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Risk management strategies versus bank failures. An analysis from the risk management perspective.

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Introduction

Nowadays, failures in the banking sector are very actual topic. Despite implementation of risk management techniques, there is significant number of banks that exposed to failure.

In the financial business the meaning of hazard the board is known as "the legitimate improvement and execution of an arrangement to manage potential misfortunes". The primary purpose of risk management techniques is to supervise and control a firm's exposure to losses or risk and to protect the value of its assets. Generally, banking is known as risky business. That is why in the banking sector, the quality of risk management system is very crucial in order to decrease the level of uncertain outcomes.

Risk management requires that the risks of a financial institution be identified, assessed and controlled. Risk management addresses a combination of credit risk, market risk, interest rate risk, liquidity risk and operational risk. Sound risk practices define who should be accountable for these risks and how the risk processes should be implemented.

In the banking sector risk management system raises different questions. These questions highlight the necessity of having risk management systems. There are following questions:

- *What types of events can damage banking and how much damage can be exposed?*

This question shows the necessity of investigating the bank's activities which are creating losses or risks. Assessment of damage is also important in order to measure damage that can happen. So, it is obvious that risk management begins with identification of the potential risks and assessing those risks.

- *What measures should be taken in order to manage those risks?*

After the identification and assessment of risks, it is important to determine what types of actions can be implemented for addressing potential issues. Adversely, if banks do not address the risks appropriately, this misstatement can lead to substantial losses for the bank. That is why in order to have healthy firm, new risk management techniques have been improved to manage these losses.

- *Did the firm make appropriate decision?*

Once measures were taken and implemented, it is important to monitor and report the consequences of implementation. It is the last step of risk management in banking industry.

To sum up, the primary purpose of risk management practices is to evaluate potential losses for the banks in the future and to take appropriate steps to combat these potential issues when they occur.

Literature Review

Risk management is one of the most important things in the organizations. Some high-profile organizations such as Barings and other companies in the UK, Enron, Adelphia and World in the USA, and recently Parmalat, are the examples of cases that used inappropriate risk management. The Cadbury Report on the Working Party of the Corporate Governance Committee (2015) on the implementation of the Cadbury Code requirement for managers to report on the effectiveness of their internal control system lists the following criteria for assessing the effectiveness of risk identification and assessment and control goals:

- Determine key business risks in a timely manner
- consideration of the likelihood of risks organizing and the significance of the consequent financial impact on the business
- Establishment of priorities for the allocation of resources available for control and the setting and communicating of clear control objectives.

The main point of risk management is to identify risks and respond them in an appropriate way. Risk management is such process that enables the identification, assessment, planning and management of risks. Merna and Merna (2014) believe risks identified at each level are dependent on the information available at the time of the assessment, with each risk being assessed in more detail as more information becomes available. In fact, the risk impact is related to time. There is often a negative perception of the word ' risk. ‘However, the prevailing risks can often have a positive

impact if managed correctly. This process is not aimed at minimizing or eliminating all these risks. The risk management process seeks to:

1) Identify the risk tolerance of the organization,

2) Determine and assess the risks that the organization faces, and

3) Modify and monitor these risks.

Risk can be defined informally in different ways, but the central notions are those of uncertainty about meeting goals or about potential loss, and of incomplete control over the outcomes of decisions. Risk management is the effort to understand these uncertainties in order to make better choices among goals and meet them more effectively. (Willey 2016)

The organization may decrease its exposure to risks that it is less well able to manage and respond to by making organizational changes, purchasing insurance, or entering into hedging transactions. Through these choices the firm aligns the risks it takes with its risk tolerances for these various types of risk.

Risk (uncertainty) is not something that an organization or a portfolio of investments can avoid. Risk-free returns are earned through risk-taking. While returns are not controlled by managers for any period, the organization's specific risks and overall level of risk are under its control. Risk management can be considered as to determine organizational risks, decide the organization's optimal risk bundle, and implement risk mitigation strategies to achieve this risk bundle. There are several activities covered by an overall risk management framework, including: establishing processes and policies for risk management.

1. Determine the risk tolerance of the organization.
2. Identification and measurement of existing risks.
3. To achieve the optimal risk bundle, manage and mitigate risks.

4. Over time monitoring of exposures to risk.
5. Communicating throughout the organization.
6. Analyzing strategic risk.

This framework is general, but in any comprehensive risk management framework all of these elements should be addressed. An organization can only understand the risks faced by the organization and have the processes and procedures in place to manage and monitor these risks effectively.

Risk management refers to the determination of the organization's risk tolerance by senior management, the elements of its optimal risk exposure strategy, and the risk management function supervisory framework. Risk management seeks to manage risk in a manner that supports the organization's overall goals in order to achieve the best business outcome in line with the overall risk tolerance of the organization. Risk governance provides organizational guidance on the risks to be pursued in an efficient manner, risks to be limited, and risks to be reduced or avoided.

A risk management committee can provide a way for different parts of the orga nization to address issues related to risk measurement, risk integration, and best ways to mitigate unwanted risks.

Determining the risk tolerance of an organization involves setting the organization's overall risk exposure by identifying the risks that the organization can take effectively and the risks that the organization should reduce or avoid. Some of the factors that determine the risk tolerance of an organization are its business lines expertise, its ability to respond to negative external events, its regulatory environment, and its financial strength and loss resistance capability. Management should examine risks that may exist within the organization as well as risks that may arise from outside when analyzing risk tolerance.

Management should examine risks that may exist within the organization as well as risks that may arise from outside when analyzing risk tolerance. The different risks to which the company is exposed must be considered and weighted against the expected benefits of bearing those risks and how they fit the organization's overall goals.

Financial risks are those resulting from financial market exposure. Examples are the risk of credit. This is the uncertainty as to whether the transaction counterparty will fulfill its contractual obligations.

Risk that stems from liquidity: This is the risk of loss if an asset is sold at a time when market conditions make the selling price lower than the asset's underlying fair value.

Risk that stems from market: This is the uncertainty over asset (stocks, commodities, and currencies) market prices and interest rates.

Non-financial risks arise from the organization's operations and from outside sources. Examples are: risk of operation. This is the risk of losses resulting from human error or faulty organizational processes.

This is the risk that because it has run out of cash, the organization will be unable to continue operating.

Risks that occur due to regulatory action: This is the risk of changing the regulatory environment, imposing costs on the company or limiting its activities.

Political or governmental risk (including tax risk): This is the risk that political actions outside a specific regulatory framework, such as tax increases, will impose substantial costs on an organization.

Legal hazard: This is the uncertainty regarding the exposure of the organization to future legal action.

Risk of the model: This is the risk of incorrect valuations of assets based on analytical models of the organization.

Tail risk: This is the risk that extreme events (those in the tails of the outcome distribution) are more likely than the analysis of the organization shows, particularly from the incorrect conclusion that the outcome distribution is normal.

Risk of accounting: This is the risk that the accounting policies and estimates of the organization will be considered incorrect.

Standard deviation is a measure of asset price and interest rate volatility.

Standard deviation may not be the appropriate risk measure for non-normal distributions of probability, particularly those with negative skewing or positive excess kurtosis (fat tails).

Beta measures the equity securities market risk and equity securities portfolios. This measure takes into account the benefits of diversification from risk reduction and is suitable for securities held in a well-diversified portfolio, whereas standard deviation is a standardized risk measure.

Risks affect our life in all aspects. In most occasions we manage risks based on our knowledge, common sense, instinct, or past experience. With respect to Chapman and Ward (2016): All projects involve risk – the zero-risk project is not worth pursuing. Risk and uncertainty are distinguished by both Bussey (2016) and Merrett and Sykes 2015) as: A decision is said to be subject to risk when there is a range of possible outcomes and when known probabilities can be attached to the outcome. Uncertainty exists when there is more than one possible outcome to a course, but the probability of each outcome is not known.

Risk management is the set of events taken by individuals or organization in order to diverse risks stemming from business. According to Smith (2016) the process risk management involves the following steps:

- Identification of uncertainties
- Implication analysis
- Response to minimize risks
- Diversification of contingencies

Overall, risk management involves risk identification, prediction how probable they are, how serious it might be. One of the main reasons behind banking failures is unsuccessful credit assessment. Credit analysis helps to determine whether borrower will be able to repay his loan in due. Also, in credit assessment process analysts evaluate possibility of recovery in case of any likelihood negative event such as default and estimate collateral. Credit can be assessed by means of several methods such as internal, cash flow analysis, computer sensitivity models, external and so on. External ratings are those issued by Moody, Fitch, and S&P. It does not matter what methods are used, the main point is to balance all available information. What is a rating agency? A rating agency is an institution that estimates financial strength of companies, especially the ability to pay principal and interest payments on due. All of the agencies use letter scores in order to indicate the financial strength of companies. By looking at them, companies can easily know that which companies has a low or high default risk. During financial crisis in 2008, those agencies were blamed for giving overrates to the companies. Those credit agencies failed to warn investors beforehand against mortgage backed securities. Moreover, those agencies were blamed for the possibility of conflict between them and security issuers. Since issuers pay certain amount to the credit rating agencies for this service, that is why, those agencies may

have been unwilling to give lower rating to those securities issued by the people who made payment.

Companies are rated by Moody's, Standard & Poor's, and Fitch for a fee. Thus, investors rely on their ratings whether to buy securities or not. Investment grade securities mean that those securities have low risk, low return and low fees, whereas high yield securities mean that those securities have high risk, high return, and high fees.

Internal rating-based (IRB) approach is used widely by most banks in order to identify credit risk according to borrower's inability to repay the debt. Ratings are providers for third party assessments of the credit quality of debt holder. Unlike small firms, in larger organizations credit analysts may use internal ratings. Internal ratings play crucial role in setting regulatory capital in such firms. Those ratings can use some methods such as credit scoring, which is a quantitative technique. In the bad economic situation defaults become greater than normal. Banks are keen to estimate losses in case of default (LGD). In the banking industry there are several practices regarding to credit rating process obtained from statistical methods. Overall, credit risk is the probability that borrower will be unable to meet his obligation in the future. Borrower can be an individual, small business, large business, sovereign government and so on. Loan is especially up to exposure of credit, maturity (duration), likelihood of default, and severity of risk if it happens. For estimating the credit risks the financial firms have to appropriately calculate default probability (PD), and the loss amount in case of default (LGD). LGD is calculated as the ratio of losses to the exposure in case of default. Total provisions being equal to the total losses are required by Basel II. In the risk management it is very important to keep some percentage of capital as available resources for unlikelihood event to absorb expected loss. The risk and capital link the

positive correlation. More risk requires more capital. According to the Basel I, the risk adjusted ratio of capital (RACR) is equal to the ration of Capital to the Risk adjusted Assets which is amount to at least 8%. Currently, Basel II (Basel Committee on Banking Supervision 2004) has introduced a new risk factor, operational risk. Thus, equation becomes the ratio of Capital to the sum of the operational risk, market risk, and credit risk.

Risk management failures arise from irrelevant risk measure used by firm in case of any situation. For instance, this measure can be Var (Value at Risk) or other metrics. Overall, there are two kinds of mistakes in risk management. It is either known risks or some risks can be overlooked, either because of the unknown risks and considered as not material. A default communicating risk to the risk management is also default and failure. After the firm makes a decision which risks will be taken? To conclude, risk managers have to manage risks, mitigate and hedge risks, and sometimes reject unsuccessful perceived projects. With regard to failures, there are mainly six types of risk management failures. They are measured incorrectly known risks, unable to take risks into account, unable to communicate risks properly to the top management, inability to monitor risks accurately, inability to control risks and fail to use appropriate risk metrics.

How can the known risks be measured adequately? Let us look at the example of Long-Term Capital Management. While measuring risks, risk managers are required to grasp the distribution of returns which are possible. In this example, distribution was a binomial, like the probability of the tossed coin. Risk managers can make a mistake in measuring risks and their size. Whereas, those managers can utilize irrelevant distributions: Furthermore, relationship between returns and their distribution can be assessed inaccurately. Correlation is very crucial in managing risks

since benefit of diversification goes down as correlation goes up. In Long-Term Capital Management example, the true probability of loss could be 70 percent which is higher than 1 percent, say 25 percent. In this scenario expected return of LTCM will be 1.25%. At this case investors can earn higher expected return by putting their money into T-bills. So, here risk management fault in assessing probability of loss outcome at 1% instead of 25% could potentially have deteriorating consequences for the fund.

Other risk management miscalculation can occur when the distribution is altogether different from reality one. If institution has more than one project, the risk will depend on how the projects are related with each other. Because if the correlation is high between projects, when markets perform poorly, all projects will perform poorly, and it will lead to large losses. Calculating correlation is not easy as it is thought, because over time it changes. Thus, unable to assess correlation accurately can lead to wrong estimation of the risk portfolio.

When risks are not unknown, risk managers use statistical methods to evaluate risks. Such techniques work well when there is lots of available data and when managers believe reasonably this returns' distribution will be repeated in the same manner as they did in the past. For example, assume that risk manager wants to calculate the returns' volatility. He will have thousands of data. Mostly, the risk manager will have good model of volatility which will work reasonably well. Sometimes, historical data can deceive investors, and can not be repeated in the same manner. For example, during subprime mortgage crisis, there was no much available data of downturn period. In this case risk management can not be conducted only by means of historical data which is lack. Various risk managers can reach different conclusions in this case. There happens fundamental issue in the risk management when risk assessments are subjective. Assume that all agree that model works very

well. But even here there is one room for people to dispute. Whereas, subjective predictions can easily be questioned: Why do risk managers grasp drop in the prices of real estate better than experts in the real estate? In case of experts in real estate conclude that decrease in prices in unlikely to happen, then why would a firm listen to the risk manager who would like to put huge amount of money on stress test to get full picture of such large drop? So, in the end the result for the firm relies on much more firm's risk appetite and its behavior than other its risk management tools.

In addition to mismeasurement can happen because of ignored risks. Overall, neglected risks can have three different forms that have various implications for the firm. The first one, a firm can neglect a risk even risk is known. In the second form, manager knows about risk, but that risk can not be captured by risk models. The last form, risk is totally unknown.

Furthermore, the risk management can fail due to mistaken information. The results of the risk management failure are the same, no matter whether no one knew about risk, or knew but could not implement proper risk models. Generally, risks are divided into market, credit, and operational in the risk management. Response to all risks is very difficult and hard task. Performing this task is very crucial, because if it is not performed, manager can only see a part of the big picture and can not manage risks effectively. There are a lot of examples that illustrate how incomplete risk aggregation can pose to huge losses from the risks that were not addressed. Probably, one of the best examples is a bank that does not exist, The Union Bank of Switzerland. In the second half of 1990, this bank took all management system and tried to aggregate them with its trading operations. One of the groups concentrated on equity derivatives which became very successful. Whereas, these traders were using different computers from the remaining of the bank: As a result, connecting their system to the

bank's system demanded to change computers as well. Consequently, bank's top management made a decision that there was nothing more important than to let traders make money. Soon, these traders lost huge amount of money, and the loss partially responsible for the bank that was merged to some another Swiss bank.

Generally, unknown risks do not lead to risk management issues. Assume that risk managers have created model that include return of the stock using normal distribution and so he has not any reason to believe that in the future these returns also will be distributed as normal distribution. Here manager is not interested in why returns of stock are changing. He has just estimated statistical distribution based on appropriate risk characteristics. With this model, what he knows is that the volatility is for example 20 percent, and here chance of loss is 5 percent of 30 percent or more than it over the time lapse. Other unknown risks do not impact management decisions as here the loss probability is very low. For instance, building can be hit by asteroid, and its chance is very low. Neglecting this risk will not impact any implication in the risk management.

Moreover, the risks can arise from communication failures to the top management. Risk management is not any action implemented by risk managers merely. Rather it is implemented in order to increase shareholder value by implementing optimal methods across the firm. Particularly, the firm has to decide the amount of risk that it can expose. That is why; risk management must provide top management with necessary and up-to-date information timely. If the board and top management knows the risks, they can address properly risks. That is why communication matters. If even the firm has the best risk system, but top management is not able to understand risk accurately and fully, and risk manager cannot explain outcomes of these risks clearly, this system can harm more than good

by inspiring wrong confidence in the risk management and its performance. The worst case happens when information reaches to board and top management too late. One of the communication failures was witnessed in the most recent financial crisis. For instance, UBS report to shareholders account for those lots of efforts was made during subprime or houses related exposures. Actually, report did not communicate right information for a lot of reasons. Since, the reports were very sophisticate and its audience did not get information or got outdated information. So, it can be concluded that risk controlling and management decrease getting the right, correct information, at the same time to the right people.

The risk management is responsible for deciding which risks to take as well. As a consequence, risk manager has to timely monitor the risks that a firm undertakes. To achieve objectives of the management, risk managers have to mitigate and hedge risks properly. In case of risks for securities change quickly, it challenges the risks to be monitored frequently to know the changes and adjust hedging accurately. If there are dramatic number of changes, risk managers may fail to accurately measure risks since risk characteristic of securities change significantly.

Moreover, the crucial thing in the risk management is to determine solutions which can be implemented quickly if time to firm for recovering is too short or limited. In case of lack of possible recommendations and solutions it makes firm hard to tackle with unexpected obstacles.

Sometimes risk managers are prone to concentrate on only risk metrics which is very narrow and can potentially harm the firm to reach its objectives. Widely used risk metric is Value at Risk. Value at risk says the maximum amount of loss given confidence level let us say 95%. Risk managers must focus on not only daily Value at Risk, but also longer-term estimations. Because short-term Value at Risk can deceive

investors by seeming attractively lower. Daily VAR only assume limited losses in a day. While looking past, in 1998 the markets became suddenly less liquid so as a result VAR measures lost their meaning. If any firm that keeps illiquid assets or assets that cannot be traded a daily VAR is not adequate measure since the firm gets stuck with the portfolio for not short-term.

Overall, risk management approaches have made significant progress since 1998. There are several cases that risk management can fail, but not each of losses illustrates a risk management failure. Generally, risk management can be developed by taking the lessons from failures.

During financial crisis period banks first of all witnessed liquidity problems and then these issues led to insolvency. So, firms that conventionally highly depended on bank debt for funding were primarily at risk. Even firms with great credit history did not have immune to these issues. As a result, during financial crisis bank lending went down significantly. This decline stem from not only decreasing demand but also supply factor. Banks that had less access to the deposits and were at great risk of credit line drawdowns decreased their ability to lend. On other hand, the banks which had good capital adequacy were unwilling to give credits the firms with whom banks did not have prior relationship. Thus, many factors like financing cost, regulations under Basel III and weak economic conditions, lower growth rates impacted banking lending. Capital requirements and liquidity minimum standards under Basel III were undeniable factors. Although this narrowed capital adequacy limits influenced availability of capitals in the banks, it had an influence on credit supply. Hence, recapitalization impacted banks' supply of funds that were given as a debt and made banks to look for how to reduce lending.

Basel III is a complex structured set of reforms developed by Basel Committee on Banking Supervision with the aim of enhancing the regulation, supervision and risk management of banking sector. Generally, the purpose is to improve banks' ability to overcome financial and economic downturns by means of mitigating risks from financial sector to economy. Secondly, it improves risk management and corporate governance system and finally to enhance banks' transparency on their disclosures. Overall, it must be noted that Basel III requirements on capital adequacy and liquidity are prone to increase banks' safety and enhance their balance sheet.

Till now the framework of regulation for capital adequacy and liquidity has undergone lots of reforms. The first international agreement dates back 1988. At that time Basel Committee on Banking Supervision set the appropriate levels of capital adequacy. By the way these minimum levels for capitalization usually refer to Basel I. The 1988 agreement helped to increase the capital of banks. It also made banks search for more efficient and effective structures. However, Basel I had some demerits including the lack of capital alignment ratios to the overall banking risks, exclusive approaches of credit risk, and ineffective applied risk mitigation instruments. Therefore, Basel I had to be revised norms and procedures. As a result, in 2006 new international framework Basel II were set with more advanced credit risk management models. Its main objective was to develop the correlation between the capital requirements and the risks that banks exposed. This framework was built upon three Pillars. The first one was to calculate the minimum capital requirements, the second was to evaluate the risk control system, and finally the third one was to efficiently use market discipline and to implement transparency.

After financial crisis in 2007, it was felt that there was need for ensuring greater stability, transparency in the operations of banking system. This emptiness gave birth

to the Basel III. Unlike Basel II, Basel III includes alternative approaches for the calculation of required capital for credit risks adjusting various levels of risk sensitivity. Bank can choose to apply either the Standardized Approach or the Internal Ratings Based Approach.

Basel III introduced more stringent capital requirements compared to Basel I and Basel II. The regulatory capital of banks is divided into Tier 1 and Tier 2, while Tier 1 is divided into Common Equity Tier 1 and additional Tier 1 capital. The distinction is important because of the highest level of subordination of security instruments included in Tier 1 capital. Common Equity Tier 1 capital includes equity instruments with discretionary dividends and no maturity, while additional Tier 1 capital includes securities that are subordinated to most subordinated debt, have no maturity, and cancel their dividends at any time. Tier 2 capital consists of unsecured subordinated debt with at least five years of original maturity.

Basel III reinforced regulatory capital ratios compared to Basel II, which are calculated as a percentage of risk-weighted assets. Basel III, in particular, increased Common Equity Tier 1 capital from 4% to 4.5% and Tier 1 capital from 4% to 6%. The total regulatory capital remained unchanged at 8 %.

Methodology

While writing methodology choosing of appropriate research methods is very crucial. Without relevant information methods it is almost impossible to gather good quality information. There are two methods of research. They are followings: quantitative and qualitative. Quantitative methods, from its name, include quantity information. Here “how many”, “how long”, and such kind of questions are answered. This method refers to quantify data and generate results from a sample of population. Unlike quantitative methods, qualitative methods include the quality of information. This method gives insight about the problem, solutions, and hypothesis.

	Quantitative	**Qualitative**
Aim	The aim is to count things in an attempt to explain what is observed.	The aim is a complete, detailed description of what is observed.
Purpose	Generalisability, prediction, causal explanations	Contextualisation, interpretation, understanding perspectives
Tools	Researcher uses tools, such as surveys, to collect numerical data.	Researcher is the data gathering instrument.
Data collection	Structured	Unstructured
Output	Data is in the form of numbers and statistics.	Data is in the form of words, pictures or objects.
Sample	Usually a large number of cases representing the population of interest. Randomly selected respondents	Usually a small number of non-representative cases. Respondents selected on their experience.
Objective/ Subjective	Objective – seeks precise measurement & analysis	Subjective - individuals’ interpretation of events is important
Researcher role	Researcher tends to remain objectively separated from the subject matter.	Researcher tends to become subjectively immersed in the subject matter.
Analysis	Statistical	Interpretive

Surveys are used in gathering primary data within quantitative methods. In the survey population is the main point that should be taken into account. The number of sample and population should be considered. The question is that whether population is easy to count or not. If it is hard to count, the secondary data is used.

Sampling is also used in quantitative method. This method is used in order to draw conclusion by choosing sample group out of population. In addition, sampling frame should be selected carefully from population. This frame should be accurate, complete, and up-to-date.

Thirdly, statistical significance is important. Because the size of population and sampling size are crucial for calculating respondents accurately:

Finding primary data is very expensive, and also time consuming. That is why often people use the secondary data as benchmark. This method gives existing information. However, this information may not applicable to every research, since it has been used for other purpose.

In statistical methods people interrogate data by means of mathematical ways. There are two main methods: descriptive and inferential methods. Former one describes data, while the latter one explains and interprets data. The confidence level illustrates how much you are sure whether the inference is correct or not. This confidence level can be impacted by the size of sample. More sample size means more confident you are about your inferences. Mean is the average. This average could be mean, mode and median. Standard deviation says about spread or volatility of sets of data.

Qualitative methods are based on the answers of social dimensions. Qualitative methods include richer and more detailed information. Social surveys are based on questions. One of the most famous method in qualitative is interview method. This

method gathers information by interviewing. This method is used in order to obtain interviewees' perceptions and behaviors. The second popular one is discussion groups which are based on inviting a number of people that compromise groups and getting their perceptions.

In this paper I mainly refer to the use of quantitative methods. I will take one of the failing banks as an example and show reasons behind this failure. This paper will try to have some solutions regarding failure and analyze the risk management structure of that bank. Most of banks failed during global financial crisis. It revealed that lots of banks were not ready to this downturn.

Beginning from 2007 August till September it was obvious that poor incentives in the USA mortgage sector had triggered problem. Regarding to this elaboration what had occurred was that the way the mortgage sector worked had changed dramatically over the years. Conventionally, the banks would increase funds, assess borrowers, and after lend money to those borrowers who were approved. Even in the worst case when default happened, the banks would tolerate losses. This system procured better incentives for banks to attentively evaluate the creditworthiness of borrower parties. Over time, this process and incentives were changed. On behalf of banks providing mortgages and holding on to those borrowers, brokers as well as some banks began to provide mortgages and sell them to be securitized. The brokers and those some banks tried to sell as many as possible mortgages since they were paid based on the number of mortgages which they approved. In addition to, brokers were selling off them, so it was not their problem if the mortgage holders got bankrupted.

The next stage was securitization in this new originate to allocate mortgages. The institutions which undertook securitization such as investment firms would pool an entirely set of mortgages together. By means of diversification those firms would

have good risk profiles and properties. The securitization process included tranche so that the risks could be allocated differentially depending on the certain tranche owned. It means that the most junior buyer tranche would be allocated any losses first. At that point as more misfortunes were aggregated these would debilitate the most reduced tranche and begin to be dispensed to the following most senior one, up the position chain. There would need to be a lot of misfortunes before the most senior ones would bear any default failure and so they were viewed as decently chance free and were evaluated triple-A. Increasingly junior tranches had lower appraisals.

At first with this new framework, the most junior tranches were held by the

Speculation bank or some another element doing the securitization: On the off chance that there was an issue, they would be hit first. The purpose behind this was to give great motivating forces to those doing the securitization to guarantee that the starts and the resulting deal were done legitimately. Progressively what occurred, however, was that all tranches were sold off, including the lesser one? This removed the motivating forces for the budgetary organizations doing the securitization to watch that everything was done legitimately. Financial analysts discovered that mortgages which were originated under the new originate to distribute model were of dramatically lower quality than those originated under the conventional system where those mortgages were held on the originating bank's balance sheet.

Moreover, there were other incentives like credit rating agencies. Because buyers were highly reliant on tranche ratings in their input decisions whether to buy or not: Here the question was whether credit rating agencies assessed process properly. Some argue that the rating agencies were not because they started to get a huge proportion of their profit from undertaking ratings of the products that were

securitized. The offer is that credit agencies began to lose their objectivity and to rate that were not justified.

With respect to mortgage incentives view of the financial crisis an entire procedure for checking quality of borrowers and underlying securitizations for mortgages broke down. The world view offered that it would be simple enough to solve financial crisis and prevent it from reoccurring. They believed that if the government managed mortgage sector to make everyone sure that they had right incentives; this would stop the problem in the future.

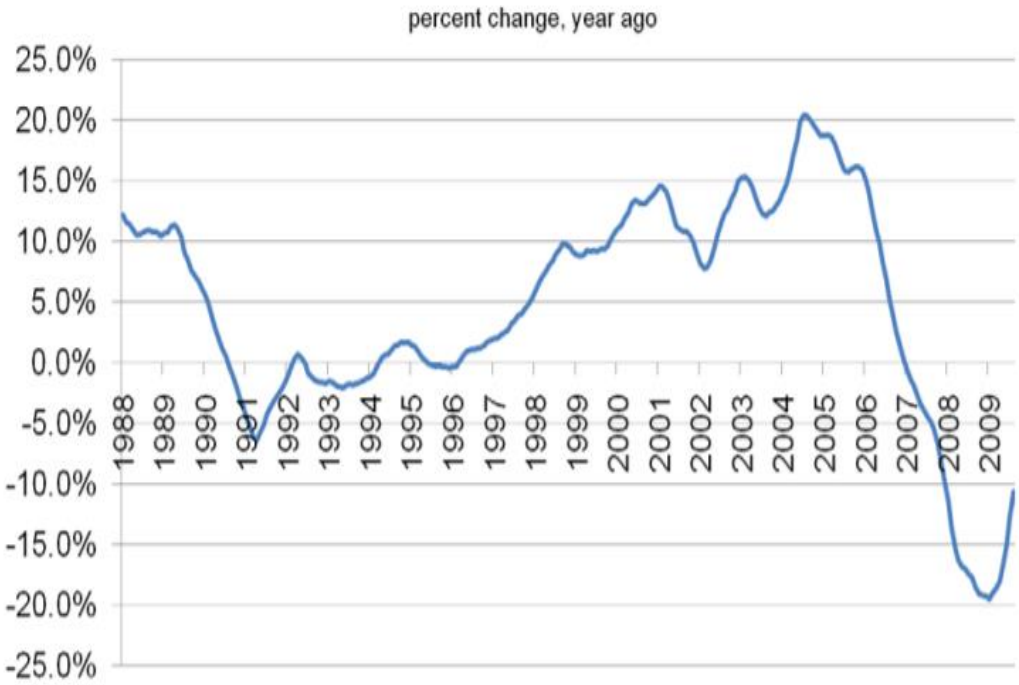
It is seen from financial statements of Federal Reserve that at first time this view was the view that they opted for. But, crisis continued and after the default of Lehman, one of the biggest collapses in the global economy made the view that problem was not in the subprime mortgages and they were generally to blame less and less plausible. The primary issue that led to crisis was that there was a bubble in real estate industry in USA. As the bubble burst, this led to the huge issues in the securitized mortgage industry and in the economy. The bubble was great. In 2005 The Economist conducted the survey and warned about increasing prices in property industry.

"[T]he totals value of the real estates in developed economies increased by more than $30 trillion over the past five years to over $70 trillion, rise equivalent to 100% of those countries' combined GDPs. Not only does this dwarf any previous house-price boom, it is greater than the global stock market bubble in the late 1920s (55% of GDP). In other word, it looks like the largest bubble in history"

Question is that what caused the bubble? Actually, there were two main reasons. The first one was that the bubble was so big in the USA in 2003-2004. In order to avoid a recession following the collapse of the tech bubble in 2000 and 9/11

terrorist attacks Federal Reserve cut interest rates to their very low level of one percent. During 2008 housing prices were increasing quickly. The Federal Reserve made significant incentives for people in majority parts of US for borrowing at one percent and buying houses going up at higher interest rates. Moreover, there were other incentives. Those incentives included the tax merits of being able to deduct interest on mortgages, in addition, the number of policies which encouraged poor people to buy houses. All these incentives created lots of demand toward houses that caused increase in house prices. After that even though Fed raised the interest rates in 2004, it was still worth to borrow, since house prices continued to increase at a rate of 8% until 2006 (see Figure below). Hence, Fed's low interest rate policy was the primary factor which really led prices to take off.

Changes in the Case-Shiller 10-City Composite Index Year-on-Year



The financial industry invented a market to trade those mortgages. In order to make profit, banks in the USA sold out those mortgages, they were also called mortgage backed securities, to other financial institutions such as banks and investors all around the world including US. Since default rates were low because of high secured standards for mortgage backed securities and were considered to be guaranteed due to increasing prices in the house markets, therefore each of financial firms including investment banks, pension banks as well as retirement funds invested a

lot in MBS because they promised continuous interest payments. As a result, the demand for these financial products rose dramatically, and within the short time banks could not stimulate anymore the demand existed in the market. Prime mortgages reached their full capacity. Because of this, US banks began to issue subprime mortgages to those who do not have evidence for income and employment, so created lots of mortgages in the market. The banks ensured low and flexible interest rates, decreasing payments and usually more than one mortgages that made possible low and middle class American to get mortgages even high amount of money for big houses that they normally could not afford. As a consequence, in 2006 house prices reached their peak price and a lot of "buyers were not purchasing for shelter, but for reselling them at a quick profit." Thus, the housing boom started. Following this event, default rates for subprime mortgages began to rise, since borrowers could not make monthly payments in time anymore.

In 2006, the Federal Reserve raised interest rates to 5.25% that led to the delinquency of even more loaners. Particularly, flexible interest rated subprime mortgages were affected the most. As interest rates went up, monthly payments also increased significantly. Hence, those houses went into banks' property and investors' that bought mortgage backed securities. Since house prices increased, the banks still had a chance to sell properties with a profit and these new prices prevented investors from losses. However, soon the supply in the USA market surpassed the demand for houses that showed a stagnation of housing prices imminent. As a result of stagnating house prices, the real value of houses decreased too. The housing bubble busted and what occurred following could be illustrated as a domino-effect. Having feared of decreasing trend, house holders including banks and investors began to get rid of their properties before losing much money. Thus, in 2007 New Century Financial Corp,

which was one of the leading subprime mortgage lenders, filled with bankruptcy. This decreasing trend in the US housing market could be stopped. Even though prime lenders feared of steadily decreasing value of houses: In that time, paying monthly mortgage payments was more expensive than selling those houses: Following this, since it became obvious how the risky was these subprime mortgages, the former actors in financial market got trouble for the subprime mortgage development.

Data gathering and analysis

Global Financial crisis showed that many banks were not ready to this crisis and most of them suffered from this crisis and failed. Financial crisis began in the US housing market in 2007. Even this crisis was spread across the world and had impacts on the economies of countries adversely. The main reason behind this crisis is seen as the US housing market. From late of 1990s, prices of houses increased significantly in response to continuously low interest rates, lending and speculation. Furthermore, crashes happened at the same time in other assets bubbled and caused the credit risk. At that time all profit seeking companies, especially financial institutions, utilized a complex financial process featured by highly leveraged borrowing, irrelevant risk analysis, and lacked regulation to bet an outcome – a bet that proved to be misguided when asset prices collapsed.

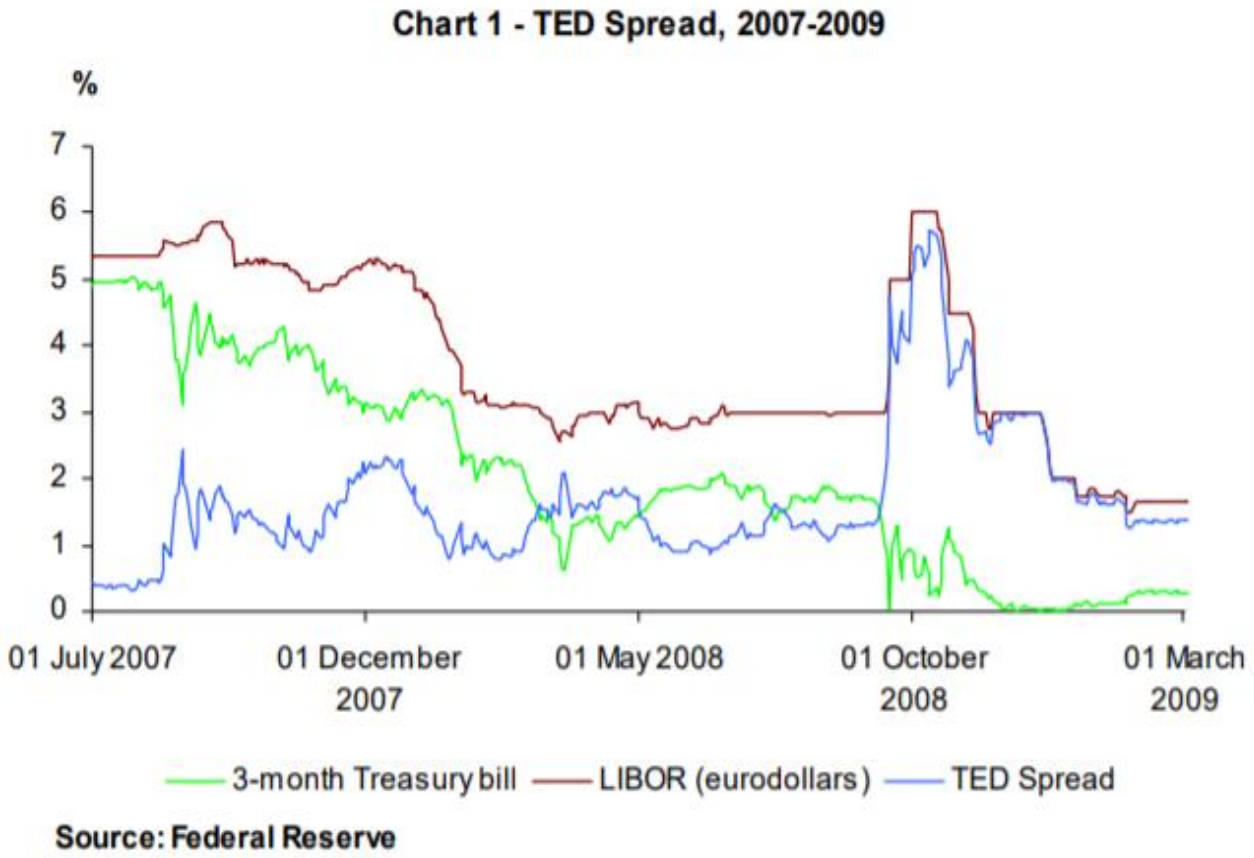
Before September 2008, financial institutions gave a response in the US primarily to liquidity concerns, demand, and prevention mortgage foreclosures. That policy included some points such as lowering interest rates, introducing the number of liquidity-improving schemes to abate the expected credit crisis, and legislation that was seeking to stimulate demand and mitigate mortgage foreclosures. After the September and October shocks credit and interest rate risk spreads increased and Fed adopted new approach. The responses after September mainly included not to bailout investment bank Lehman Brothers, passage of 787$ bn American Recovery and Reinvestment act and so on.

House prices began to decrease. Foreclosures increased rapidly. In turn, credit agencies downgraded risk assessments of asset backed financial instruments in half of 2007. Increasing level of risk limited the ability of financial product issuers to pay interest, showed the realization of bursting bubbles. One of the largest American investment banks Bear Stearns heavily engaged in mortgage-backed securities and

therefore as a result was damaged. It was unable to recapitalize debts and losses, therefore this company could not survive when stock price collapsed in March 2008 and was acquired by Morgan Chase on 16 March 2008 by means of government assisted takeover. As default rates continued to increase, mortgage lenders encountered problems, because the value of collateral decreased. The USA's largest mortgage lender Indy-Mac collapsed on 11st of July 2008 and its assets were taken.

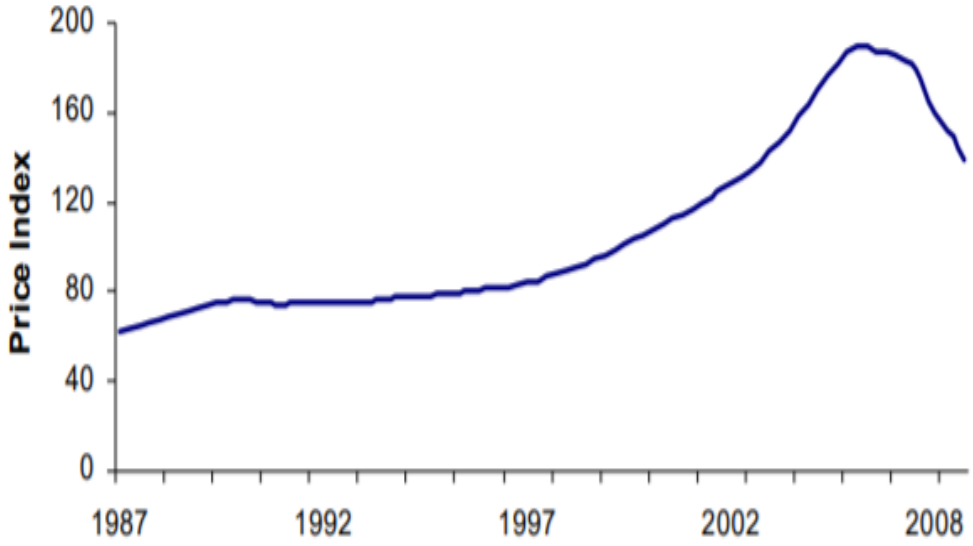
In September and in October 2008 the crisis hit the banking industry. Lehman Brothers became unable to raise necessary capital. This failure illustrated that government was not willing to bail out banking industry, and this in turn caused an increase in interbank lending rates. On 15th of September Bank of America acquired investment bank Merrill Lynch for 50$ bn. As a result of this news, the financial markets became highly volatile. Dow Jones Index, which is constituted 30 largest listed companies, saw dramatical shifts daily and saw its biggest point drop value.

Nevertheless, credit channels narrowed London Interbank Offer Rate (LIBOR) exceeded the interest on Treasury bills (a 3 months). TED spread shows perceived risk in the economy. From the graph it is clear that LIBOR dramatically exceeded the expected three-month Federal Fund rates.



In the USA house prices went up dramatically from 1998 to 2005, approximately doubling over this period. Showing escalation in the house prices, it was correctly anticipated that the imminent collapse was coming of what believed as a housing bubble.

Chart 2 - S&P/Case-Shiller US National Home Price Index, 1987-2008



Source: S&P/Case-Shiller Home Price Index, Standard and Poor's

This increase in the house prices indicated large rises in the demand for housing and occurred despite an increase in the supply of housing. The dramatic increase in the demand for housing is attributed to the number of factors.

The first factor was low interest rates. Low interests remained from 1999 till 2004. These stable low interest rates made adjustable-rate mortgages attractive to potential customers. The second factor was the support for subprime market. There is proof that suggests in lots parts of USA receiving a subprime mortgage was a lot easier and cheaper. In addition to it, Federal Reserve revealed that the difference between interest rates of subprime and prime markets went down significantly from 2.8% in 2001 to 1.3% in 2007. There are a variety of explanations about credit guaranteed to the riskiest borrowers. One of them is that Congress, Clinton as well as Bush Administrations made pressures to the government sponsored enterprises Fannie and

Freddie to decrease their standards for lower income families in order to make mortgages accessible to them. Mortgage lenders were trying to sell subprime loans to the banks which sought to convert the loans into profitable securities. This in turn led to moral hazard. As the mortgage lenders could be profitable by selling riskier loans, these actions became more appealing to them. Initially available low interest rates were also attractive for the banks since it gave them certain period to sell on mortgages before they defaulted. Fed could not prevent this lending. Other factor was speculation. Property speculation accentuated the rise in house prices. At the time of Federal Reserve Chairman Alan Greenspan market speculator thought that assets bubbles would be treated with care. It in turn created moral hazard incentive where investors could reap large profits, whereas their losses could be reduced as the Fed reacted with increased liquidity.

To sum up, all these factors created housing bubble. Till 2005 -2006 the value of subprime mortgages approximately made up 20 percent of total new mortgages as opposed to less than 7 percent in 2001. Thus, lending of subprime mortgage increased from $180 bn in 2001 to $625 bn in 2005.

Till 2006 lots of factors conspired to burst the bubble. The first one was average wages per hour remained stable or declined since 2002 till 2009. As a result, prices could not go up, since housing became unaffordable. Secondly, growth in housing supply followed price rises. It is true that prices were able to tolerate downward pressure until 2005, as demand exceeded excess supply escalated the sharp fall in prices. Thirdly, since interest rates rose, to its peak of 5.25%, Adjustable rate mortgages were seen less appealing in the first half of 2006.Fourthly, since personal savings from disposable income decreased below zero, fewer householders had the requisite finance to support increases in debt.

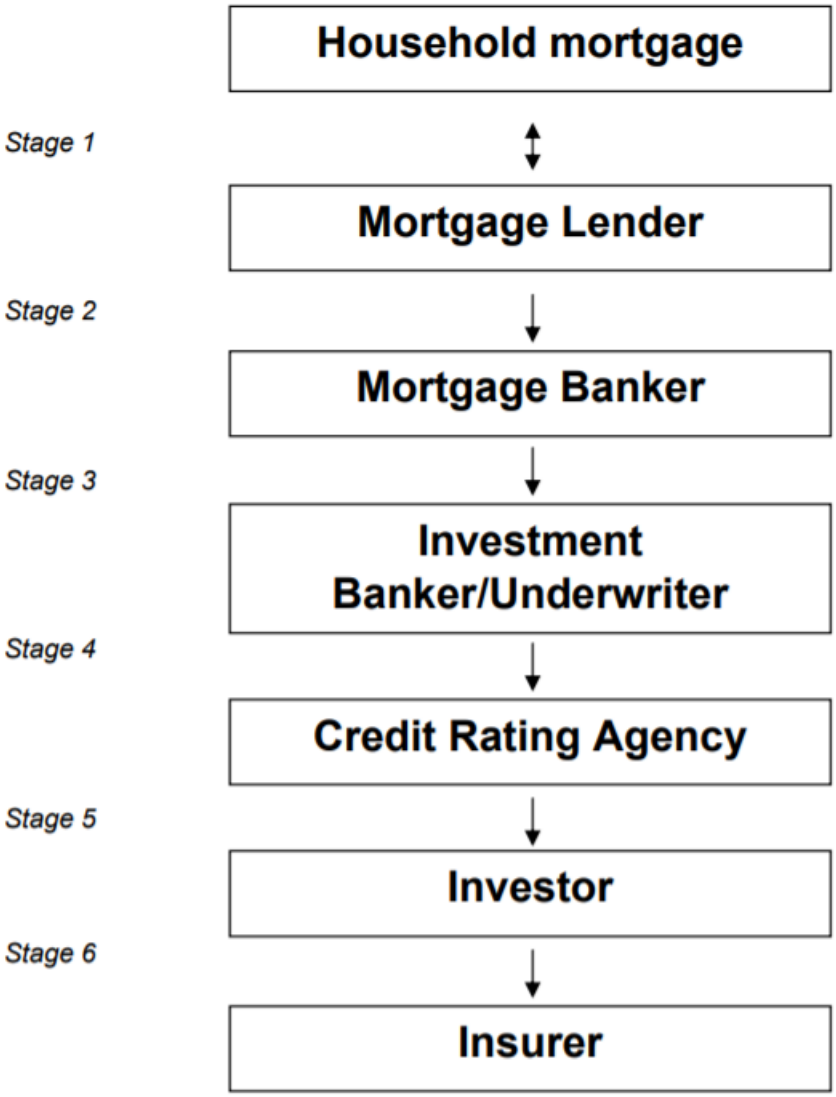
The proportion of risky borrowers extended well beyond in the housing market. Despite mortgages' majority as a single component, the value of non-mortgage asset-backed securities also grew significantly.

The issues that emerged from the lodging bubble increased exponentially as a result of the way in which they were re-bundled and dispersed to the worldwide money related markets. Complex developments intended to augment proficiency and benefits by assigning danger to those most joyful to hold up under it altered fund in the mid-1990s. The beginning of contract advances for the most part pursued a perplexing procedure where the underlying credits were gone through various agents and wound up dispersed crosswise over budgetary markets. Outline 1 gives a review of the procedure.

Generally, contract investors like Fannie and Freddie would issue bonds to buy Home loans and pitch the advances in packages to the market. The governmentally supported Fannie furthermore, Freddie were made for this reason and progressively filled in as the financiers of home loans. Notwithstanding, the creative new budgetary procedure saw the home loan broker thus sell the home loan on for a benefit to a speculation investor. This third stage may not happen where a home loan bank additionally served the capacity of a venture bank – just like the case with Fannie and Freddie.

Diagram 1

Overview of the financial process



At the fourth stage, the venture broker gathers countless (or organized home loan-based money related items) that it endorses with the end goal of making a security it can pitch to speculators. Utilizing confounded money related instruments, venture financiers would pool together a substantial number (more often than not among 1,000 and 25,000) of home loans into a security known as a home loan upheld security (MBS) or a collateralized obligation commitment (CDO) where the security

could contain diverse kinds of advantages including contracts as guarantee. By pooling together vast quantities of benefits, these securities significantly diminished the danger of all out default albeit kept up the equivalent anticipated return (and hazard nonpartisan credit spread). Indeed, even where defaults happened the proprietor would at present get comes back from the gained guarantee (for the most part the house itself). A large group of progressively confused engineered items, for example, CDO-squares were supported by the first securities, and were sold along these lines.

The MBSs and CDOs fluctuated in piece and structure however yielded returns – either money streams after some time or market esteem – relying on their hazard profiles. It is at stage 5 where the hazard profile was commonly determined: FICO score offices (CRAs) would make their hazard evaluation of these advantages and their diverse tranches, and this would price the security offered to the market by the venture banks yet would likewise serve to advise chance weighted capital prerequisites under the Basel II capital system. Given that 80% of subprime MBSs were appraised AAA (the most elevated FICO score level) and 95% in any event grade A, the securities seemed, by all accounts, to be very appealing ventures, obligated to offer liberal returns which could be set apart as high-esteem resources on an association's asset report. Once appraised, the securities were either kept by venture banks – as speculations or insurance – or allocated and acquired by financial specialists including different banks, flexible investments and benefits assets, as a component of their advantage portfolios. Economist Markus finds that annuity reserves by and large bought the most secure tranches, flexible investments acquired more dangerous parts and guarantor held the least secure tranches for checking purposes. Selling such a

security can profit the guarantor by giving modest and different financing and expelling dangerous resources from the monetary record.

Banks were expected to deal with their hazard and to meet their Basel II capital necessities. Subsequently, they looked for assurance against the most dangerous securities in stage 6. This came as a monetary derivative called a credit default swap (CDS) which, consequently for a small amount of the conceivably substantial return, safeguarded the holder of the MBS or CDO against the danger of default. The presence of bare CDSs – CDS contracts where not one or the other party really held the hidden resource – made rich ground for hypothesis just as hazard the board:

Insurance firms like AIG could make the same number of CDSs as they wished given that the advertising was unregulated. The Commodity Futures Modernization Act of 2000 determined that CDSs were not characterized as protection, securities or fates contracts (and in this manner went unregulated). For whatever length of time that the back-up plans remained AAA-appraised, they didn't have to put up any insurance; also, CDSs could be posted as benefits promptly utilizing default probabilities dependent on late experience. The CDS showcase contained critical theory upon the results of the protection/swap contracts, and this guaranteed subordinates brokers over the world spread dangers over a significantly more extensive range of speculators.

Contract dealers realized that the guarantors of securities could sell practically any contract available, and in like manner this urged moneylenders to give more credits. Lehman Brothers, for instance, seemed to empower liberal loaning models and fake movement at the home loan loaning firms, (for example, First Alliance) which it had gained. This cycle guaranteed that the market in MBSs, CDOs and CDSs achieved tremendous extents: by 2007 MBSs esteemed at more than $2tr were issued into the security market; CDOs were issued to the estimation of $521bn; despite the fact that

80-90% of the CDS advertise was in light of theoretical wagers, its notional esteem took off to $62tr by December 2007.

As the bubble burst, two key highlights imperiled the profits from home loan supported resources: first, default implied that a substantial income was stopped; second, the housing collateral on which significant depreciation was seen on this basis (see Chart 2).In spite of the fact that the breakdown of the subprime showcase cost the economy more than $1tr, the harm was extraordinarily amplified by the trap of budgetary instruments built around it – or the "chain response" as US Treasury Secretary Henry Paulson portrayed it.

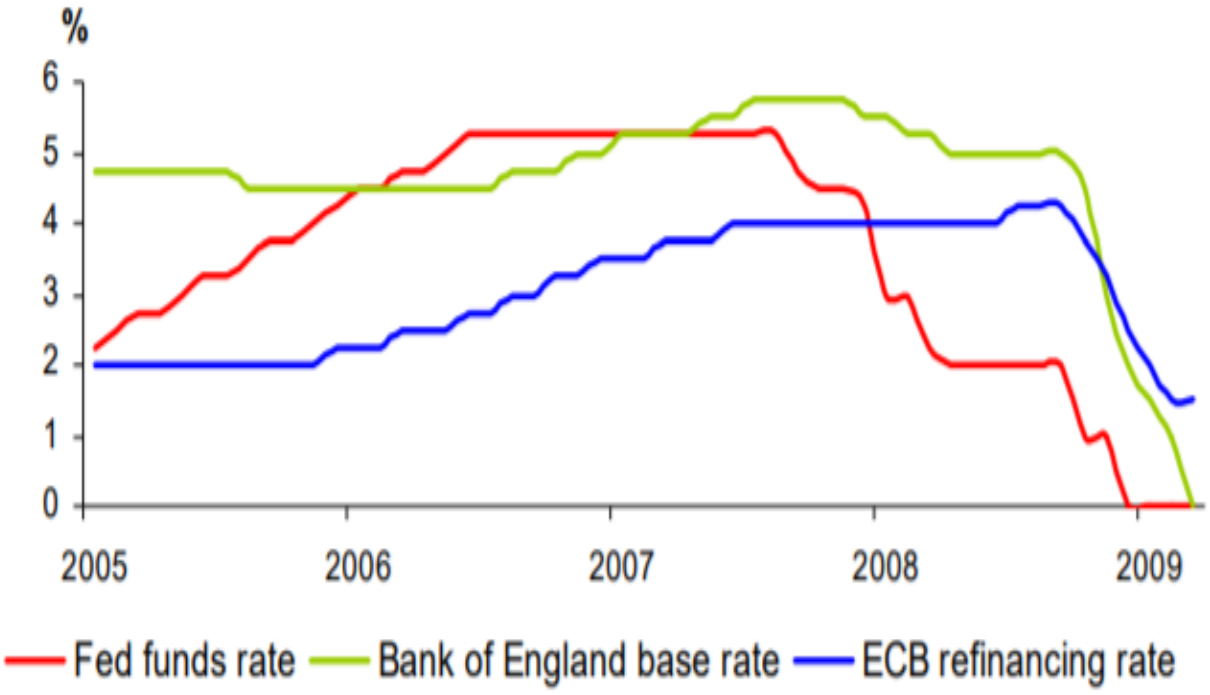
The financial crisis in the short time spread to influence US and real economy in the World. Doubts about financial losses and uncertainty ensured interbank loan rates increase. Moreover, banks and hedge banks witnessed bank runs of depositors who wanted to redeem their money. This bank run in turn required from bank to have good capital adequacy in order to meet investors' demands. Institutions which had used MBSs and CDOs as collateral for having asset-backed commercial paper especially a short-period horizon loan contract engaged in by firms and banks. They could no longer get the sufficient loans as interest rate gaps spiked.

Federal Reserve operated as a key factor in regulating financial threats under the period of Alan Greenspan who commonly opted for injection of liquidity and lower interest rates in the reaction. Federal Reserve, led by Ben Bernanke after 2006, admitted a known approach but a bit wide using four main methods.

Firstly, interest rates were stable in the reaction of Fed. Fed's fund rates were 5.25% in the summer of 2007, Fed Reserve Board consisting of 7 governors voted to decrease interest rates to 2% in August 2008. (Chart 3): This decision entailed significant cut with 1.25% (a decrease of 125 basis point) in January 2008. The Fed also

made a decision about decreasing the gap between funds rate and discount rates. By means of this decrease, it was expected that banks would become more liquid. Prior to August 2007 the opportunity rate was 100 basis points above the Fed Funds rate; however this gap had decreased to about 25 basis points in March 2008.

Chart 3 - Headline Interest Rates at the Bank of England, ECB and the Fed, 2005-2009



Sources: Bank of England, ECB and Federal Reserve

Secondly, The Fed introduced the Term Auction Facility in 2007 December for offering short-term liquidity. Term Auction Facility allowed depository firms to anonymously bid to get funds underwritten by a large variety of collateral over a 25-36-day period. From December 2007, auctions were held each two weeks and entailed huge sums including from $20bn to $50bn, which increased more than $50bn after May 2008. In the first month successes were felt in decreasing credit spreads, but such

decreases traditionally ended only few days and could not have any significant impact on spreads after March 2008. In July 2008 The Fed extended the period of Term Auction Facility to 84 days.

Thirdly, the TSLF (Term Securities Lending Facility) was announced in March 2008 and amounted to $200bn in Treasury securities with an attempt to raise bank liquidity and to decrease credit spreads on MBSs that stopped trading because of their riskier premiums. It allowed banks to use a wide range of assets including junk bonds (high yield bonds) and securities in the form of collateral. In 2008 May it included ABSs. It also could not be effective and fail to decrease MBS risk spreads in the long run despite of having initial success.

Fourthly, The Fed made takeover of Bear Stearns easier. Mainly the investment banks were exposed to lots of risks in MBSs. Therefore, they required non-ordinary loans to survive in the weekends prior to being bought by JPMorgan Chase. The Federal Reserve Bank of New York protected JPMorgan Chase against misfortunes surpassing $1bn in return for a charge, a reasonable sign the Fed felt that the bank couldn't be permitted to come up short.

In 2008, September Lehman brothers with over $600 billion gross assets filled with bankruptcy which was one of the largest defaults in the history of US. This company was the fourth largest investment firm in the USA after Goldman Sachs, Morgan Stanley, and Merrill Lynch before its failure. The CEO of Lehman Brothers was Richard Fuld who was being characterized with his aggressiveness, ruthless, and ambition. At that time, Lehman brothers was highly leveraged firm and used huge amount of short term repurchase transactions, thus it made for Lehman Brothers company difficult to renew contracts and banks rejected to lend, posing Lehman

Brothers' demise. Lehman Brothers' collapse was the worst downfall and economic recession after World War II.

Looking into financial reporting of Lehman's more details, we can see while its earnings were $489 million for the first quarter, and could raise capital $4 billion equity capital in April, followingly Lehman Brothers reported large losses $2.8 billion in the 2nd quarter in 2008. The reason was the investment failure of subprime mortgages.

	Three Months Ended	
In millions	May 31, 2008	Feb 29, 2008
Beginning tangible equity capital	$25,696	$23,103
Net income	(2,774)	489

In 2007 in the last quarter Lehman brothers' assets were equal to $691.1 ban; in the first quarter of 2008 it was 786 bn, whereas in 2008 in the second quarter it was $639 bn. Of course, the proportion of liquidity changed over the period over three different classes. The proportions of liquidity were 52.5%, 53.8%, and 53.2% respectively in the assets, 42.4%, 41.6%, and 41.4% respectively in intermediate asset levels and finally the rest ones were 5.1%, 4.6%, and 5.4% accordingly in the illiquid assets. Cash and equivalents, cash and securities engaged for regulatory purposes, agency debt, corporate equities, money market instruments, corporate debt and commercial paper are included to liquid assets. Receivables, mortgage backed securities and mortgages, borrowed securities, interest rate derivatives are included to intermediate liquid assets. Finally, property, equipment, plant, goodwill and intangible assets and other assets are included to illiquid assets.

	OWNED		SOLD BUT NOT YET PURCHASED	
IN MILLIONS	NOV 30, 2007	NOV 30, 2006	NOV 30, 2007	NOV 30, 2006
Mortgage and asset-backed securities	$ 89,106	$ 57,726	$ 332	$ 80
Government and agencies	40,892	47,293	71,813	70,453
Corporate debt and other	54,098	43,764	6,759	8,836
Corporate equities	58,521	43,087	39,080	28,464
Real estate held for sale	21,917	9,408	—	—
Commercial paper and other money market instruments	4,000	2,622	12	110
Derivatives and other contractual agreements	44,595	22,696	31,621	18,017
	$313,129	$226,596	$149,617	$125,960

CONSOLIDATED STATEMENT OF FINANCIAL CONDITION

IN MILLIONS	NOVEMBER 30, 2007	2006
ASSETS		
Cash and cash equivalents	$ 7,286	$ 5,987
Cash and securities segregated and on deposit for regulatory and other purposes	12,743	6,091
Financial instruments and other inventory positions owned (includes $63,499 in 2007 and $42,600 in 2006 pledged as collateral)	313,129	226,596
Collateralized agreements:		
Securities purchased under agreements to resell	162,635	117,490
Securities borrowed	138,599	107,666
Receivables:		
Brokers, dealers and clearing organizations	11,005	7,449
Customers	29,622	18,470
Others	2,650	2,052
Property, equipment and leasehold improvements (net of accumulated depreciation and amortization of $2,438 in 2007 and $1,925 in 2006)	3,861	3,269
Other assets	5,406	5,113

In the economy one of the worst cases was the failure of Lehman brothers in the US history. In order to see full picture of this failure it is a good idea to analyze the financial condition before the failure. Before the collapse, Lehman brothers shifted from conventional banking to the modern banking. Approximately one decade before the financial market in the US witnessed what can be best defined as a financial bubble. This bubble stemmed from taking advantage of lower interest rates which translated into significantly lower operating costs. A lot of financial analysts see the reason of this collapse in the real estate industry. Mortgages were turn into bonds and CDOs which were bought by investors. It meant that initially people could buy mortgages with lower prices relatively. In 2007 the financial crisis started to hit financial market in the US and some Europe countries. It forced Federal Reserve and European Central banks to save their economies by bailing out. Hence, the collapsed subprime mortgages became a feature of 2007 year, in addition to, alone the value of only subprime mortgages amounted to $2 trillion mark by August in 2007. As the financial crisis was ensured, the banks made freeze interbank lending. The reason behind that case was that correctly pinpointing bonds and CDOs was very difficult and it had been influenced by the collapse of subprime mortgages.

Despite lots of challenges encountered by banks, investors could not predict that this failure could affect entire financial system. Moreover, the collapse of subprime mortgages, the Dow reached its peak in 2007 October.

There were several factors that played a role of catalysts in the collapse of Lehman Brothers. The first one was excessive leverage. The second one was over-dependence on the short-term debt, the third one factor was under-collateralization, and the fourth catalyst was incapability of raising capital. Overdependence on the short-term debt makes the firms fragile to liquidity shocks.

The several areas that Lehman failed to control were business and risk management. Lots of decision which were taken by Lehman Brothers was not out of ordinary. The failure stemmed from risk bearing capacity of Lehman's. In addition, financial reports deceived investors. In 2006, Lehman brothers switched its strategy to more aggressive method by means of increasing its investments high profit lines, which means to the high risky ones. (Baker, 2016). In the 2007, Lehman brothers leveraged lending and private equity such as investments. These investments were considered risky, since Lehman Brothers were acquiring illiquid assets which might be sold lower than its intrinsic value or even might not be sold easily in the market. Lehman brothers at that time began to shift from moving concentrating on exclusively on the moving business, to the storage business, which means making longer-term investments utilizing Lehman Brother's balance sheet. Despite Lehman informed the Board, Board did not take it seriously. It was informed that in order to increase aggressively the firm would take high business risks. Furthermore, the board was informed that business risk would cause high risk metrics overages. Fact is that after 2008 financial crisis, conditions hampered the firm's liquidity substantially.

There were also misstatements in the financial statements. Because Lehman treated repo transactions like financing, not sales transactions. From mid-2007, Lehman encountered a crisis, since market participants started to begin requiring the investment banks to decrease their leverage. Incapability of decreasing leverage could lead to a rating to go down, that would have imminent. Tangible effects on the Lehman in mid-late-2007: Till January 2008, Lehman hoped to decrease firm's positions in not only commercial, but also in residential real estate, and managed to leverage the loans by the half. Selling out the inventory, however, was very difficult in late 2007. Lots of Lehman's inventory strategies were hard to sell without incurring

any considerable losses. Furthermore, selling illiquid inventory at lower prices could lead to decreased confidence of Lehman in the market.

Question is that whether Lehman could prevent default? In this question the only judgement could lie on its good risk absorption capability when it had lower chance of crisis occurrence. In this case, following things could be taken into account. The first one is the risk appetite. The risk appetite and risk exposure are the main indicators that need to be in the form of ratios in order to show picture of the firm's risk attitude. Changing attitude is a strategic problem and should be decided by management, not executives. But in the Lehman Brothers the change of attitude was decided by executives and the default of Lehman Brothers led to revaluation of risk exposure stemming from credit default swaps.

Stress tests could have alerted Lehman Brothers about forthcoming crisis. It demanded to give much attention, while Lehman gave scant attention to stress tests (Schapiro, 2010). This failure highlighted the necessity of newer testing systems and methods including tests for destruction (Kemp, 2014).

> Risky assets exposure needs to be consistent with adequate capital (McNeil, Frey 2015). It is true that Lehman raised a capital in the crisis, but this capital was accommodated with risky assets already in the balance sheet, not for forthcoming assets in the future. Adequate capital is also measured using a credit conversion element.

The honest, accurate profile statement would have indicated alarming duration difference for Lehman (Carrel, 2017). Thus, either it was not done, or neglected by executives. No matter when, in case of long-term assets are financed by short-term assets, the gap in the duration will inform to underline the forthcoming danger and

threat. Risk management system had better have duration gap analysis (Asian Development Bank, 1999).

Fair valuation and asset recognition should be compliance with International Financial Reporting Standards. Fair valuation is expected to be driven by market condition and management perception. Moreover, an asset is recognized only in case of reporting firm has the right to its future benefits including cashflows (Epstein 2014). The cash that was indeed a substation for a repo was not treated as an asset of Lehman under IFRS. Although Lehman was prone to stick to the legal ownership identification and reported them as its assets:

The default of Lehman Brothers, one of the largest investment banks, has had lots of impact on the entire economy that is why this case is examined a lot by using ratios. The researches indicated that the credits of Lehman Brothers were very bad, whereas its management was not only unwilling, but also unable to reserve its declining. In addition to it, management could not comply with the legislatures set by the responsible authorities, and its risk management team managed risks insufficiently proportionally. The last but least this company was fragile to its risks and unable to stop them. And supervisory authorities should have informed that Lehman Brothers witnessed some signs of decrease respectively.

The famous financial crisis happened in 2008 brought weaknesses in the banks' system and illustrated the outcomes of non-expected risks within uncertainties. The sequences of those events led to extreme decreases in the growth rates and increases in the employment rates significantly. This crisis forced all financial institutions to examine their financial activities regularly and supervise them effectively.

In 1979 the US banking industries established the Uniform Financial Institutions Rating System (UFIRS); it was followed by the establishment of Federal Reserve. The

main indicators to measure health level of company of are CAMELS ratios, which are interpreted as capital, asset's quality, management, its earning, and liquidity ratios. This CAMELS method concentrates on the evaluation of the banks by examining balance sheet, P&L or Profit and Loss statement, so they are able to observe institution's trend. In the CAMELS system performances are ranked from 1 to 5 scales, 1 means optimal, and 5 means worse case for the risk management.

Let us examine each other. The first one is Capital Adequacy Ratio. Capital ratio of bank is very crucial indicator. Its main role is to save bank in case of any risks or threats. The bank which is called have capital adequacy should maintain its capital adequacy ratio higher than 8%, or total quantity of capital has to equal greater or equal to 8% of its risk weighted assets.

Capital Adequacy ratio is ratio of the sum of the TIER I and TIER II to the risk weighted assets. Here TIER I is composed of the basic and own capital. It entails preferred and common stocks as well as convertible bonds. While, TIER II is bank's mandatory capital: TIER I is demanded to be half of the risk weighted assets. The higher TIER I capital means better capital adequacy ratio.

The second important indicator is Asset quality's ratios. Asset quality evaluation is done by means of assessing credit risks which are associated with portfolio of bank. Here bad and doubtful claims are also taken into account. It is calculated as following formula:

(TOTAL NON-ACTIVE LOANS less than 90 DAYS – PROVISIONS) / TOTAL LOANS

The nominator includes the net non-performing assets. The non-performing assets more than 90 days are defined by Basel II. The lower ratio is interpreted as the more accurate or better bank provisions, the better quality and reliable portfolio.

The third necessary ratio is management quality ratio. The mechanism is formed by management which decides to make sure bank is doing well, smooth operation and handle and exercise risks very well. Here the ratio of management expenses to the sales is used widely. It reveals the correlation between the percentages of expenses and sales. Expenses include all operating expenses. Lower ratio means better management logically.

The fourth indicator is earning ratio. Because earning is the primary source of income for the financial institutions: It is measured with regard to interest rates and provisions. The evaluation of earning shows not only amounts and income trends, but also duration and its quality.

ROA= NET PROFITS/ TOTAL ASSETS

ROE= NET PROFITS/ OWN CAPITAL

The first ratio illustrates the relation of net profits to the total assets. In the end firm knows whether the firm produces enough profit. Higher ratio is better performance.

The second ratio indicates the relation of the net profits to the capitals. The higher ratio is better efficient manner management of own capital.

The fifth measurement is liquidity ratio. It measures the ability of the bank to combat its financing sources and market condition's change which forces the firm to liquidate faster, and it is resulted losses.

Ratios are followings:

Loans to the Total deposits are the ratio of the total loans to the total deposits and this ratio measures the extent of deposits for issuing the loans. The lower the ratio is means better liquidity for banks.

The second formula is the ratio of the circulating assets to the total assets which measures bank's liquidity with respect to its circulating assets. The higher ratio means the better indicator for the liquidity of the bank.

The last but least ratio is sensitivity to the entire market. It examines the changes in the interest rates, foreign currencies, price of the selling and others. The ratio of the Total securities to the Total assets gives the formula for Total securities to the Total assets. Price changes may have unfavorable results for the bank. The higher ratio means higher market securities for the banks, which is the worst case.

The result of the research:

2003 CAR= (13,175 TIER I + 2,224 TIER II) / 156,031 WEIGHTED Assets = 9.870%

2004 CAR= (14,922 TIER I + 2,924 TIER II) / 185,727 WEIGHTED Assets= 9.609%

2005 CAR= (16,793 TIER I + 3,408 TIER II) / 221,434 WEIGHTED Assets = 9.123%

2006 CAR= (19,193 TIER I + 5,879 TIER II) / 287,021 WEIGHTED Assets= 8.735%

2007 CAR= (22,493 TIER I + 7,643 TIER II) / 414,638 WEIGHTED Assets= 7.268%

Table 1. CAR

YEAR	CAR
2003	9,870%
2004	9.609%
2005	9.123%
2006	8.735%
2007	7.268%

The table chart above gives information about Lehman Brother's Capital Adequacy ratios from 2003 till the 2008. It is seen that in 2007 capital ratio keeps the lower CAR 8%, so the financial condition of Lehman was not good, and became worse

as the time passed. At that time bad and doubtful claims were also in large numbers. So, it made access to the capital very sophisticated.

Let us have a look at assets' quality ratios:

Table 2. Assets Ratios

YEAR	ASSETS RATIO
2003	0.02567
2004	0.03331
2005	0.02800
2006	0.03343
2007	0.05412

2003 (853 NON-PERFORMING - 460 PROVISIONS) / 15,310 LOANS= 0.02567

2004 (1,189 NON-PERFORMING - 564 PROVISIONS) / 18,763 LOANS= 0.033316

2005 (1,257 NON-PERFORMING - 651 PROVISIONS) / 21,643 LOANS= 0.027986

2006 (2,056 NON-PERFORMING - 1,121 PROVISIONS) / 27,971 LOANS= 0.033433

2007 (4,074 NON-PERFORMING - 1,732 PROVISIONS) / 43,277 LOANS= 0.054115

As mentioned, lower ratio is better. These results show that Lehman had lower ability to measure, control, and mitigate credit risks and its ability worsened. Lehman Brother's policy to issue loans was very ineffective and the worst. By increasing the amount of high risky debt and it also increased the insolvency ratios and led to raise non-performing assets.

In the management ratios, company is able to determine whether it is doing smooth operation and how it is handling risks. These ratios illustrate the signs of the development and the ratio is stable in high levels. Combining all results till now, we can deduce that loans were bad and doubtful. The Lehman had better to be flexible to the recommendation given by supervisory authorities.

2003 4,752 / 17,289 = 0.274770

2004 6,388 / 21,252 = 0.300520

2005 7,929 / 32,421 = 0.244571

2006 9,537 / 46,709 = 0.204158

2007 10,599 / 59,004 = 0.179635

Table 3. Management ratios

YEAR	MANAGEMENT RATIO
2003	0.274773
2004	0.300518
2005	0.244571
2006	0.204158
2007	0.179635

Looking at the earnings ratios of Lehman into more detail, we can deduce that profits were low and insufficient. Fair price for ROA usually lies between 1% and 2.5%.

2003 ROA = 1,700 NET PROFITS / 312,063 TOTAL ASSETS= 0.005444

ROE = 1,700 NET PROFITS / 13,177 OWN ASSETS= 0.128966

2004

ROA = 2,371 NET PROFITS / 357,168 TOTAL ASSETS= 0.006633

ROE = 2,371 NET PROFITS / 14,920 OWN ASSETS= 0.15878

2005

ROA = 3,262 NET PROFITS / 410,064 TOTAL ASSETS= 0.00795

ROE = 3,262 NET PROFITS / 16,794 OWN ASSETS= 0.194117

2006

ROA = 4,006 NET PROFITS / 503,547 TOTAL ASSETS= 0.007958

ROE = 4,006 NET PROFITS / 19,191 OWN ASSETS= 0.208796

2007

ROA = 4,194 NET PROFITS / 691,065 TOTAL ASSETS= 0.006066

ROE = 4,194 NET PROFITS / 22,490 OWN ASSETS= 0.186394

Table 4. Earnings Ratios

YEAR	ROA	ROE
2003	0.005444	0.128966
2004	0.006633	0.15878
2005	0.007950	0.194117
2006	0.007958	0.208796
2007	0.006066	0.186394

The outcomes for ROE are near to the average. It is acceptable ratio. Its profits were increasing for the five years but in 2007 profits declined and signaled the upcoming collapse.

Liquidity ratios are as followings:

E. LIQUIDITY RATIOS

L1

2003 15,310 / 39,999 = 0.38276

2004 18,763 / 50,140 = 0.374212

2005 21,643 / 44,975 = 0.481223

2006 27,971 / 58,609 = 0.477248

2007 43,277 / 86,346 = 0.501204

L2

2003 131,099 / 312,061= 0.420106966

2004 150,077 / 357,168 = 0.420186019

2005 179,362 / 410,063 = 0.437401082

2006 230,175 / 503,545 = 0.457109097

2007 313,103 / 691,063 = 0.4530744669

With regard to the L1 ratios we can conclude that those ratios are normal. It means that loans were lower than deposits. The highest ratio is witnessed in 2007, approximately half of its deposits. Whereas, L2 circulating assets were lower than average assets.

Table 5. Liquidity Ratios

YEAR	L1	L2
2003	0.382760	0.420106966
2004	0.374212	0.420186019
2005	0.481223	0.437401082
2006	0.477248	0.457109097
2007	0.501204	0.453074466

The last but least, the sensitivity ratios showed the poor levels of management. These ratios plummeted in 2004 by reaching nearly half. Due to instability in the unexpected risk periods it decreased afterward.

Table 6. Sensitivity Ratios

YEAR	SENSITIVITY
2003	0.455738
2004	0.488840
2005	0.343223
2006	0.447221
2007	0.435899

If we combined all ratios in one table chart, here it would be much easier to compare different results by means of CAMELS system. This system facilitates draw conclusions easily. All of the individual ratios are ranked from 1 to 5. In which 5 shows the best, while 1 illustrates the worst performance. The higher result means better banking status in the market. Here coefficients chosen from individual ratios are followings: C=3.5, A=1.5, M=1, E=3, L=2, S=2.

From combined ratios we can conclude that based in CAMELS ratios assessment Lehman Brothers experienced the best year's performances in 2005, 2006. While following year everything changed adversely and led to the collapse of Lehman Brothers. In 2007 Lehman witnessed the worst condition. Most of its credits were doubtful and bad. However, management was not eager to decline the volume of those bad and doubtful credits. Moreover, the management did not comply with the laws, limits set by the responsible authorities while risk management system alarmed the company that methods were insufficient. Based on CAMELS assessment, US Federal Reserve and responsible oversee authorities should have felt his decline, and should have taken strict methods, measures in order to prevent this upcoming decline, and the chance of collapse.

Table 7. Combined Rating Scores

YEAR	2003	2004	2005	2006	2007
CAR	9.870%	9.609%	9.123%	8.735%	7.268%
RATING	5	4	3	2	1
ASSET	0.02567	0.03331	0.02800	0.03343	0.05412
RATING	5	3	4	2	1
MANAGEMENT	0.274773	0.300518	0.244571	0.204158	0.179635
RATING	2	1	3	4	5
ROA	0.005444	0.006633	0.007950	0.007958	0.006066
RATING	1	3	4	5	2
ROE	0.1289661	0.15878	0.194117	0.208796	0.186393953
RATING	1	2	4	5	3
L1	0.382760	0.374212	0.481223	0.477248	0.501204
RATING	4	5	2	1	3
L2	0.420107	0.420186	0.437401	0.457109	0.453074466
RATING	1	2	3	5	4
SENSITIVITY	0.455738	0.488840	0.343223	0.447221	0.435899
RATING	2	1	5	3	4

Table 8. Results of Combined Rating

RATING 2003	47
RATING 2004	50.5
RATING 2005	63.5
RATING 2006	66
RATING 2007	43

Conclusion

This financial crisis greatly had impacts on whole economy. It adversely affected to the all financial industry around the world. The CAMELS assessment not only indicated the reason of Lehman due to extended credits, but also showed the role of ineffective role of Credit Rating Agencies. Because at that time Credit Agencies had given excellent rates to the Lehman Brothers; The US Federal Reserve should have felt this collapse beforehand and should have taken measures to prevent it. The rating agencies should learn from this lesson should be forced to review operation attentively and to give accurate ratings, interpreting correctly, and recommending proper solutions. In reverse case, similar event will be witnessed. At the moment Basel III gives guidelines, which are prone to emphasize for treating paradoxes and on TIER I. Furthermore, credit rating agencies have to review way of operation and make sure transparency of evaluations and keep their role in the market by being honest.

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