending Expansion .......................................................8
Figure 5: US Properties with Foreclosure Activities .................................9
Figure 6: A History of Home Values ..........................................................26
Figure 7: US Existing Home Sales, Inventory and Months Supply ..........27
Figure 8: Diagrammatic Presentation of, how the Rated Assets got Created Out of Sub Prime Mortgages .......................................................31
Figure 9: Sub-prime Crisis Cycle ...............................................................35
Figure 10: United States: Great Depression Vs Recent Crisis ...............51
Figure 11: US GDP Growth since 1930s ....................................................52
Figure 12: Number of Bank Failures in U.S ..............................................67
CAUSES OF SUBPRIME CRISIS

The subprime crisis of 2007-2008
The proximate cause of the financial turbulence in 2007-2008 is attributed to the subprime mortgage sector in the United States of America. The seeds of the subprime crisis were sown early in the new century with USA’s central bank, the Federal Reserve, cutting the prevailing interest rates. Following the dotcom bubble burst in the USA around the turn of the decade, monetary policy in the USA and other advanced economies was eased aggressively. The USA witnessed two other major events which further pulled down the interest rates in the country. Russia defaulted on part of its national debt in August 1998, panicking markets. Russia announced it would restructure its debt and postpone some payments. In the aftermath, investors dumped higher-risk securities, including those having nothing to do with Russia, and fled to the safety of USA’s Treasury bills and Federal Deposit Insurance Corporation’s (FDIC) -insured deposits. In response, the Federal Reserve cut short-term interest rates three times in seven weeks. Secondly, a slowdown in the US economy in 2000 pushed Federal Reserve to cut the interest rates further. In 2001, the Federal Reserve cut interest rates for 11 times to 1.75 per cent, the lowest in 40 years. In response to growing concerns regarding market stability, the Federal Reserve established:

(i) the Term Auction facility for cash loans to commercial banks,

(ii) the Term Securities Lending Facility for loans of Treasury securities to securities dealers, and

(iii) the Primary Dealer Credit Facility for cash loans to securities dealers.
The Federal Reserve continued to keep the interest rates low for an extended time period in order to revive demand and boost economy. The mortgage rates fell too owing to this. Thus, home refinancing surged, climbing from USD 460 billion in 2000 to USD 2.8 trillion in 2003. Policy rates in the USA reached one per cent in June 2003 and were held around these levels for up to June 2004. During 2003, the strongest US companies could borrow for 90 days in the commercial paper market at an average 1.1 per cent, compared with 6.3 per cent just three years earlier; rates on three-month Treasury bills dropped below 1 per cent in mid-2003 from 6 per cent in 2000. By 2003, creditworthy home buyers could get fixed-rate mortgages for 5.2 per cent, which was three percentage points lower than three years earlier. The savings were immediate and large. For a home bought at the median price of USD 1,80,000 with a 20 per cent down payment, the monthly mortgage payment
would be USD 286 less than that in the year 2000. Or to turn the perspective around—as many people did—for the same monthly payment of USD 1,077, a homeowner could move up from a house worth USD 1,80,000 to USD 2,45,000.

The demand for houses rose on the back of low interest rates. People started buying second homes. The average size of houses also rose during this period. Lower interest rates and broader access to credit were available for other types of borrowing, too, such as credit cards and auto loans. Increased access to credit meant a more stable, secure life for those who managed their finances prudently. It meant families could borrow during temporary income drops, pay for unexpected expenses, or buy major appliances and cars. It allowed other families to borrow and spend beyond their means. Most of all, it meant a shot at homeownership, with all its benefits; and for some, an opportunity to speculate in the real estate market.

The prime borrowers were not the only ones who wanted to take advantage of the historically low interest rates. The subprime or non-prime borrowers also joined the bandwagon. (Subprime borrower is a person who is considered a higher-than-normal credit risk. Subprime borrowers typically have a below-average credit history and are penalized for their poor credit with higher interest rates). In the past, lenders avoided making unsound loans because they would be stuck with them in their loan portfolios. However, this problem was now taken care of by ‘securitization’. (Securitization is the financial practice of pooling various types of contractual debt such as residential mortgages, commercial mortgages, auto loans or credit card debt obligations and selling said debt as bonds, pass-through securities or collateralized mortgage obligations (CMOs) or collateralized debt obligations (CDOs), to various investors). With the growth of securitization, it
wasn't even clear anymore who the lender was. The mortgages would be packaged, sliced, repackaged, insured, and sold as incomprehensibly complicated debt securities to an assortment of hungry investors. Now even the worst loans could find a buyer.

The quality of loans/mortgages started to deteriorate. Mortgage-lending standards were falling. Financial institutions and credit rating agencies embraced mathematical models as reliable predictors of risks, replacing judgment in too many instances. Too often, risk management became risk justification. The heavy debt taken on by some financial institutions was exacerbated by the risky assets they were acquiring with that debt. As the mortgage and real estate markets churned out riskier and riskier loans and securities, many financial institutions loaded up on them. By the end of 2007, Lehman Brothers had amassed USD 111 billion in commercial and residential real estate holdings and securities, which was almost twice what it held just two years before, and more than four times its total equity. And again, the risk wasn’t being taken on just by the big financial firms, but by families, too. Nearly one in 10 mortgage borrowers in 2005 and 2006 took out “option ARM (adjustable rate mortgages)” loans, which meant they could choose to make payments so low that their mortgage balances rose every month.

Over-the-counter (OTC) derivatives played a vital role in the march towards the financial crisis. The enactment of legislation in the year 2000 banned the regulation of OTC derivatives by both the federal and state governments. Credit default swaps (CDS)—fueled the mortgage securitization pipeline. CDS were sold to investors to protect against the default or decline in value of mortgage-related securities backed by risky loans. Companies sold protection—to the tune of USD 79 billion, in AIG’s case—to investors in these newfangled mortgage securities, helping to
launch and expand the market and, in turn, to further fuel the housing bubble. CDS were essential to the creation of synthetic CDOs. These synthetic CDOs were merely bets on the performance of real mortgage-related securities. They amplified the losses from the collapse of the housing bubble by allowing multiple bets on the same securities and helped spread them throughout the financial system. Goldman Sachs alone packaged and sold USD 73 billion in synthetic CDOs from July 1, 2004, to May 31, 2007.

Within the financial system, the dangers of this debt were magnified because transparency was not required or desired. Massive short-term borrowings, combined with obligations unseen by others in the market, heightened the chances the system could rapidly unravel. The economy was, thus, witnessing an untrammeled growth in risky mortgages. Unsustainable, toxic loans polluted the financial system and fueled the housing bubble. Subprime lending was supported in significant ways by major financial institutions. Some firms, such as Citigroup, Lehman Brothers, and Morgan Stanley, acquired subprime lenders. In addition, major financial institutions facilitated the growth in subprime mortgage-lending companies with lines of credit, securitization, purchase guarantees and other mechanisms. Regulators failed to rein in risky home mortgage lending. In particular, the Federal Reserve failed to meet its statutory obligation to establish and maintain prudent mortgage lending standards and to protect against predatory lending. A combination of all these factors paved way for the crisis which engulfed not only USA but the whole world.
Rates of both banks and homeowners have been low

![Graph showing 30-year conventional mortgage rate and Effective federal funds rate from 1975 to 2010.](source)

*Source: Federal Reserve Bank of St. Louis, Federal Reserve Economic Database*

**Figure 2: Bank Borrowing and Mortgage Interest Rates**

**Initial signals**

Nonprime lending continued to rise on the back of low interest rates and aggressive support from mortgage originators. It surged to USD 730 billion in 2004 and then USD one trillion in 2005, and its impact began to be felt in more and more places. Many of those loans were funneled into the pipeline by mortgage brokers—the link between borrowers and the lenders who financed the mortgages—who prepared the paperwork for loans and earned fees from lenders for doing it. More than 2,000,000 new mortgage brokers began their jobs during the boom, and some were less than honorable in their dealings with borrowers.
Formation of the Housing Bubble

While the Bubble was under formation, in the meantime, real estate rates kept on rising at a steady pace. Soon nontraditional mortgages were crowding other kinds of products out of the market in many parts of the country. More mortgage borrowers nationwide took out interest-only loans, and the trend was catching up fast with all types of borrowers. Because of their easy credit terms, nontraditional loans enabled borrowers to buy more expensive homes and ratchet up the prices in bidding wars. The loans were riskier too. Thus, the securitization machine began to
guzzle these once-rare mortgage products with their strange-sounding names: Alt-A, subprime, I-O (interest-only), low-doc, no-doc, or ninja (no income, no job, no assets) loans; 2-28s and 3–27s; liar loans; piggyback second mortgages; payment-option or pick-a-pay adjustable rate mortgages. New variants on adjustable-rate mortgages, called “exploding” ARMs, featured low monthly costs at first, but payments could suddenly double or triple, if borrowers were unable to refinance.

Sub Prime Lending Expanded Significantly between 2004-06

This, however, did not deter either the borrowers or the mortgage originators from their ambitions. In 2006, USD 600 billion of subprime loans were originated, most of which were securitized. That year, subprime lending accounted for 23.5 per cent
of all mortgage originations. Household debt rose from 80 per cent of disposable personal income in 1993 to almost 130 per cent by mid-2006. More than three-quarters of this increase was mortgage debt. Part of the increase was from new home purchases, part from new debt on older homes.

The large financial institutions also started increasing their hold in the subprime market. Lehman Brothers, the fourth-largest investment bank, purchased six different domestic lenders between 1998 and 2004, including BNC and Aurora. Bear Stearns, the fifth-largest, ramped up its subprime lending arm and eventually acquired three subprime originators in the United States, including Encore. In 2006, Merrill Lynch acquired First Franklin, and Morgan Stanley bought Saxon Capital; in 2007, Goldman Sachs upped its stake in Senderra Funding, a small subprime lender.

![Figure 5: US Properties with Foreclosure Activities](source)

With increase in disbursement of risky loans and as home prices shot up in much of the country, many observers began to wonder if the country was witnessing a
housing bubble. Also, a pattern of higher foreclosure rates frequently appeared soon after. The percentage of borrowers who defaulted on their mortgages within just a matter of months after taking a loan nearly doubled from the summer of 2006 to late 2007. Thus, the changes in the financial system were not going unnoticed. Alarm bells were clanging inside financial institutions, regulatory offices, consumer service organizations, state law enforcement agencies, and corporations throughout America, as well as in neighborhoods across the country. Many knowledgeable executives saw trouble and managed to avoid the train wreck. While countless Americans joined in the financial euphoria that seized the nation, many others were shouting to government officials in Washington and within state legislatures, pointing to what would become a human disaster, not just an economic debacle.

Meanwhile, the number of cases of reported mortgage fraud continued to swell. Suspicious activity reports, also known as SARs, are reports filed by banks to the Financial Crimes Enforcement Network (FinCEN), a bureau within the Treasury Department. In November 2006, the network published an analysis that found a 20-fold increase in mortgage fraud reports between 1996 and 2005. In 2005, news reports were beginning to highlight indications that the real estate market was weakening. Home sales began to drop, and Fitch Ratings reported signs that mortgage delinquencies were rising.

Despite all the signs that the housing market was slowing, Wall Street just kept going and going—ordering up loans, packaging them into securities, making profits, earning bonuses. By the third quarter of 2006, home prices were falling and mortgage delinquencies were rising, a combination that spelled trouble for mortgage-backed securities. Even then, from the third quarter of 2006 on, banks
created and sold some USD 1.3 trillion in mortgage-backed securities and more than USD 350 billion in mortgage related CDOs.

**The Crisis**

The stage was set for a crisis. The total value of mortgage backed securities issued between 2001 and 2006 reached USD 13.4 trillion. There was a mountain of problematic securities, debt, and derivatives resting on real estate assets that were far less secure than they were thought to have been. In early 2007, it became obvious that home prices were falling in regions that had once boomed, that mortgage originators were floundering, and that more and more families, especially those with subprime and Alt-A loans, would be unable to make their mortgage payments. A few of the many questions now in front of everyone were: How the housing crisis would affect the financial system that had helped inflate the bubble? Were all those mortgage-backed securities and collateralized debt obligations ticking time bombs on the balance sheets of the world's largest financial institutions?

As 2007 went on, increasing mortgage delinquencies and defaults compelled the ratings agencies to downgrade first mortgage-backed securities, then CDOs. Alarmed investors sent prices plummeting. Hedge funds faced with margin calls from their repo lenders were forced to sell at distressed prices; many would shut down. Banks wrote down the value of their holdings by tens of billions of dollars.

The summer of 2007 also saw a near halt in many securitization markets, including the market for non-agency mortgage securitizations. For example, a total of USD 75 billion in subprime securitizations were issued in the second quarter of 2007
(already down from prior quarters). That figure dropped precipitously to USD 27 billion in the third quarter and to only USD 12 billion in the fourth quarter of 2007. Alt-A issuance topped USD 100 billion in the second quarter, but fell to USD 13 billion in the fourth quarter of 2007. Once-booming markets were now gone—only USD 4 billion in subprime or Alt- A mortgage-backed securities were issued in the first half of 2008, and almost none after that.

CDOs followed suit. From a high of more than USD 90 billion in the first quarter of 2007, worldwide issuance of CDOs with mortgage-backed securities as collateral plummeted to USD 29 billion in the third quarter of 2007 and only USD 5 billion in the fourth quarter. And as the CDO market ground to a halt, investors no longer trusted other structured products. Over USD 80 billion of collateralized loan obligations (CLOs), or securitized leveraged loans, were issued in 2007; only USD 10 billion were issued in 2008. The issuance of commercial real estate mortgage–backed securities plummeted from USD 232 billion in 2007 to USD 12 billion in 2008.

Those securitization markets that held up during the turmoil in 2007 eventually suffered in 2008 as the crisis deepened. Securitization of auto loans, credit cards, small business loans, and equipment leases all nearly ceased in the third and fourth quarters of 2008.

By the end of 2007, most of the subprime lenders had failed or been acquired, including New Century Financial, Ameriquest, and American Home Mortgage. In January 2008, Bank of America announced it would acquire the ailing lender Countrywide. It soon became clear that risk—rather than being diversified across the financial system, as had been thought—was concentrated at the largest
financial firms. Bear Stearns, laden with risky mortgage assets and dependent on fickle short term lending, was bought by JP Morgan with government assistance in the spring. Before the summer was over, Fannie Mae and Freddie Mac were put into conservatorship. Then, in September 2008, Lehman Brothers failed and the remaining investment banks, Merrill Lynch, Goldman Sachs, and Morgan Stanley, struggled as they lost the market’s confidence. AIG, with its massive credit default swap portfolio and exposure to the subprime mortgage market, was rescued by the government. Finally, many commercial banks and thrifts, which had their own exposures to declining mortgage assets and their own exposures to short-term credit markets, teetered. IndyMac had already failed over the summer; in September, Washington Mutual became the largest bank failure in US history. In October, Wachovia struck a deal to be acquired by Wells Fargo. Citigroup and Bank of America fought to stay afloat. Before it was over, taxpayers had committed trillions of dollars through more than two dozen extraordinary programmes to stabilize the financial system and to prop up the nation’s largest financial institutions.

Ten essential causes of the financial and economic crisis

The following ten causes are essential to explain the financial and economic crisis.

I. Credit bubble

Starting in the late 1990s, China, other large developing countries, and the big oil producing nations built up large capital surpluses. They loaned these savings to the United States and Europe, causing interest rates to fall. Credit spreads narrowed, meaning that the cost of borrowing to finance risky investments declined. A credit bubble formed in the United States and Europe, the most notable manifestation of
which was increased investment in high-risk mortgages. U.S. monetary policy may have contributed to the credit bubble but did not cause it.

II. Housing bubble

Beginning in the late 1990s and accelerating in the 2000s, there was a large and sustained housing bubble in the United States. The bubble was characterized both by national increases in house prices well above the historical trend and by rapid regional boom-and-bust cycles in California, Nevada, Arizona, and Florida. Many factors contributed to the housing bubble, the bursting of which created enormous losses for homeowners and investors.

III. Nontraditional mortgages

Tightening credit spreads, overly optimistic assumptions about U.S. housing prices, and flaws in primary and secondary mortgage markets led to poor origination practices and combined to increase the flow of credit to U.S. housing finance. Fueled by cheap credit, firms like Countrywide, Washington Mutual, Ameriquest, and HSBC Finance originated vast numbers of high-risk, nontraditional mortgages that were in some cases deceptive, in many cases confusing, and often beyond borrowers' ability to repay. At the same time, many homebuyers and homeowners did not live up to their responsibilities to understand the terms of their mortgages and to make prudent financial decisions. These factors further amplified the housing bubble.

IV. Credit ratings and securitization

Failures in credit rating and securitization transformed bad mortgages into toxic financial assets. Securitizers lowered the credit quality of the mortgages they
securitized. Credit rating agencies erroneously rated mortgage-backed securities and their derivatives as safe investments. Buyers failed to look behind the credit ratings and do their own due diligence. These factors fueled the creation of more bad mortgages.

V. Financial institutions concentrated correlated risk
Managers of many large and midsize financial institutions in the United States amassed enormous concentrations of highly correlated housing risk. Some did this knowingly by betting on rising housing prices, while others paid insufficient attention to the potential risk of carrying large amounts of housing risk on their balance sheets. This enabled large but seemingly manageable mortgage losses to precipitate the collapse of large financial institutions.

VI. Leverage and liquidity risk
Managers of these financial firms amplified this concentrated housing risk by holding too little capital relative to the risks they were carrying on their balance sheets. Many placed their firms on a hair trigger by relying heavily on short-term financing in repo and commercial paper markets for their day-to-day liquidity. They placed solvency bets (sometimes unknowingly) that their housing investments were solid, and liquidity bets that overnight money would always be available. Both turned out to be bad bets. In several cases, failed solvency bets triggered liquidity crisis, causing some of the largest financial firms to fail or nearly fail. Firms were insufficiently transparent about their housing risk, creating uncertainty in markets that made it difficult for some to access additional capital and liquidity when needed.
VII. Risk of contagion
The risk of contagion was an essential cause of the crisis. In some cases, the financial system was vulnerable because policymakers were afraid of a large firm’s sudden and disorderly failure triggering balance sheet losses in its counterparties. These institutions were deemed too big and interconnected to other firms through counterparty credit risk for policymakers to be willing to allow them to fail suddenly.

VIII. Common shock
In other cases, unrelated financial institutions failed because of a common shock: they made similar failed bets on housing. Unconnected financial firms failed for the same reason and at roughly the same time because they had the same problem: large housing losses. This common shock meant that the problem was broader than single failed bank–key large financial institutions were undercapitalized because of this common shock.

IX. Financial shock and panic
In quick succession in September 2008, the failures, near-failures, and restructurings of ten firms triggered a global financial panic. Confidence and trust in the financial system began to evaporate as the health of almost every large and midsize financial institution in the United States and Europe was questioned.

X. Financial crisis causes economic crisis
The financial shock and panic caused a severe contraction in the real economy. The shock and panic ended in early 2009. Harm to the real economy continues through today.
Some of the causes mentioned above have been explained in detail below:

1. The credit bubble:

The financial and economic crisis began with a credit bubble in the United States and Europe. Credit spreads narrowed significantly, meaning that the cost of borrowing to finance risky investments declined relative to safe assets such as US Treasury securities. The most notable of these risky investments were high-risk mortgages. The US housing bubble was the most visible effect of the credit bubble but not the only one. Commercial real estate, high-yield debt, and leveraged loans were all boosted by the surplus of inexpensive credit. There are three major possible explanations for the credit bubble: global capital flows, the repricing of risk, and monetary policy.

Global capital flows

Starting in the late 1990s, China, other large developing countries, and the big oil producing nations consumed and invested domestically less than they earned. As China and other Asian economies grew, their savings grew as well. In addition, boosted by high global oil prices, the largest oil-producing nations built up large capital surpluses and looked to invest in the United States and Europe. Massive amounts of inexpensive capital flowed into the United States, making borrowing inexpensive. Americans used the cheap credit to make riskier investments than in the past. The same dynamic was at work in Europe. Germany saved, and its capital flowed to Ireland, Italy, Spain and Portugal. Global imbalances are an essential cause of the crisis and the most important macroeconomic explanation. Steady and
large increases in capital inflows into the US and European economies encouraged significant increases in domestic lending, especially in high-risk mortgages.

**The repricing of risk**

Low-cost capital can, but does not necessarily have to, lead to an increase in risky investments. Increased capital flows to the United States and Europe cannot alone explain the credit bubble. We still don’t know whether the credit bubble was the result of rational or irrational behavior. Investors may have been rational—their preferences may have changed, making them willing to accept lower returns for high-risk investments. They may have collectively been irrational—they may have adopted a bubble mentality and assumed that, while they were paying a higher price for risky assets, they could resell them later for even more. Or they may have mistakenly assumed that the world had gotten safer and that the risk of bad outcomes (especially in U.S. housing markets) had declined. For some combination of these reasons, over a period of many years leading up to the crisis, investors grew willing to pay more for risky assets. When the housing bubble burst and the financial shock hit, investors everywhere reassessed what return they would demand for a risky investment, and therefore what price they were willing to pay for a risky asset. Credit spreads for all types of risk around the world increased suddenly and sharply, and the prices of risky assets plummeted. This was most evident in, but not limited to, the US market for financial assets backed by high-risk, nontraditional mortgages. The credit bubble burst and caused tremendous damage.
Monetary policy

The Federal Reserve significantly affects the availability and price of capital. This leads some to argue that the Fed contributed to the increased demand for risky investments by keeping interest rates too low for too long. Critics of Fed policy argue that, beginning under Chairman Greenspan and continuing under Chairman Bernanke, the Fed kept rates too low for too long and created a bubble in housing. It is argued that the Fed set interest rates too low in 2002–2006 and that these low rates fueled the housing bubble as measured by housing starts. It is suggested that this Fed-created housing bubble was the essential cause of the financial crisis. Had federal funds rates instead followed the path recommended by the Taylor Rule (a monetary policy formula for setting the funds rate), the housing boom and subsequent bust would have been much smaller. This analysis can be applied to the European economies and can be found that similar forces were at play. Chairman Bernanke, however, argues that the Taylor Rule is a descriptive rule of thumb, but that “simple policy rules” are insufficient for making monetary policy decisions. He further argues that, depending on the construction of the particular Taylor Rule, the monetary policy stance of the Fed may not have diverged significantly from its historical path. Former Chairman Greenspan adds that the connection between short-term interest rates and house prices is weak—that even if the Fed’s target for overnight lending between banks was too low, this has little power to explain why rates on thirty-year mortgages were also too low.
Conclusions:

- The credit bubble was an essential cause of the financial crisis.
- Global capital flows lowered the price of capital in the United States and much of Europe.
- Over time, investors lowered the return they required for risky investments.
- Their preferences may have changed, they may have adopted an irrational bubble mentality, or they may have mistakenly assumed that the world had become safer. This inflated prices for risky assets.
- US monetary policy may have contributed to the credit bubble but did not cause it.

The housing bubble

The housing bubble had two components: the actual homes and the mortgages that financed them. We look briefly at each component and its possible causes. There was a housing bubble in the United States—the price of US housing increased by more than could be explained by market developments. This included both a national housing bubble and more concentrated regional bubbles in four “Sand States”: California, Nevada, Arizona, and Florida. Conventional wisdom is that a bubble is hard to spot while you’re in one, and painfully obvious after it has burst. Even after the U.S. housing bubble burst, there is no consensus on what caused it. While we still don’t know the relative importance of the possible causes of the housing bubble, we can at least identify some of the most important hypotheses:
Population growth

Arizona, Florida, Nevada, and parts of California all experienced population growth that far exceeded the national average. More people fueled more demand for houses.

Land use restrictions

In some areas, local zoning rules and other land use restrictions, as well as natural barriers to building, made it hard to build new houses to meet increased demand resulting from population growth. When supply is constrained and demand increases, prices go up.

Over-optimism

Even absent market fundamentals driving up prices and shared expectations of future price increases can generate booms. This is the classic explanation of a bubble.

Easy financing

Nontraditional (and higher risk) mortgages made it easier for potential homebuyers to borrow enough to buy more expensive homes. This does not mean they could afford those homes or future mortgage payments in the long run, but only that someone was willing to provide the initial loan. Mortgage originators often had insufficient incentive to encourage borrowers to get sustainable mortgages. Some combination of the first two factors may apply in parts of the Sand States, but these
don't explain the nationwide increase in prices. The closely related and nationwide mortgage bubble was the largest and most significant manifestation of a more generalized credit bubble in the United States and Europe. Mortgage rates were low relative to the risk of losses, and risky borrowers, who in the past would have been turned down, found it possible to obtain a mortgage. In addition to the credit bubble, the proliferation of nontraditional mortgage products was a key cause of this surge in mortgage lending. Use of these products increased rapidly from the early part of the decade through 2006. There was a steady deterioration in mortgage underwriting standards (enabled by securitizers that lowered the credit quality of the mortgages they would accept, and credit rating agencies that overrated the subsequent securities and derivatives). There was a contemporaneous increase in mortgages that required little to no documentation.

As house prices rose, declining affordability would normally have constrained demand, but lenders and borrowers increasingly relied on nontraditional mortgage products to paper over this affordability issue. These mortgage products included interest-only adjustable rate mortgages (ARMs), pay-option ARMs that gave borrowers flexibility on the size of early monthly payments, and negative amortization products in which the initial payment did not even cover interest costs. These exotic mortgage products would often result in significant reductions in the initial monthly payment compared with even a standard ARM. Not surprisingly, they were the mortgages of choice for many lenders and borrowers focused on minimizing initial monthly payments.

At some point, both lenders and borrowers became convinced that house prices would only go up. Borrowers chose, and were extended, mortgages that they could not be expected to service in the longer term. They were provided these loans on
the expectation that accumulating home equity would soon allow refinancing into more sustainable mortgages. For a time, rising house prices became a self-fulfilling prophecy, but ultimately, further appreciation could not be sustained and house prices collapsed. This posits a relationship between the surge in housing prices and the surge in mortgage lending. There is not yet a consensus on which was the cause and which the effect. They appear to have been mutually reinforcing. In understanding the growth of nontraditional mortgages, it is also difficult to determine the relative importance of causal factors, but again we can at least list those that are important: Nonbank mortgage lenders like New Century and Ameriquest flourished under ineffective regulatory regimes, especially at the state level. Weak disclosure standards and underwriting rules made it easy for irresponsible lenders to issue mortgages that would probably never be repaid. Federally regulated bank and thrift lenders, such as Countrywide, Wachovia, and Washington Mutual, had lenient regulatory oversight on mortgage origination as well.

- Mortgage brokers were paid for new originations but did not ultimately bear the losses on poorly performing mortgages. Mortgage brokers therefore had an incentive to ignore negative information about borrowers.

- Many borrowers neither understood the terms of their mortgage nor appreciated the risk that home values could fall significantly, while others borrowed too much and bought bigger houses than they could ever reasonably expect to afford.

- All these factors were supplemented by government policies, many of which had been in effect for decades that subsidized homeownership but created
hidden costs to taxpayers and the economy. Elected officials of both parties pushed housing subsidies too far.

Excruciating anecdotes showed that mortgage fraud increased substantially during the housing bubble. There is no question that this fraud did tremendous harm. But while that fraud is infuriating and may have been significant in certain areas (like Florida), it was unable to measure the impact of fraud relative to the overall housing bubble. The explosion of legal but questionable lending is an easier explanation for the creation of so many bad mortgages. Lending standards were lax enough that lenders could remain within the law but still generate huge volumes of bad mortgages. It is likely that the housing bubble and the crisis would have occurred even if there had been no mortgage fraud. We therefore classify mortgage fraud not as an essential cause of the crisis but as a contributing factor and a deplorable effect of the bubble. Even if the number of fraudulent loans was not substantial enough to have a large impact on the bubble, the increase in fraudulent activity should have been a leading indicator of deeper structural problems in the market.

Conclusions:

Beginning in the late 1990s and accelerating in the 2000s, there was a large and sustained housing bubble in the United States. The bubble was characterized both by national increases in house prices well above the historical trend and by more rapid regional boom-and-bust cycles in California, Nevada, Arizona, and Florida.
• There was also a contemporaneous mortgage bubble, caused primarily by the broader credit bubble.

• The causes of the housing bubble are still poorly understood. Explanations include population growth, land use restrictions, bubble psychology, and easy financing.

• The causes of the mortgage bubble and its relationship to the housing bubble are also still poorly understood. Important factors include weak disclosure standards and underwriting rules for bank and nonbank mortgage lenders alike, the way in which mortgage brokers were compensated, borrowers who bought too much house and didn’t understand or ignored the terms of their mortgages, and elected officials who over years piled on layer upon layer of government housing subsidies.

• Mortgage fraud increased substantially, but the evidence gathered did not show that it was quantitatively significant enough to conclude that it was an essential cause.
A History of Home Values

The Yale economist Robert J. Shiller created an index of American housing prices going back to 1890. It is based on sale prices of standard existing houses, not new construction, to track the value of housing as an investment over time. It presents housing values in consistent terms over 116 years, factoring out the effects of inflation. The 1890 benchmark is 100 on the chart. If a standard house sold in 1890 for $100,000 (inflation-adjusted to today's dollars), an equivalent standard house would have sold for $66,000 in 1920 (66 on the index scale) and $199,000 in 2006 (199 on the index scale, or 99 percent higher than 1890).

DECLINE AND RUN-UP Prices dropped as mass production techniques appeared early in the 20th century. Prices spiked with post-war housing demand.

BOOM TIMES Two gains in recent decades were followed by returns to levels consistent since the late 1950's. Since 1997, the index has risen about 83 percent.

Turning bad mortgages into toxic financial assets

The mortgage securitization process turned mortgages into mortgage-backed securities through the government-sponsored enterprises (GSEs) Fannie Mae and Freddie Mac, as well as Countrywide and other “private label” competitors. The securitization process allows capital to flow from investors to homebuyers. Without it, mortgage lending would be limited to banks and other portfolio lenders, supported by traditional funding sources such as deposits. Securitization allows homeowners access to enormous amounts of additional funding and thereby makes
homeownership more affordable. It also can diversify housing risk among different types of lenders. If everything else is working properly, these are good things. Everything else was not working properly.

Meanwhile the Existing Home Sales to Inventory had substantially grown up

Some focus their criticism on the form of these financial instruments. For example, financial instruments called collateralized debt obligations (CDOs) were engineered from different bundled payment streams from mortgage-backed securities. Some argue that the conversion of a bundle of simple mortgages to a mortgage backed security, and then to a collateralized debt obligation, was a problem. They argue that complex financial derivatives caused the crisis. We conclude that the details of this engineering are incidental to understanding the essential causes of the crisis. If the system works properly, reconfiguring streams of mortgage payments has little effect. The total amount of risk in a mortgage is
unchanged if the pieces are put together in a different way. Unfortunately, the system did not work as it should have. There were several flaws in the securitization and collateralization process that made things worse.

Fannie Mae and Freddie Mac, as well as Countrywide and other private label competitors, all lowered the credit quality standards of the mortgages they securitized. A mortgage-backed security was therefore “worse” during the crisis than in preceding years because the underlying mortgages were generally of poorer quality. This turned a bad mortgage into a worse security.

- Mortgage originators took advantage of these lower credit quality securitization standards and the easy flow of credit to relax the underwriting discipline in the loans they issued. As long as they could resell a mortgage to the secondary market, they did not care about its quality. The increasing complexity of housing-related assets and the many steps between the borrower and final investor increased the importance of credit rating agencies and made independent risk assessment by investors more difficult. In this respect, complexity did contribute to the problem, but the other problems listed here are more important.

- Credit rating agencies assigned overly optimistic ratings to the CDOs built from mortgage-backed securities. By erroneously rating these bundles of mortgage-backed security payments too highly, the credit rating agencies substantially contributed to the creation of toxic financial assets.

- Borrowers, originators, securitizers, rating agencies, and the ultimate buyers of the securities into which the risky mortgages were packaged all failed to
exercise prudence and perform due diligence in their respective transactions. In particular, CDO buyers who were, in theory, sophisticated investors, relied too heavily on credit ratings.

- Many financial institutions chose to make highly concentrated bets on housing prices. While in some cases they did that with whole loans, they were able to more easily and efficiently do so with CDOs and derivative securities.

- Regulatory capital standards, both domestically and internationally, gave preferential treatment to highly rated debt, further empowering the rating agencies and increasing the desirability of mortgage-backed structured products.

There is a way that housing bets can be magnified using a form of derivative. A synthetic CDO is a security whose payments mimic that of a CDO that contains real mortgages. This is a "side bet" that allows you to assume the same risk as if you held pieces of actual mortgages. To the extent that investors and financial institutions wanted to increase their bets on housing, they were able to use synthetic CDOs. The risks in these synthetic CDOs, however, are zero-sum, since for every investor making a bet that housing performance will fall there must be other investors with equal-sized bets in the opposite direction. These are related but different problems. While many involve the word "derivative," it is a mistake to bundle them together and say, "Derivatives or CDOs caused the crisis." In each case, we assign responsibility for the failures to the people and institutions rather than to the financial instruments they used.
Conclusions:

Rather than “derivatives and CDOs caused the financial crisis,” it is more accurate to say:

- Securitizers lowered credit quality standards;

- Mortgage originators took advantage of this to create junk mortgages;

- Credit rating agencies assigned overly optimistic ratings;

- Securities investors and others failed to perform sufficient due diligence; International and domestic regulators encouraged arbitrage toward lower capital standards;

- Some investors used these securities to concentrate rather than diversify risk; and

- Others used synthetic CDOs to amplify their housing bets.
Diagrammatic Presentation of how the Rated Assets got Created Out of Sub Prime Mortgages.
Other causes for the Financial Crisis

Many other causes of the financial crisis have been outlined below, none of them alone—or all in combination—provides a plausible explanation of the crisis. Low interest rates and a flow of funds from abroad is the most sought out cause for the financial crisis, worldwide. Claims that various policies or phenomena—such as low interest rates in the early 2000s or financial flows from abroad—were responsible for the growth of the housing bubble, do not adequately explain either the bubble or the destruction that occurred when the bubble deflated. The US has had housing bubbles in the past—most recently in the late 1970s and late 1980s—but when these bubbles deflated they did not cause a financial crisis. Similarly, other developed countries experienced housing bubbles in the 2000s, some even larger than the US bubble, but when their bubbles deflated the housing losses were small. Only in the US did the deflation of the most recent housing bubble cause a financial meltdown and a serious financial crisis. The reason for this is that only in the U.S. did subprime and other risky loans constitute half of all outstanding mortgages when the bubble deflated. It was not the size of the bubble that was the key; it was its content. The 1997-2007 US housing bubble was a class in itself. Nevertheless, demand by investors for the high yields offered by subprime loans stimulated the growth of a market for securities backed by these loans. This was an important element in the financial crisis, although the number of mortgages in this market was considerably smaller than the number fostered directly by government policy. Without the huge number of defaults that arose out of US housing policy, defaults among the mortgages in the private market would not have caused a financial crisis.
Deregulation or lax regulation

There has been no significant deregulation of financial institutions in the last 30 years, the repeal of Deregulation or lax regulation. Explanations that rely on lack of regulation or deregulation as a cause of the financial crisis are also deficient. First, no significant deregulation of financial institutions occurred in the last 30 years. The repeal of a portion of the Glass-Steagall Act, frequently cited as an example of deregulation, had no role in the financial crisis. The repeal was accomplished through the Gramm-Leach-Bliley Act of 1999, which allowed banks to affiliate for the first time since the New Deal with firms engaged in underwriting or dealing in securities. There is no evidence, however, that any bank got into trouble because of a securities affiliate. The banks that suffered losses because they held low quality mortgages or MBS were engaged in activities—mortgage lending—always permitted by Glass-Steagall; the investment banks that got into trouble—Bear Stearns, Lehman and Merrill Lynch—were not affiliated with large banks, although they had small bank affiliates that do not appear to have played any role in mortgage lending or securities trading. Moreover, the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA) substantially increased the regulation of banks and savings and loan institutions (S&Ls) after the S&L debacle in the late 1980s and early 1990s, and it is noteworthy that FDICIA—the most stringent bank regulation since the adoption of deposit insurance—failed to prevent the financial crisis.
The shadow banking business

The large investment banks—Bear, Lehman, Merrill, Goldman Sachs and Morgan Stanley—all encountered difficulty in the financial crisis, and major blame for this is laid at the door of the Securities and Exchange Commission (SEC) for failing to supervise them adequately. It is true that the SEC’s supervisory process was weak, but many banks and S&Ls, stringently regulated under FDICIA, also failed. This casts doubt on the claim that if investment banks had been regulated like commercial banks, or had been able to offer insured deposits like commercial banks, they would not have encountered financial difficulties. The reality is that the business model of the investment banks was quite different from banking; it was to finance a short-term trading business with short-term liabilities such as repurchase agreements (often called repos). This made them especially vulnerable in the panic that occurred in 2008, but it is not evident that the existence of investment banks, or the quality of their regulation, was a cause of the financial crisis.

Failures of risk management

Claims that there was a general failure of risk management in financial institutions or excessive leverage or risk-taking are part of what might be called a “hindsight narrative.” With hindsight, it is easy to condemn managers for failing to see the dangers of the housing bubble or the underpricing of risk that now looks so clear. It is not clear that any of them, including the redoubtable Warren Buffett, were sufficiently confident about an impending crisis that they put real money behind their judgment. Human beings have a tendency to believe that things will continue to go in the direction they are going, and are good at explaining why this must be
Blaming the crisis on the failure to foresee it is facile and of little value for policymakers, who cannot legislate prescience. The fact that virtually all participants in the financial system failed to foresee this crisis, as they failed to foresee every other crisis, does not tell us anything about why this crisis occurred or what we should do to prevent the next one.

The following diagram explains the cycle of the subprime crisis:

![Diagram of the subprime crisis cycle](image-url)

Figure 9: Sub-prime crisis Cycle
Risk Measurement, Accounting and Incentive Structure

Risk Measurement

Another microeconomic cause of the crisis is related to problems in risk measurement. Five issues are relevant in this context. First, the use of historical data was restricted to the very recent period (period of Great Moderation) for pricing new financial instruments, which yielded misleading results. Risk was reduced through:

- **Hedging**, whereby two risks were thought to offset each other because their payoffs were negatively correlated; and
- **Diversification**, whereby risk was spread among assets whose returns were less than perfectly correlated.

Though generally true, at times historical correlations may lead to misleading results. Thus, even very sophisticated statistical models failed to accurately measure and price risks, resulting in mismanagement of risks on many occasions. The limitations of historical correlation was one of the problems associated with securitizing sub-prime mortgages in the United States, whereby large numbers of what were objectively low-quality loans were pooled together out of which a mix of high-quality and low-quality securities backed by the pool were created (originate) and sold to an entirely new class of borrowers (distribute). The major flaw, however, was that originators generally retained little of the default risk and as the boom developed, the quality of the loans progressively worsened. Before the crisis, the ‘originate-and-distribute’ model worked well as it provided diversification on the assumption that asset prices in various regions of the world would not move together. For example, before the crisis, investing globally was
thought to reduce risk, as prices in various regions of the world would not move together. This assumption turned out to be false. When asset prices that previously moved independently (providing diversification) or in opposite directions (providing a hedge) started to move together, the risks rose instead of falling. When the bad times came, correlations became large and positive. What was risk reduction became risk concentration.

Second, it was difficult to assess the low probability of such large events. Measuring, pricing and managing risk require modern statistical tools based largely on historical experience. Given its simplicity, the natural assumption is that returns of many different assets are normally distributed (and so have thin tails). And, although tail events are infrequent, in reality they are more frequent than is predicted by a normal distribution. Even though the problem with assuming a normal distribution was well known, the assumption persisted with the not-so-surprising result that insurance against infrequent catastrophes was underpriced.

Third, apart from problems in measurement, there were also governance problems in risk management practices in financial institutions. The financial institutions found it relatively easy to move activities outside the regulatory perimeter through structured investment vehicles. More generally, the crisis showed that the enlarged financial sector — comprising both traditional banks and increasingly important parallel financial system comprising non-bank intermediaries and off-balance sheet entities — had become much riskier than in the past. The failure of governance is also evidenced by the failure of all relevant institutional defenses against serious financial instability. Thus, the Board, the management, risk management practices and internal controls allowed excesses. The rating agencies, the advisors, the analysts and the auditors failed to give an alert on the build-up of risks, possibly due to relevant incentives or counterparty dealings. The financial regulators
allowed these excesses to occur. Finally, the market discipline on which reliance has generally been placed and which may include media and public opinion did not prevent these excesses.

Fourth, more generally, the crisis showed that the enlarged financial sector – comprising both traditional banks and an increasingly important parallel financial system composed of non-bank intermediaries and off-balance sheet entities – had become much riskier than in the past. The absence of a national uniform regulatory authority resulted in oversight of the mortgage market and the scale of the financial sector’s involvement in sub-prime mortgage products. Multiple regulators facilitated regulatory arbitrage by the market participants and thus exacerbated the risks. Despite the fact that financial markets had globalised, the framework for cross-border regulation was weak.

Fifth, there was a large disconnect between the risk officers and the top executives who are the decision-makers. With the former rarely having sufficient day-to-day contact with top decision makers, they often could not communicate their assessments effectively. Besides, on certain occasions when what was happening was profitable, it was difficult to get managers and directors to listen.

**Accounting Procedures**

It is generally perceived that the accounting procedures that the market participants followed also contributed to the crisis. The accounting standards were pro-cyclical, especially due to the policy of mark-to-market rules of valuation of assets and liabilities. Mark-to-market (MTM) is an accounting act of recording the price or value of a security or portfolio to reflect its current market value rather than its book value. However, considering that not all securities are liquid enough to have a tradable market price, they are marked at the fair value usually based on a model.
The model is fed with inputs for which there are market prices (prices of similar securities, interest rates, etc.) or assumptions about the input values. The problem with MTM accounting is that it relies on the notion that the market is an asset's best arbiter of value. Most of the time, that is a fair assumption, but it breaks down in a market crisis. When investors are gripped by fear, panic selling can produce prices that are out of sync with underlying asset values. Worse, a market may stop trading altogether.

Given the large size of the market for structured finance products and related derivatives in the Over-the-Counter (OTC) markets prior to the crisis, it had become nearly impossible to determine their fair value. As is clear, in the recent crisis, fair value accounting was at fault not for the values chosen to represent various on-balance sheet positions, but for the various off-balance sheet extensions of commercial and investment banks to warehouse risks that, for reputational reasons, would have to be brought back onto the balance sheet if and when cumulative losses developed. Besides, at large and complex financial institutions, individual managers had strong incentives to discover and to exercise reporting options that overstate their capital and understate their exposure to loss. This expands their ability to extract implicit subsidies that risk-taking can generate from implicit safety-net support.

It is this potential for a complete reversal of fortunes for the best performing financial firms just because of mark-to-market accounting that has necessitated a review of international accounting norms. There is also a viewpoint that in creating and deepening the securitization crisis, the role of fair value accounting is being overstated. In the US, a major purpose of adopting fair-value accounting was to require some of the developing losses at troubled financial firms to be recognized and resolved more promptly than in the past. But in reality, under fair value
accounting, portfolio positions were “marked to model” rather than to an actual transaction price, thus providing the opportunity to clever managers to adjust model outcomes until they produce pre-specified results. This had more to do with the incentive structure of the firm managers than with the accounting norms.

**Incentive Structure**

The crisis highlighted the faults in the incentive structure faced by investors and fund managers. First, with regard to investors, as income/earning levels were growing, they failed to pay due attention to the balance sheets of the banks where they were doing business or of the finances of the firms in which they were invested through the purchase of equity or debt securities. Apart from lack of knowledge, the belief that someone else was watching – be it a trusted manager, an equity analyst, a credit rating agency or the regulator – made them assume that the system was sophisticated and that their investments were safe, while in reality the system was complex and opaque. The complexity of the financial system and the financial products was mistaken for sophistication of the system (BIS, 2009).

Second, managers of financial firms also were functioning under a distorted incentive structure. Compensation schemes based on the volume of business encouraged managers to go in for excessive risk-taking in financial firms. They saw a need to drive up returns on their equity to satisfy shareholders as well as to enhance their pay packages and sometimes also to retain their jobs in the race. Large annual bonuses running into several million dollars indirectly provided the incentive to take undue risk, innovate new financial instruments and market them to investors in search of higher yields, thus increasing leverage and creating fragile institutions and also an unstable financial system. Equity holders (because of limited liability) and asset managers (because of their compensation system) were
unduly rewarded for risk-taking. Greed became the accepted norm even if it meant giving up on the firm's credentials in the short run. Here one needs to emphasize the role of animal spirits in encouraging people to take rash decisions, not to consider the future rationally in their decisions about savings and ultimately in encouraging corruption. As a result, even if managers recognized a bubble in the price of some asset, they could not take advantage of that knowledge by selling short for fear that investors would withdraw funds. Such rewards were inconsistent with performance since governments invariably ended up providing funding support to prevent systemically important financial institutions from failing.

To sum up, while there is no single explanation in the realm of macroeconomic management that appears totally satisfactory, there is a common thread to most of the explanations, namely, serious underestimation of potential for market failures as it relates to macro-economy in general and the financial sector in particular. The linkage of the different causes, though not very obvious, seems to be as follows.

As a consequence of the global imbalances, savings from Asia got invested in advanced countries, driving down their real interest rates. This led to massive expansion in credit quantity with erosion of quality because of the predatory search for yield. This, in turn, led to the generation of new toxic financial products through slicing, hedging and originating and distribution, all of which combined to brew the crisis to an explosive dimension.
Credit Rating Agencies (CRAs):
Role in Sub Prime Crisis

Credit Rating Agencies (CRAs) are mainly commercial institutions which earn revenue for the publication and evaluation of the creditworthiness of their clients. They have been playing an important role in the management of financial market risk, particularly in global securities and banking markets: they issue credit worthiness opinions that help to overcome the information asymmetry that exists between those issuing debt instruments and those investing in these instruments. CRAs originated in the USA at the turn of the 20th century and concentrated on rating of corporate bonds. Their activities subsequently increased in scope and scale. At present, no major type of security, issuer or geographic area is excluded. CRAs now define a truly global benchmark for credit risk. Since the Great Depression, the CRA’s benchmark has also been used in the regulation of financial markets. For example, banks and certain other types of investors are only allowed to hold lower risk securities rated ‘investment grade’ as per the Basel norms. Over the past few decades these companies have been engaged in providing ratings for a wide range of more complex financial instruments, known as structured finance products.

Under the 2004 Basel Committee on Banking Supervision (BCBS) new capital adequacy framework (Basel II), banks can use ratings assigned by a recognized CRA in determining credit risk weights for many of their institutional credit exposures. Policymakers have been giving increasing attention to CRAs over the past decade on a number of occasions, generally coinciding with the increase in stress in financial markets. Regulators worldwide turned their attention to the role of CRAs following their failure to weather the difficulties of East Asian economies.
in July 1997, the corporate collapses at the beginning of this century notably in the EU and the US (Enron, Dotcom, and Parmalat), and the recent financial crisis.

Role of Credit Rating Agencies in the Recent Financial Crisis

CRAs were close to the origin of the problems with subprime markets as they were giving favorable opinions on instruments that were financially engineered to give high confidence to investors. The investors – relying on CRAs’ expertise – often took little or no interest in the risk characteristics of these instruments, the performance of underlying assets and the general market outlook. The CRAs gave AAA ratings to numerous issues of sub-prime mortgage-backed securities, many of which were subsequently downgraded to junk status. Critics cite poor economic models, conflicts of interest, and lack of effective regulation as reasons for the rating agencies’ failure. Another factor is the market’s excessive reliance on ratings, which has been reinforced by numerous laws and regulations that use ratings as a criterion for permissible investments or as a factor in required capital levels.

CRAs helped to develop the Mortgage Based Securities (MBS) and Collateralized Debt Obligations (CDOs) that sparked the crisis. CRAs advised issuers on how to structure and prioritize the tranches of an MBS or a CDO. The goal was to help issuers squeeze the maximum profit from a CDO or an MBS by maximizing the size of its highest rated tranches. The purpose of tranches was to create at least one class of assets with a higher credit rating than the average rating of a CDO or an MBS’s underlying asset pool. CRAs rated each tranche based on the creditworthiness of the loans in that tranche and its priority. Tranches got higher credit ratings by “prioritization”: issuers guaranteed that the “senior” tranches would be paid before “junior” or “subordinated” tranches. At the height of the
hiring boom, almost all senior tranches got the highest rating possible, namely, AAA.

The CRAs failed to adequately assess the credit risks in MBSs and CDOs. The CRAs held an over-optimistic view of the housing market. Their rating model assumed that housing prices would continue to increase generally. CRAs underestimated the complexity of the MBSs and CDOs. The SEC found that the growth in the quantity and complexity of structured finance deals since 2002 proved too much for some CRAs.

In July 2008, the SEC concluded that the CRAs failed to manage conflicts of interest between MBS and CDO issuers and the CRAs. CRAs were supposed to serve investors, but conflicts of interest led some CRAs to cater to MBS and CDO issuers by inflating ratings. The causes of the conflicts of interest include:

1. Relationship conflicts: CRAs have had a close, ongoing working relationship with the largest MBS and CDO issuers;
2. Issuer-paid ratings: 98 per cent of the ratings produced by the CRAs have been paid for by issuers, not investors. The pay incentive led some CRAs to try to inflate ratings of paying issuers in hopes of gaining repeat business from those issuers; and
3. Advising-rating combination: CRAs advised issuers on how to structure MBSs and CDOs to get high ratings. Then CRAs “confirmed” that advice by issuing the “promised” ratings.
Role of other entities in the financial crisis

Role of Hedge Funds
As a result of the slicing of risk and the support of credit ratings, the CDOs could be marketed to investors with different appetites for risk. Investors, particularly hedge funds, who wanted to maximize yield with higher risk exposure would buy the equity tranche of the CDOs. Hedge funds further created leverage by borrowing against the assets they added to their investment portfolio (like CDOs and MBSs). For example, in the United States, two hedge funds of Bear Stearns had large leveraged exposure to CDOs. When the sub-prime default concerns gripped the market, the values of the CDOs were marked down, requiring the hedge funds to face margin calls from brokers (that is, demands for more assets to back the leverage). Investors in the hedge funds recognized the potential for losses and suddenly asked the funds to return their investments. For the hedge funds, the options were either to borrow more (which was difficult and costlier in the face of the credit squeeze) and repay the impatient investors or to go for a ‘fire sale’ (of CDOs at falling value) and face the investors’ call on their investment with them. The more extreme option was to default, meaning not to pay back the investors on demand. This is what Bear Stearns had to face when it closed down two of its hedge funds that were ultimately bailed out by the US Federal Reserve and taken over by JP Morgan.
Role of Off-Balance Sheet Entities (OBSEs)

One of the major reasons for originators to leverage their loan portfolio was that soon after they originated the loan, the same was sold in the secondary market, which left them free of any financial responsibility. Banks failed to identify the risks involved in the complex securitization process. Indirectly, banks’ balance-sheets remained exposed to developments in the sub-prime market through off-balance sheet entities (OBSEs) such as Structured Investment Vehicles (SIVs) that were investing in MBSs and CDOs by borrowing in the short-term commercial paper (CP) market. OBSEs, such as SIVs, are entities that allow financial institutions to transfer risk off their balance sheet and permit exposures to remain mostly undisclosed to regulators and investors; and achieve relief from regulatory capital requirements under Basel I. Although financial institutions were required to disclose the nature of the relationship between the parent and a subsidiary when the parent did not own, directly or indirectly through subsidiaries, more than half of the voting power (International Accounting Standards 27.40) of the OBSEs, such information was often in a footnote in a firm’s report. Banks with the objective of meeting Basel I norms were engaged in a process of continuous shifting of risk to the market through securitization of loans and the use of credit default swaps (CDS) to buy protection in the market, thus, freeing up capital for more lending. This created a ‘shadow banking system’, which remained almost completely unregulated.

Financial institutions transferred the mortgage claims to SIVs they had established and then the SIVs, by issuing and selling securitized products, transferred the risks and returns to investors, earning commissions in the process. By doing so, financial institutions could maintain their own financial soundness and circumvent restrictions on capital adequacy ratios, while earning a steady flow of income. To
generate greater profit from these commissions, each of which was small, it became necessary to expand the provision of mortgage loans and engage in securitization on a large scale. This business model seems to have led to a relaxation of lending standards and excessive mortgage lending. SIVs first came to light during the Enron scandal. Since then, their use has become widespread in the financial world. In the years leading up to the crisis, the top four U.S. depository banks moved off the balance sheet an estimated USD 5.2 trillion of assets and liabilities into special purpose vehicles or similar entities.

**Role of Basel Norms**

The Basel I minimum capital adequacy requirement has generally been instrumental in encouraging banks to shift risk from their balance sheets through securitization or through shadow banking conduits in the way described above. Some believe that if Basel II had been in place in more countries, the recent stressful episode could have been less severe. Implementation of Basel II in more countries prior to the crisis would have helped in addressing certain, if not all, sub-prime-related problems. This could have happened by ensuring capital charges even for off-balance sheet exposures that were assumed through shadow banking conduits, more risk-sensitive treatment for securitization-related exposures, greater risk differentiation while changing the exposure from prime to sub-prime loans or from corporate lending to leveraged lending, greater disclosures and more rigorous risk assessment frameworks within the banks. Under Basel I, capital charges were not required to be applied to supporting liquidity facilities that essentially represent loan assurances/ guarantees of financial support to back an OBSE with less than a one-year commitment, while they were required for those with longer terms. For most banks in the US and Europe, the implications for the originating banks of these supporting facilities were not fully realized until difficulties arose in early
August 2007. Basel II requires banks to hold regulatory capital for various liquidity and other support facilities, thus, enhancing the transparency to investors and regulators.

Although there are elements in Basel II that would have reduced some of the pressures, it is difficult to conclude that the event could have been avoided. Considering that Basel II encourages the banks’ hedging of risk exposures to lower risk weights on asset holdings, the use of credit default swaps (CDSs) would have expanded. While hedging credit risk through CDSs could be helpful, counterparty risk to those issuing such swaps is still present. Besides, while the enhanced disclosure and capital requirements of Basel II could discourage the originating banks from issuing below-investment-grade instruments as higher leverage and riskiness of exposures will be accounted for more clearly in the bank’s capital requirements, it could not have prevented another crisis. Basel II’s excessive emphasis on ratings and models for valuation and calculation of risks very often distorts the true picture. In a macroeconomic context, it has been argued that the implementation of Basel II capital requirements could have a pro-cyclical effect on the business cycle. Specifically, in an economic downturn, anticipated losses would require banks to increase their capital (depending upon the sensitivity of rating models to economic conditions), putting further downward pressure on the provision of credit, and thereby accentuating the downturn. Incidentally, against this backdrop, Basel II provisions are being improvised to take into account some of these factors.

Besides, there have been a host of nonbank financial institutions such as insurance companies, hedge funds, pension funds, and mutual funds that were not directly affected by the disclosure requirements for OBSEs under Basel II, yet they remained potential channels for systemic risks. Hedge funds that were holding the
riskiest tranches of structured products are de facto not subject to any disclosure requirements. While the recent turmoil strengthens the case for mandatory disclosures by hedge funds before regulators, one cannot deny that there needs to be a balance between disclosure that provides market and regulatory confidence while not constraining hedge fund flexibility in contributing to the smooth functioning of the market.

Thus, regulatory arbitrage between banks and non-bank financial institutions and lack of coordination among regulatory structures could also have contributed to the crisis. Regulatory arbitrage across borders was also misused to the maximum. In a bid to attract financial services, regulators in international financial centres, such as London and New York, adopted a policy of relatively soft regulations or what has been described as light touch regulation. The eagerness to develop some centres as global financial centres resulted in a race to the bottom in regulation.

Subprime crisis vis-a-vis The Great Depression:

The closest parallel to the recent crisis has been the Great Depression. In both cases, the United States has been at the epicentre of the crisis. Second, both crisis had a global impact. Third, both crisis were preceded by asset and credit booms. Fourth, rapid credit expansion and financial innovations accompanied the boom in both crisis. Fifth, liquidity and funding problems of banks and financial intermediaries have been at the core of both episodes. Sixth, both crisis were essentially banking and financial sector crisis that turned into economic recessions/depressions. The transmission channel from the financial sector to the real sector that operated in both the episodes has been similar. Problems in the financial sector reduced the availability of funds for borrowers, led to a rise in the marginal cost of funds, and losses from falling asset prices reduced the net worth
of borrowers. Seventh, large similarities exist between the paths and the levels of financial and economic variables such as loan ratios and stock prices during both crisis. Finally, both crisis have changed the intellectual framework of managing economies and have revived the debate on the role of public policy in avoiding a crisis, the so-called Keynesianism.

Despite these similarities, the recent crisis differs from the Great Depression in several aspects. First, although both have been global crisis, the scale of impact in terms of the number of countries affected has been much larger for the recent crisis than for the Great Depression. This is attributed to the levels of financial and economic integration today that are much higher than in the period prior to Great Depression, thus leading to a larger and faster transmission of shocks from the US to the rest of the world. Second, macroeconomic conditions were more favorable in the recent crisis vis-à-vis the Great Depression. The recent crisis was preceded by a period of high growth and low inflation with macroeconomic stability. On the other hand, global economic conditions were weaker in mid-1929; Germany was already in recession and consumer prices had either stagnated or had already started falling in Germany, UK and the US before the start of the recession. Third, while the credit boom prior to the Great Depression was more US-specific, the boom prior to the recent crisis was more global with increased leverage and risk-taking prevalent in advanced countries and in many EMEs. Fourth, the origins of the recent crisis were in wholesale banking (and, therefore, more difficult to contain) rather than in retail banking which was the case with the Great Depression. Fifth, unlike in the 1930s, there is no gold standard, which could serve to restrict how much the money supply can be expanded. Finally, counter-cyclical policy responses were absent in the early stages of the Great Depression. Policies were initiated only by 1933, after the Gold Standard was given up. In contrast, the
recent downturn has seen strong and swift monetary and fiscal policy support, which was both global and well co-ordinated, to revive the world economy.

United States: Great Depression Vs Recent Crisis

<table>
<thead>
<tr>
<th>(Per cent)</th>
<th>Great Depression</th>
<th>Recent Crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Real GDP Decline</td>
<td>13 in 1932</td>
<td>6</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>3 in 1929 to 25 in 1933</td>
<td>4.6 per cent in 2007 to 9 in 2009; 10 projected in 2010</td>
</tr>
<tr>
<td>Decline in Prices</td>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>Stock Price Decline</td>
<td>85</td>
<td>43</td>
</tr>
<tr>
<td>Increase in Fiscal Deficit</td>
<td>1.5</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Figure 10: United States: Great Depression Vs Recent Crisis

A comparison with the Great Depression solely on the basis of macroeconomic indicators for the US gives the impression that the recent crisis is not as bad as the Great Depression.
The decline in GDP in 2009 is the sharpest since the post-World War II period, yet the decline in GDP is less than that of the post-Great Depression and post-World War II periods. However, a comparison based on world indicators such as the world output, world stock market, world trade and aggregate money supply indicates that the recent crisis is worse than the Great Depression. The only factor that places the recent crisis better than the Great Depression is in terms of the length/duration of the crisis. This is because of the swift, large, lasting and the coordinated way in which the central bankers and policymakers across the world have responded to the recent crisis, probably learning from the lessons of the Great Depression for economic recovery today if we look at the GDP trend since Great Depression Days.

While a Depression has been avoided, the recent problems in Greece and euro area highlight the fact that the recovery is still fragile. It may be noted here that while
problems in Greek economy have been aggravated due to the recent financial crisis, the weaknesses in the Greek system are more structural.

To sum up, the recent crisis seems to be less adverse than the previous episodes of crisis in terms of duration, although the extent of output loss for the recent crisis is estimated to be larger. The Great Depression seems to be the closest equivalent to the recent crisis. Though the US has been at the centre of both crisis and both have been essentially financial and banking crisis, the recent crisis has been more global due to the enhanced financial linkages that prevail today.

The evolution of the US banking system before the crisis

It is rather pertinent to discuss the US banking system prior to crisis as it may highlight the nature of functioning of the USA banking system. In a few decades, US banks experienced dramatic changes and transformations which were essentially fuelled by the combined impacts of deregulation and technological changes. This resulted among other things in the boom of financial markets and the development of securitization which led to the 2007-2008 credit bubble and the following crisis. In this section we describe the main evolutions of the US banking industry in order to better understand the nature of the banking industry in the 2000s and the causes of bank failures during the crisis. This will help us determine the variables which we will use to compare failed and non-failed banks, as well as potential inputs to the dynamic logistic model.

At the beginning of 1980s, the US banking industry was essentially made of small depository institutions which dominated real estate lending, consumer lending and
small business lending. The US banking industry had been shaped by the regulation of the 1920s and 1930s following the Great Depression. Commercial banking was the largest intermediary in the US financial system with nearly 60 per cent of intermediated assets when including thrifts and other depository institutions. In this heavily regulated context, banks were protected from geographical competition by the McFadden Act of 1927 which prohibited interstate branching. There was only one loophole in the McFadden Act, which allowed cross-border banking through multibank holding companies. However, prior to the Banking Act of 1956 exploiting this loophole required state approval.

Following the Banking Act of 1956 which closed the loophole on BHC acquisitions across states, and until 1978, the beginning of interstate banking deregulations at the state level, not a single state allowed one of its banks to be owned by a multibank holding company. In addition to interstate banking prohibition, most states limited to different degrees intrastate branching. Some states such as Illinois or Texas even prohibited any form of branching, imposing unit banking institutions.

The Glass-Steagall Act of 1933 shielded banks from product competition with other financial services providers. Commercial banks were strictly forbidden to engage in investment banking, insurance or brokerage. In addition to that, thrifts and credit unions were not allowed to issue commercial and industrial loans, limiting them to compete with commercial banks only on services to households. Banks were also protected to some extent from pricing competition as Regulation ‘Q’ limited competition on interest rate paid on all deposits except negotiable certificates of deposit (CDs) above USD 100,000, by imposing ceiling rates. In the context of high inflation and increasing interest rates at the end of the 1970s, the
90-day Treasury Bill rate exceeded by far the ceiling imposed by regulation Q, provoking a large outflow of deposits from the traditional banking system to other non-bank financial institutions such as the newly created money market mutual funds, which allowed their owners the ability to write checks.

The beginning of a 20-year deregulation process thus coincides with a period of difficulties for the US banking system due to the rise of disintermediation and the competition on deposits from non-bank institutions.

The development of technological innovation also put pressure on the weakest players. These deep changes were well received by banking scholars, whose research had shown the inefficiency and sometimes harm that geographic and product competition regulation imposed on bank customers.

**Evolution of the US banking regulation at the Federal level: step-by-step approach**

**1975 – 1994: Oval of restrictions on intrastate branching**

Maine was the first state to dismantle restrictions on intrastate branching in 1975. It was followed by New-York and New-Jersey in 1976 and 1977. The removal of intrastate branching allowed statewide consolidation of the banking industry. Several scholars looked at the effect of such deregulation on economic growth and have found mixed results. However, it is certain that such deregulation helped to build a stronger banking system.
1978 – 1994: Oval of restrictions on interstate branching
Maine again was the first state to allow bank holding companies from other states to acquire Maine banks in 1978, as long as reciprocity existed with the state of the acquiring banks. Restrictions began being effectively dismantled only in 1982 when New-York state passed a similar law, and when Massachusetts passed regional reciprocity limited to New-England states. Before the end of the decade, most states (but six of them) participated to one or several regional pacts.

1982: Germain Depository Institutions Act
The original purpose of the Act was to deregulate the thrift industry by allowing them to issue commercial loans and thus to compete directly with commercial banks. The act also removed regulation Q which had caused a massive outflow of deposits from thrifts and commercial banks to money market mutual funds. The act also permitted banks and thrifts to create money market deposits accounts to compete directly with money market funds. The Bank Holding Company Act of 1956 was amended to allow bank holding companies to acquire failed banks and thrifts in any state, regardless of state law.

1987: Authorization by the Federal Reserve to create Section 20 subsidiaries
In compliance with the powers granted by the Bank Holding Company Act of 1956 and the 1970 Amendments to the Act, the Federal Reserve allowed banks to form investment banking subsidiaries. These newly formed affiliates were permitted to underwrite municipal revenue bonds, mortgage and asset-backed securities (Tier 1 powers). The revenues generated by the Section 20 subsidiaries should not exceed 5 per cent of total revenues, in order to respect the restrictions imposed by the Section 20 of the Banking Act of 1933.
1987: Extension of Section 20 subsidiaries permitted activities
The Federal Reserve granted additional authorizations to selected group of banks to underwrite corporate securities. This privilege was then increased and extended to other banks. The revenue limit was raised to 10 per cent.

1989: Financial Institutions Reform, Recovery and Enforcement Act (FIRREA)
The Act came as a response to the Savings & Loans crisis. It allowed bank holding companies to acquire thrifts, required agencies to issue CRA (Community Reinvestment Act) ratings publicly. To compensate for the costs generated by the CRA, FHLB (Federal Home Loan Banks) membership was opened to commercial banks. Previously it had only been available to thrifts and insurance companies. This boosted FHLB membership from 3,000 at the end of 1990 to 7,000 in 1999, and today almost two thirds of commercial banks are FHLB members. Advances from FHLB constitute an easy source of non-risk priced funding. It is used by almost one third of commercial banks. However, it is said that risky banks have a higher probability to rely on these advances than safer ones. Freddie Mac and Fannie Mae are also given additional responsibility to support mortgages for riskier borrowers (e.g. low-income families).

1987 – 1994: Reigle-Neal Interstate Banking and Branching Efficiency Act
The Act repealed the McFadden Act of 1927 and permitted both interstate branching and acquisitions among bank holding companies. It completed the process of deregulation of geographic restrictions.

1987 – 1996: Extension of Section 20 subsidiaries permitted activities
The Federal Reserve removed the firewalls that were keeping investment and commercial banking departments from working together, based on the experience of less regulated foreign underwriting affiliates allowed by the Edge Act of 1919.
This resulted in increased synergies between commercial banking and investment banking activities stemming from lowered information costs. The revenue limit was raised to 25 per cent of total revenues, enabling more banks to develop an investment banking business.

1987: Modernization Act (FSMA)
This Act symbolized the final step of the deregulation process by repealing the Glass-Steagall Act of 1933, opening the way to the formation of giant financial services conglomerates and the establishment of American universal banks. Among other things, the Glass-Steagall Act prevented any bank from having more than 30 per cent of the deposits in any state, and 10 per cent nationwide. Besides bank holding companies, the GLBA created financial holding companies, allowed to engage in commercial banking, insurance, securities underwriting, asset management, brokerage services and merchant banking. The revenue limit for Section 20 subsidiaries was raised to 45 per cent.

The emergence of universal banks in the US
Product deregulation has encouraged commercial banks to enter new activities: first investment banking with the creation of Section 20 subsidiaries, and then brokerage, insurance underwriting or merchant banking with the repeal of the Glass-Steagall Act. These new opportunities actually benefitted the most to a small number of already large commercial banks which had the strength and resources to enter these new businesses. It was found that the announcement of the GLBA resulted in significant higher abnormal share price returns for the largest banks. Moreover, even among large banks there was a significant higher return for banks which had a Section 20 subsidiary before the GLBA than for those which had not.
Developing new activities and expanding product mix was the key to achieve what has been called economies of scope. Contrary to economies of scale that are based on costs, economies of scope do not occur in the production process, but are rather based on revenue synergies and arise in the context of client-relationship management. Indeed, the idea is to develop customer-led growth by offering additional products to existing customers. For example, a lending relationship with a large company gives the opportunity to offer additional services such as derivatives products, hedging, advisory services or even debt and equity underwriting services. This generates information scope economies in so far as information and monitoring costs incurred in the framework of lending relationship can be spread on more products. Moreover information can also be re-used across the different product lines in order to better assess client-specific risks and improve the risk-return profile of the bank’s activities. The existence of scope economies based on relationship increased the competition for gaining new customers. It thus has become widespread to offer underpriced corporate loans in order to attract new customers. The measure of profitability is consequently no more assessed on an individual transaction basis, but on a relationship basis by evaluating the resources devoted to a client against the revenues that the same client generates in the form of interest payments and fees for the bank.

The best illustration of the existence of scope economies based on information-sharing and informational advantage comes from the entry of commercial banks into the security underwriting business through section 20 subsidiaries in the 1990s. The commercial banks entered the underwriting business successfully. Their performance particularly strong in debt underwriting and Yankee underwriting where they captured on average 58 per cent and 60 per cent respectively of the market over 2001-2004 versus only 19 per cent and 15 per cent
respectively over 1990-1996. Their market share in equity and in municipal bonds underwriting also surged from 5 per cent and 12 per cent respectively over 1990-1996 to 40 per cent and 36 per cent respectively over 2001-2004. This gain in market share was mostly at the expense of independent investment banks. The top-6 bulge bracket investment banks also experienced a decline in market share over the 1990s and early 2000s except for equity offerings where they reinforced their positions overtime.

The product diversification had a dramatic impact on the banking industry as a whole, even though banks from different sizes have been impacted to different degrees. It was found that a larger product scope of commercial banks translated into both a worsening of cost productivity and an improvement of profit productivity from 1991 to 1997. This means that banks were able to expand into more sophisticated products and services that generated higher profits despite bearing higher costs. The situation is contrasted between smaller and larger banks: banks in the larger quartile have experienced much higher profit productivity gains than banks in the smaller quartile. This demonstrates that scope economies have been more accessible to larger banks.

It was studied that the return on assets (ROA) of banks by size categories (megabanks (top one per cent), large banks (2 per cent to 5 per cent), community banks (6 per cent to 40 per cent), micro-banks (41 per cent to 100 per cent)): it was found that megabanks and large banks had higher and increasing ROA over 2000-2005, while community and micro-banks had lower and decreasing ROA. This was owing to a decline in net interest margin (NIM) for all bank categories, but which had a stronger negative effect on the smallest banks.
It can be concluded that larger banks were better at substituting towards the most profitable product mix: the quantity expansion of lending compensated lower interest margins and non-interest revenues were increasing thanks to fees coming from new traditional products (such as off-balance sheet products and securitization) and from non-traditional products (such as investment banking, brokerage and insurance). Smaller banks benefitted less from the GBLA and cross-selling opportunities, as their scale prevented most of them to engage in investment banking or securitization, even though a large number were cross-selling insurance products or charged additional fees for the servicing of traditional products such as loans sold to securitized pools.

**Technological changes**

Deregulation of the US banking industry had such a dramatic impact because it was been paralleled with a technological revolution which gave commercial banks the means to fully exploit both new geographical and product expansion opportunities.

Technological changes which impacted the commercial banking industry can be divided into two categories: financial innovations such as credit scoring or new products such as derivatives and asset-backed securities, and information technology-related changes such as the development of internet-banking, ATMs, electronic means of payment (credit and debit cards). However, most of the financial innovations of the three last decades have been made possible because of the progress of compilation and computation technologies. They made possible the development of new products, risk-management tools and regulatory frameworks (Basle I, Basle II) because they made technically possible to perform heavy
calculations and run complex statistical models and they lowered both information processing time and information processing costs. The ratio of computers and software to value added reveals that banking is the most IT-intensive industry in the United States.

A first decisive innovation was the apparition of the automated-teller machine (ATM) in the 1960s and 1970s. Initially banks thought that ATMs would be substitutes for human tellers. However, data revealed that both the number of ATMs and of bank branches increased overtime. It suggested that ATMs and branches with employees complemented rather than cannibalized each other. The 1980s saw the development of additional major financial and technical innovations. The computers increased information processing capacities as well as reduced the cost and time of information transfer were instrumental in the apparition and the development of new financial markets such as options, futures, swaps on interest rates, stock indexes and other financial assets. At the same time they allowed existing financial markets to function more efficiently thanks to the development of electronic platforms to match orders on existing exchanges. Moreover, new technology was a key factor in the development of securitization and asset-backed securities, even though deregulation played an important role too. Indeed, the development of information technology made easier the computation and dissemination of information concerning the performance and the operation of the asset pools.

Technology has also had a dramatic impact on consumer and small-business lending. Introduced for the first time in the 1950s, credit scoring spread from consumer and real estate loans in the 1980s to small business lending in the 1990s. While it has been used by most banks for consumer loans and mortgages, credit
scoring has also been used mostly by large banks for small business lending, whereas small banks rather tend to emphasize soft (non-quantifiable) information and relationship lending. According to the Federal Reserve's 1996 Senior Loan Officer Survey, credit scoring is primarily used in approving loan applications. Moreover, 80 per cent of banks using credit scoring use it as a marketing tool, in order to determine from whom to solicit loan applications, and only 20 per cent of banks using it, set loan terms based on the scoring results. The credit scoring and new technology may have resulted in increased lending, as banks are now accepting higher-risk borrowers, which were previously rejected. Credit scoring also had for consequence to lower underwriting costs as it is less expensive than human due diligence, even though it is unclear whether it is more effective at predicting default. The intensive use of credit scoring was necessarily accompanied by the development of private databases and information exchanges: they are intermediaries through which banks and other lenders share data on the credit worthiness of applicants. These exchanges aggregate data from various sources, e.g. banks, public records, trade creditor, and provide credit reports and/or credit scores to financial institutions. Such databases provide useful information; indeed, it was found that lending is higher and default rates lower in countries where lenders use information exchanges.

Another extraordinary evolution has been the changes which have affected the payment system. The 1990s have witnessed a switch from paper-based payments — i.e. cash and checks — to electronic payments — i.e. debit and credit cards. A study revealed that the number of checks paid in the United States fell from 49.5 billions in 1995 to 42.5 billions in 2000, this means an overall decrease by 14.2 per cent or a 3 per cent decline on average per year. In the meantime, credit card payments surged from 10.4 billion to 15.0 billion (an overall 44.2 per cent increase or 7.3 per
cent constant annual growth rate (CAGR)), and debit card payments exploded from 1.4 billions to 8.3 billions (an overall 592.8 per cent increase or 35.6 per cent CAGR). In 2002, it was found that between 1990 and 2000 cash share and check share in personal spending fell respectively from 25.7 per cent to 16.3 per cent and from 61.8 per cent to 56 per cent. During the same period, credit and debit card share surged respectively from 12.2 per cent to 21.2 per cent and from 0.4 per cent to 6.5 per cent. Increased use of electronic payment resulted in a strong increase of the use of automated clearing houses (ACH). The volume handled by the Fed's ACH quadrupled from 915 million in 1990 to 3.8 billion in 2000. The rise of electronic payment may have two main explanations: increased volume and improved technology have considerably lowered unit costs – Fed data on ACH show a fall of 83 per cent in real unit costs over 1990-2000, increasing use of electronic payments reflects the increased possibility to use such means of payments (growing network of merchants/ businesses accepting credit cards) and the growing number of debit and credit card among the population – most Americans now have several credit cards, thanks to the marketing efforts of the credit card industry (lifestyle cards, personality cards, etc.).

Progress in both financial and information technology have given banks new means to manage their risks and interest rate exposures. This was made possible by the development of increasingly sophisticated risk-models thanks to the rise in computing capacity, and new financial products such as derivatives that offer the possibility to implement complex and targeted risk management policies. In the 1990s, banks began to use new tools based on Value-at-Risk (VaR). Moreover the Basle Capital Accord adopted by the largest banks in the late 1990s and early 2000s went one step further in increasing the link between regulatory capital requirements and credit or asset risk. To comply with this new regulatory
framework, banks have been continuing to develop their risk management models to estimate their exposures, default rates, loss given default, etc. Internet also revolutionized front-office technologies and banking was no exception. The most widespread strategy has become the click-and-mortar, which combines a website with an existing network of branches and ATMs. Indeed, there were very few internet-only independent players and most of them have failed or shut their operations. Internet-only subsidiaries of large banks have also been reconverted to participate in a click-and-mortar strategy.

We can distinguish between two types of websites: informational ones and transactional ones. According to a study, 37.3 per cent of national banks had a transactional website and an additional 27.7 per cent had only an informational website in 2002. The adoption rate of transactional website is very much linked to the bank size, with 100 per cent of banks with more than 10 billions in total assets having one in 2000 and only 20 per cent of banks with 100 million or less in total having one. However, the adoption rate has been rapidly increasing. Even though internet remains a marginal channel in the distribution of banking product and services it has been gaining share against other channels and helped reduce costs as well as problems associated with geography and distance.

Data on the failure of US regional banks
The data are extracted from the quarterly Call Reports filed by all FDIC insured banks with the Federal Financial Institutions Examination Council ("FFIEC"), which collect them on behalf of several banking regulators (the Federal Deposit Insurance Corporation (FDIC), the Federal Reserve (Fed), and the Office of the
Comptroller of the Currency (OCC)). The data are taken from the Call reports on a quarterly basis. They include income statement, balance sheet and off balance sheet items for the period 2001-2009. The data on bank failures are disclosed by the FDIC on its website and provide the name, the certificate number and the closure date of individual banks.

It was observed that 10,504 individual banks over the 2001-2009 period, of which 7,608 had data available over the entire time period. The other banks had either failed or been acquired or closed during the 2001-2009 time period. As only 189 banks had failed, most of the remaining 2,666 banks which had disappeared may have been acquired. This again emphasized the increasing concentration of the industry.

The list of failed banks, disclosed on the FDIC's website, showed that 230 banks failed between 2001 and the end of the first quarter of 2010. For the purpose of this study, we considered that the so called subprime crisis began on August 9, 2007, when BNP Paribas froze withdrawals from three funds and suspended net asset value calculations because the rising illiquidity of ABS on the market made them difficult to trade and to value fairly.
The table given below lists down the number of bank failures in the US over time:

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Bank Failures</th>
<th>Number of Failed Banks missing in call Reports</th>
<th>Missing in%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>4</td>
<td>2</td>
<td>50.0%</td>
</tr>
<tr>
<td>2002</td>
<td>11</td>
<td>1</td>
<td>9.1%</td>
</tr>
<tr>
<td>2003</td>
<td>3</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>2004</td>
<td>4</td>
<td>1</td>
<td>25.0%</td>
</tr>
<tr>
<td>2007 Q1</td>
<td>1</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>2007 Q2</td>
<td>0</td>
<td>0</td>
<td>na</td>
</tr>
<tr>
<td>2007 Q3</td>
<td>1</td>
<td>1</td>
<td>100.0%</td>
</tr>
<tr>
<td>2007 Q4</td>
<td>1</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>2008 Q1</td>
<td>2</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>2008 Q2</td>
<td>2</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>2008 Q3</td>
<td>9</td>
<td>3</td>
<td>33.3%</td>
</tr>
<tr>
<td>2008 Q4</td>
<td>12</td>
<td>2</td>
<td>16.7%</td>
</tr>
<tr>
<td>2009 Q1</td>
<td>21</td>
<td>1</td>
<td>4.8%</td>
</tr>
<tr>
<td>2009 Q2</td>
<td>24</td>
<td>4</td>
<td>16.7%</td>
</tr>
<tr>
<td>2009 Q3</td>
<td>50</td>
<td>8</td>
<td>16.0%</td>
</tr>
<tr>
<td>2009 Q4</td>
<td>45</td>
<td>8</td>
<td>17.8%</td>
</tr>
<tr>
<td>2010 Q1</td>
<td>41</td>
<td>4</td>
<td>9.8%</td>
</tr>
</tbody>
</table>

Thus the causes for Subprime Crisis are multifold as its impact is percolating from USA centric crisis to a Multifold World Financial Crisis.