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The Bankruptcy of Lehman Brothers

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Abstract

This study has the objective of analyzing the bankruptcy of Lehman Brothers, in an attempt to discover and prevent new failures of such magnitude, and to discover what were the causes, and its respective role, in this bankruptcy. How the financial crisis affect this old investment bank, and the role of new investments and financial instruments like CDO, CDS, Synthetic CDO and other ABSs. Also, the role of the real estate bubble and how Lehman acted in this bubble, and consequent burst of it. Together, with an analyzes of the role of risk and how to manage it, and moral hazard and its dangerous role to the financial market, in special financial firms.

Key Worlds: Leverage, Lehman Brothers, Subprime Crisis, CDO, CDS, Synthetic CDO.

JEL Codes: E44, G01, G21, G33

Abstracto

Este estudo, tem como objectivo a análise dos diferentes factores que levaram à falência da Lehman Brothers, numa tentativa de descobrir e prevenir novas falências, de magnitude semelhante e de descobrir as suas causas, bem como os respectivos papéis nesta falência. Por um lado, tentamos perceber como a crise financeira afectou este antigo banco de investimento e o papel dos novos investimentos, instrumentos financeiros, como: *CDO*, *CDS*, *Synthetic CDO* e outros *ABSs*. Por outro lado, o papel da bolha imobiliária e como esta agiu na Lehman e seu consequente rebentamento. Desta forma realizámos uma análise do papel do risco e como geri-lo, do risco moral e o seu papel perigoso no mercado e instituições financeiras.

Palavras-chave: Alavancagem financeira, Lehman Brothers, Crise do Subprime, CDO, CDS, Synthetic CDO.

JEL Codes: E44, G01, G21, G33

List of Abbreviations

ABS: Asset-Backed Securities;

AIG: American International Group;

ARM: Adjustable Rate Mortgage;

BofA: Bank of America;

CCDO: Commercial Mortgage Collateralized-Debt Obligations;

CD: Certificate of Deposits;

CDO: Collateralized-Debt Obligations;

CDS: Credit Default Swamp;

CEO: Chief Executive Officer;

COO: Chief Operating Officer

FDIC: Federal Deposit Insurance Corporation;

FED: Federal Fund Rate;

GSE: Government-Sponsored Enterprise;

ISDA: International Swap Derivatives Association;

LBO: Leverage Buyouts;

LIBOR: London Interbank Offered Rate;

LTCM: Long-Term Capital Management;

Lvg: Leverage;

KDB: Korea Development Bank;

MCDO: Mortgage Related Collateralized-Debt Obligations;

NB: Neuberger Berman;

NYSE: New York Stock Exchange;

RCDO: Residential Mortgage Collateralized-Debt Obligations;

RCE: Return on Common Equity;

Repo: Repurchase Agreement;

SEC: Securities and Exchange Commission;

TARP: Toxic Assets Relive Plan;

U.S.A.: United States of America;

US: United States;

YoY: Year to Year;

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Executive Summary

Esta dissertação, tem como objectivo a análise dos diferentes factores que levaram à falência da Lehman Brothers, numa tentativa de descobrir e prevenir novas falências, de magnitude semelhante, e de descobrir as suas causas, bem como a intervenção, de cada um dos actores, nesta crise.

Na primeira parte, faremos uma breve introdução a este estudo, revelando os nossos objetivos, que inclui uma análise dos problemas mais recorrentes no sector bancário, em especial, os que afectaram o banco de investimento Lehman Brothers, como, por exemplo, o risco moral, a gestão de risco e o investimento de curto e longo prazo. Será, ainda, descrita, sumariamente, a metodologia usada.

Na segunda parte desde estudo, faremos uma análise literária dos temas que envolveram a falência do Lehman Brothers, nomeadamente, a gestão de risco, incluindo instrumentos financeiros como CDOs, CDSs e CDOs sintéticos; a relação entre agente e principal; o risco moral, assim como outras soluções típicas. Será abordada a relação entre investimentos de longo e curto prazo; risco sistémico e corrida aos bancos, bem como o "*Lender of Last Resort*".

Na terceira parte, tentamos explicar como a crise financeira afectou este antigo banco de investimento e o papel dos novos investimentos e instrumentos financeiros, como o CDO, CDS, Synthetic CDO e outros ABSs. Qual o papel da bolha imobiliária, quais as consequências do seu rebentamento e a iteracção com o Lehman. É, ainda, alvo da nossa atenção, o risco e sua gestão, o risco moral e o seu papel nessa falência. Ilustraremos os momentos finais, que levaram ao pedido de falência da Lehman Brothers, bem como algumas das consequências desta falência.

Na parte final, concluímos que a falência do Lehman Brothers se deveu a múltiplos factores, incluindo o alto nível de alavancagem; mostrando, ainda, como risco moral pode ter afectado esta falência.

Chapter 1 – Introduction

This dissertation deals with the basic problems, that banking industry faces and investment banks, from the basic theory of banking like different ways to manage risk and financial instruments, that would create the crisis, like CDO, CDS and other types of ABS, with special attention to the events that led to the bankruptcy of Lehman Brothers, like an increase in risky behaviors from senior management. the high risk investments, in real estate, together with the fallacy that prices in Real estate, would never go down; a credit crunch that create a lack of capital and its inability to find proper funding to stay afloat, during the crisis, and its consequences to the broader economy.

The motivation for choosing such subject, for this dissertation, comes from the need to understand the current economic crisis, from the begging in the financial markets to the spread to the broad economy. Together with the need to better understand the banking industry, and its dangers to the broad economy, and how banking can improve it or damage it, and considering the complexity and size of such problems and subjects, we choose to analyze the bankruptcy of Lehman Brothers. Its particular role in the financial crisis that spread and create the current economic crisis, not only as an event that change it from a relative contained to be completed spread through the global economy.

The main point of this dissertation, encompass the many causes to Lehman Brothers debacle, which include moral hazard, excessive risk being taking by the firm, large investments in real estate and related assets, with the fallacy that the prices would never go down, its very high levels of leverage, together with an overvalued estimate of assets, an inability to find investors and capital, to stanch the damage, together with the lack of capital, that would take down the firm. The outside factors were also analyze, the burst of the real estate boom and the consequent subprime crisis, the strong lack of political will to save – bailout – another financial institution, with taxpayers money.

This work is organized as follows: in the second chapter, we present a small review of the main problems that are associated with the banking industry; Why banks take too many risks; how to analyze and manage risk, including financial instruments

that will help manage the risk; the principal-agent relation in the financial industry; a simply and summarized analyzes of moral hazard; the liquidity problems associated with bank deposits, bank runs, together with systemic risk; and the last, a simplified analyzes on theories about lenders of last resort.

In the third chapter, we undertake a lengthily analyzes of the process and events that led to the collapse of Lehman Brothers. A small history of the bank, its approach in risk since. Richard Fuld become CEO, its leveraging strategies, with a special attention to leverage buyouts. we did, also, an approach on the firm's Real Estate investments and real estate related instruments. Together with a simplified analyzes of the crisis, including its begging's in the subprime market, and its spread to other markets. Then, a more detailed analyzes of crisis in Lehman Brothers, with a description of the final events that would led Lehman Brothers to file for bankruptcy protection. To finalize, a small and generic description of the sale to Barclays Capital and Nomura Holdings, the consequences of the collapse. In the final chapter, we present some conclusions about the breakdown of Lehman Brothers.

Chapter 2 – Banking

The modern banking industry, is one of the most important industry in our modern economy, and it is a lot more than the original and old bank system in the medieval ages of Europe where the main activity of a bank were to store and protect wealth (in various forms usually gold and gems) and the initial lending operations. The modern banking industry is spread worldwide and employs thousands of peoples in numerous activities, going from the original vault of wealth to the extremely complicated models of future debts, passing to the common check book accounts, savings, investment, deposits, lending and much more.

Our society has a very high need for the banking systems to function properly, in order to provide the means of payment and credit that our economy is based upon. The banking industry provides a range of services to our economic system, like credit for companies, credits to consume, and providing more efficient ways of handling capital, also provide consulting for its clients on different ways of investments, and wealth management.

We will discuss with more careful attention to the different parts of the industry and with special attention to the sector of investment banking and the financial sector. We will talk about risk and different ways of managing it, Principal-Agent relations and problems, borrow short and investing long, bank runs, systemic risk and lender of last resort.

2.1 Managing Risk

2.1.1 Risk

Risk in the banking industry is in simple terms the probability of some unexpected event to happen and change the expected return of an investment. In banking the most dangerous is the probability of default of its borrowers or the lack of liquidity due to illiquid investments made by the bank.

2.1.1.1 Credit Risk

Credit Risk is the risk that a bank takes when lending capital, the risk in this case consist on a default probability by the debtor. This is the most important risk in the banking industry considering that the industry consist in very different ways of lending (Freixas & Rochet 2008), the correct analysis of this type of risk is extremely important and necessary, the wrong risk assessment may cause some problems like a lack of profitability to a full failed of the bank or financial system.

Being the most important kind of risk also means that it has a very large range of possibilities, types and sizes. Credit risk varies from a very small risk to a very large (the different ways of managing, handling and reducing risk will be discuss later). The analysis of such risk can be done on a variety of forms such as the capability of the debtor of making the payments, with his declare income, or the capacity of production of goods and services (mean case for business from farms to industries) and naturally the possibility of some asset or assets to serve as collateral (usually but not exclusively real estate).

2.1.1.2 Liquidity and Interest Rate Risk

Liquidity risk consists in the risk take by a bank, when this bank issue liquid deposits, guaranteed with illiquid assets such as loans. When a bank does such operation it is taking the risk of an abnormal and unexpected withdrawal, this withdrawals can be cause by a different range of reasons but the most important for a bank is the Interest Rate or more specific the future change in the Interest rate, considering that the bank is paying for its deposits and being pay by its assets or loans, an abrupt change on the interest rate can cause a massive wave of withdrawals that will force the bank to find new source of funding usually in a more expensive way, that can in a worst case scenario cause the bankruptcy of the bank through a bank run, this change on the future of interest rate consist the Interest Rate Risk.

Interest Rate Risk is problematic because, when interest rate raises, clients can withdraw its deposits, to finding more profitable alternatives. That is, with the fixed rate of bank deposits, a variation in interest rate will not be passed to the client, which now have a larger interest to withdraw and find better rates for its' money.

The combination of Liquidity and Interest Rate Risk is one of the most dangerous risks in the industry, and with the current extremely interconnected players of the market this consist in a very dangerous risk that can easily transform from systemic risk to a systemic fail and collapse.

2.1.2 Managing Risk

Managing all the above risks and others are an essential part of the banking business and the way that is done will reveal to be the difference between successes or failures in the industry. In an industry that is driven by risk taking, too much risk may cause someone's demise but taking too little risk will also be a problem usually on profitability. The ideal risk to be taking is a relative idea (and probably will never be discovered or agreed on); the best way than, is to take a secure quantity of risk and with a preferable diversification on the level of risk, and avoid unnecessary and most important unrewarded risk.

Managing risk is the entire process of avoid, reducing and handling risk, in this paper we will ignore the avoidable risk. The most common way of reducing risk is to ask something in exchange, this is known as collateral, that can be simple and easy as the asset that the credit is being use to buy, a common example of this is a mortgage to buy a house, in a way that if the debtor does not pay the lender will take possession of such asset, in this case the house or -in other cases- an investment portfolio or any other asset that was used as collateral. Another way of reducing risk is to make an insurance of the debt in question. An important part of managing risk is the way that the bank analyses such risk, so the firm can manage, after taking the risk and the hedging of such risk.

An important way to manage risk is to prevent the damage that risk can cause in the bank and in the system, for this cause all banks must have reserves on the risk it owns, that is every time a bank makes an investment, a loan or any other operation with risk, the same bank is force by regulations to reserve a percentage of the investment, this percentage varies with the amount of the risk the same is taking[1]. The reserves do

[1]I will not describe the percentage correspond to different levels of risk because this is determinate in the Basel III agreement that yet is not completely in function.
[2] The United States Of America (U.S.A.) Treasury Bills and Bonds are merely an exemplar of an asset that was considered safe but due to political reasons in the U.S.A. this may be not the case anymore.

not need to be kept in capital and hoard in the bank's vaults it can be in very safe securities such as the Treasury Bills or Bonds of the United States of America[2].

Of the enormous numbers of ways to managing risk we will take special attention on ABS or Asset-Backed Securities and its most important variants CDO or Collateralized-Debt Obligations, CDS or Credit Default Swap and synthetic CDOs.

2.1.2.1 Asset-Backed Securities

Asset-Backed Securities or ABS is a type of securities that is backed by an asset. This being a financial instrument to managing and reducing risk in the securities market, that works in a very simple way, first a pool of assets is created and a value is determinate, this is the value of the securities being issued and sold (Zweig 1993).

Why use an ABS? Because in a normal issued security like bonds if the issuer of such a bond defaults the normal procedure is to go to a court of law and then decide which asset goes to whom, in an ABS the asset distribution is already done than saving a significant amount of time and resources. Also the risk of an ABS is already calculated -and know in the moment of the sale, with the fact that is a pool of assets, the associated risk is spread giving a higher total yield at a lower risk.

2.1.2.2 Collateralized-Debt Obligations

Collateralized-Debt Obligations or CDOs is a type of ABS, in which the assets used as guarantee is the debts of others, in simple terms a CDO is an ABS which bonds and others securities as the assets used as guarantee. In the basic principle of finance, diversification is the main goal of a CDO, for lack of a better explanation, is a pool of debt, from bonds, to mortgage, to student loans, that is put together in order to create a very large investment pool and then slice it into pieces, called tranches that are sold to investors.

With this financial innovation, it becomes possible for small investors to allocate their resources to a wider range of investments. That happens because when a CDO is created it uses different types of investments with a variety of risks and yields. With this tool, the risk and income is averaged out, then becoming a relative safe investment. In a

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way to better guarantee CDOs, as a safe investment, it is usually slice into several tranches, with different risks and incomes. The most popular division of a CDO is in three segments: the first and safest, is the Senior Tranche; followed by the Mezzanine Tranche and then Equity Tranche, which will be responsible for the first wave of losses, and it is the riskiest of all tranches. An important note, is that the usual repayment of the investment is done monthly or annually, depending on the payment of the debts in the underlying assets of the CDO.

The equity tranche was initially, almost exclusively, to be hold by the issuer of the CDO, making the system safer and reducing the risk of moral hazard, in the way that the first wave of losses would be taken by the issuer of that CDO.

But with the economic evolution and the fear of inflation that allowed the Federal Fund Rate FED to be very low, and then the consequent fear of an economic downturn due to the terrorist attacks of September 11, that not only allowing the FED to be low, but making it even lower. This scenario makes that the yield paid by almost all safe investments become incredibly increasingly low, then a need and hunger for higher yields make it possible for the issuer to sell very easily the equity tranche, the one that bears most of the risk but is also the most profitable. This economic movement, make the initial solution to moral hazard problem almost completely invalid, since the issuer do not hold the riskiest part of the CDO, it has a great incentive to low its standards towards risk and increase the volume of fees (Lewis 2011).

2.1.2.2.1 Commercial and Residential Mortgage Collateralized-Debt Obligations

Commercial and Residential Mortgage Collateralized-Debt Obligations (CCDO or RCDO) are the same as a normal CDO, in which the pool being composed only by real estate mortgages, and the yield come from the payments of the same mortgages. This type of investments was thought to be very safe, because, among other reasons was based on real (physical, visible and touchable) assets, that is, the property in which the mortgage was guarantee. That is believed to be a very good collateral not only for the under value of the real estate asset which guarantee the CDO, but also, because since the great depression that never had been a depreciation of housing values in a national level (U.S.A.). Considering that the mortgages being packaged were spread through the country and the belief that the burst of a bubble in the national level was not going to happen, then creating a very good guarantee to the Mortgage CDO.

Its important to point out, that the commercial and residential CDO are two different types of CDO, in which the difference is the real estate involved, the difference being naturally, commercial CDO is based on commercial mortgage, like a office building, a new store or warehouse, and the residential being based on housing, as investment, holidays or to live.

2.1.2.2.1.1 Subprime Mortgage

Subprime Mortgage is a type of mortgage in which the lender makes a loan to a borrower of a relative low credit history, considering that borrowers with a low income or poor credit history, cannot make the traditional prime mortgage. That way the mortgage range is spread to a large part of the population, in specific, the medium and low class. This is on the other hand compensate by higher interest rates and the natural higher profitability.

Subprime Mortgage become extremely important, when it is used as raw material to make more Mortgage related CDO (MCDO), with the steadily number of prime mortgages in the system, and an increasing appetite for more MCDO and more lucrative ones. The major players start shifting from prime mortgages to subprime mortgages, which resolve two problems, more raw material -since that market sector was not too much explored- and a more profitable source for CDO to rely on.

2.1.2.3 Credit Default Swap

Credit Default Swap CDS is a simple swap agreement between two parties, in which one guarantees the other investment, in exchange for a fee usually a very small percentage of the investment's value, traditionally in an annually period.

Initially, it was use exclusively in bonds of blue chip companies, which had by norm, a very high credit rating and low yields. In a way to rise profits and low the necessary amount of capital reserves, CDSs were create to take the risk out of the investor balance sheet, in this case the commercial and investment banks, due to regulations in the Unites States of America (U.S.A.), and international agreements that all banks were forced to have capital reserves for all of its investments.

CDSs were created by J.P. Morgan in the 90's as a way to resolve a very trick problem. Historically, J.P. Morgan is a commercial bank, with a very large base of

corporate clients and by being a corporate bank, it suffer from a very big problem, most of its business were loaning and issuing securities to blue chips American companies. thus have a very high credit rating and then low yields on its bonds, what make the profitability very low, even worst with the regulators demands for cash reserves. To revert this problem, they created a contract between two parties, in which the default of one of J.P. Morgan debtors would be compensate by the other part, in more simple terms this was a type of debt insurance called Credit Default Swap (Lewis 2011).

This way the initial debt was transfer from the lenders book to the part guaranteeing the debt, that way investors, mainly banks, would be able to remove a very large amount of debt and, more important, risk from its books. This allow than to use its cash reserves to make more lending and other investments. originally, this was not a well received idea, from the point of view of the regulators but was accepted and then become increasable part of the financial market, as a very efficient way of removing risk of balance sheets and books. Although, the risk was not completely eliminated, it just was shifting from one company to another, and this was based on the reputation of the counterparts to deliver the expected results. This new type of financial innovation is not a traditional insurance so it is not regulate by its normal state-based regulator, instead, it is regulate by ISDA International Swap Derivatives Association.

Not being regulate as an insurance but as a derivative, the parts guaranteeing the risk or debts, did not need to post collateral as a normal insurance company does, this way the entire system rely on the credit ratings of the company guaranteeing the contracts, and the need of collateral is decide by ISDA, that is not a government agency, but an association of the sector. It is important to remember, that not being insurance, the parties buying this contracts, do not actually need to own debts and investments, what make this a very popular choice for speculators and hedge funds. And at the same time, a very risky and dangerous instruments for the firms, guaranteeing the debt and to the financial system, especially when the risk of it was not properly calculated.

2.1.2.4 Synthetic Collateralized-Debt Obligations

Synthetic Collateralized-Debt Obligations is a financial innovation that uses CDS, as raw material for CDO, which is a pool of CDS, sliced into tranches and sold just like any other CDO.

The big difference here is that instead of a traditional CDO model, were investors pay for a bond then collect the income as it is produce, in a Synthetic CDO the investor accept the possibility of a very huge pay out and then collect the premiums. Because there is no initial pay in for the investor, and with the belief that was extremely safe, a very large numbers of investors would be willing to participate in this contract, usually hedge funds. But because it was not a normal CDO, were the most you could lose, was what you had invest. this was actually based on a CDO, the potential for losses were huge and, in theory, endless –since the CDS, was based on have no traditional insurance regulation and the number of CDSs for a single CDO could be enormous, reminding that CDS investors do not need to own the assets they were insuring. And considering the very large number of CDS in each synthetic CDO, the risk was extremely high, if things start to go wrong there were a very high possibility of systemic risk.

Another problem with these type of investments, were the amount of collateral were not fixed, and there were always an agreement between parts, both supervised by ISDA. That create the problem of collateral request by the parts that were paying the premiums, specially when the CDS risk aggravate, creating a very large problem for the counter-parts holding these debts on their books. So the debt holders had an increasing need for capital, to post as collateral, aggravating even more the whole situation. Furthermore the amount of collateral post, usually dependent on its credit ratings, now having the problem in finding more collateral, generating worst ratings thus enlarging even more the need for collaterals (Gibson 2004).

2.2 Agent-Principal Dilemma

The Agent-Principal dilemma is a problematic dilemma, concerning the relation between both, considering that they have their own interest on mind, and that they may not be the same all the time. The Principal comprehend the partners in the bank, or in more recent events the shareholders. The Agent are the employees of the company, the ones that actually run the business and make the company profitable and stable.

The major problem in this relationship, is that the Agent has a more immediate perspective (Short-term) and the Principal has a less immediate perspective (Long-term). This becomes a problem, when the incentives come into play, because

shareholders want to increase profitability. They give incentives to the employees, based on production, so the more income an Agent brings to the company, more he will earn. having an alignment of interest between the Agent and the Principal, but because the agent has a short-term perspective, he will be willing to take larger risks. That means he will increase short-term profits, even at the expense of long term stability. This collides with the interest of the Principal that has long-term perspective.

2.2.1 Agent-Principal Relationship

The relationship between the Agent and the Principal is one of the most studied parts of banking theory. A very good part of in management of banks, is based on this relation, on how properly compensating the employees, to encourage a more profitable business, without jeopardizing the company's future, with risky investments, that pays handsomely in short-terms fees, but create very dangerous levels of risk.

The Agent-Principal relationship in banking, used to be simpler, since most banks had a close partnership, in which the agents and principals were the same person, which make the current dilemma almost inexistent, with a different kind of dilemma that was solved –or partially– creating the current dilemma.

In the old system, banks were closed and relative small partnerships, where the administrators were the partners. In this model, the partners were the agent and the principal, so they had the short and long term interest in mind, because they want to increase profits, but they would not jeopardize the banks future, by taking too much risk in exchange for a short-term income.

In the current system, banks are open traded corporations, in the stock exchange, and are managed by independent managers and executives, that receive bonus for performance. This way the agents – managers and executives – have a strong stimulus to increase the profitability of the bank, but that stimulus create a problem for the principal – shareholders. The agent now has an incentive to increase profits which means, in the banking industry taking more risk. This is a problem for the principal that has a long term interest in the bank.

The dilemma can be simplified in these terms: the principal has long-term interest and the agent has short-term. Furthermore, the principal also has short-term

interests to increase profits, that sustain a reliable management to risk. This way that allows the bank to increase profits but not being destroyed by its risk taking.

The traditional solution – or the initial solution – was to increase profitability, by given a good incentive to its employees, usually in a form of bonus which is calculated in relation with the income that the employee brings to the bank. Thus creating the real and current dilemma that is based on moral hazard.

2.2.2 Moral Hazard

Moral hazard is an economic theory, most common in insurance areas of the economic science, this situation occur when a part has a tendency to take risk, because the cost that would incur by said risk taking, will not be affected by the part taking the risk. This is the central part of the Agent-Principal Dilemma, because the risk taken by the agent will incur to the principal's capital and also, the agent has an incentive from the principal to increase profit by seeking risk. Moral hazard is the base of the problem, the agent has an incentive to take more risk, that can jeopardize the bank, and the principal do not have an interest to end the incentives, that create a more profitable enterprise.

Moral hazard is a serious problem in the banking industry, and especially, in the agent-principal relation, considering that the risk taken by its employees will not damage such employee's capital and net worth. And that those employees are compensate on the basis of short term income, made by taking different types of risk. The problem is even more aggravated by the fact that this risks are usually on the long-term period, so that employee have a double incentive to take that risk. First, the compensation and then, most likely, if the risk evolves to losses, will be, probably, too late, making the employees risk taking even less liable for the consequences. That means, the agent has more than simple reasons to take risk, not only will not be responsible for any problems, that come from taking such risk, but will also be rewarded by taking such risk.

Moral hazard creates a serious and complicate problem, for the entire system, that can even evolve to a systemic risk. With that in mind, solving this problem is the ultimate goal for the banking theories to solve, with no absolute success until the moment. The more common way of handle moral hazard is, to supervise the actions of

the agents with risk analysts and regulators, that control – the limits of risk – and define unrewarded risk that can be taken by the agent and the entire company.

2.2.3 Typical Solutions to the Agent-Principal Dilemma

The initial solution applied by most banks, to increase the profitability was to create a system of bonus, were the employees will be reward by their actions, to increase revenues. This way, the principal has a more profitable investment, this creates an incentive to the agent work harder and to be more profitable but, in the other hand, due to the nature of the banking industry, also reward the agent for taking risks, considering that banks are supposed to take risk, this by its self, does not constitute a problem.

The agent that is taking risk starts to become a problem when, agent affected by moral hazard, stops caring about the amount of risk or how risky the investments are. Furthermore this becomes more problematic, when taking risks, generates immediate returns in forms of fees, that are paid to the bank according the total value of the initial investment. This fees are a huge source of revenues for the bank, playing a major role in the agent's bonus. Because they are paid in relation with the revenue, the agent has a very large incentive to take very risky investments that paid larger yields and fees and, also, to invest in very large investment, that pay fees accordingly to its sizes.

To solve this new problem, which the part that relays on moral hazard, and the incentive to take more risky bets, in favor of a higher bonus, exposing a lack in proper care to the soundness of such investments and the company itself. Some companies try to solve the agent-principal dilemma with bonus (that create a good incentive to more profitable postures), but this bonus are paid in stocks of the company, so the agent has a larger incentive to take only risk that will not damage the company's future. Now the agent also has an long-term interest, creating a larger alignment between Principal and Agent interests (Tirole 2010).

This solution is even more productive, when the agent that receive shares – as bonus – are not allowed to sell then in the short-term period. That is the company issuing or distributing new shares as a bonus pool, to its employees, banning then to sell such shares before a determinate period, that can be from an year to five years. This solution creates an even larger alignment of interests between Agent and Principal.

This simple solution can be improved, by a more complex form of calculating when the agent is allowed to sell their shares and cash in its bonus. Usually this solution is applied, creating a formula or structure where part of the bonus is given in cash and other in shares, which has a different maturity dates. The part composted by stocks, is slice into different parts, the slices have a wide range from short to long, this creates a better distribution in time, accordingly to the risk take by the agent (Tirole 2010).

So if an Agent takes most of its risk in the medium to long-term period, he will be compensate in the medium to long-term period. But if he takes an evenly spread from short to long-term risk, it can be rewarded in a similar spread of period. This way, spreading the bonus in time, has a very simple goal: guarantying that the agent take the risk analyzes seriously; and do not jeopardize the company's future, increasing short-term revenue and bonus, by taking too much risk or unrewarded risk. Considering that a significant part of such employees' compensation is now completely tide to the future of the company, he has a very large incentive to take risk seriously and do not jeopardize its own future by exchanging risk for income.

As usual in economics, this solution creates another problem, that is related to employees' loyalty considering that, at this point, most of this employees' net worth is completely tide to the stock price of the company. Eventuality, if a crisis affects this company and plunge its stock prices, the employees will lose their will to continuing in the company. Now, they have an incentive to jump the boat and sell their trade to a competitor, in a form, not only to preserve part of its own net worth but, also, to punish senior management.

2.3 Borrow Short, Investing Long

Banks traditionally use clients' deposits to invest and to leverage the amount of money and liquidity, in the entire system. Most of a bank's investments are traditionally in the long-term periods and clients' deposits are in the short-term period.

Depositors have frequently short-term expectations, in their bank deposits, this can become problematic when interacted with the banks' long-term expectations. When a bank takes a deposit, it will use part of it to invest, namely lend money to other clients, and that is not a simple operation because it cannot be reverse simply and quickly. So

when a client wants to withdrawal its money or part of it, the bank has to be able to provide the client's money, meaning it has to be able to calculate the probability of withdrawals correctly and predict the necessary amount of reserves it needs and the investments that can be made.

This generates a liquidity problem, meaning, the banks or firms do not have a problem of profits or losses, but because of the baking nature, they have illiquid assets, as guarantee to its clients deposits, which are liquid. And then, because illiquid assets are not easily turned into liquidity, now we have a liquidity problem, which is very serious and can easily spread and become a catastrophic fail, bringing down the bank and even start a domino effect in the system.

One solution to this problem, was to create other financial instruments that can be used in the short-term, and replace the source of funds, from the deposits, to other types of short-term borrowing. Those types of borrowing are, for example, Certificate of Deposits (CD), Commercial Paper and Repurchase Agreement (Repo) and others similar to those in the money market.

The money market has money as the only commodity, which is a source of cash to meet short-term debt obligations. Being a part of the financial markets for short-term transactions and investments, with maturity of one year or less. It is compose by a number of different instruments such as CDs, Commercial Paper, Repos, Treasury Bills, Bills of Exchange among others.

Although money market is used by a large number of corporations, its core consist on interbank lending, and those instruments are often benchmarked to the LIBOR – London Interbank Offered Rate. Money markets are a vital source of liquidity to the global financial system, and it components bear different kinds of risk, maturities, currencies and structures.

The players of the money markets are equally important, being the most common the money market fund, which are mutual funds that deal, almost exclusively, on the short-term debt, like US Treasury Bills and Commercial Papers. Money funds are important to the global financial system, because they provide quick liquidity to financial firms, governments and corporations. They are considered as being safe but have a higher yield.

Those bank funding sources are a very good way to provide cash in short- term period, usually to finance day to day operations, but can be used to prevent a liquidity crisis, considering that is an open market and have easily tradable instruments. Those instruments have also another advantage, because the banks can use it as a short-term investment, and, is important to point out, that those instruments are not exclusive to banks and are widely use by most of large corporations, to provide day to day funds. It is important to remember, that because this instruments are widely spread in its use, by and from banks, meaning that a lot of corporations, financial and not financial, use them as a way to invest short-term and to find money, especially commercial paper and Repos.

Certificate of Deposits (CD) are a time deposit, with fixed timed withdrawal, which banks offer to clients as an alternative to saving accounts.

CDs are insured by the Federal Deposit Insurance Corporation (FDIC), making then virtually risk free, and are different from saving accounts, having a specific fixed term, usually monthly, quarterly, semiannually, or even, one to five years and have, traditionally, fixed interest rate. Clients and banks prefer this method, because is beneficial for both: clients have a larger interest rate than in a traditional deposits account; and banks because give then the certainty that the client will not withdrawal before planed.

Repurchase Agreements or Repos, are instruments that allow quick, easy and safe source of funds, in the short-term period. Those consist in a sale of securities, together with an agreement that the seller will buy back in a near future, usually at a higher price. In practice, the buyer acts as a lender and the seller a borrower, thus creating collateral for the lender and making the investment safer, with a fixed interest rate sometimes called repo rate.

Repos are typically short-term, having three kinds of maturity: overnight, term and open Repo. As the name suggests, overnight reaches maturity, in the next morning or a one-day transition; the second, has fixed term or a specific date to mature; the third, and last, is a Repo with no fixed term or no specific date to mature. Although Repos are mostly short-term, is not completely unusual to find repos with maturity as long as two years.

Repos usually use three types of transactions: specified delivery, try-party and hold-in-custody. Specified delivery requires the delivery of the bonds in the beginning of the contract, until the date of the maturity. Tri-party, where a third party is included and acts as an intermediary between the others parts involved, this party has the function of administrate the transaction, to hold and allocate securities (collateral), until the maturity of the Repo or the default by the seller. The third party is a custodian bank or international clearing house. And the hold-in-custody type is the one where the assets are held by the borrower, thus saving costs in third part's custodies, or the implicit cost of transferring the assets to the lender.

Commercial Paper is a type of security, issued by large corporations to get money to meet short-term obligations, and it is an unsecured promissory note, or, I own you, with a fixed short-term maturity between 1 to 365 days. And, because Commercial Papers are not backed by any collateral, only very high rated firms are able to sell their Commercial Paper at a reasonable discount.

Commercial Papers are usually sold at a discount from face value, this discount works as the interest rate in a traditional lending and having higher yields than bonds, due to the lack of collateral, but are typically lower than banking lending.

Commercial Papers are a better option than a line of credit with a bank, because they are cheaper then a bank line of credit. It takes some time to a business to established and get a high enough credit rating, to be able to use this instruments, and it can lose it in a time of crisis. Commercial Paper has some advantages to issuing companies and investors, unlike a line of credit, Commercial Paper can be resold on the market, because of the high credit of the issuer, its Commercial Paper has a lower cost.

All these forms of short-term investments and instruments are viable way to provide liquidity to the system, and an alternative to clients' deposits, but all these forms still have the same problem, face it with deposits: in crisis all of those forms usually shut down, and the bank goes back to the problem of having most of its assets, invested in long-term and with short-term obligations, thus having a liquidity crisis.

Although they do not resolved completely the problem, they help managing the issue and avoiding a liquidity crisis, in the first place, they also create a relatively cheap way of handle this particular problem, because, even when liquidity crisis happen, most

banks are still able to use money markets instruments, to find short-term funds and stop the bleeding. Is important to notice, that this is not always the case and even this markets, eventually, close its doors to troubled banks because in fear of spreading the liquidity problem to the system, and naturally, because we are handling with short-term debts and short-term crisis, and the victim of this crisis is having short-term problems, this market can shut down to avoid contamination.

2.4 Bank Runs and Systemic Risk

Liquidity crisis are very problematic and they can cause bank runs and systemic risk, or even, systemic failure. A Liquidity crisis happens, when a specific firm has an inability to cover its short-term obligations, due to some unpredicted event, with its deposits being withdrawal and the firm becomes unable to convert its long-term assets to liquidity.

Liquidity crisis began in different ways, and usually, in response to market fears, which can be a widely spread rumor or a bad quarter result or some other reasons, that may compromise the firms future. In a reaction to this, most of clients take their money out of the bank, fearing for their capital safety, this is called a Bank Run, which will aggravate the initial liquidity crisis, in a spiral of bad news and worsening the banks financial situation, which, facing a bank run, will try to stabilize itself in different forms with the same principal of providing security to its clients, and guaranteeing the stability in the long run.

Bank runs can be a very serious problem, when, without a solution the consequences can be terrible. Bank runs generate a loss spiral, that when people in fear of losing their savings, will withdrawal their deposits, and when they do that, the bank become more vulnerable, increasing the chances of a failure. This will just generate more fear for the depositors, lead them to go in an even more frenetic way, trying to get out before irreversible damage happens. But this movement will only worsen the situation, and the spiral of loss, generates even more panic, widening the original bank run.

Bank runs have a large number of economic theories, which work on how they start, how they function and what motivates rational players to act in an irrational

manner. The better way to explain how agents behave, is with a comparison with the prisoners' dilemma of game theory, because just like in the prisoners' dilemma, all participants, would be better if they do not engage, that is – in this case – do not rush to the bank and withdrawal their deposits. But because they do not know how others participants will react, they chose to engage in the less worse scenario that is to rush and withdrawal.

Just like in the prisoners' dilemma, all participants act in a rational way, after irrational fears, or, as individuals, they act rationally but, as a group, their action are irrational. This is when a bank run happens, the rational thinking is to withdrawal deposits but, this is irrational, because withdrawing in massive numbers, will aggravate the initial dilemma, and aggravates the fear of the bank failure. This will encourage more people to run to their bank and withdrawal their deposit, worsening the spiral of losses in a vicious cycle.

Bank runs typically begins with, reports of losses and then, the panic is exaggerated by the fear already the system, but they can also start by unfounded rumors, and as they spread, they create the initial fear, which will start the bank runs and the entire spiral of losses. There are also bank runs, that are initiated by real bank liquidity problems, which did bad investments or miscalculated risk, creating real problems. when the long-term investments and assets value become lower than the short-terms obligations, the bank run is not unjustifiable and the clients have real reasons to fear losses.

Indifferent to rational or irrational bank runs are extremely dangerous. Therefore, there are in place several different types of institutions to prevent one or, to stop it, either way they can only act, when the reason for a bank run is not based on real and very problematic crisis, in the bank itself. Although, in some cases, even the bank having major mistakes, or even participated in criminal activities, has to be help in a way to prevent spread and contagious to different financial organizations.

The most common institutions, which act in this area, are present in almost all countries, but especially, in the developed economies, where central banks and others financial authorities enjoy a relative independence of their government. The central bank that will act directly or through intermediaries. Most economies have some sort of

financial authority or association, that provides certain types of insurance to depositors, like the FDIC in the U.S.A.

This institutions and ways of control have, in most cases the function of restoring confidence in the system, considering that most of the banking industry is based upon the trust of clients in their banks. Trust should be maintained in order to avoid, not only bank runs, but also other serious problems, like counterparts asking for more collateral to keep lines of credit open, or continuing buying short-term papers and investments with the bank.

Restore trust can take several shapes and forms, being common – without government intervention – the entry of a large investor, in an attempt to shore up the company. This can be done through different types of investments, but usually, the buying of a significant stake of the company in trouble, in an attempt to show the market that the bank is still solid, and can attract investors, and as most actions with the idea of restoring trust, has an immediate goal of remove the fear on the system, avoiding spreading of panic and more losses.

Banks Runs should be control and supervise with extreme care, because a bank run creates huge feelings of fear that can spread to the system, becoming a systemic bank run, in which, people in fear of a specific banking failure, are afraid that another bank takes a hit by this failure. Going after their capital in other banks, is the next step, and, at this point, we have a systemic bank run, that can be classified in the area of systemic risk.

Systemic risk is, in a simple definition, the risk presented to the entire system, which can happens for different reasons, like bank runs or a failure of a key player or counterpart. Systemic risk, usually, is the risk of a domino effect type of crisis or a crisis, that causes the failure of institutions, one after the other. And like a domino, the best way to prevent the entire system to collapse, is to prevent any collapse or to strength the system, so a failure do not affect the rest of the market.

Failing of a major player, can create some distress in the market, because the counterpart positions and the direct damage done, by the failure, in this positions held by the rest of the market. This is, the capital that was applied in the failed player, hit by direct damage, can be brutal and cause failure of other players, spreading the original

failed bank crisis. And this spread can be a lot worse than the original crisis, because now not only the damage is done around the system, multiplying the original crisis and, also, spreading fear of more losses around the system. And more important, the fear that others players can also fail due to the lack of strength, to hold the blow, generating more fear, and bank runs, that can even worsening the already complicated situation.

Failure of market players are concern to the system, but also are large hits on specific areas, like subprime mortgage or currencies, this hits can cause systemic damage, because they are in areas operated by large portion of the players, so damages in niche areas, operated by most firms, can create a critical damage to the system, without the failure of a market member or operator. This critical blow, can spread fear of systemic failure, that can become real, which in turn, can cause the collapse of previously health companies, not because the damage are in an area alone, but by the fear and concern for safety on the market. And this can result, in failure that will create massive risk, considering that most firms involved, in this specific area, suffer losses, so a failure of others players is seeing as more likely than just the fear.

As already said, bank runs are a very large concern in systemic risk and, in most cases bank runs are also a part of a larger crisis. Which are complicated and very serious to handle during systemic crisis, because is relativity easy and quick to a bank run become a systemic bank run. Considering that most people are already scared and afraid of firms going down and bankruptcies, with most actions to avoid systemic risk, is to prevent bank runs and, more precise, avoiding contagious to other institutions. That is the reason why, creating liquidity, is one of most common and successful ways to prevent a bank runs from spreading or stanch the losses of capital.

Systemic Risk can be translated as the risk to the entire system, not only, of a complete collapse, but also a large damage to the system, that can harm the economy and force to a large recession. Because the size of the damage caused by systemic risks, each individual firm (unit of the market) has to be identified according to its connections, with the rest of the market. This means, that if a specific company has too many counterparts or clients, the damage to the system will be larger and related to its connections and sizes.

The common phrase, too big to fail, is a clear example of systemic risk and it is used to show the damage create by a single failure, in the market, it usually means that a

failure, of one particular firm, will create so much damage and stress on the system, that the collapse of it, is likely or even inevitable. Another phrase commonly used is too interconnected to fail, which is more precise in terms of systemic risk, because the risk is given by the connections of such firms, that is the way our current financial system works. Today, most banks and financial firms, work in a network, in which a large number of trades, between multiple players, happen daily demonstrating the interconnection of the market.

Systemic risk is perceive as a serious problem that should be avoid, every possible time, as said the causes of fails and damage can spread fear and, even more important, it can damage the trust in the financial intermediaries.

Considering that banking is greatly based upon trust, the lost of that trust can cause collapse firms and, even worse, in the systemic cases, creates distrust in the system – or the health of the system. This distrust is catastrophic for the financial markets, not only people will start to withdrawal massively, but also, they will stop buying financial products and trading in different markets: from futures, stocks, derivatives to commodities. This halt of trading may indicate the frieze of the markets and, this will exponentially harm the financial system and a significant part of the market value, can disappear very quickly, causing even more panic and runs.

Restoring trust, stopping rumors and panic is extremely important in managing systemic risk, stopping a bank run will not resolve the problem and the risk will not disappear. This will be just under control and will prevent fast and easy contamination of others markets and players, stanch the losses and, more important, the fear in the market of spreading is essential to prevent systemic failure and control the crisis.

Considering that when a crisis grows, it will make more and more damage, and will keep spreading in an increasing speedy, so restoring the trust and safety to the system, may be extremely difficult and just stopping the damage, may be almost impossible. Government officials usually do not have tools to prevent systemic crisis, and traditionally, governments do not have the necessary authority or political will to intervene. Even without political will or not a clear authority or oversight of the financial system, most governments will – in a serious crisis, with a large risk to the

entire system and, consequently the economy – intervene to prevent a collapse of the system or to restore trust bringing safety to the market.

This last minute intervention, usually, will be done in a lender of last resort alike solution, this is to prevent a large damage or collapse, so institutions will intervene – frequently a government institution but that is not a necessity, international governments may also intervene to prevent losses of value to the system, and to prevent contamination. This intervention, has the only propose, of stanch the current crisis and reestablish the soundness of the system, thus this has to be a large intervention, that will send a clear signal to the market, with this intervention be large enough to resolve the problem for once, and prevent more liquidity issues and stanch the systemic risk.

2.5 Lender of Last Resort

The Lender of Last Resort is the savior at the end of road. Because in a crisis, there will be a point where not getting involve, will be too expensive, and the only logical option is to intervene and save the day. The lender of last resort is based on very controversial economic theories, to avoid more damage and prevent a larger and spreader crisis, because any intervention will create problems, that can be serious or worst than the initial damage, which the intervention was trying to solve.

The lender of last resort works in a simple and effective way: when a major player or market is hit by serious problems, including bank runs, this entity will provide a large amount of capital to the markets, in order to stabilized it. This large capital can be provide by different ways, from buying problematic assets, bonds or papers, to traditional lending, or more extreme, with capital injections to acquiring a stake on the problematic company. This is not only to create liquidity on the system, but also, to show the strength of the system, and to show that the system is now safe and the systemic risk was avoided and a larger problem was prevented.

One of the reasons, why lenders of last resort are so controversial, is because when there is an intervention of this kind, this will inevitably, generate moral hazard, because most players have seen what happens when they fail or, to be more precise, what happens when their risk strategies colossally fail. At this stage governments, will not allow them to simply fail and will rescue the company, creating a serious risk taking problem – or moral hazard – in which the firms have an incentive to change long-term

stability for short-term profits. Considering that the government will, in the end rescue the company and restore it. This serious issue is the main cause of controversy in the lender of last resort theory.

One argument against the lender of last resort, is to allow a crisis to naturally burn out, is a more effective way to restore balance in the economy, that when out of balance generates a series of manias, this is based on the fact that crisis are by essence a natural part of the cycle and are a very efficient way to put it back on tracks. Although this argument is largely used, there is not much analytical data to support this conclusion, that let a crisis do its damage and restore itself, will cause less damage and losses than a intervention, as confirmed by Kindlerberger (2000). There were cases, in which not intervene, was a good solution, but there were other cases when the lack of intervention cause more damage and recession then the original crisis and panic.

The best way found, to prevent the problem of moral hazard and others created by interventions of a Lender of Last Resort, is to have it but, still, have the uncertainty of not having one and of its actions. The economy should have a Lender of Last Resort, but should not know if, when or how it will act. This uncertainty is a form to prevent, not only, moral hazard, but also allow it to punish the intervened company – not for illegal acts but for too risks ones – this punishment can be to a large restructuring of the management team or to a very expensive rescue, to its shareholders.

And also, to avoid market players from making profits on the predictability of such institutions, and this is complex, because most players will expect a standard of behavior and such institution, will have to act in an unexpected way and outside of the standards, preventing that its actions will not be nullified by the markets, in the expectations of a predictable action.

In summary, the Lender of Last Resort is a very important part of the system, but in order to work properly, its actions should not be predictable and avoid more damage than it is trying to solve, and should have a good and strong way to punish and avoid risk behavior from, it possible rescued.

Chapter 3 – Lehman Brothers

Lehman Brothers was an investment bank, in the broker-dealer model, with almost 150 years of history, which act on the financial market, being responsible for the creation and expansion of a large number of blue chip American companies, reaching the railway business, the airways, retail and new technologies. It business also included participations on real estate, mortgage lending and wealth management.

3.1 About Lehman Brothers

Henry Lehman funded Lehman Brothers in 1844, in the state of Alabama U.S.A.. Years later, his two brothers join to firm, which by that time, handles with dry goods and cotton, and after some years, it took an approach to the financial markets, opening an office on New York, that sell, primarily, cotton to industry, which quickly evolve in to small securities. Its remarkable history, also includes helping with creation of the Coffee and the Petroleum Exchanges and, being form the south, and with good northern connections, Lehman was designated to be the Alabama government's fiscal agent, to help sell state's bonds.

The accelerated growth of railroads, together with the change in the U.S.A. economy from rural to industrial, resulted in an incredible boom in activities on Wall Street, mostly to support new railroads constructions, expansions and, also, new industries. Some important financing done by Lehman Brothers in this railroads era, were: Chicago and North Western Railroad, the Pennsylvania Railroad, The Baltimore & Ohio, the Great Northern and the reorganization of the Union Pacific.

In 1887, the firm became a member of the New York Stock Exchange (NYSE), this step marked the evolution form a commodities business to a merchant-banking firm. Together with Goldman Sachs, they underwrote securities issues for the emerging retail industry.

Robert Lehman was the last of the family's manager to steer the company, with his business philosophy that center on consumption, he direct the firm to emerging industries, focused on mass consumption. As an example of this orientation, we can see supporting of emerging industries, like the entertainment business, investing in theaters

and studios of the motion picture. The firm also participated in the growth of the communications industry, underwriting first public offerings and providing funding to various players in this sector. In this era of new industries, it also participated in the financing of different oil companies and oil related business.

At the arrival of a new era of industries, especially electronic ones, the firm was a participant on the underwriting and funding many companies in this sector, in a quickly pursuit of investments opportunities.

In the 60's and 70's following a trend of industries, a large expansion happened: the firm become an official dealer of U.S. Treasuries and increased its global presence, opening offices around the world. This also enhanced its international stature when merged with the firm Kuhn, Loeb & Co.

During the merger and acquisitions frenzy of the 80's, the firm was a major actor as advisor on several large U.S. and international transactions. In the trend of the 80's, Lehman would be acquired by American Express and merged with Shearson to form Shearson Lehman Brothers.

In the wave of personal computers and microprocessors, the firm would support companies like Intel, raising funds to expand it and meet demands to the new personal computer market. Lehman also was involved in the creation of new healthcare industries, like biotechnology, was principal in helping companies gain access to funds and capital to development of new products and technology.

American Express began to divest its financial services, by business lines in 1992, and eventually, in 1993, Lehman Brothers was spun off. In 2000, Lehman celebrated its 150th anniversary (Anon n.d.).

3.2 Taking Risk

Richard Severin Fuld, Jr. become Chief Executive Officer (CEO) of Lehman Brothers, in 1994, at Lehman's bankruptcies in 2008, he was the Wall Street's Longest CEO, still in office after 14 years and, part of Lehman's workforce for almost 40 years. Richard "Dick" Fuld was one of Lewis Glucksman disciple's and a trader by tradition and not an investment banker, as was the usual in Lehman Brothers (Fishman 2008).

Dick “the Gorilla” Fuld, become Lehman’s CEO after the spin-off of the company from American Express (McDonald & Robinson 2010).

Fuld manage Lehman Brothers trough some large and pretty nasty crisis like, the 1997 Asian financial crisis or the Long Term Capital Management collapse, in 1998, after the Russian debt default (Geisst 2003), Fuld manage to steer the firm, through rough times but was not able to save it from the Subprime Crisis. He was internally known for its risk taking, increasing the limit of risk taken by the firm, as well choosing employees with more risk lover profile than risk averse. A clear example of it was the nomination of Joe Gregory to be his President and Chief Operating Officer (COO).

After 1994, when Fuld took office, an increasing in risk that Lehman was taking could be observed. We will use the liabilities to analyze the risks that were taken by the firm (that is, for lacking an easiest way to analyzing it) as the table 1 show, after 1994 there were a significant increase of liabilities held by the firm and a continuing increase on their rate of growth. It is also important to notice, that on average, the growth was 13.41% on the 9 years period before 2000.

Another important factor is the incredible increase in growth, on 1994 and 1999, both years had an increase of over 20% on the growth of liabilities, that means a substantial increase in risk taken by the firm. To counter effect the risk of increasing liabilities, the firm also rose its equity, this was done to avoid a problematic effect and guarantee a safe capital cushion to prevent liquidity crisis, in a possible time of stress.

As the table 1 shows, the increasing in liabilities and assets, the growth of the business and also the increase in revenues, on average of 13.75%, during the period of 1993 to 2000, in this period the increase in liabilities is significant, the firm’s equity was also being raised, so the financial leverage was under control. Being reduced at this period, is very clear that the result of enlarging liabilities to enhance assets, is the increase of revenue lightly larger, than the raise in liabilities.

With these results, we can conclude that increasing liabilities or risk will also increase the revenues, that, can naturally create an expectation of earnings by increasing risk and liabilities, and increasing equity, the risk was under control – or they believed.

Table 1 – Lehman's Brothers Assets, Revenue, Equity, Liabilities, Liabilities and Equity, Leverage levels from 1992 to 2000

Field	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000
Total Assets	85232	80474	109947	115303	128596	151705	153890	192244	224720
Growth (YoY)		-5,58	36,62	4,87	11,53	17,97	1,44	24,92	16,89
Total Revenue	10611	10674	9190	13476	14260	16883	19894	18989	26447
Growth (YoY)		0,59	-13,9	46,64	5,82	18,39	17,83	-4,55	39,28
Total Equity	2361	2052	3395	3698	3874	4523	5413	6993	8641
Growth (YoY)		-13,09	65,45	8,92	4,76	16,75	19,68	29,19	23,57
Total Liabilities	82871	78422	106552	111605	124722	147182	148477	185251	216079
Growth (YoY)		-5,37	35,87	4,74	11,75	18,01	0,88	24,77	16,64
liab & equity	85232	80474	109947	115303	128596	151705	153890	192244	224720
Growth (YoY)		-5,58	36,62	4,87	11,53	17,97	1,44	24,92	16,89
Leverage		57,1992	47,8325	39,6776	38,373	37,976	35,868	34,2707	32,894
Growth (YoY)			-16,38	-17,05	-3,29	-1,03	-5,55	-4,45	-4,02

Source Bloomberg Table 1

In a search for more profitable and larger business, Joe Gregory was appointed COO for his approached on risk, more important, his profile as a risk taker and lover that would allowed the firm to growth substantially.

Joe Gregory and Fuld were friends from a long time, from their time in the trading floor. Joe Gregory was a known risk lover, with large interest in leverage buyouts (LBO) and investments in real estate and related assets, like Mortgage CDOs, he was the main supporter of the real estate acquisitions and leverage buyouts frenzy, that happen on the command of Mark A. Walsh, which was the head of Global Real Estate Group, at Lehman Brothers.

Mark A. Walsh under direct supervision of Joe Gregory, were great believers on the fallacy that the real estate assets would never lose value, in global terms, or to be more specific, in the national level, considering that real estate had never lost value in the national level, since the great depression, and a significant lost in the national market had never happen.

After the dot com crisis on 2001, the pattern not only continue to happen, but also the increase on liabilities continues to make more and more revenue, and is important to notice that the raise in liabilities in 2000 and 2001 was not accompanied by the enlargement of revenues. In reality, although the crisis of LTCM, followed by the burst of the dot com bubble, and the 9/11th terrorist attacks were a big hit in the revenues of the firm, that continued to increase liabilities and assets – in a leveraged assets manner, were more and more liabilities were being taken to buy more assets to increase revenue – in a smaller way on the beginning of the 2000 to 2008 period.

After the resolution of the dot com and 9/11th produced crisis, and with the rebound of the economy plus the very low interest rate, put in place by the FED, the increase in risk taking – that is liabilities – is significant. After 2003, the growth in liabilities is larger than the previous and with the growth being, usually, higher than 15%.

This new increase in liabilities and risk, was, this time, followed by significant increase in revenue, to highlight the period after 2004, were the increase in revenue is always higher than 20%, peeking in the 2005-06 period, were the growth was 52.56% and 44.07%, respectively as can be seeing in the table 2.

Is important to realize that the average growth, in liabilities, from 2001 to 2008, was 14.62% and if we exclude the year of 2008 when the firm files for bankruptcy protection, the average is of 19.03% and that the last 3 yeast previous of the bankruptcy, the growth rate was increasing, and increasing more than 10% a year, as can we see in the table 2.

Table 2 – Lehman's Brothers Assets, Revenue, Equity, Liabilities, Liabilities and Equity, Leverage levels from 2001 to 2008

Field	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Current
Total Assets	247816	260336	312061	357168	410063	503545	691063	639432
Growth (YoY)	10,28	5,05	19,87	14,45	14,81	22,8	37,24	-7,47
Total Revenue	22392	16781	17287	21250	32420	46709	59003	
Growth (YoY)	-15,33	-25,06	3,02	22,92	52,56	44,07	26,32	-83,7
Total Equity	9169	9652	14484	14920	16794	19191	22490	26276
Growth (YoY)	6,11	5,27	50,06	3,01	12,56	14,27	17,19	16,83
Total Liabilities	238647	250684	297577	342248	393269	484354	668573	613156
Growth (YoY)	10,44	5,04	18,71	15,01	14,91	23,16	38,03	-8,29
Tot liab & equity	247816	260336	312061	357168	410063	503545	691063	639432
Growth (YoY)	10,28	5,05	19,87	14,45	14,81	22,8	37,24	-7,47
Financial Leverage	31,842	31,7575	28,0986	26,036	26,2086	27,0338	30,2501	34,66
Growth (YoY)	-3,2	-0,27	-11,52	-7,34	0,66	3,15	11,9	14,59

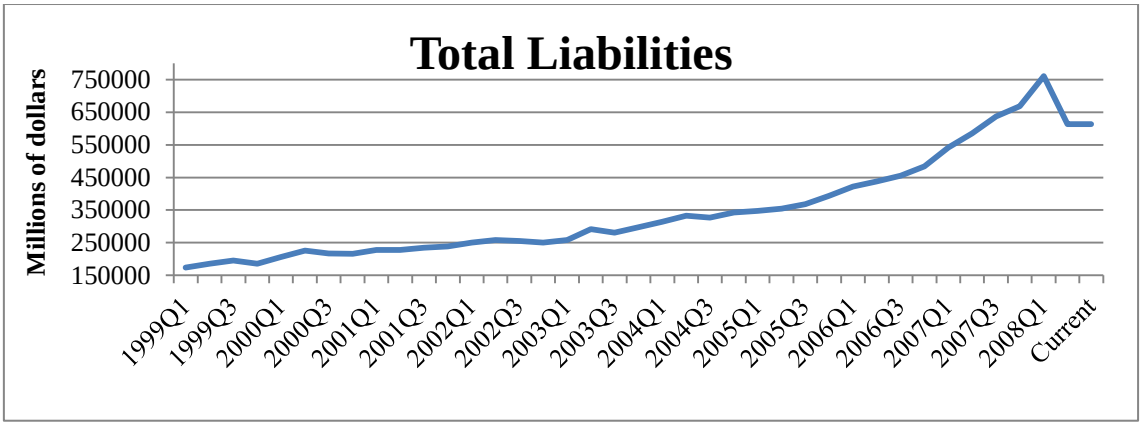
Source Bloomberg Table 2

The increasing of liabilities and, therefore, risk was constant over the last two decades, it has some periods were there are some negative growth or very small growth on liabilities, but these periods were short and followed by the normal periods of increased growth.

We also can see, the liabilities growing in absolute numbers over the quarters, from 1999 to the end of the firm. As we can see on chart 1 a continued increase of liabilities, we can also see an increase of almost 600 billion dollars in this period, that is

about 500%. Is also important to note that the larger increase in liabilities is in the short period before the subprime crisis of 2007-08, this include the years of 2006 and 2007 when the crisis had already began.

Chart 1 – Total Liabilities



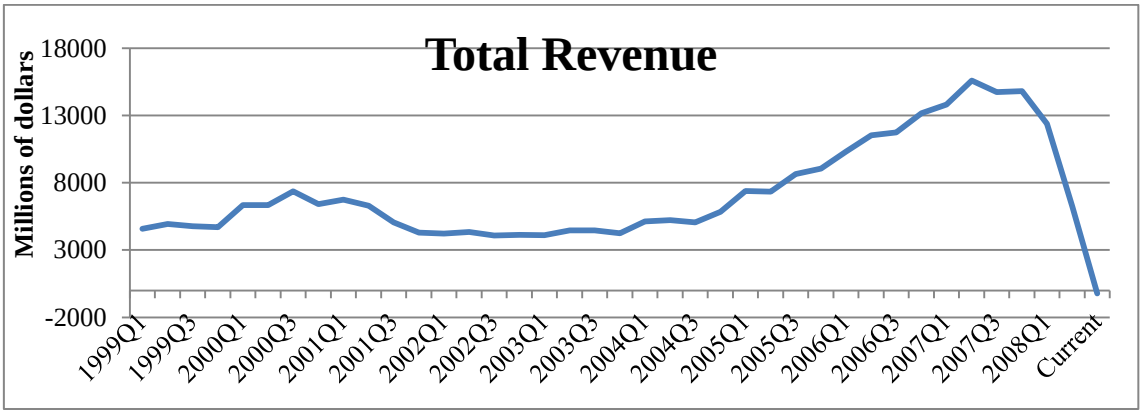
Source Bloomberg Chart 1

As a result of the increase in liabilities, to support financial assets, we can also see the increase in revenues, that happen during the dot com bubble and the subprime and mortgage related assets bubble. After the dot com bubble burst, the fall in revenue was substantial and actually the level of revenue got back to the previous level.

We should also point, that the increase in revenue during the bubble of the real estate related assets, was more accentuated that the previous ones, and also happened in a steady way, but this steady way was more sharp than the increase in liabilities, which means that the growth in revenues was higher than the growth in liabilities, increasing not only revenue but also the profitability of the firm.

Another fact is that, the revenue did not start to show reduction even on the third quarter of 2007 and, only, start to fell on the beginning of 2008, and until the filing of bankruptcy the revenue fell sharply, to negative one, or just stopped making money. Is also remarkable, that the growth in revenue was almost 375% from the period of 2004 to the peak of the bubble in 2007, and that the loss of revenue in the period of the third quarter to the bankruptcy was higher than 100% becoming negative on the moment of the bankruptcy.

Chart 2 – Total Revenue



Source Bloomberg Chart 2

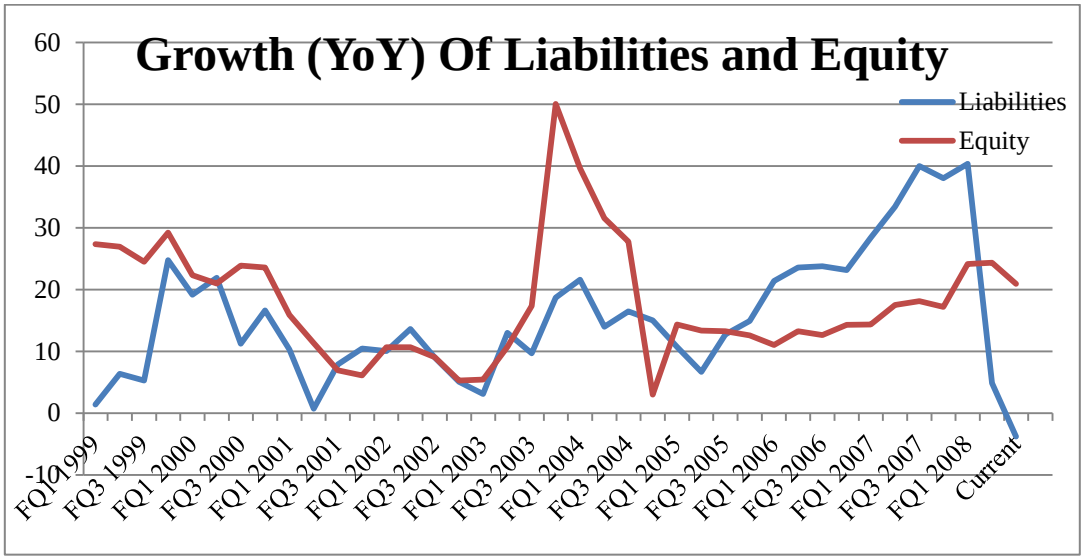
We can see in chart 3, that the growth of liabilities was always lower than the growth in equity, with short periods of exception, specially the period after the last quarter of 2005, being important in the risk analyses, because it represents the state of mind in the management team. Increase in liabilities is always perceive as an increase in risk – risk does not automatically means high or low risk, when increasing equity, the leverage risk is smaller or easier to control and the possible damage is lower if the leverage level is low.

After 2005, the pattern changed and the growth in liabilities become increasingly higher, than the growth in equity, this happen just when the bubble of the real estate related assets began, than starting to take more and more risk to increase its financial leverage, which means that the size of the damage created by any investment risk would be larger and more difficult to control.

Chart 3 shows, how the approach on risk changed over the time, and more important after 2005, caused by the increasing in the mortgage and subprime mortgage related assets, before 2005 the approach on risk was more conservative and more careful and after, being more careless in their behavior facing risk and leverage.

Chart 4 and 5 shows, the amount of assets, liabilities, equity and revenue, it is important to notice that the difference between then is very large and shows the risk for a huge damage, and the possible catastrophic consequences to the firm if the risk pay out on a default or a failed investment.

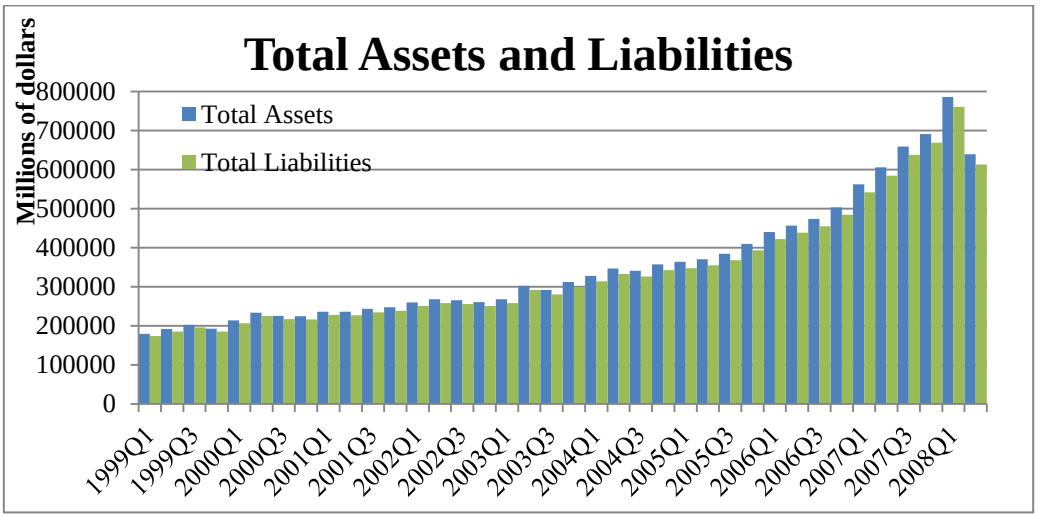
Chart 3 – Liabilities and Equity Growth



Source Bloomberg Chart 3

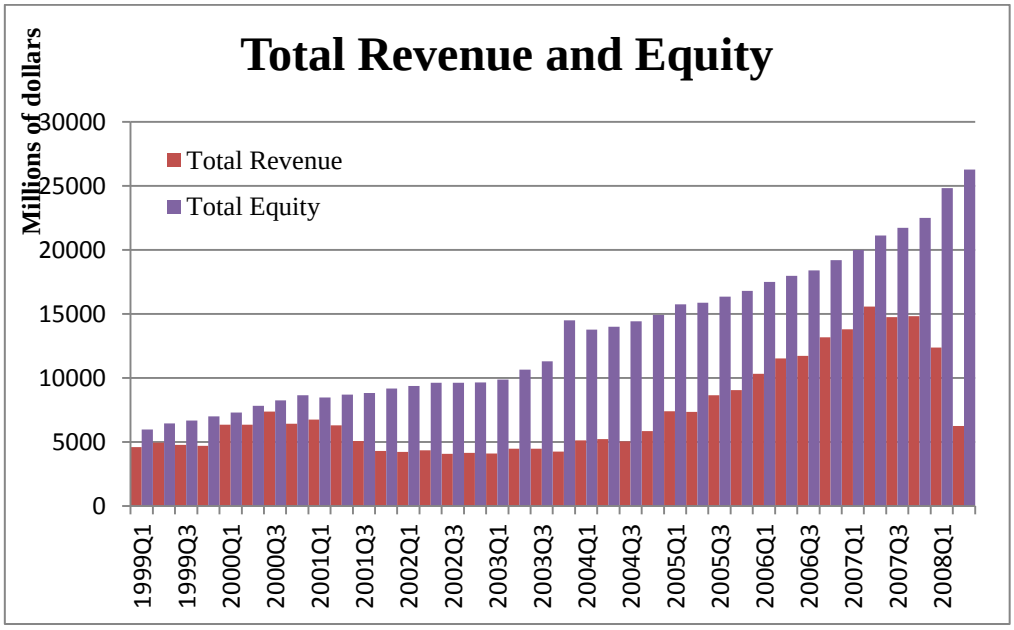
It is also important to see the steady growth in assets, liabilities, revenue and equity, although there are some periods were a decreases can be notice, specially on the last year which shows a huge decrease in assets value's.

Chart 4 – Total Assets and Liabilities



Source Bloomberg Chart 4

Chart 5 – Total Revenue and Equity



Source Bloomberg Chart 5

A clear example of the increase in risk taking is the exit of Michael Gelband, former global head of fixed income and head of capital markets, after warning his bosses about excessive risk taking and consequent disagreement with senior management, that would result in his exit of the bank, after several years working to Lehman Brothers. Another example of exit after disagreement with senior management team is when Alex Kirk, former global head of principal investing, quits from Lehman Brothers because of a disagreement with Joe Gregory, on the subject of leverage, specially the high level of leverage in the Lehman Brothers books, that were higher than 30-times.

Risk is a very important part of banking and managing risk is essential for success, but Lehman, in the last years of its existence, were taking more and more risk, without properly managing it, most of its risk taking were being support by the idea that they were actually taking very low risk investments. That is because most of its strategy was based upon real estate or related assets, and with the idea that real estate would never lose any significant value.

The increasing in risk can be seeing in the very high increase of leverage and leverage buyouts that the firm was involved, as a strategy of expansion and growth, Lehman started investing in different areas of the real estate market, such as mortgage

generation and lending, real estate management or wealth management. This strategy of investment, was in a large part, financed by leverage assets or new issuing of bonds, increasing the leverage level in the firm's books, increasing the size of the possible damage, in the case of a black swam. That is because the high level of leverage, would create a catastrophic consequence in the case of small depreciation of real estate assets, as was actually observed.

3.3 Leverage

Leverage is a key process in modern banking, which consists in banks using clients deposits, in lending money to agents, improving the economy, which will than make more deposits, lending to the broad economy again. This also can be started with an initial lending, from a central bank or institutions alike, this is a simple way to define and explain how and what leverage is. In the real world, it is more complex and involve different ways of leveraging, the most important for us is the one used by investment banks, in special Lehman Brothers.

This type of leverage, which the firm issue new bonds and others financial instruments, as a source of capital, that will be used in investments and other assets and markets. This is a common form to assemble capital, and make new investments, this is particularly important, because leverage brings natural risks and as higher it is, higher will be the risk of a catastrophic damage.

That will occur because, in comparison with the firm's equity and level of debt – in an investment – this is seriously and dangerous, because as higher the leverage goes, the lower will be the necessary devaluation of assets, which will harm the firm and wipe out its equity and damage the investment of its clients.

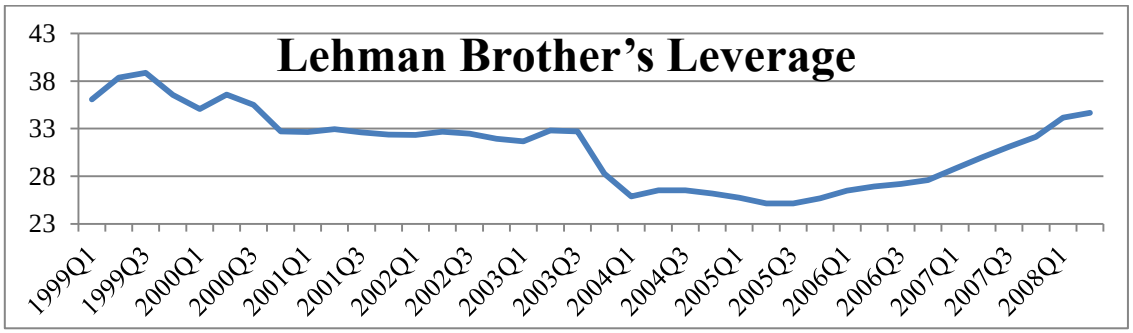
Leverage was the most important factor in the collapse of Lehman Brothers, without the high leverage level that Lehman had, may be it would be possible to save itself in this crisis, the high level of leverage may not have being the cause of the collapse, but was what determinate the collapse. If the company had a lower level of leverage, not only it would, probably, be able to find new investors, but also the government would be more willing to help in a bailout alike or support to a deal in the Bear Sterns and JPMorgan Chase & Co model.

Lehman choose to engage in a very high level of leverage, to support a quick and fast expansion of its operations, in special, the expansion of mortgage related investments, such as MCDO, Real Estate deals and Leverage Buyouts (LBO). These expansions were in some cases not based upon economic or market factors, but instead in psychological factors, such as the wish to beat competitors and keep growth at all cost, even in cases where this growth were not sustainable. This can be exemplified by the acquisition, in partnership with Tishman Speyer, of the Archstone-Smith Trust, a trust of high end luxury apartments in New York, in an astonishing 22 billion dollars deal, in which Lehman Brothers and Bank of America were responsible, in a 50-50 partnership, for more than 17 billion dollars and an additional 4.6 billion dollars bridge equity financing[3].

In the period of 1999 to 2008, the leverage level in Lehman Brothers change significantly, from a very high and increasing in its beginning to suffer an outstanding decline in the following periods, than later to increase again during the dot com bubble and, again, a decline on the burst of that crisis, as can be seeing on chart 6.

After the burst of the dot com crisis, the level of leverage was stable and almost the same, with little change, until the third quarter of 2003, when an sharply and large increase in equity reduced significantly the leverage levels of the firm. Just previously to the subprime mortgage boom, and then, was stable for a period of almost 2 years, when it start to rise again, initially very slowly and after 2006 – after the beginning of the subprime crisis – it started to increase sharply, until a sudden change in the patterns, and then the increase become very slowly.

Chart 6 – Lehman Brothers Financial Leverage



Source Bloomberg Chart 6

[3] In a paraphrase of New York Times May 3, 2009 in:
http://www.nytimes.com/2009/05/03/business/03real.html?pagewanted=all

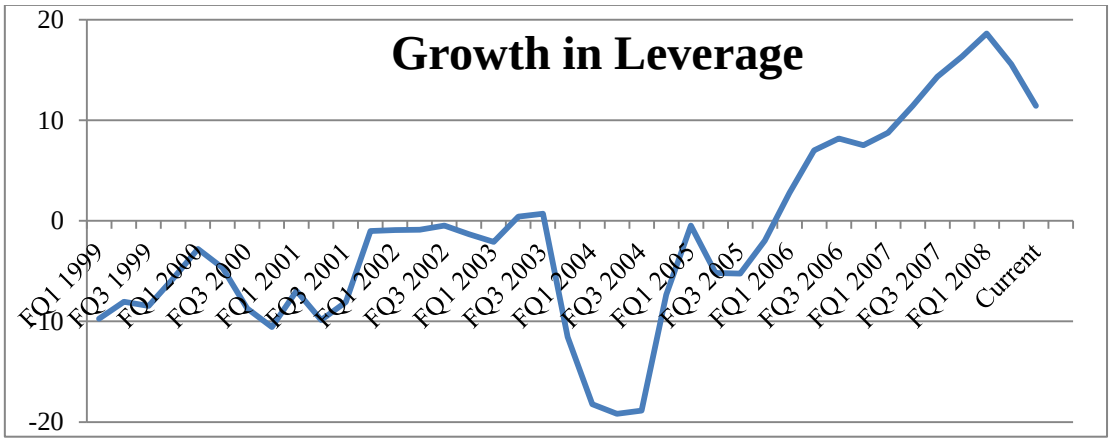
Table 3 and chart 7, also, shows that during the subprime crisis, the growth in the leverage levels was always positive, and in most of the times, even increases. This raise in growth was significant and after the second quarter of 2006, the rate was always superior to 7% and, after the second quarter of 2007, the rate was higher than 11%, increasing to more than 15% after the last quarter of 2007, peaking in the first quarter of 2008, with 18.62% increase in relation to the previous period.

Table 3 – Leverage Levels and Growth from Q1 99 to Q3 08

Field	Q1 1999	Q2 1999	Q3 1999	Q4 1999	Q1 2000	Q2 2000	Q3 2000	Q4 2000	Q1 2001	Q2 2001	Q3 2001
Lvg	36,08	38,37	38,88	36,56	35,07	36,57	35,49	32,71	32,63	32,96	32,63
Growth	-9,74	-8,05	-8,45	-5,71	-2,79	-4,68	-8,71	-10,55	-6,95	-9,86	-8,07
Field	Q4 2001	Q1 2002	Q2 2002	Q3 2002	Q4 2002	Q1 2003	Q2 2003	Q3 2003	Q4 2003	Q1 2004	Q2 2004
Lvg	32,38	32,33	32,68	32,47	31,95	31,66	32,81	32,70	28,26	25,88	26,52
Growth	-1,01	-0,91	-0,87	-0,48	-1,33	-2,10	0,42	0,71	-11,53	-18,23	-19,17
Field	Q3 2004	Q4 2004	Q1 2005	Q2 2005	Q3 2005	Q4 2005	Q1 2006	Q2 2006	Q3 2006	Q4 2006	Q1 2007
Lvg	26,53	26,19	25,76	25,15	25,14	25,68	26,48	26,92	27,20	27,61	28,80
Growth	-18,86	-7,33	-0,48	-5,17	-5,23	-1,97	2,79	7,02	8,18	7,53	8,78
Field	Q2 2007	Q3 2007	Q4 2007	Q1 2008	Q2 2008	Current					
Lvg	30,00	31,10	32,12	34,17	34,66	34,66					
Growth	11,43	14,35	16,35	18,62	15,57	11,45					

Source Bloomberg Table 3

Chart 7 – Growth on Leverage Levels



Source Bloomberg Chart 7

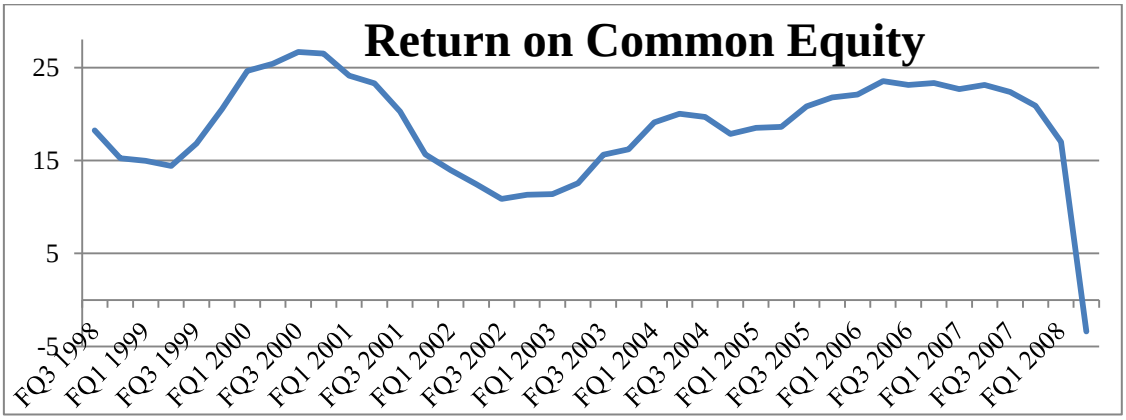
When we compare the results of the firm with its levels of leverage, we will use the Return on Common Equity (RCE), as instrument to analyze how well the company was performing, RCE, as the analytical instrument, it is an important way to measure the results of the company and more significant how it performed to its owners or shareholders.

When analyzing the RCE in chart 8, we can observe a lack of pattern for the entire period but we can also see, unmistakably, areas of growth and declining areas. More important, than identifying these areas, is to see its connections with the leverage levels, concluding that most of the patterns do not actually coincides with the leverage levels.

An clear example of the lack of relation, is the fact that after the first quarter of 2004, the RCE continues to growth moderately for one year, then have a small period of lower growth and then enjoyed, again, a small growth until stabilizes after the second quarter of 2006, to be around 23 dollars per share, until its fall to a negative when the firm collapses.

The most important factor to be notice, is that unlike the growth in leverage, that become sharper and sharper close to the end, the levels of RCE were stable and change very little, in the same period. More important, the levels of leverage change, substantially, during this period and the levels of RCE changes were not very significant, and stayed on the same levels in a pattern that resembles a snake, unlike the pattern of leverage that resemble a weird smile.

Chart 8 – Return on Common Equity



Source Bloomberg Chart 8

Some of these deals, were done with the only intent of doing the deal, or for doing a deal larger than the competition, or because the last big deal was not done by them, the Archstone-Smith Trust is a clear example of this, the Real Estate division had lost a significant deal, in with the Tishman Speyer was the client, this loss of a business is characterized as one of the reasons for why Lehman was involved in the Archstone-Smith Trust transactions. This is a particular example of investment, done through

leverage, in an environment that was not favorable to Real Estate investment, because the imminent burst of the bubble.

This leverage based expansion, was not a new trend and it is commonly used to support large expansions, mergers and acquisitions. Issue debt, in the form of bonds, CDO, LBO bonds or others types of debt to finance expansion, was not a new trend and it is used since the beginning of the financial market. The important part here are the level of leverage and the risk that will be in this new expansion, this risk varies, naturally, and can be very low in investment, with the government backing or approval, for example, or very high, when it is related to financial markets or in a specific area that is in a great change.

Lehman Brothers had a very simple strategy to increase its participation, in the CDO markets, with especial attention to Mortgage CDOs. In the traditional CDOs market, the firm would buy mortgages from mortgage lenders, package it, slice it and sell it as investment grades tranches to its clients. In a clearly expansionary maneuver, to produce and sell more CDOs, the firm started to buy mortgage lenders and increase its line of credits to home builders, making possible to buy more and more mortgages, the raw material for CDOs. This move had the advantage of insuring a line of supply, at cheaper rates, indifferent of the competition for mortgages, this not only guaranteed a stable supply of raw material, also preventing competitors to gain access to more raw material. This would give the firm a better control of the final price.

Most of these investments were done with more debt, issuing bonds and debt to support and finance that expansion. Another part of its high leverage, was the debt used to support the new creation of loans and mortgages, which was done by debt in the bond or similar types. This was, usually, done with relative short-term debt, which was used to provide capital to student loans and mortgages, that would be resold, package, slice it, repackage and sold to investors. This was done in a short-term period creating a dangerous situation, in which the bank holds an incredible amount of debt. This was dangerous, because if the bank were unable to sell the CDOs, it will be caring a huge amount of debt in its books. This huge amount of debt, in its books, with a very large amount of illiquid assets as collateral, will create a very high level of leverage and an even more dangerous problem of liquidity, if any depreciation happens.

Lehman Brothers used this instruments, to finance and support its expansion and investments, and would invest largely in real estate, as a secure asset, with very low or inexistent risk of depreciation, this choice would mark the future of the firm and, untimely, the collapse of Lehman Brothers Holdings. That would be significant, because many investors, that could have saved Lehman, on its last days, would raise the issue of wrong valuation of its real estate assets, a clear example was the comments of David Einhorn, a hedge fund manager, that stated that value of the real estate assets were being overvalued.

On chart 9, we can see the different levels of leverage, in the major banks that operated in the investment sector[4], how the different banks react to the crisis, from its beginning to the critical point, were Lehman failed. After the dot com crisis, Lehman had a very high level of leverage, which was being in a reduction trend, until the beginning of 2004, when the financial leverage levels stabilized, than changed, in the third quarter of 2005, when an ascension trend began. At this point, most banks had the same trend of rising its' leverage levels, some more sharply than others, but they were all increasing – with the exception of JP Morgan, which had a stable trend with just a very slight increase.

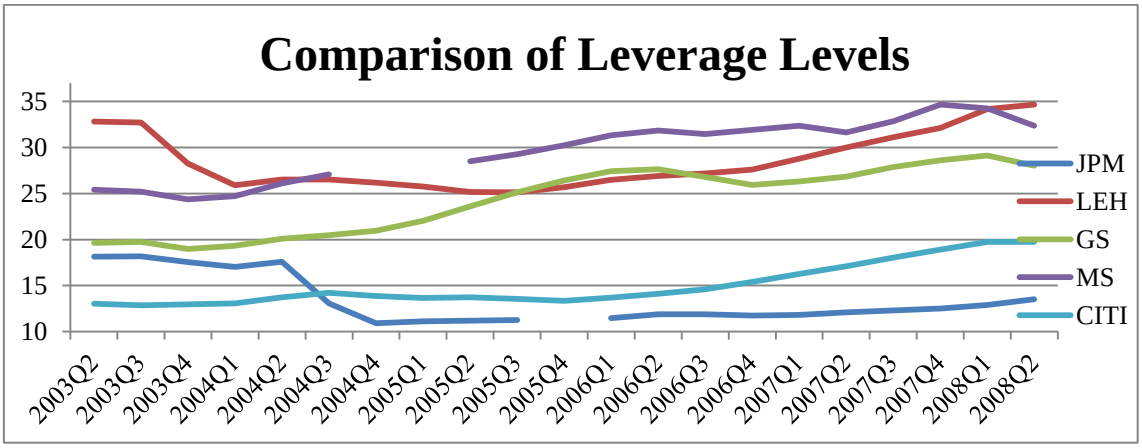
The importance in chart 9, is the movement happening during the subprime boom and its burst, noticing that in the beginning of the crisis, all the banks involved in subprime mortgages, kept on increasing leverage levels. Goldman Sachs was the first bank to reduce its leverage levels, starting in the second quarter of 2006, followed by Morgan Stanley, which started reducing its leverage levels, and stabilizing in lower growth area. This pattern would only change about a year later when, again started to increase, only to decline in the end of 2007.

Another fact to be noticed, is that Lehman was the only firm that, during the entire period of the crisis, did not stop increasing its leverage levels and, also, become even sharper on the last two periods. Most firms kept increasing leverage levels but reducing the pattern, until, eventually, starting to reduce its' levels, Morgan Stanley was the firm with higher leverage levels until the beginning of 2008, when it reduce a little

[4]Because Bear Sterns and Merryl lynch were bought, their leverage levels become part of JP Morgan Chase & Co and Citigroup respectively, and I could not find independent information.

its leverage. Meanwhile, Lehman continued to increase its leverage significantly, and only started to reduce the speed of the leverage growth, in 2008.

Chart 9 – Leverage Level Comparison



Source Bloomberg Chart 9

Leverage buyouts (LBO) are a type of acquisition, in simple terms that use the cash flow of the assets, which has bought as a mean of payment and the assets, in general, as a guarantee of the debt being issued, that is, buying an asset and this asset's cash flow, will serve to pay the debt and the debt value will be guaranteed, by the asset itself – this being simple bonds or an entire company. The debt, like bonds, for example, will be attached to the bought assets.

This way is particularly good to finance an acquisition or merger, it is very good, because does not jeopardize the original company, that is the company purchasing stays safe, from any unlucky event, that may happen, to the company being bought. For example, if a firm buys a company, in a different sector, and does not integrate the new company's assets to itself and, in the eventually of the bought company is forced to declare bankruptcy, the buying one is safe. Therefore, its assets would not be affect by this failure, or the eventual default on the bought company's debts, this include the LBO bonds that were issued to finance the acquisition.

Lehman Brothers was a very important player in the market for LBO, had important clients – like hedge funds or private equity firms – which uses LBO in large amounts, to support the cost of an asset acquisition. In a similar way, to support the expansion, by high leverage, in real estate investments, Lehman also allowed its high leverage levels in order to support LBO, and increase its markup, in this area of the

business. Not only for fees and interest rate, but also to be able to play in the major league, as was once said by Dick Fuld, and to compete with the larger firms, specially, with Goldman Sachs.

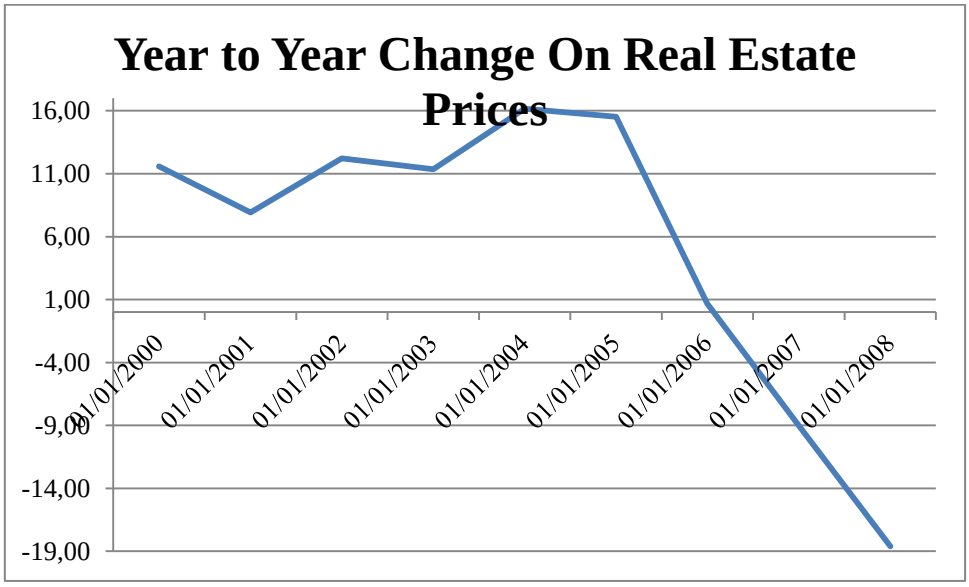
3.4 Real Estate

Investment in real estate was always consider a safe investment, most investors like the fact that the real estate is palpable, which can be seen, touched, lived in and improved, considered a safe investment, even if lose some value, because the asset is still there. Together with this felling of safe haven for investment, was the fallacy of that time, in which a depreciation in real estate, would never occur in the national level, that because indifferent of small depreciation, in regional or local markets, the U.S.A. national real estate market, had never showed any depreciation, since the great depression of the 30s'.

Chart 10 and table 4, shows that from the beginning of the year 2000 until the end of 2006, the average price of real estate had a growth of almost 103%. This was an incredible growth, in a relative short period, and alongside with rising rates, would create a large wish to buy more and more real estate, from investors and, very important, for small and first time investors. Those investors would use real estate properties as a source of income or living, this constant movement of the market created a great cycle of increasing prices, since more and more investors, were being attracted to real estate assets.

Initially, the large investment houses would not participate in this movement, but with the amazing growth in this market and the large amount of mortgages being generated, to allow investors to buy new real estate assets, the mortgage originators would soon go after investment firms to find funding, that would allow to increase lending thus, creating a larger market.

Chart 10 – Year to Year Change on Real Estate



Source Bloomberg Chart 10

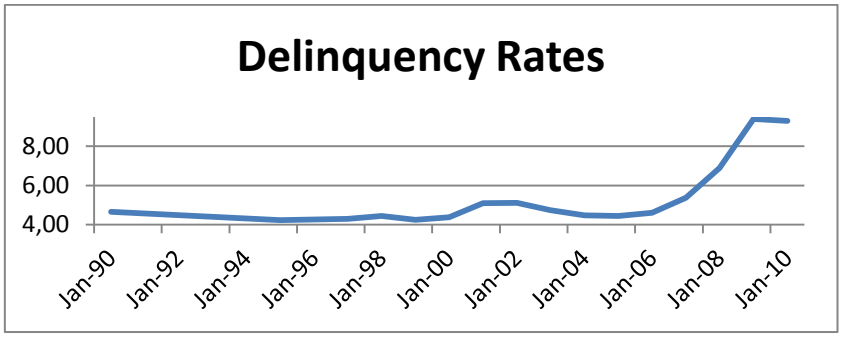
Table 4 – Evolution of Real Estate Price

Date	31/12/00	31/12/01	31/12/02	31/12/03	31/12/04	31/12/05	31/12/06	31/12/07	31/12/08
Last Price	111.58	120.43	135.15	150.49	174.83	201.97	203.33	184.97	150.54
Y2Y Change	11.58	7.93	12.22	11.35	16.17	15.52	0.67	-9.03	-18.61

Source Bloomberg Table 4

Together with this data was the fact that there was rarely a period, in which the mortgage default level was higher than 5 percent, and the two times when this occur was in 2001 and 2002, as a reaction of the dot com burst, alongside with 9/11th Terrorist attacks, that had very negative effects on the economy. This can be seeing with the rise of delinquency rates to 5.11%, leaving the 4.3% average, returning to it, after this brief period. The next significant rise would be in 2007, in the begging of the financial crisis, being actually one of the major factors to the financial crisis, as chart 11 and table 5 shows.

Chart 11 – Total Delinquency Rates



Source United States Census Bureau Chart 11

Table 5 – Delinquencies Rates

	1990	1995	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total	4.66	4.24	4.30	4.45	4.26	4.38	5.11	5.11	4.74	4.48	4.45	4.61	5.38	6.90	9.40	9.30
Prim[5]	NA	NA	NA	2.59	2.26	2.28	2.67	2.63	2.51	2.30	2.29	2.39	2.94	4.30	6.50	6.50
Sub[6]	NA	NA	NA	10.88	11.44	11.92	14.04	14.33	12.17	10.80	10.84	12.27	15.62	19.90	25.50	25.90
Fed[7]	6.68	7.55	8.12	8.47	8.58	9.07	10.78	11.53	12.21	12.18	12.51	12.74	12.71	13.00	14.00	12.80
Vet[8]	6.35	6.44	6.93	7.10	6.80	6.84	7.67	7.86	8.00	7.30	7.00	6.67	6.43	7.20	7.90	7.50

Source United States Census Bureau Table 5

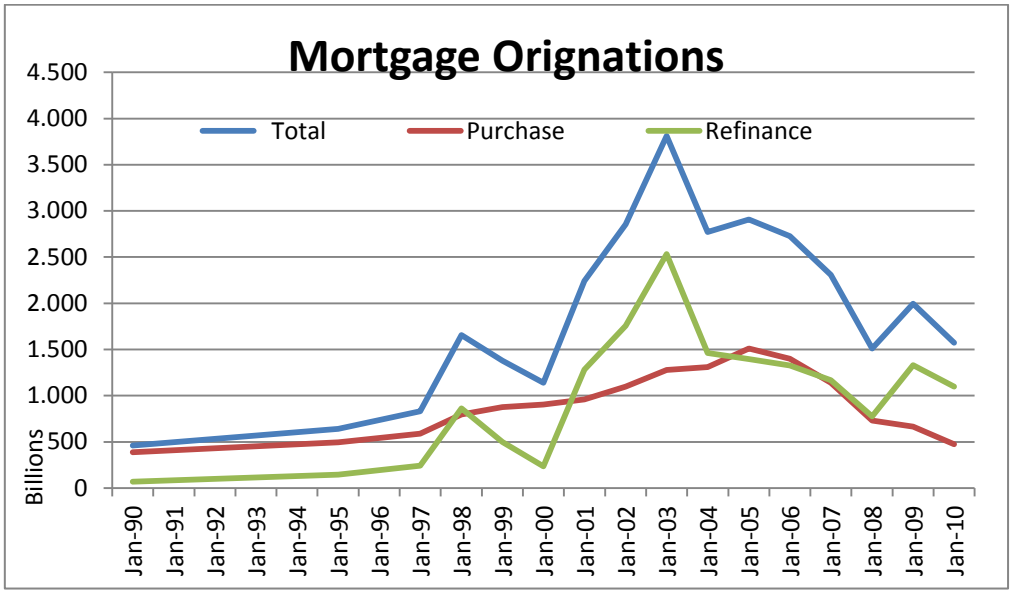
Base on this premises, most financial firms started to invest in real estate and related assets, in most cases not only investing in this types of assets, but also in generating CDO related to real estate, such as Residential Mortgage Collateralized-Debt Obligations (RMCDO) or Commercial Mortgage Collateralized-Debt Obligations (CMCDO). Those types of assets were an imprecise source of revenue and profits, for most of the financial firms, but to Lehman was more than a simple and very profitable business, becoming one of the major players in the CDO markets.

3.4.1 Real Estate Related Assets

Charts 12 and 13 shows that until the end of 90s', most mortgage originations were to buy a house or equivalent, and only a small part was to refinance an already owned property. There was a clear trend of steadily rise on refinance, which would have the first peak on the beginning of 1998, and suffer a sudden inversion on this trend, in the following years.

[5]Prime conventional loans
[6]Subprime conventional loans
[7]Federal Housing Administration loans
[8]Veterans Administration loans

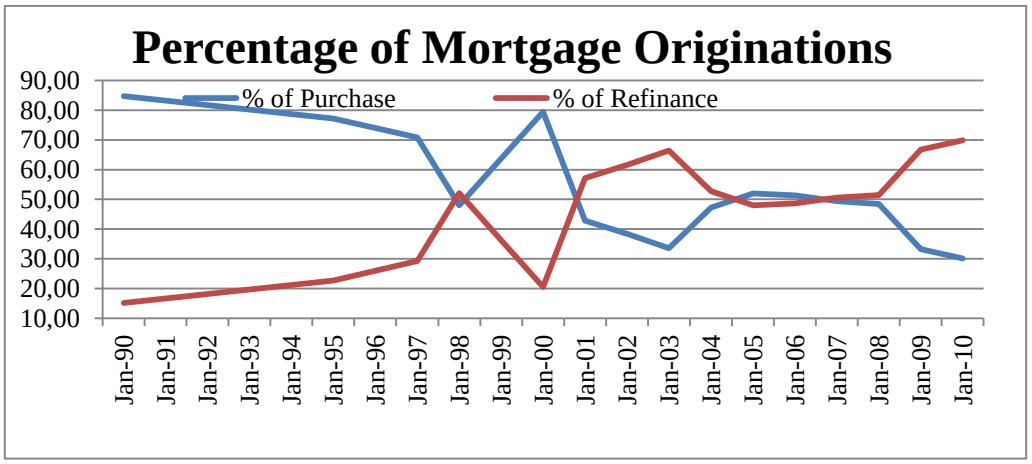
Chart 12 – Mortgage Originations



Source United States Census Bureau Chart 12

This trend would change, yet again, in the beginning of the decade of the 2000s', in 2001, the trend not only had cleared changed, but also the refinance stabilized, as the main source of mortgage originations, for a few years, and only to changed, on the beginning of the subprime crisis, during the peak years of the crisis. As observed at chart 12, this path changed to what appear to be a more natural state, where refinance stay as a larger percentage of mortgages than the purchase of real estate assets, at least until the beginning of 2010.

Chart 13 – Percentage of Mortgage Originations



Source United States Census Bureau Chart 13

This was an important factor, influencing all the process, which would end in the collapse of Lehman Brothers, because it shows how many mortgages were being created, incentivized by CDOs manufactures, so they could have more and more raw material, to create and sell more CDOs tranches.

All this CDO frenzy were not only happing in Lehman, the entire industry was using new mortgages, to sustain the growing demand for CDOs, in a direct consequence, most mortgages lenders were selling its mortgages to investment banks, so they would not bare the risk of a default in the mortgages, that they were lending, this fact creates moral hazard, because mortgage lenders would make a profit in fees, and then sell the risk to investment banks, so they would be willing to accept more risky mortgages.

A clear demonstration that more risky mortgages were being taken, was the change from prime to subprime mortgages, remembering that subprime is riskier than prime, and this shift in position happen in the entire industry, not only in small markets or areas. Prime mortgages continued to exist and be preferred by investors and borrowers, but to generate more CDOs was necessary more and more debt, like mortgages.

All major investment banks were buying mortgages to create CDOs, but there were some banks, specially, that would be taking huge amounts of debts to create CDOs, in order to generate fees, this were Bear Sterns, Lehman Brothers and Merrill Lynch.

Initially, Lehman was buying mortgages from distinct lenders in different areas of the country, and these mortgages worked as raw material in theirs CDO machine. Than Lehman chose to move to a more aggressive posture in the CDO markets, that move was the acquisition of mortgage lenders, all through the country – in a strategy to guarantee an increasing source of raw material, for the very profitable business of the CDOs, which were having a staggering increase on demand.

To support the raise in demand of CDO tranches, for investment purposes, Lehman started to expand into the mortgage lending business, in form to ensure a stable supply of mortgages, that would be transform in CDOs. Mainly, this expansion was in

form of acquisitions, specially, the acquisition of mortgage lenders, like BNC Mortgage and Aurora Loan Services, that were specialized in non-prime mortgage lending.

Lehman chose to expand to non-prime mortgage for different reasons, which include the fact, that non-prime mortgages are more profitable for lenders and that prime mortgage, apparently, disappeared from markets, after a significant increase in mortgages purchases to support the CDO system. Not only non-prime mortgage markets were still easily accessible, but also in a search for higher yields for CDOs investors, using Subprime and Alt-A [9]mortgages were ideal because they produced higher yields for investors, and higher fees for the CDO originator, in this case, Lehman Brothers.

Is important to note, that in both cases, they were lending substantial amounts of money, in an increasing attempt to provide raw material for the CDOs. BNC mortgage was lending more the a billion dollars, and Aurora Loan services more than 3 billion dollars a month, this not only express the staggering amount of debt being crated, to support the CDO machine of Lehman Brothers, but also demonstrated the enormous effort being done to provide all this debt. In thus circumstances Lehman had to borrow and lend and then sell as CDOs tranches. This was a large operation that employed hundreds, if not thousands, of workers, all over the world, and more important, used the firm's balance sheet as a warehouse, while the CDOs were being created, to the time they were sold.

This had another problem, if the firm is not able to sell it, in the proper time, it would be forced to report a large loss, and its leverage levels would increase, significantly, to a dangerous level and, probably would not be able to continue lending to its mortgage clients. Also would not be able to pay its short-term debt obligations, specially the ones connected to the system of debt warehousing, which would be transformed into CDO tranches.

Was remarkable the size of the investments being done in these real estate related assets, specially when the market for homes started to dry out, and sales become more difficult and prices started to fall, even then, investments kept growing and stabilizing without reducing. At this point the subprime crisis had already began, being

[9] Alt-A or Alternative A, is a type of mortgage, riskier than type A but less risker than Subprime. Usually, people with bad credit ratings and history, and also lacking the necessary documents for a Type A mortgage, but, usually, not low income.

particularly real in the end of 2006 and through 2007, Lehman started to lose its grip after October 2007, that's when the firm started to reduce its lending operations, and started to look out for more capital, In a shine attempt to increase its capital bases, and reduce its leverage levels, primarily based on Fuld's argument, that a good capital cushion would absorb any liquidity problems, allowing the firm to remain strong.

3.4.2 Lehman Invests in Real Estate

Lehman Brothers also choose to invest in real estate and real estate managing funds, with the belief that real estate would never depreciate significantly. With the booming of almost all real estate assets, investing in real estate, were considered a safe and very profitable business. Lehman starts to support LBO in real estate and related assets, for its clients, to then move it into this path with its Global Real Estate Group division.

Lehman Brothers was on a path of acquisitions and consolidation of its real estate assets, acquiring more and more assets, since the end of the dot com crisis, from 2001 and 2002, Lehman increased drastically its investment in real estate, and its deals on this market, also increasing the size of the deals significantly. The Archstone-Smith Group – that owns high-end luxury apartments buildings and other high profile buildings, like the Rockefeller Center, in New York – is an example of a large deal, which used a considerable amount of leverage to finance it. Another example of a large deal was the purchase of the Coeur Défense Building, in Paris, this deal was made on the peak of this boom, and was paid a high value, of more than 2 billion dollars.

The investments made by Lehman Brothers, with the command and supervision of Mark A. Wash, were very profitable for a number of years but, unfortunately, end up bring the firm down with its high debt load and, more important, a very illiquid asset base, that would lose significant value during the crisis, affecting, even more, the stability of the company. To aggravate a serious situation, some important hedge fund managers and investors, started to doubt the Lehman way of evaluating its real estate assets. The correct evaluation of these assets is extremely important, because some of this assets were being used as collateral, to show stability for deposits and investments.

If the real estate asset is improperly evaluated, investors may lose its investments and holdings. So when some investors start to put in question how sound the real estate

structure of investment was, Lehman started to show, in the beginning, a small loss of trust, that would be aggravated in time, without the correct action from Lehman, to easy investors' concerns, and to correct its evaluating models.

When this was done, most investors with special remark to David Einhorn's Greenlight Capital hedge fund, which was one of the first to named or noted the problems in Lehman Brothers, and continued to find the values too high. David Einhorn's conclusion was that the values of the real estate assets, were too high and the models used were over confidant, in a market that had already stagnated (Lindgren 2008), and the late correction was too little too late, particularly because Lehman continued to over valuated assets in its books (Story 2008).

3.5 Crisis in Lehman Brothers

The crisis that hit Lehman Brothers did not started at Lehman, it started in the market, more specially in the subprime mortgage markets, during the period of 2004 to 2006, the subprime mortgage markets had suffer a spectacular increase in volume, in the system where the mortgage lender would lend, then sell this mortgage or debt to investment banks, that would put all together in a package and then slice it into tranches and sell it to investors.

3.5.1 Subprime Mortgage Crisis

Subprime Mortgages are a kind of lending, to borrowers with bad credit history or ratings, to counter that problem, the interest rates were higher than a prime – normal – mortgage. To increase the number of mortgages, most mortgage originators start to diversify, in different types and options of payments.

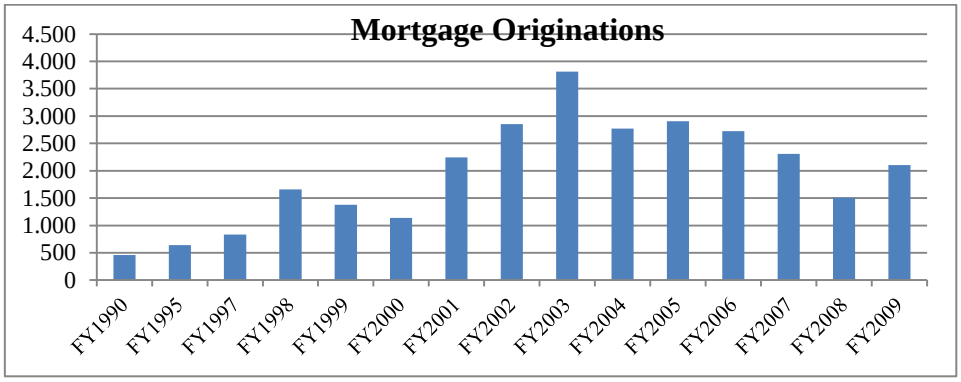
This diversification created different kinds of mortgages, such as Adjustable Rate Mortgage (ARM), in which the interest rate would be very low in the beginning, known as teaser rate, and then would reset to a higher rate. There were also only interest mortgages, in which the borrower could choose to pay only the interest on the debt and not the principal, and are also variations of this model, that the borrower could choose to add the interest or part off it, to the principal and not pay for that month or months.

Another very popular mortgage was the ARM, that is because most people do not have enough capital to put in their new homes, so they choose an ARM type, in most cases, with the full intention of refinance, after the initial teaser rate – which was typically two years – and use the higher value of the asset, the house, as a source of cash infusion to consumption, other investments or to get a better interest rate, on the fact that now the mortgage value would be smaller than the value of that house. Most of these investments were done with the belief that home prices would never go down. That belief was not exclusive to the home owners and mortgage lenders, investment banks and investors also believed that this pyramid of debt would keep growing on this stable base, the house market.

In charts 14, 15 and table 6, we can see the increase in mortgage originations is very significant, and with a clear trend of refinance instead of purchase homes, this clear trend shows how much of the mortgages were being created, and were just for new homes, or for a refinance deal, in which a significant part were being used as an ATM machine, to other consumption propose than the house itself.

As a result of such a large issue of mortgages, the price of home sky rocket after the dot com burst, there were other influences, like the very low rate of the FED during this period, due to uncertain economic times, in order to avoid a recession, as consequence of the burst. All these debts were being transformed in ABSs, using mortgages and other debts as assets, this securitization of debt, helped create an investment frenzy, where billions and billions of dollars were being thrown at the market of debt, and direct to mortgages, auto loans, student loans and debts to consumption, like credit cards. All this surplus of capital going to the economy, was many times, based upon the value of houses or equities, this help fueled the already bubbled priced houses and real estate, but also a large growth in the economy.

Chart 14 – Mortgage Originations



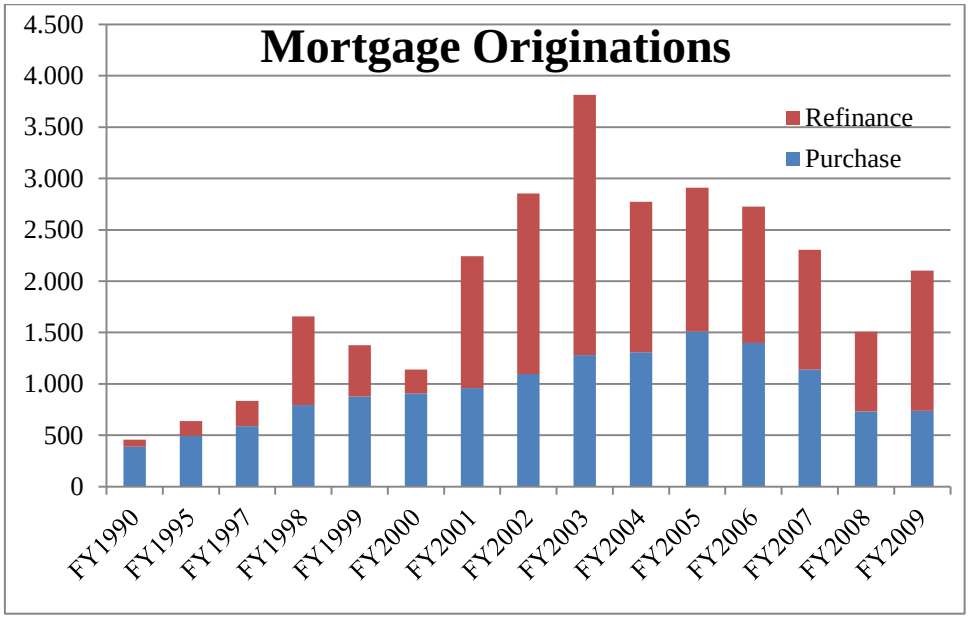
Source United States Census Bureau Chart 14

Table 6 – Mortgages Originations, Purchases and Originations of Mortgages

Mortgage Originations	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total (billion dollars)	1656	1379	1139	2243	2854	3812	2773	2908	2726	2306	1509	2103
% Growth	98,80	-16,73	-17,40	96,93	27,24	33,57	-27,26	4,87	-6,26	-15,41	-34,56	39,36
Purchase	795	878	905	960	1097	1280	1309	1512	1399	1140	731	739
Refinance	862	500	234	1283	1757	2532	1463	1397	1326	1166	777	1364
% Mortgages Refinance	52,05	36,26	20,54	57,20	61,56	66,42	52,76	48,04	48,64	50,56	51,49	64,86

Source United States Census Bureau Table 6

Chart 15 – Refinance and Purchase of Mortgage Originations



Source United States Census Bureau Chart 15

As a consequence of investors around the world throwing capital in the U.S.A. housing market, the real estate prices ballooned to historic highs, to use the raising

value of their homes, home owners started to make more and more loans on the house and refinance it when the house price's increased, using their houses as a personal ATM machine, to finance other investments, student costs, cars or just simple and plane consumption of goods. All this debt based consumption and massive increased in prices, resulted in one of the largest economic boom, that the planet had already seen, the economic activity started to growth all over the globe, and this period was consider one of the largest prosperity periods of all times.

But as always, all good times come to an end, and the over-indebt home owners started to have difficulties to pay their debt loads, and with theirs reset of the ARM types – Teaser Rates – starting to occur without the new increase in home's prices, to support more debt, or even a new refinance of the debt, a large number of borrowers had to actually started to pay the higher rate of interest, that they were avoiding from the beginning.

At this point in time, many home owners were not able to keep their payments, and in a moment where most areas of the U.S.A. had have a very sharp fall in prices in real estate assets. A very large number of home owners choose to simple walk away and drop the keys in the mail box, together with people that did not choose to walk away, mortgage lenders started to foreclose, in many areas, in an increasing number, which only aggravated the problem, making house prices fall even more, with the sudden large supply of houses, in a market where the demand was been reducing in a very fast pace.

All this conditions were the beginning of a very complicated and serious storm, in one side, we have most investment banks, providing huge amounts of capital to mortgage lenders and then reselling to investors. When this investors started to realize the problem of the sharp and sudden fall in value, on the underline assets of CDOs and other mortgages related assets, they started to redrawing from this markets, creating a problem with the CDOs' machines. Suddenly, when that were not all that money to lend and keep prices going up, the entire system come to a sudden stop.

Even more serious, most investment banks involved in the CDO markets, were warehousing billions of dollars, at that moment unsold and unsellable CDOs, and to complicate even more, many of the CDOs used subprime mortgages, like ARM, as a guaranteeing asset.

When foreclosures started to pop up, all over the country, the yields being paid by this debts, stopped, and the CDOs that used its cash flows to repay investors, started to have problems paying investors, then the value began to be wipe out. The CDOs structures were built to guarantee some safety, to institutional investors, which means, at this point the equity tranche, had being hit hardly, soon the damage started to hit the mezzanine, and senior tranche.

An important remark is that, in most cases, the equity tranche were being held by investment banks, in a type of guarantee for the system, if those CDOs loose value. That loss of value, could wipe out a considerable amount of capital, from the originator banks, making the entire situation even worst.

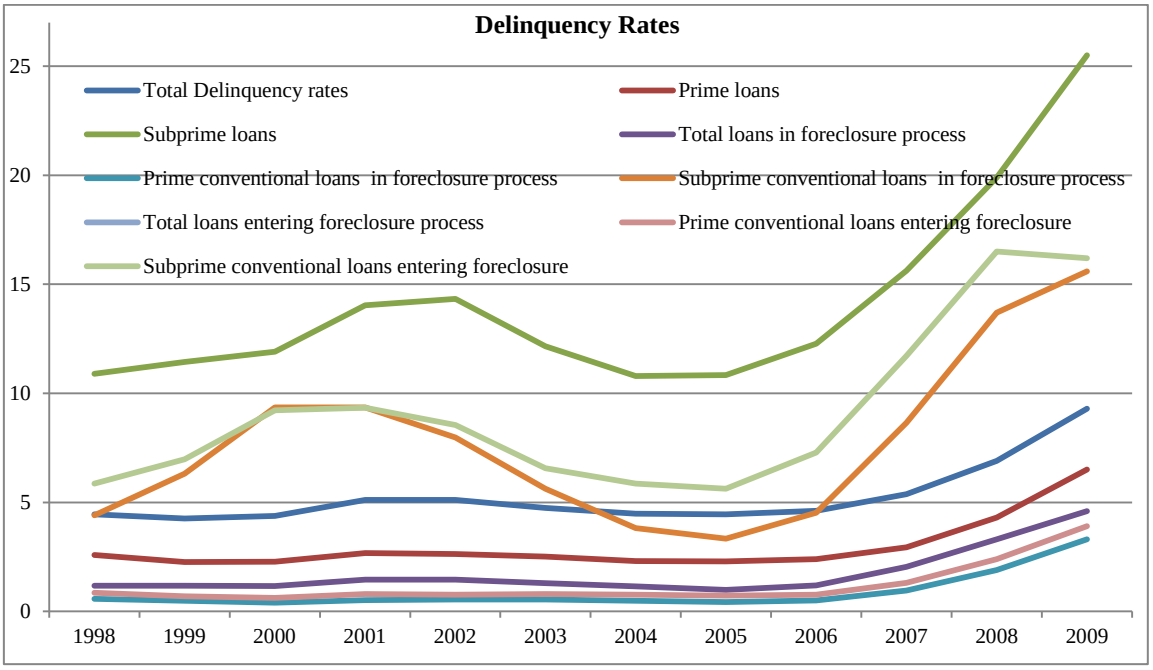
In chart 16, it is possible to see how the delinquency rates evolve, in that period, from a very low to a very high rate, which shows the behavior of the market.

Another important fact were the foreclosure rates, from thus entering the process and in process, with foreclosures affecting the prices of surrounding properties, which if in a specific area and in large numbers, will alter the balance between supply and demand, creating an excess of supply. That will make the prices drop even more, together with these economic principles, areas with large numbers of foreclosures are less attractive to investors or new home owners, lowering the price even more.

As seeing in chart 16 and table 7, the delinquency rates, in prime mortgages, were very low and remained low until 2008, than starting to climb significantly. This shows how the growth in delinquency rates, in the subprime markets, influenced other markets, specially real estate.

In the foreclosure rates is even, more visible, we can clearly see that during the boom years of 2004 and 2005, even the rates for subprime mortgages were extremely, if we consider the high risk associated with subprime mortgages. But again, it is possible to see how these markets have a great influence in the prime market, altering the entire real estate market trend, establishing and spreading the crisis.

Chart 16 – Delinquency Rates



Source United States Census Bureau Chart 16

Table 7 – Delinquencies Rates

Delinquency Rates	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total	4,45	4,255	4,375	5,1075	5,11	4,74	4,48	4,45	4,605	5,38	6,9	9,3
Prime loans	2,59	2,26	2,275	2,67	2,63	2,51	2,3	2,29	2,3875	2,94	4,3	6,5
Subprime loans	10,9	11,4375	11,915	14,04	14,33	12,165	10,8	10,84	12,2725	15,62	19,9	25,5

Foreclosure Rates	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total loans in foreclosure process	1,17	1,17	1,16	1,46	1,46	1,29	1,15	0,99	1,19	2,04	3,3	4,6
Prime conventional loans	0,58	0,48	0,39	0,51	0,54	0,55	0,49	0,42	0,5	0,96	1,9	3,3
Subprime conventional loans	4,41	6,32	9,35	9,35	7,97	5,63	3,82	3,33	4,53	8,65	13,7	15,6
Total loans entering foreclosure process												
Prime conventional loans	0,85	0,69	0,62	0,79	0,77	0,79	0,77	0,72	0,76	1,3	2,4	3,9
Subprime conventional loans	5,86	6,97	9,22	9,34	8,54	6,57	5,86	5,63	7,28	11,72	16,5	16,2

Source United States Census Bureau Table 7

3.5.2 The Damage Lick to Other Markets

The initially contained subprime crisis, started to spread to other markets in the way of a credit crunch, meaning the lack of credit started to spread to other markets and sectors, which are, in large scale, funded by credit. This also creates significant problems, in business related to subprime mortgages, like home builders or mortgage lenders, and with many players in markets connected to mortgages, started to suffer a

very quick reduction on its activities. This also spread to home related business, like furniture makers, sellers and home services like plumbers or electricians.

This spread and contamination of markets become a serious problem, in particular, for financial institutions, not only because they were extremely involved in this business but also because they are a credit oriented businesses. They depend – very much so – on credit and on the investors' trust, when this contamination hit the financial industry, firms that were closely involved were hit first and very hard, with a lot of damage, most important, the damage was on the confidence of the firms, this was especially true for Bear Sterns, Lehman Brothers and Merrill Lynch.

The three larger players in the MCDO industry were: Bear Sterns, Lehman Brothers and Merrill Lynch. Almost all investment banks or investment branches were largely involved, but this three were involved very deep and with very large investments, when this investments started to present losses, together with the inability to resell the warehoused CDOs, the combination of effects would result in a very large damage to the financial industry, which depend on credit, that was becoming very hard to find, and most investors were showing concerns of a larger economic problem. In order to prevent losses of their own, they started to pull of capital from money markets and slow the pace of investments.

The credit crisis become evident when the French bank BNP Paribas close three of its large funds, which operated in the subprime market (Boyd 2007), for some authors, this is the very beginning of the credit crisis or the spread to the financial industry, from the previous contained crisis, after BNP Paribas closed its funds, another financial institutions were forced to do the same. Bear Sterns was forced to close two of its largest hedge funds, following significant losses in its assets, puting the assets and debts, on its books. This move was a significant blow to the balance sheet of the firm, which now become extremely high leveraged and cause the firm to have liquidity and capital problems.

All this problems forced Bear Sterns to seek help, initially, asking for investors to put more capital on the firm and then, to government help or potential partners to buy a stack on the firm, or even the entire company.

After some time seeking help, in the markets and even assistance from the U.S.A. Government, that would provide 25 billion dollars in assistance, using assets that the market would not accept as collateral, on March 14th 2008, for a window of 28 days during this period Bear Sterns would had to find a market solution. Nevertheless, in the following weekend, a special meeting with some members of the financial industry, was set up to find a solution for the Bear Sterns crisis, the final solution was a simple buy of the firm by JP Morgan Chase & Co.

Even with the JP Morgan Chase & Co interest on Bear Sterns, the JP Morgan Chase & Co team sent to analyze the books of that firm, did not like what they saw and choose not to pursuit such deal, but with some time and with government assistance and, especially, some pressure, they managed to keep negotiating.

The final deal was made with an extremely low price for Bear Sterns, just 2 dollars a share[10] and a package from the federal government, that would insure 30 billion dollars of Bears Sterns debts and toxic real estate assets, in a very large purchase assistance package, that would actually only cover 29 billion of losses. But the 30 billion dollars of assets in question, would need to suffer a billion dollars in losses, for the federal very large purchase assistance package, entered in action and cover the following losses (Sidel et al. 2008).

3.5.4 The Storm Hits Lehman

After the purchase of Bear Stern by JP Morgan Chase & Co, the federal government, in an attempt to get a head of the crisis and to control its effects, through the treasury department, approved a plan and got congressional approval for a takeover of Fannie and Freddie. In the words' of secretary Paulson, this was supposed to be just a bazooka in its pockets, but he had no intention to use it, this was effective for a while but in September. By that time things start to aggravated again and more bad news, from larger mortgage default numbers were showing up, and larger losses to the two Government-Sponsored Enterprises (GSE). Secretary Paulson to prevent even larger losses to the financial system, was forced to use its bazookas, putting the two GSE,

[10]This was the initial price, that would be later changed to 10 dollars a share (Shell & Today 2008), is important to notice that the original price of 2 dollars a share, created some controversy, among other reasons, was that 2 dollars a share, were less than the Bear Sterns headquarters' building price alone.

under government conservatorship, more specific, under control of the US treasury department (Sorkin 2009).

This move, together with the previous moves to support the sale of Bear Sterns to JP Morgan Chase & Co which was known as the Jamie deal (in relation to its CEO), started to put a large pressure on independents investment banks like Lehman Brothers, Merrill Lynch and others. This pressure were mainly on Lehman Brothers, an independent investment bank in the old merchant bank model, that was extremely leveraged, and in large ways, involved in the subprime mortgage and CDOs business.

All this alignment of losses and bad news, aggravate the situation and marks the arrival of the storm to the firm, the consecutive losses in real estate and the inability to sell more CDOs, mainly the ones that the firm had storage, on its warehousing departments, ready for reselling.

All this problems would not be so serious, if the chosen model to provide capital for CDOs from mortgages, was not short term debt, like commercial papers, but because the CDOs were quickly sold, no problem would appear and the model would look safe. But when the crisis started, and investors stopped buying CDOs, the model collapsed and the firm was holding billions of debt and obligations on its books, that could not be sold and short term obligations, that would had difficulty repaying. This situation was, in some instance, predictable, so Dick Fuld and other senior managers tryed to improve their capital cushion, after the end of 2007. Fuld always managed to save Lehman from previous crisis, with a good and health capital cushion.

The problem this time, was that most traditional investors were not willing to invest in an apparent troubled company, Lehman was still showing good results on its reports, but the market expectation was, that on the second quarter, the earnings would be very low or inexistent, with this fear in mind, most larger investors would not invest in Lehman. And, the so needed confidence of the market, was slipping away very fast, in this precise moment, Lehman did not needed an immediate capital injection, but with its options running low and uncertainty growing, Lehman started to look for possible partners, to arrange more capital and to show the solidity of the firm to the market.

One of the possible partners that Lehman was looking for, was Warren Buffet, the chairman and CEO of Berkshire Hathaway – a known investor and the CEO of one

of the largest holdings in the world, and with an amazing capacity for investments. After a brief negotiation and an initial proposal, that was considered too expensive by Lehman's senior management, the initial deal had a premium from the share prices that day, and an annually high yield, in what is known as the cost of doing business with Buffet. This move would probably rally the markets, pushing away some of the fear and uncertainty.

The Buffet's proposal was an investment in preferred shares, with a dividend of 9 percent and warrants, plus shares of Lehman at 40 dollars (Sorkin 2009), which was a price with a premium of 5 percent at that time. Dick Fuld discarded the proposal as too expensive, and that the Lehman's shares were at 60 dollars in March, and this deal would cost Lehman 320 million dollars a year if Buffet invested 4 billion dollars (Hanson 2011).

After the dismissal of the Buffet's deal, Lehman would have another investor interested. The Korea Development Bank (KDB) was very much interested in making a deal, which could be in the form of getting a stack of the firm or a large part of its operations. After a long time settling legal matters, and according minor adjustments, both firms arranged a meeting in the offices of a law firm, to discuss the deal and to reveal the books and evaluated Lehman's assets.

KDB was willing to invest in Lehman Brothers, assuming that Lehman was able to spun off its real estate assets and its enormous debt associated with it, the agreement was relatively simple. The Plan was, Lehman would spun off to another company, that would hold the real estate and its debt, and KDB would invest in the remain company, which now had a significantly lower debt load, and would not have the troubled real estate assets that had a complicated model of valuation. This investment would be in the form of acquiring a substantial stake on the new company (Anderson & White 2008).

The deal with KDB did not happen according to Sorkin (2009), because of a Dick Fuld's attempt to sell the real estate assets to the KDB, in a larger deal, displeasing the Korean negotiators, making then walk away from the deal.

After these attempts of raising capital and increase its capital ratio, to end market uncertainties, the firm started to look for a buyer, not only for a stake but the entire firm,

preferably a firm that had enough size to support the problems and to bring certainty to the markets.

During this period, most employees of Lehman Brothers were seeing a large part of their personal wealth, disappear, that because a large part of their bonuses, was in Lehman's stocks. We should underline the case of Neuberger Berman, that was bought by Lehman in previous years, Neuberger Berman (NB) is an investment-advisory firm that manage the high-net-worth of wealth individuals, and a firm that had being making a lot of profits for Lehman. And, as employees' of Lehman Brothers they were paid in Lehman's stocks, just like any other employee.

This fact is important because, NB was a profitable part of the firm, that had not being hit by losses and had not taken incredible amounts of risk, this situation become problematic to Lehman's senior management, because they started to rise the possibility of leaving the company, this affected how the senior management, not only, started looking for a deal, in which the company would be sold entirely, and also to spun off the NB.

Lehman started talks with Bank of America (BofA), in an acquisition or merger type of deal, were BofA would buy the entire company and support the troubled assets, the problem, with this scenario, was that BofA was unwilling to accept that risk without some kind of government support, in an Jamie deal style, were the government would take part of the risk in Lehman's toxic assets (Anderson & Sorkin 2008).

Simultaneously, with the negotiations with BofA, Lehman also talked to Barclays, about the possibility of buying the firm. Barclays did not show interest in the entire firm, but was interested in the North-American operations and willing to buy the entire company, but just like BofA, Barclays was not willing to take the risk of the toxic assets, without government assistance or some private solution.

3.6 Bankruptcy

To prevent the Lehman Brothers bankruptcy, the government tried to make a private deal, after making clear that it would not intervene, in this matter, and would not bailout Lehman or facilitated any kind of purchase, with government support. Also. at that point, most of the financial industry was in great jeopardy, most people assume that

if Lehman Brothers fall, Merrill Lynch would be next and the investment banking industry, would collapse.

On the weekend of September 13th, 2008, the government summoned the CEOs of the major investment banks, in order to work a deal, in which the private sector would provide support to the deal that BofA or Barclays, would buy the company, but not the toxic assets. This meeting happened because, at that point, Lehman Brothers would not be able to keep its obligations, on the next Monday's opening bell – September 15th (Sorkin 2009).

The negotiations happening in the Federal Reserve Bank of New York, about Lehman Brothers were divided in different groups, in which some of the bankers would work in different aspects of the process, some would work in the spun off firm, that would hold the real estate and its toxic assets, this firm or instrument would be the one in which the others banks would invest, in order to take the burden of debt and toxic assets from the firm being bought by BofA or Barclays.

During the negotiations, to try saving Lehman Brothers many alternatives were discussed but, even with the government orchestrating the meeting for deal, the federal government and the Federal Reserve, made clear that it would not put taxpayers money, on the line, to save the Wall Street firm. Both BofA and Barclays, were not completely satisfied with the model and deal, without the government assistance.

In the beginning of the process, Barclays warn, not only the treasury department, but also the Federal Reserve Bank of New York, that even if could make the deal, it would need shareholder approval and due to British legislation, it would need, at least, 30 days to complete the deal. And, that someone needed to assume Lehman's liabilities, for that period, just like JP Morgan Chase & Co was liable for the deals of Bear Sterns, before the merger was complete. Is particularly important to notice that Barclays was not very interested, on Lehman's entire operations, it was interested on the North American operations, but still was on the table, mainly because of the very low price of the deal (Sorkin 2009).

With the worsening of the Lehman's situation, together with the uncertainty of the markets, and the already volatile situation in Merrill Lynch, that was, also, looking for investors, to take a stack on the firm, increasing its ratio of capital, and attenuated

the losses of its CDOs department. During this search for investors, it had contacted BofA and tried to make a deal, for a small part of the company.

During the meeting – to save Lehman – Merrill Lynch realizes the size of the problem it faced and started talks with BofA, about an acquisition of the entire company. This deal was done, in parallel with the talks about the Lehman's deal, and was completed before the end of the weekend (Mollenkamp et al. 2008), solving a problem to the financial industry, but taking out one of the bidders for Lehman Brothers.

With this development, the situation for Lehman become more serious, but at the same time, the group responsible for finding founding, for the deal in the private sector, to support the purchase and the spun off of the holdings of real estate, toxic assets and its debt. After a long time, discussing the various possibilities, the group in charge of finding sourcing for the spun off company started to finalizing a type of agreement that would work, is important to say that Jamie Dimon CEO of JP Morgan Chase & Co, offered one billion dollars of his firm, to found this spun off, and was followed by other CEOs on the meeting, according to Sorkin (2009).

At this point, most people involved on the situation, thought that the deal with Barclays would came true, Fuld actually summoned the board, to do an extraordinary vote, on the subject.

After some attempts of contact, with Timothy F. Geithner, Sir Callum McCarthy, of the Financial Services Authority, of the United Kingdom, talked to Geithner about the concerns he had about the Barclays-Lehman deal, and the possibility of contamination of the British financial markets. He informed that, even if they were comfortable with this deal, which they were not, Barclays would need shareholder approval, which would take, at least 30 days.

Secretary Paulson contact the Chancellor of the Exchequer, Alistair Darling, and tried to exercise some pressure and guarantee that the toxic assets, were not part of the deal, and that Barclays would not be liable for this assets and the debt load of Lehman Brothers, but, at the same time, said that the federal government would not intervene.

This sequence of events definitely killed the deal, leaving no other option to Lehman. The only option, would be file for chapter 11 of the bankruptcies law, to protected, not only, the employees, but also investors and the market. In a decision of Secretary Paulson, supported by Geithner, has concluded that a filing for bankruptcies would protect the investors, bondholders, employees and shareholders and also stabilize the markets. They decided that Lehman should file for bankruptcy protection, and that should be announce by the Chairman of the U.S. Securities and Exchange Commission (SEC), Christopher Cox, because it were Lehman Brothers' regulator. These announce should be done that night, Sunday September 14th to 15th, in order to be ahead of the opening in the Asian markets.

With the executive board of Lehman Brothers gathered, in session, and already informed that the Barclays deal had failed, they received a call of the Chairman of the SEC, Christopher Cox, in an unclear way instructed the board to file for bankruptcy.

Lehman Brothers filed for bankruptcy protection, in the night of September 15th, 2008. Being the largest bankruptcy file in history, and the most complex one.

After the bankruptcy filing of Lehman Brothers, the largest and most complex of history, involving more than 600 billion dollars in assets and the beginning of the trial and the proceedings. During this process, Barclays Capital become available to buy the North American operations of Lehman Brothers, negotiating a deal, in which Barclays Capital, would be liable for the operations and trading of Lehman, in North America. This deal would also include the workforce, allowing almost ten thousand employees, not to go jobless, and also investors not to lose all their money.

Barclays had, already, showed interest on Lehman's North American investment banking and capital markets business, and made clear that would be available for buying the North American operations and its liabilities. Barclays would agree to absorb almost 50 billion dollars in securities and assume, almost, 45 billion dollars in trading liabilities. This deal also included the Lehman Brothers headquarters on Midtown Manhattan – an office skyscraper evaluated in about 960 million dollars – and the two New Jersey data centers; Barclays would also keep other Lehman's assets and business in the Americas area (Chasan 2008).

This final deal would include the assets and liabilities of Lehman Brothers and, also, a guarantee that it would keep Lehman's employees, for 90 days and that would have up to 2.5 billion dollars, in potentially severance pays' liability from employees. The final deal to buy Lehman Brothers, was worth 1.3 billion dollars (Anon 2008).

This deal, and primarily the low value of the agreement, generated some controversy, mainly because it was almost the price of the building alone. The judge argues that this deal was not the best, but was the only one available, and that the current week had been exceptional and in this financial circumstances, this would have to be done to stabilize the markets. The purchase was finalized on September 22, 2008 after the court ruling in favor of the purchase, Judge James Peck said in court "I have to approve this transaction because it is the only available transaction."After a 7 hours hearing in which deal was approved.

In the same day, Nomura Holdings Inc. agree to acquire the Lehman Brothers, in the Asia pacific region, including Japan, Hong Kong and Australia, and announced its intentions' to acquire Lehman Brothers' investment banking and equities businesses, in Europe and the Middle East. Also, they manage to meet the conditions to the deal and the purchase was going forward (Simmons 2008), is important to notice that more than 50% of the Lehman Brothers revenue had come from non-US operations (Lehman Brothers 2008).

3.7 Consequences

The filing for bankruptcy, by Lehman Brothers, would end up having serious consequences, the first and most notable, was the markets were complete unstable and entering a very bad spiral of loss, in large panic, only compared with the 1929 Crash.

Between the numerous consequences to the economy and to the financial world, a very important one, that should be noted, was the almost collapse of AIG, the insurance giant, that had a financial branch called AIG Financial Products, which between other products, sold CDSs a very large amount of it. When Lehman Brothers collapsed and filed for bankruptcy, the intense fear on the system took AIG to over drive and its already complicated, made the firm unable to keep its obligations on the short-term period.

The situation with AIG become so serious, that the government was forced to intervene, and in the end, bailing out AIG with a capital injection of 85 billion dollars, that would also mean, that the federal government would own about 80% of the company (Merced & Walsh 2008). This action was significant, because it changed the government policy of not intervention and not bailing out financial firms.

With this political change, the government started to strategize a different position and now, instead of trying fixing the problems after they happen, they started to act on the possibilities of fixing it before they appear.

The final solution to this crisis, was the project TARP – Toxic Assets Relive Plan – in which the government would spend 700 billion on the economy and in the financial system, in order to prevent a contagious of the main stream economy, and a possible recession and more important, that provide needed capital to troubled banks (Paulson 2011).

The plan, more specific, was to lend, in a type of capital injection, in which the government lend 125 billion dollars to the 9 larger banks of the U.S.A., in order to end the liquidity problems. The banks were chosen, not only for needing but also some that did not need, in order to cover the fragility of some banks and the strength of others (Sorkin 2009).

The major consequence were a complex crisis on the financial system and in the economy, done by this bankruptcy. The Lehman Brothers collapse may not have cause the initial problems on the economy, but was a very serious turning point on this crisis. The collapse of Lehman Brothers put major fear on the entire global financial system and cause a major recession to the entire world economy.

Chapter 4 – Conclusion

We conclude that the bankruptcy of Lehman Brothers had many factors, that culminated in a fatal blow to the solidity of the firm. Lehman Brothers made large number of risky deals, without making a proper analyze to its effects and risk, and the idea that the real estate prices would never come down, in a significant way, on the national level, influencing the decisions to invest heavily on real estate.

Another important fact was its very high level of leverage, simultaneously with very risky assets, in which the debt was being applied together with the risk. Besides this, the fact that most of its CDO's underlying assets were overvalued and in need to have its proper value identified. When this correction happens, creates a massive underwriting on its books, hugely multiplying the leverage ratios of the firm. Aggravating an already bad situation, and making most of Lehman Brothers counter-partners not willing to extend a line of credit or asking for more collateral for it, leaving Lehman in a bad position, without enough capital to prevent its on default.

Without Lehman brothers' ability to find a new source of capital, from small investors or institutional buyers, created by the market fear and uncertainty, not only the uncertainty of times but also Lehman's colossal and, not precise, number of toxic assets and unknown values. Plus, the lack of willing investors and absence political will to make another intervention on the financial industry.

Other important point is, that even with the current systems which prevent moral hazard and manages its damages, the problem is not complete resolved and, sometimes, can be extremely dangerous, although moral hazard was not the only reason why Lehman collapse, it was an important one for the subprime crisis.

Considering our current level of interconnections, in the banking industry, it would be reasonably to created a better regulatory system, that would not only prevent moral hazard and firms risky positions, that hold debt from others firms. Another solution could be a reduction on the interconnections in the financial markets, but this may look unreasonably, from the current state of the financial industry, and could be compare with the implantation of the Glass-Steagall Act of the 30's. In which most of the banking standard rules and protocols were changed, to better protect the economy

and the banking industry itself, from such a systemic risk. We are not proposing a similar legislation but an act or agreement similar to the Basel agreements, to prevent systemic risk, preferably without causing even more damage to the banking system or the economy, like a mandatory increase in capital ratios can cause.

Our final conclusion is that, not only banks should be better regulated, through stronger and more effective regulators, and not necessarily more regulations, guaranteeing that irregular and illegal behavior, are being, not only, punished but also corrected. Banks, rating agencies, media institutions and others that serve a public purpose should step into a large transparency and ethical behavior, like proposed by Halvorsen (2008), considering that if most of the financial industry step into a more ethical behavior, not only we would have a more trustworthy industry, preventing moral hazard damages, and reducing the will of the agents to act unethically and in a risker manner.

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Annexes

Evolution of Real Estate Prices

Date	Last Price	Change
31-01-00	100	0,00
29-02-00	100,76	0,76
31-03-00	101,95	1,18
30-04-00	103,5	1,52
31-05-00	105,2	1,64
30-06-00	106,76	1,48
31-07-00	107,77	0,95
31-08-00	108,64	0,81
30-09-00	109,35	0,65
31-10-00	110,04	0,63
30-11-00	110,81	0,70
31-12-00	111,58	0,69
31-01-01	112,39	0,73
28-02-01	113,07	0,61
31-03-01	114,14	0,95
30-04-01	115,29	1,01
31-05-01	116,24	0,82
30-06-01	117,29	0,90
31-07-01	118,2	0,78
31-08-01	119,09	0,75
30-09-01	119,84	0,63
31-10-01	120,31	0,39
30-11-01	120,53	0,18
31-12-01	120,43	-0,08
31-01-02	120,64	0,17
28-02-02	121,06	0,35
31-03-02	122,3	1,02
30-04-02	123,92	1,32
31-05-02	125,86	1,57
30-06-02	127,82	1,56
31-07-02	129,66	1,44
31-08-02	131,22	1,20
30-09-02	132,43	0,92
31-10-02	133,55	0,85
30-11-02	134,41	0,64
31-12-02	135,15	0,55
31-01-03	135,64	0,36
28-02-03	136,19	0,41
31-03-03	137,2	0,74
30-04-03	138,56	0,99
31-05-03	140,06	1,08
30-06-03	141,39	0,95
31-07-03	142,99	1,13
31-08-03	144,56	1,10
30-09-03	146,28	1,19
31-10-03	147,82	1,05
30-11-03	149,22	0,95
31-12-03	150,49	0,85
31-01-04	151,69	0,80
29-02-04	153,1	0,93
31-03-04	155,49	1,56
30-04-04	158,47	1,92
31-05-04	161,6	1,98
30-06-04	164,82	1,99
31-07-04	167,43	1,58
31-08-04	169,31	1,12
30-09-04	170,96	0,97
31-10-04	172,41	0,85
30-11-04	173,65	0,72
31-12-04	174,83	0,68
31-01-05	176,44	0,92
28-02-05	178,5	1,17
31-03-05	181,3	1,57
30-04-05	184,24	1,62
31-05-05	187,21	1,61
30-06-05	190,1	1,54
31-07-05	192,67	1,35
31-08-05	194,98	1,20
30-09-05	197,36	1,22
31-10-05	199,4	1,03
30-11-05	200,97	0,79
31-12-05	201,97	0,50
31-01-06	202,44	0,23
28-02-06	203,19	0,37
31-03-06	203,65	0,23
30-04-06	204,82	0,57
31-05-06	205,86	0,51
30-06-06	206,38	0,25
31-07-06	206,52	0,07
31-08-06	206,18	-0,16
30-09-06	205,8	-0,18
31-10-06	205,41	-0,19
30-11-06	204,65	-0,37
31-12-06	203,33	-0,65
31-01-07	202,31	-0,50
28-02-07	201,57	-0,37
31-03-07	201,01	-0,28
30-04-07	200,54	-0,23
31-05-07	200,12	-0,21
30-06-07	199,44	-0,34
31-07-07	198,72	-0,36
31-08-07	197,37	-0,68
30-09-07	195,69	-0,85
31-10-07	192,98	-1,38
30-11-07	188,94	-2,09
31-12-07	184,97	-2,10
31-01-08	180,68	-2,32
29-02-08	175,96	-2,61
31-03-08	172,2	-2,14
30-04-08	169,98	-1,29
31-05-08	168,6	-0,81
30-06-08	167,78	-0,49
31-07-08	166,36	-0,85
31-08-08	164,65	-1,03
30-09-08	161,64	-1,83
31-10-08	158,09	-2,20
30-11-08	154,5	-2,27
31-12-08	150,54	-2,56

Source Bloomberg Annex 1

Leverage Comparison

Date	JPM	LEH	GS	MS	CITI
2003Q2	18,1373	32,8141	19,6346	25,4195	13,0276
2003Q3	18,178	32,7011	19,7342	25,1956	12,8601
2003Q4	17,5503	28,2631	18,967	24,3644	12,9458
2004Q1	17,0429	25,8846	19,3103	24,7343	13,0617
2004Q2	17,5915	26,5242	20,0764	26,1259	13,7117
2004Q3	13,0611	26,5329	20,4562	27,0944	14,2063
2004Q4	10,9238	26,1926	20,9509		13,881
2005Q1	11,105	25,7597	22,0418		13,6687
2005Q2	11,1754	25,1537	23,6006	28,5248	13,7251
2005Q3	11,2398	25,1446	25,125	29,2825	13,5681
2005Q4		25,6758	26,4124	30,2382	13,3566
2006Q1	11,4769	26,4778	27,4374	31,3319	13,7003
2006Q2	11,8769	26,919	27,636	31,8487	14,1005
2006Q3	11,8889	27,2007	26,8017	31,4711	14,5824
2006Q4	11,7268	27,6092	25,9438	31,9223	15,4067
2007Q1	11,8223	28,8015	26,3318	32,3864	16,2811
2007Q2	12,1012	29,9955	26,8322	31,6489	17,0878
2007Q3	12,2816	31,1044	27,8658	32,8706	18,0233
2007Q4	12,5071	32,1243	28,6005	34,6793	18,901
2008Q1	12,8794	34,1652	29,1409	34,2637	19,7377
2008Q2	13,5225	34,6643	28,0275	32,3628	19,7425

Source Bloomberg Annex 2

Lehman Brothers' Revenue from Segments and Geographic Regions

Date	Net Revenue	Product Brand Segments	Capital Markets	Investment Banking	Investment Management	Geographic Segments	United States	Europe and Middle East	Asia Pacific	Other Americas
Current										
FY2007	19257	19257	12257	3903	3097	19257	9634	6296	3145	182
FY2006	17583	17583	12006	3160	2417	17583	11116	4536	1809	122
FY2005	14630	14630	9807	2894	1929	14630	9270	3601	1650	109
FY2004	11576	11576	7694	2188	1694	11576	8225	2104	1247	
FY2003	8647	8647	6018	1722	907	8647	5908	1864	875	
FY2002	6155	6155	3620	1731	804	6155	3869	1674	612	
FY2001	6736	6736	4024	1925	787	6736	4241	1955	540	

Source Bloomberg Annex 3

Table 1194. Mortgage Originations and Delinquency and Foreclosure Rates

[In percent, except as indicated (459 represents $459,000,000,000). Covers one- to four-family residential nonfarm mortgage loans. Mortgage origination is the making of a new mortgage, including all steps taken by a lender to attract and qualify a borrower, process the mortgage loan, and place it on the lender's books. Based on the National Delinquency Survey which covers 45 million loans on one- to four-unit properties, representing between 80 to 85 percent of all 'first-lien' residential mortgage loans outstanding. Loans surveyed were reported by approximately 120 lenders, including mortgage bankers, commercial banks, and thrifts]

Item	1990	1995	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mortgage Orignations																
Total (billion dollars)	**459**	**640**	**833**	**1.656**	**1.379**	**1.139**	**2.243**	**2.854**	**3.812**	**2.773**	**2.908**	**2.726**	**2.306**	**1.509**	**1.995**	**1.572**
Purchase (billion dollars)	389	494	590	795	878	905	960	1.097	1.280	1.309	1.512	1.399	1.140	731	664	473
Refinance (billion dollars)	70	145	243	862	500	234	1.283	1.757	2.532	1.463	1.397	1.326	1.166	777	1.331	1.099
Delinquency Rates \1																
Total	**4,66**	**4,24**	**4,30**	**4,45**	**4,26**	**4,38**	**5,11**	**5,11**	**4,74**	**4,48**	**4,45**	**4,61**	**5,38**	**6,90**	**9,40**	**9,30**
Prime conventional loans	(NA)	(NA)	(NA)	2,59	2,26	2,28	2,67	2,63	2,51	2,30	2,29	2,39	2,94	4,30	6,50	6,50
Subprime conventional loans	(NA)	(NA)	(NA)	10,88	11,44	11,92	14,04	14,33	12,17	10,80	10,84	12,27	15,62	19,90	25,50	25,90
Federal Housing Administration loans	6,68	7,55	8,12	8,47	8,58	9,07	10,78	11,53	12,21	12,18	12,51	12,74	12,71	13,00	14,00	12,80
Veterans Administration loans	6,35	6,44	6,93	7,10	6,80	6,84	7,67	7,86	8,00	7,30	7,00	6,67	6,43	7,20	7,90	7,50
Forecloasure Rates																
Total loans in foreclosure process \2	**0,94**	**0,87**	**1,11**	**1,17**	**1,17**	**1,16**	**1,46**	**1,46**	**1,29**	**1,15**	**0,99**	**1,19**	**2,04**	**3,30**	**4,30**	**4,60**
Prime conventional loans	(NA)	(NA)	(NA)	0,58	0,48	0,39	0,51	0,54	0,55	0,49	0,42	0,50	0,96	1,90	3,00	3,50
Subprime conventional loans	(NA)	(NA)	(NA)	4,41	6,32	9,35	9,35	7,97	5,63	3,82	3,33	4,53	8,65	13,70	15,10	14,50
Federal Housing Administration loans	1,31	1,33	2,05	2,35	2,01	1,66	2,17	2,78	2,93	2,67	2,34	1,92	2,34	2,40	3,20	3,50
Veterans Administration loans	1,24	1,27	1,75	1,88	1,71	1,19	1,33	1,58	1,59	1,50	1,13	1,01	1,12	1,70	2,20	2,40
Total loans entering foreclosure process \3	1,24	1,30	1,42	1,49	1,39	1,51	1,80	1,80	1,66	1,73	1,63	1,86	2,84	4,20	5,40	5,00
Prime conventional loans	(NA)	(NA)	(NA)	0,85	0,69	0,62	0,79	0,77	0,79	0,77	0,72	0,76	1,30	2,40	4,00	4,00
Subprime conventional loans	(NA)	(NA)	(NA)	5,86	6,97	9,22	9,34	8,54	6,57	5,86	5,63	7,28	11,72	16,50	16,20	12,90
Federal Housing Administration loans	1,73	2,12	2,46	2,60	2,35	2,25	2,82	3,27	3,61	3,91	3,41	3,31	3,56	3,80	4,80	4,70
Veterans Administration loans	1,62	1,99	2,05	2,07	1,76	1,53	1,69	1,84	1,91	1,96	1,53	1,40	1,57	2,30	3,10	3,30

SYMBOL:

NA Not available.

FOOTNOTES:

\1 Number of loans delinquent 30 days or more as percentage of mortgage loans serviced in survey. Annual average of quarterly figures. Delinquency rate does not include loans in the process of foreclosure.

\2 Percentage of loans in the foreclosure process at year-end, not seasonally adjusted.

\3 Percentage of loans entering foreclosure process at year-end, not seasonally adjusted.

Source: Mortgage Bankers Association of America, Washington, DC, "MBA Mortgage Originations Estimates"; National Delinquency Survey, quarterly, \<http://www.mortgagebankers.org/\> and unpublished data.

For more information: http://www.mbaa.org/

Internet release date: 9/30/2011

Source United States Census Bureau Annex 4

Lehman Brothers' Returns

Field	FQ3 1998	FQ4 1998	FQ1 1999	FQ2 1999	FQ3 1999	FQ4 1999	FQ1 2000	FQ2 2000	FQ3 2000	FQ4 2000	FQ1 2001
Returns											
Return on Common Equity	18,2507	15,2347	14,9787	14,4045	16,8423	20,5347	24,6524	25,3823	26,6622	26,491	24,1234
Growth (YoY)	21,93	-1,71	-6,33	-25,39	-7,72	34,79	64,58	76,21	58,3	29,01	-2,15
Return on Assets	0,4998	0,4817	0,4282	0,4134	0,4603	0,6541	0,7437	0,7106	0,784	0,8514	0,7202
Growth (YoY)	16,05	4,34	0,89	-24,97	-7,89	35,79	73,66	71,91	70,32	30,17	-3,16
Return on Capital	0,5457	0,5327	0,4642	0,4535	0,5081	0,7406	0,8365	0,7947	0,8763	0,9613	0,8205
Growth (YoY)	14,57	4,43	0,67	-25,09	-6,88	39,02	80,19	75,24	72,45	29,79	-1,91
Field	FQ2 2001	FQ3 2001	FQ4 2001	FQ1 2002	FQ2 2002	FQ3 2002	FQ4 2002	FQ1 2003	FQ2 2003	FQ3 2003	FQ4 2003
Returns											
Return on Common Equity	23,2902	20,2681	15,6469	13,978	12,4508	10,8707	11,3243	11,3868	12,543	15,6078	16,1897
Growth (YoY)	-8,24	-23,98	-40,94	-42,06	-46,54	-46,37	-27,63	-18,54	0,74	43,58	42,96
Return on Assets	0,7129	0,6503	0,5316	0,4702	0,4101	0,361	0,3837	0,3702	0,3925	0,5046	0,5936
Growth (YoY)	0,32	-17,05	-37,56	-34,7	-42,47	-44,48	-27,81	-21,27	-4,3	39,77	54,7
Return on Capital	0,8075	0,74	0,6125	0,5424	0,476	0,421	0,448	0,4342	0,4614	0,599	0,6927
Growth (YoY)	1,61	-15,56	-36,29	-33,9	-41,06	-43,1	-26,86	-19,94	-3,06	42,27	54,63
Field	FQ1 2004	FQ2 2004	FQ3 2004	FQ4 2004	FQ1 2005	FQ2 2005	FQ3 2005	FQ4 2005	FQ1 2006	FQ2 2006	FQ3 2006
Returns											
Return on Common Equity	19,1091	20,0129	19,6889	17,8727	18,5117	18,6282	20,8299	21,8009	22,0989	23,5302	23,1162
Growth (YoY)	67,82	59,55	26,15	10,4	-3,13	-6,92	5,8	21,98	19,38	26,31	10,98
Return on Assets	0,6935	0,6904	0,7162	0,708	0,7442	0,7385	0,8334	0,8498	0,8637	0,9165	0,8918
Growth (YoY)	87,34	75,9	41,92	19,26	7,3	6,97	16,37	20,03	16,06	24,1	7
Return on Capital	0,8138	0,8118	0,8424	0,8197	0,8534	0,8622	0,9603	0,9869	1,0033	1,0783	1,0398
Growth (YoY)	87,43	75,95	40,64	18,34	4,87	6,21	14	20,4	17,55	25,07	8,27
Field	FQ4 2006	FQ1 2007	FQ2 2007	FQ3 2007	FQ4 2007	FQ1 2008	FQ2 2008				
Returns											
Return on Common Equity	23,323	22,6634	23,1359	22,3622	20,8908	16,9869	-3,398				
Growth (YoY)	6,98	2,55	-1,68	-3,26	-10,43	-25,05					
Return on Assets	0,8772	0,8119	0,8171	0,7608	0,7018	0,5244	-0,0822				
Growth (YoY)	3,22	-6	-10,85	-14,69	-19,99	-35,42					
Return on Capital	1,0306	0,9423	0,9545	0,8863	0,8299	0,6105	-0,0962				
Growth (YoY)	4,42	-6,08	-11,49	-14,76	-19,47	-35,22					

Source Bloomberg Annex 5

Lehman Brothers' Totals

Field		FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002				
Total Assets		85232	80474	109947	115303	128596	151705	153890	192244	224720	247816	260336				
Growth (YoY)		-5,58	36,62	4,87	11,53	17,97	1,44	24,92	16,89	10,28	5,05	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Current
Total Revenue	10611	10674	9190	13476	14260	16883	19894	18989	26447	22392	16781	312061	357168	410063	503545	691063	639432
Growth (YoY)		0,59	-13,9	46,64	5,82	18,39	17,83	-4,55	39,28	-15,33	-25,06	19,87	14,45	14,81	22,8	37,24	-7,47
Total Equity	2361	2052	3395	3698	3874	4523	5413	6993	8641	9169	9652	17287	21250	32420	46709	59003	
Growth (YoY)		-13,09	65,45	8,92	4,76	16,75	19,68	29,19	23,57	6,11	5,27	3,02	22,92	52,56	44,07	26,32	-83,7
Total Liabilities	82871	78422	106552	111605	124722	147182	148477	185251	216079	238647	250684	14484	14920	16794	19191	22490	26276
Growth (YoY)		-5,37	35,87	4,74	11,75	18,01	0,88	24,77	16,64	10,44	5,04	50,06	3,01	12,56	14,27	17,19	16,83
Tot liab & equity	85232	80474	109947	115303	128596	151705	153890	192244	224720	247816	260336	297577	342248	393269	484354	668573	613156
Growth (YoY)		-5,58	36,62	4,87	11,53	17,97	1,44	24,92	16,89	10,28	5,05	18,71	15,01	14,91	23,16	38,03	-8,29
Financial Leverage		57,1992	47,8325	39,6776	38,373	37,976	35,868	34,2707	32,894	31,842	31,7575	312061	357168	410063	503545	691063	639432
Growth (YoY)			-16,38	-17,05	-3,29	-1,03	-5,55	-4,45	-4,02	-3,2	-0,27	19,87	14,45	14,81	22,8	37,24	-7,47
												28,0986	26,036	26,2086	27,0338	30,2501	34,66
																11,9	14,59

Source Bloomberg Annex 6