2008 CRISIS: ARE RISK MANAGERS GUILTY

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‘’ABSTRACT’’

After the banking industry has spent millions of dollars to establish risk management systems, many people blame risk managers about the ‘’perfect storm’’ that they weren’t able to see it coming, their models did not work. This thesis aims to be an objective ground to discuss whether it is the failure of Risk Managers or not? Having looked from many points of view, I have found Risk Managers not guilty. The place and lacking authority of risk managers in institutions have shown me that they were not the true convicts to be addressed for these failures. Moral hazard, senior managers’ and rating agencies incentive problems and government policies which have led to the de-regulation of the markets are some of the real causes behind this misery. I accept that there are flaws in risk management systems and risk managers status as well. Risk managers quant profile has to change in order to place risk managers as business partners. I find, establishing firm-wide risk management culture and improving Enterprise Risk Management is very crucial. 'Back to basics must come again as simple is the best. Models must be built linked to macroeconomic indicators and history must always be remembered.

‘’ÖZET’’

Bankacılık endüstrisi risk yönetim sistemlerine milyonlarca dolar sarfettikten sonra, yaklaşmakta olan ‘’mükemmel fırtınayı’’ önceden öngörmemeleri ve modellerinin yetersiz kalmasından dolayı çoğu kişi risk yöneticilerini suçlamıştır. Bu tezin amacı hatanın gerçekten risk yöneticilerine ait olup olmadığını objektif bir bakış açısıyla ele almaktır. Pek çok farklı açıdan inceledikten sonra risk yöneticilerini suçsuz buldum. Konumları ve etkin otoriteye sahip olmamaları onların bu başarısızlıklardan dolayı suçlanabilecek doğru adres olmadıklarını anlamama neden oldu. Bu muammanın ardındaki gerçek nedenler arasında ahlaki bozukluklar, üst düzey yöneticiler ile rating şirketlerinin menfaat çıkar ilişkileri ve piyasalarda deregülasyona yol açan devlet politikalarını sayabiliriz. Risk yönetim sistemlerinde ve risk yöneticilerinin rollerinde bazı açıklar olduğunu kabul etmekteyim. Risk yöneticilerinin quant profili, onları iş ortaklığı statüsüne getirmek için değişmelidir. Kurum bazında risk yönetim kültürünü oluşturmanın ve kurumsal risk yönetimi çerçevesinin geliştirilmesinin çok kritik olduğunu düşünmekteyim. Temel prensiplerin en iyisi en basit olandır fikrinden hareketle geri gelmesi gerekmektedir. Modeller makro ekonomik endikatörlere bağlı olarak kurulmalı ve tarih her zaman hatırlanmalıdır.

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1. INTRODUCTION

The global financial crisis of 2008 is a major financial crisis, the worst of its kind since the Great Depression, which is ongoing as of December 2008. It became strikingly visible in September 2008 with the failure, merger or conservatorship of several large United States-based financial firms. The underlying causes leading to the crisis had been reported in business journals for many months before September, with commentary about the financial stability of leading U.S. and European investment banks, insurance firms and mortgage banks consequent to the sub-prime mortgage crisis.

Beginning with failures of large financial institutions in the United States, it rapidly evolved into a global crisis resulting in a number of European bank failures and declines in various stock indexes, and large reductions in the market value of equities (stock) and commodities worldwide. The crisis has led to a liquidity problem and the de-leveraging of financial institutions especially in the United States and Europe, which further accelerated the liquidity crisis. World political leaders and national ministers of finance and central bank directors have coordinated their efforts to reduce fears but the crisis is ongoing and continues to change, still evolving at the time being into a currency crisis with investors transferring vast capital resources into stronger currencies such as the yen, the dollar and the Swiss franc, leading many emergent economies to seek aid from the International Monetary Fund. The crisis was triggered by the sub-prime mortgage crisis and bottom line has not been reached yet.

This is very challenging since we witness unbelievable things to happen everyday and will all be witnesses to the reshaping of the world's new financial system.

This paper aims to be an objective ground to decide whether Risk Managers are guilty because they did not do their job and made their firms loose millions of usd and even go bankruptcy.

In order to do this I will look from very different aspects from the beginning of the crisis up to date. These will cover: the reasons behind the crisis, government policies, market players and risk managers status; economists, regulators, rating agencies point of view as

well as government politics, macro economy, lessons learned from financial disasters previously happened.

I will also take a look at the latest industry and expert comments, articles, press releases, papers in order to reach a healthy and objective conclusion.

As a risk manager I will also give my comments about what must be done to improve risk management in order to overcome these failures and will also give you some of the new debates going on in order to give risk management a new shape from experts, academicians, market participants and also regulators consultations.

In order to do that I will look from different points of view. These will cover Macroeconomics and Government Policies, Market Players and Risk Managers.

2. MACROECONOMICS AND GOVERNMENT

In this topic I aim to give a brief outlook of the world's economy, the situation of the world and balances just before the 2008 crisis.

2.1 US Government Policy and the World's New Shape

In year 2000 American consumers had started to make more savings due to the crisis they faced one after another in recent years. American governors were afraid to face recession and deflation. In an economy whose share of private consumption covers two thirds of the economy, it was very hard to grow without consumption expenditures. So they had to give confidence to consumers, who had started to make savings due to their worries about crisis together with their future worries. By this way they would also be able to increase employment levels in the economy.

After 2001 recession, US government policy was to lower interest rates in order to awake the economy. These changes can be tracked in the following figure which shows US inflation with Fed interest rates.

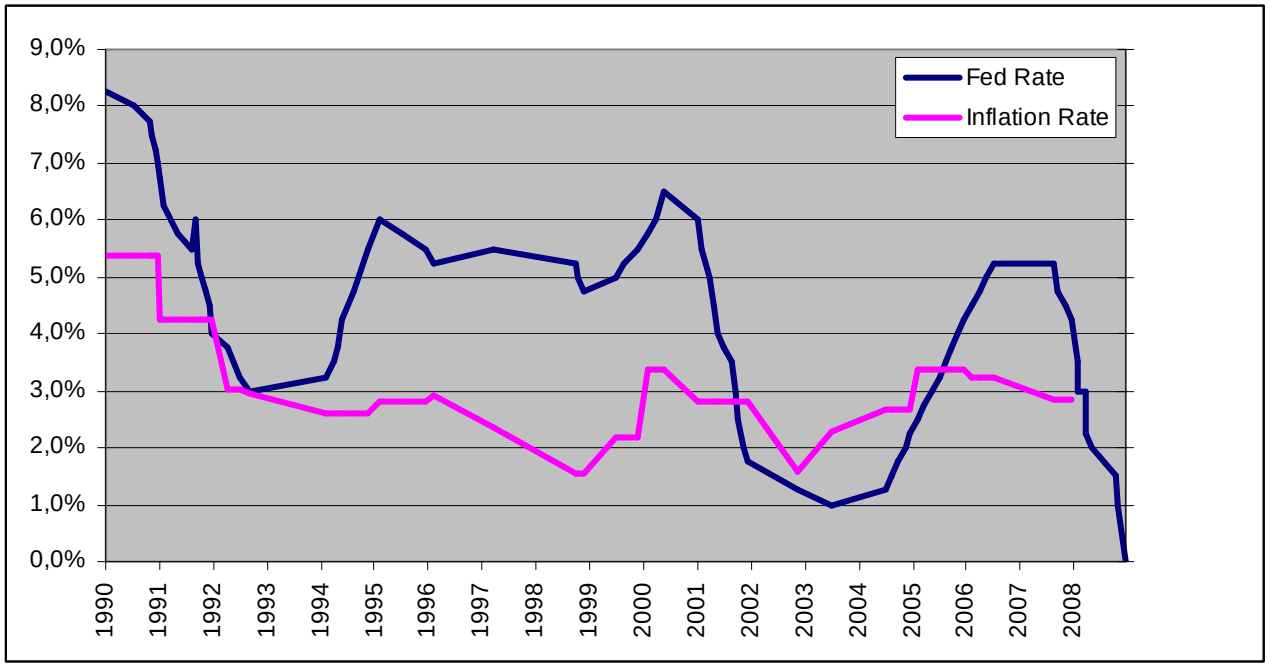

Figure 2-1 US inflation with Fed interest rates

As can be seen from the figure US government policy lowering interest rates went on till the end of 2003. These cut in interest rates increased the demand towards borrowing opportunities and also making it cheaper.

Since the stock market had recently gone out of a crisis, demand headed directly to real estate properties.

This demand towards real estate made their prices go higher and higher. These increases in prices can be tracked also with Schiller's index given below.

Table 2-1 Schiller's Real Home Price Index

Year	Real Home Price Index
1989	127,51
1996	109,92
1997	109,64
1998	113,07
1999	119,48
2000	126,30
2001	133,04
2002	142,05
2003	153,10
2004	168,37
2005	189,15
2006	202,82
2007	195,89
Average Real Price	
1890-2007	103,13

2.2 Effects of Government Policies

Government interest rate policies led to cheap and plenty borrowing opportunities which also motivated the huge growth of hedge fund industry. This industry is known as being the leader of the most speculative group of investors which I will discuss in detail in the next chapter.

The increase in home prices led homeowners to take extra loans from financial institutions for other type of retail credits with the differences.

By 2003 or so, mortgage lenders were running out of people they could plausibly lend to. Instead of curtailing lending, they spread their nets to people with little hope of repaying their loans.

Sub-prime lending jumped from an annual volume of 145 billion usd in 2001 to 625 billion usd in 2005, more than 20 % of total issuances. More than a third of sub-prime loans were for 100% of the home value-even more when the fees were added in. Light documentation mortgages transmuted to ‘’ninja loans’’-no income, no job, no assets. (Morris, 2008, p.69)

By securitization Banks transformed these illiquid assets into liquid assets with the help of Special Purpose Vehicles.

2.3 Changing Laws

Government made a change in laws concerning mortgage buyers. This was done to prevent time consuming legal barriers in order to increase the markets efficiency. With this new change they brought a walk away clause which simply let mortgage owners to walk away from their homes without any further legal action. These new arrangements also increased the attraction to these types of loans.

2.4 Special Purpose Vehicles

Fannie Mae and Freddie Mac

In fact government loosening mortgage buyer’s laws was also due to a deep trust in mortgage associations like Fannie Mae and Freddie Mac. Fannie Mae is a government sponsored enterprise (GSE), founded in 1938 during the Great Depression. The corporation's purpose is to purchase and securitize mortgages in order to ensure that funds are consistently available to the institutions that lend money to home buyers. In other words Fannie Mae buys loans from mortgage originators, repackages the loans as mortgage-backed securities, and sells them to investors in the secondary mortgage market with a guarantee that principal and interest payments will be passed through to the investor

in a timely manner. Also, Fannie Mae may hold the purchased mortgages for its own portfolio. Freddie Mac was created in 1970 to expand the secondary market for mortgages in the US. Along with other government sponsored enterprises, Freddie Mac buys mortgages on the secondary market, pools them, and sells them as mortgage-backed securities to investors on the open market. This secondary mortgage market increases the supply of money available for mortgages lending and increases the money available for new home purchases.

And also by purchasing the mortgages, Fannie Mae and Freddie Mac provide banks and other financial institutions with fresh money to make new loans. This gives the United States housing and credit markets flexibility and liquidity.

With the huge growth of mortgage loans they had become highly leveraged.

Fannie Mae's total assets were 882.5 billion usd and its equity was only 44 billion usd and same way Freddie Mac's total assets were 794.4 billion usd and its equity was only 26.7 billion usd in 2007.

As of 2008, Fannie Mae and the Federal Home Loan Mortgage Corporation (Freddie Mac) owned or guaranteed about half of the U.S.'s $12 trillion mortgage market.

As a result of governments policies towards increasing consumption, growth rate of US Economy which were lower than %2 in year 2001 with the decrease in consumption dynamics due to worries about recession, increased its speed making a 5 year average of %3 which could be seen in the figure below.

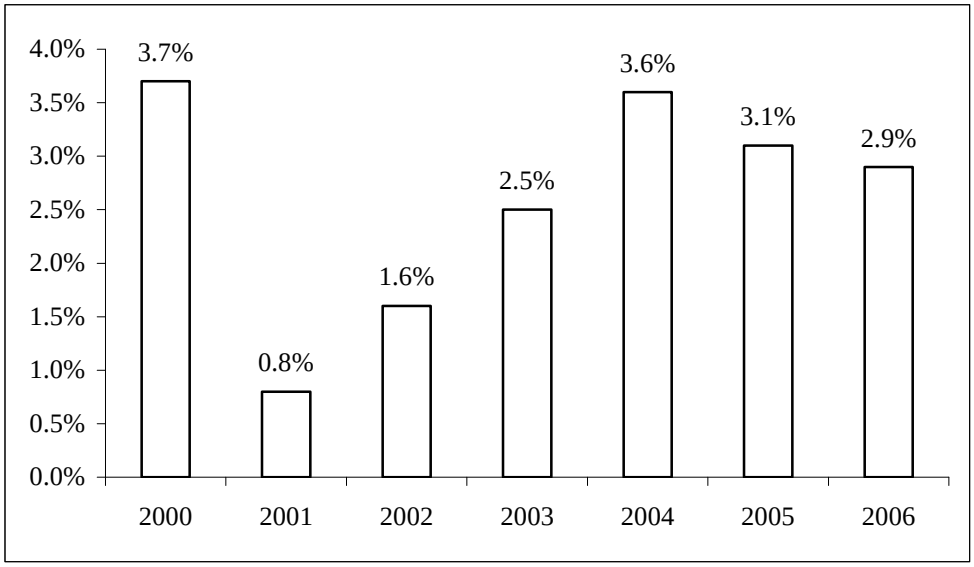

Figure 2-2 USA Economics Growth (real, GDP)

The growth in US Economy which was due to consumptions made more than savings, started to show itself in the current balance deficit increase. In year 2002 the current balance deficit which was around 400 billion usd corresponding to %4 of Gdp increased to 800 billion usd, 7% of Gdp in year 2006.

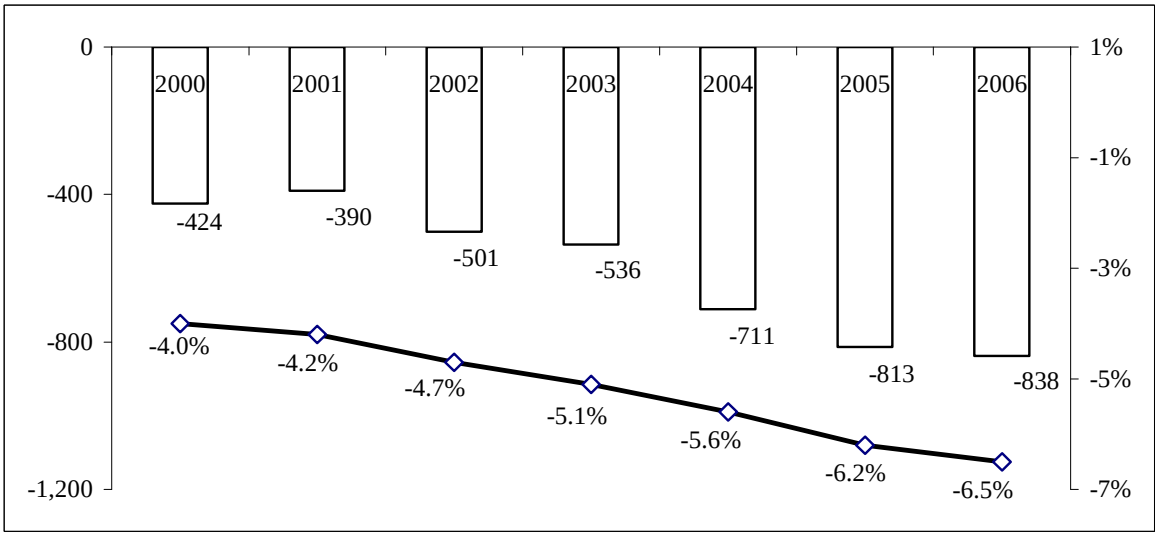

Figure 2-3 Current Account Balance of USA

This high negative gap meant US economy was unable to raise funds for expenses through savings and therefore had to find foreign funding source for finance.

The profile of investments was worrisome for US politicians. After 2000 crisis long term investments were made in bonds heavily rather than stocks and equity investments. Especially there was a huge decrease in equity investments from 314 billion usd in year 2000 to 53 billion usd in 2003. Stock investments raised only a little after 2004. Bond investments were rising up to 4.7 trillion usd with a %161 increase when compared with 2000 figure. In fact bond investments have low risk profile which reflects that investors were keeping away from US stock and capital investment risk which indicate investors had worries about US current balance deficit.

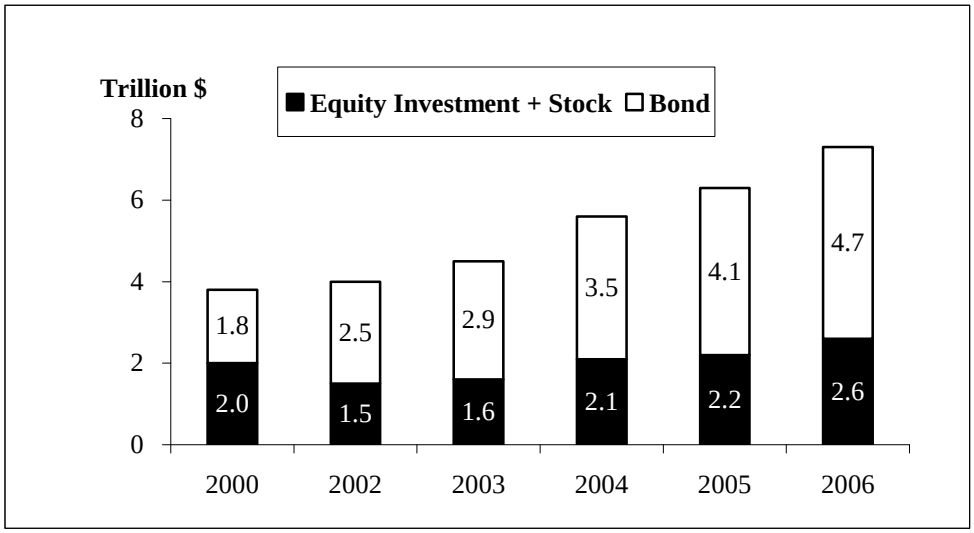

Figure 2-4 (Long-Term) Foreign Investment Made to USA

There was also another worry for US governors that majority of US government bonds were being held by central banks which has a potential to be influenced by political directives. Indeed investments of China, Japan and Middle East countries that export petrol were sharing top of the list which have sensitive political relations with US that can be a threaten for the economy.

Table 2-2 Portfolio of Countries who held Long Term Investments in US Bonds (Billion $)

Country	2000	2002	2003	2004	2005	2006
Japan	286	411	514	736	814	827
China	91	165	250	320	485	678
England	212	160	177	223	283	324
Luxembourg + Cayman	120	219	307	432	525	600
Middle East Countries that export petrol	29	39	26	34	54	92

While US economy being the growth engine of the global economy with its consumption power, Asian economies were becoming the production engine, China being the leader. On the production side China and on the technology side India were going on integrating with the world offering their challenging production facilities to global and native customers. China reached an average of %10 growth speed between 2002 and 2006, becoming the fourth biggest economy following US, Japan and Germany. During this time Asian Five which consist of India, South Korea, Malaysia, Philippines, Singapore and Indonesia grew around %6 accompanying Chinese economy.

Asian consumption did not follow production output because income levels did not increase accordingly. Source underlying this growth was exports and US market was holding a big portion of this amount. Some small economies like Singapore, Hong Kong and Malaysia's export volumes were exceeding their economic sizes. Import shares in economies were greater than %50 in Taiwan and Thailand and were more than one third in bigger economies like China and South Korea. Since these counties did not have natural energy sources, they had to import petrol, energy, other commodities and metals.

Table 2-3 The Importance of Exports and US Market for Asian Countries

Country	Share of Exports in Economy	Share of Exports made to US in Total Exports
Japan	13%	23%
China	38%	21%
Hong Kong	168%	15%
South Korea	37%	13%
Taiwan	70%	15%
Singapore	137%	10%
Thailand	65%	15%
Malaysia	121%	19%
Indonesia	39%	12%
Philippines	39%	18%

This was the growth engine of the world Economy.

While US consuming, Asian countries were producing goods and services depending on natural sources which were supplied from Latin America to Africa.

For example China's petrol import had increased from 1.4 million barrels in year 2000 to 3.4 million barrel in 2006 per day.

These demand towards natural sources increased their prices accordingly.

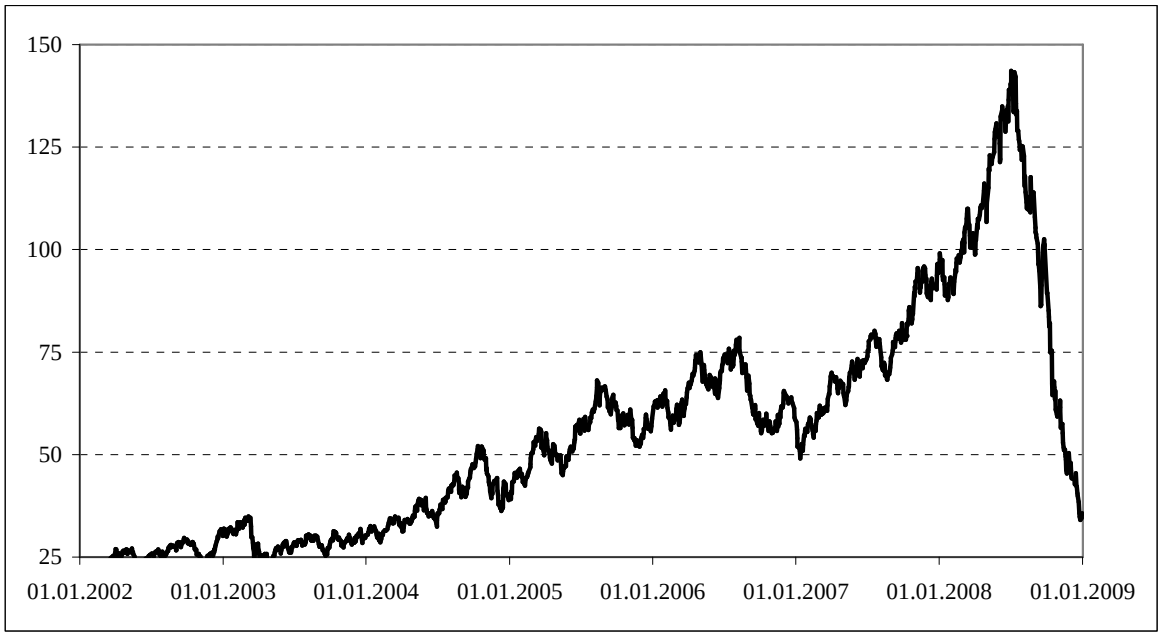

Figure 2-5 Brent Petrol Price (SPOT - $)

These increases were also followed by other types of metals and commodities appreciations in values.

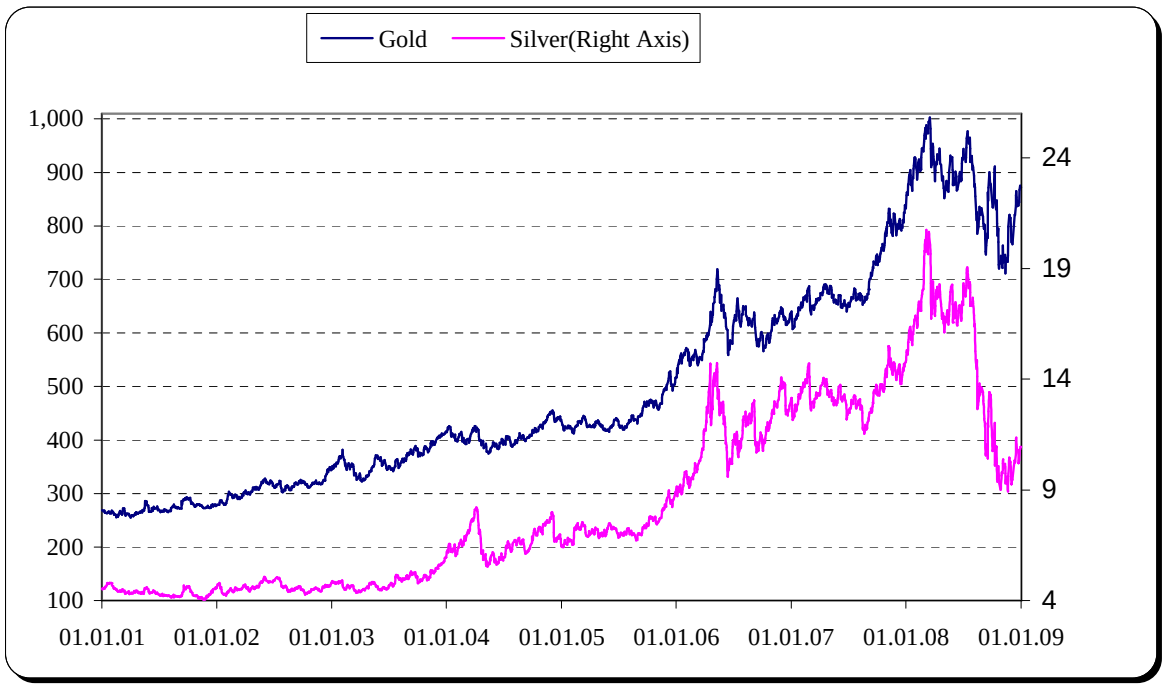

Figure 2-6 Gold, Silver Prices ($/ONS)

Asian countries foreign exchange income was increasing in an accelerated speed along with current balances in the opposite way with US. At the top of the list was China whose current balance surplus increased from 35 billion usd in 2002 to 250 billion usd in year 2006.

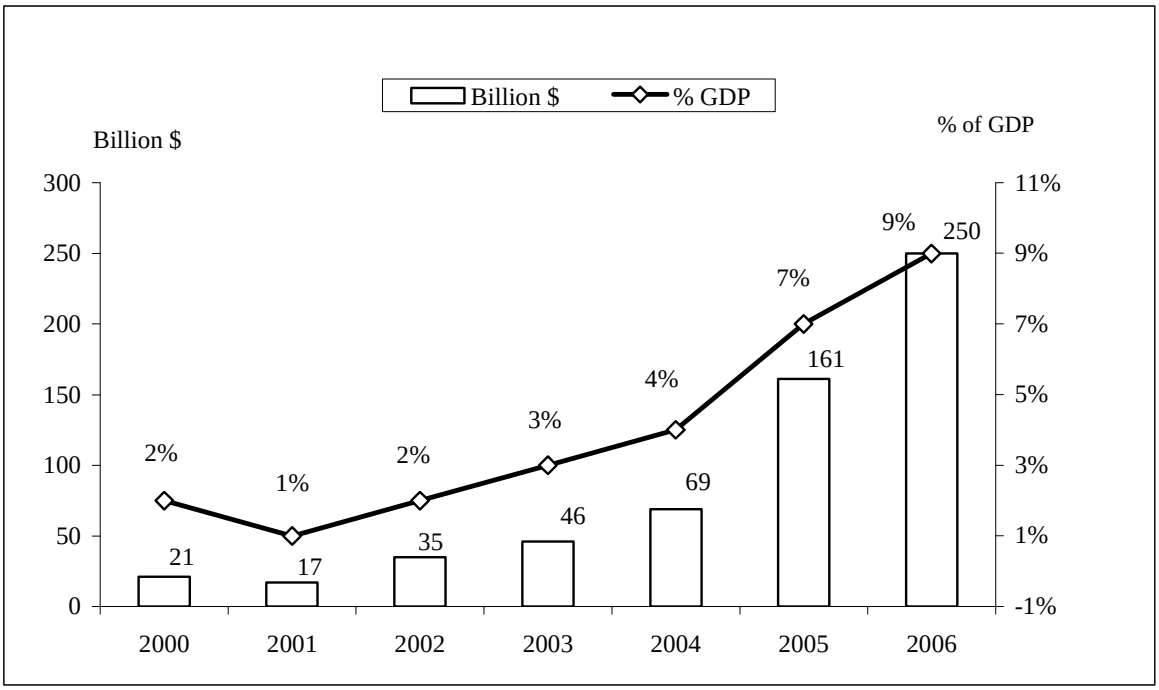

Figure 2-7 Current Account Balance of China

Chinese governors took some precautions in order to avoid falling into a situation like Japan during 1980's after which the country had suffered a long period of time with recession and deflation loop which still goes on. Communist party resisted all types of pressure in order not to appreciate Yuan like Yen. So Chinese central bank started to buy US dollars in order to keep Yuan's value cheap. This increased the reserves in a great amount. In year 2006 it was over 1 trillion usd.

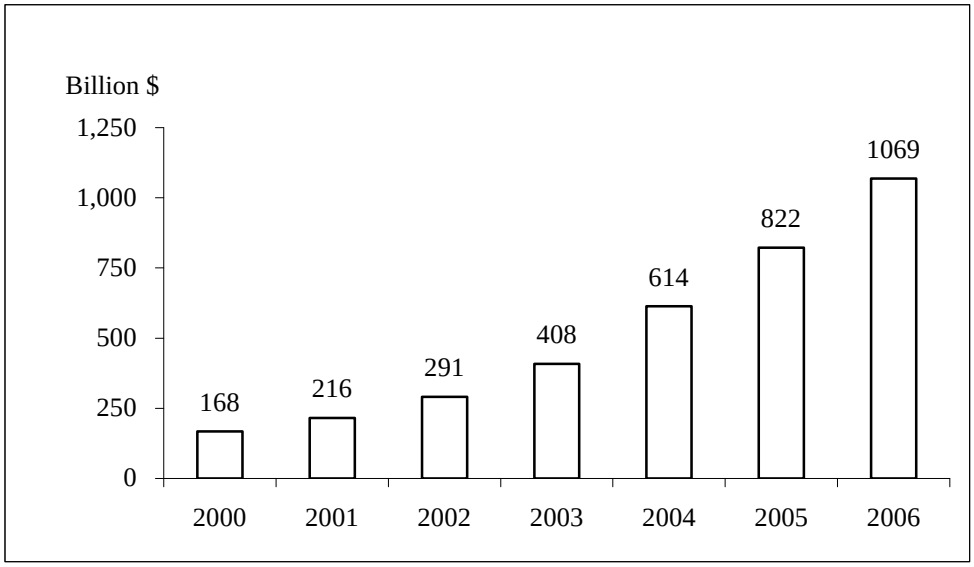

Figure 2-8 China's (Formal) Currency Reserves

This increase in reserves was not only special to China. Current account surpluses of other Asian countries, who were also contributing to exports, were also increasing in the same manner.

This increase in reserves was good for central banks but it was causing an inflationary pressure.

They took some precautions to lower the equity inflow into their economy like applying high taxes for short term funding applied in Thailand. Asian and Arabic members of OPEC pegged their currency to usd like Bretton Woods regime. Other than gold they were using usd.

As a consequence global economy grew, world trade volume increased and developed countries left their worries about 2001 recession. In these perspective commodities, emerging market bonds and stocks prices increased and investors earned a lot of money during this boom cycle.

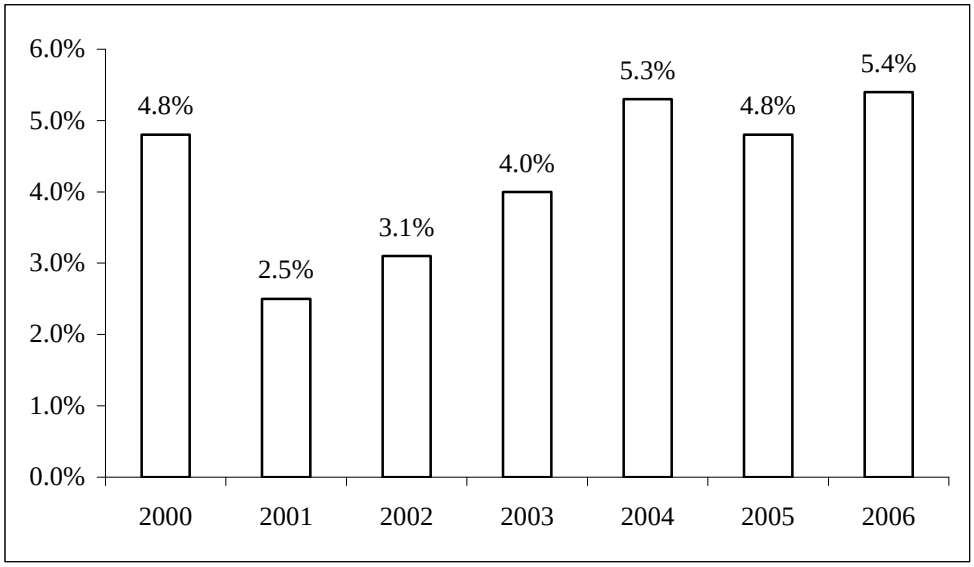

Figure 2-9 Global Economic Growth

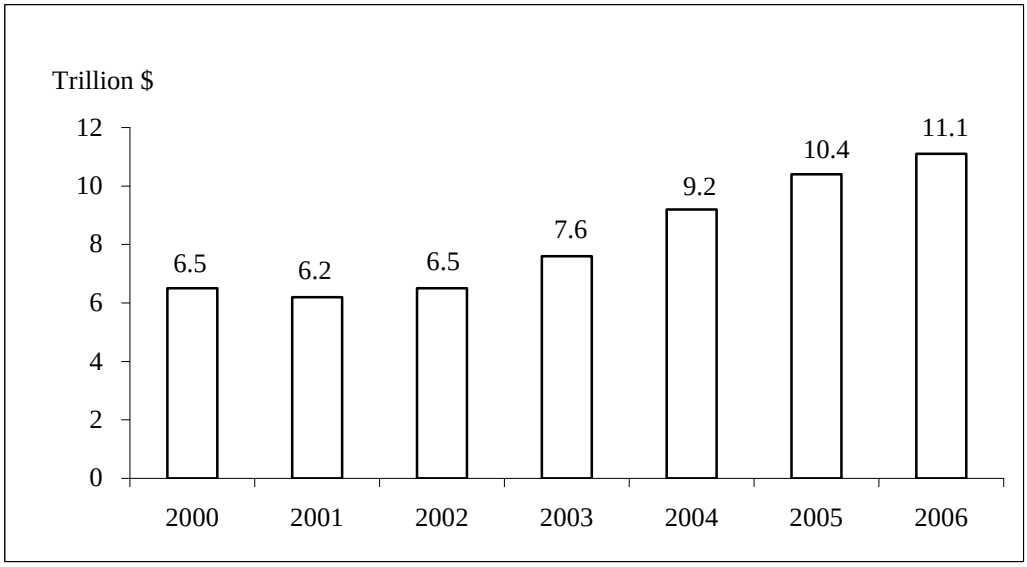

Figure 2-10 World Trading Volume

At year 2007 the World's capital flow pie chart shows us the consequences of these new formations. China and other Asian countries were exporting %37 of World's capital, followed by Arabic countries, Russia and some European countries and US was importing %50 of the total world's capital inflow.

Major Net Exporters and Importers of Capital in 2007

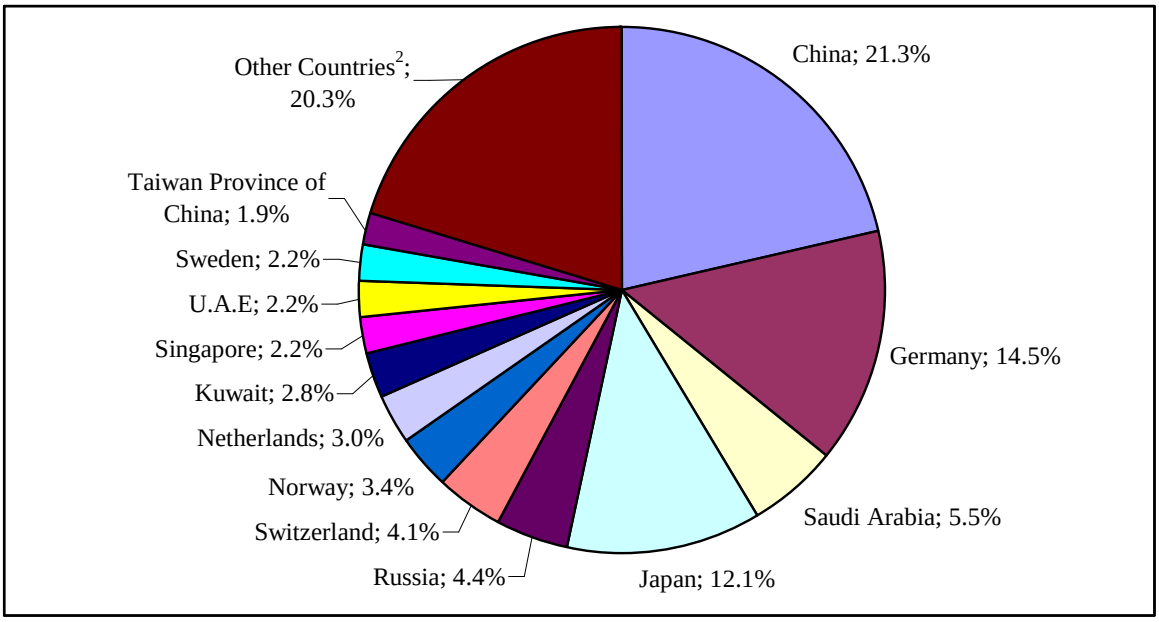

Figure 2-11 Countries That Export Capital[1]

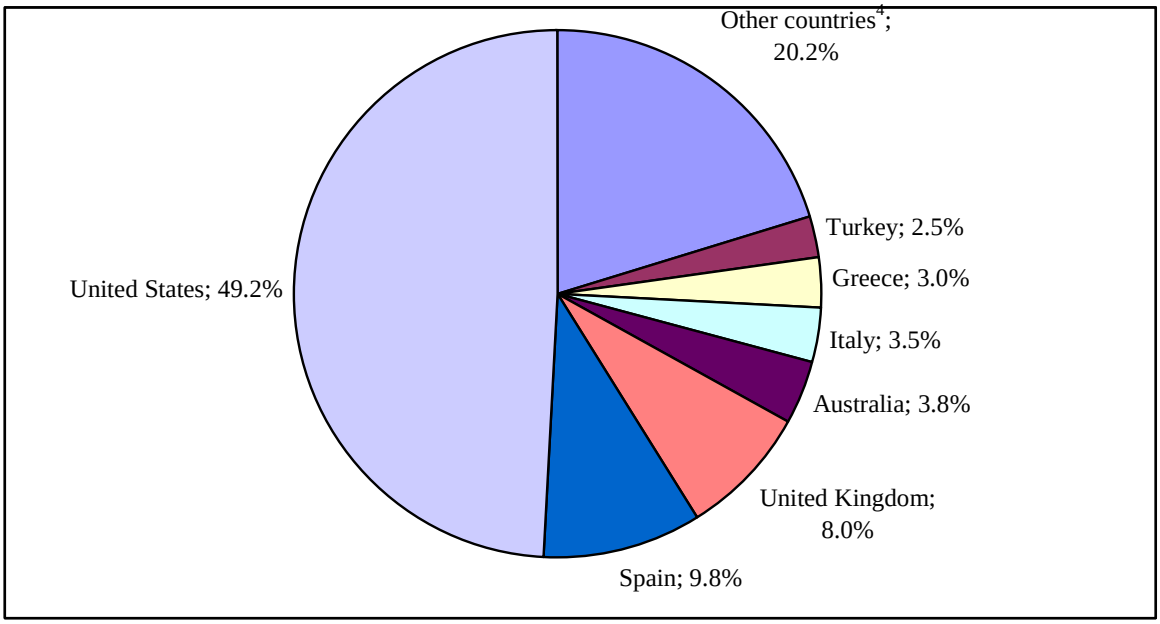

Figure 2-12 Countries That Import Capital[3]

Source: IMF, World Economic Outlook database as of September 25, 2008.

[1] As measured by countries account surplus (assuming errors and omissions are part of the capital and financial accounts).

[2] Other countries include all countries with shares of total surplus less than 1.9 percent.

[3] As measured by countries' current account deficit (assuming errors and omissions are part of the capital and financial accounts).

[4] Other countries include all countries with shares of total surplus less than 2.5 percent.

2.5 On the positive side

a) As a Result of the Government Policies

Indeed during these government policies by lowering interest rates and loosening regulations Merrill Lynch estimated that about half of all economic growth in the first half of 2005 was housing-related, either directly through home-building and housing-related purchases, like new furniture, or indirectly, by spending refinancing cash flows. More than half of all new private-sector jobs since 2001, they calculated, were in housing-related activities. By 2005, 40 percent of all home purchases were either for investment or as second homes. (Experts believe that a large share of the ‘’second homes’’ actually are speculations for resale) Since by 2000’s, consumers had learned how to ride down the interest rate curve with abandon. But most Americans might be surprised to learn that over the long term, home prices track very closely to the rate of inflation. (Morris, 2008, pp: 66-68)

2.6. On the Negative Side

a) Warning speeches Ignored by Governmental Bodies

Based on the historic trends in valuations of U.S. housing, many economists and business writers have predicted a market correction, ranging from a few percentage points, to 50% or more from peak values in some markets, and, in spite of the fact that this cooling has not affected all areas of the U.S., some have warned that it could and that the correction would be "nasty" and "severe". Chief economist Mark Zandi of the economic research firm Moody's Economy.com predicted a "crash" of double-digit depreciation in some U.S. cities by 2007–2009. In a paper presented at a Federal Reserve Board economic symposium in August 2007, Yale University economist Robert Shiller warned, “the examples we have of past cycles indicate that major declines in real home prices—even 50 percent declines in some places—are entirely possible going forward from today or from the not too distant future.’’

In August 2006, Barron's magazine warned, "a housing crisis approaches", and noted that the median price of new homes has dropped almost 3% since January 2006, that new-home inventories hit a record in April and remain near all-time highs, that existing-home inventories are 39% higher than they were just one year ago, and that sales are down more than 10%, and predicts that "the national median price of housing will probably fall by close to 30% in the next three years ... simple reversion to the mean." Fortune magazine labelled many previously strong housing markets as "Dead Zones;" other areas are classified as "Danger Zones" and "Safe Havens". Fortune also dispelled "four myths about the future of home prices." In Boston, year-over-year prices are dropping, sales are falling, inventory is increasing, foreclosures are up, and the correction in Massachusetts has been called a "hard landing". The previously booming housing markets in Washington, D.C., San Diego, Phoenix, and other cities have stalled as well. Searching the Arizona Regional Multiple Listing Service (ARMLS) shows that in summer 2006, the for-sale housing inventory in Phoenix has grown to over 50,000 homes, of which nearly half are vacant. CEO Robert Toll of Toll Brothers explained, "builders that built speculative homes are trying to move them by offering large incentives and discounts; and some anxious buyers are canceling contracts for homes already being built." Homebuilder Kara Homes, known for their construction of "Mc Mansions", announced on September 13, 2006 the "two most profitable quarters in the history of our company", yet filed for bankruptcy protection less than one month later on 6 October. Six months later on April 10, 2007, Kara Homes sold unfinished developments, causing prospective buyers from the previous year to lose deposits, some of whom put down more than $100,000.

As the housing market began to soften in winter 2005 through summer 2006, NAR chief economist David Lereah predicted a "soft landing" for the market. However, based on unprecedented rises in inventory and a sharply slowing market throughout 2006, Leslie Appleton-Young, the chief economist of the California Association of Realtors, said that she is not comfortable with the mild term "soft landing" to describe what is actually happening in California's real estate market. The Financial Times warned of the impact on the U.S. economy of the "hard edge" in the "soft landing" scenario, saying "A slowdown in these red-hot markets is inevitable. It may be gentle, but it is impossible to rule out a collapse of sentiment and of prices... If housing wealth stops rising... the effect on the world's economy could be depressing indeed." Angelo Mozilo, CEO of Countrywide Financial, said "I've never seen a soft-landing in 53 years, so we have a ways to go before

this levels out. I have to prepare the company for the worst that can happen." Following these reports, Lereah admitted that "he expects home prices to come down 5% nationally", and said that some cities in Florida and California could have "hard landings." National home sales and prices both fell dramatically again in March 2007 according to NAR data, with sales down 13% to 482,000 from the peak of 554,000 in March 2006 and the national median price falling nearly 6% to $217,000 from the peak of $230,200 in July 2006. The plunge in existing-home sales is the steepest since 1989. The new home market is also suffering. The biggest year over year drop in median home prices since 1970 occurred in April 2007. Median prices for new homes fell 10.9 percent according to the Commerce Department.

Based on slumping sales and prices in August 2006, economist Nouriel Roubini warned that the housing sector is in "free fall" and will derail the rest of the economy, causing a recession in 2007. Joseph Stiglitz, winner of the Nobel Prize in economics in 2001, agreed, saying that the U.S. may enter a recession as house prices decline.

b) Ignored Forecasts Concerning Construction Sector

Several home builders have revised their forecasts sharply downward during summer 2006, e.g., D.R. Horton cut its yearly earnings forecast by one-third in July 2006, the value of luxury home builder Toll Brothers' stock fell 50% between August 2005 and August 2006, and the Dow Jones U.S. Home Construction Index was down over 40% as of mid-August 2006.

c) Misleading Speeches done by Government Authorities

Even government respected authorities were making speeches on the favor of the ongoing housing bubble. They were showing as if the world was risk free. By these speeches they were encouraging people to take even the riskiest type of mortgages more and more everyday.

In 2004, when families had a historic chance to lock in long-term fixed-rate mortgages at only 5.5%, Greenspan said that they were loosing tens of thousands of dollars by not grabbing 1 year ARM’s (Adjustable rate mortgages), then at teaser rates of only 3.25%. In

any scrapbook of bad advice from economic gurus, that should be near the top of the list. Greenspan's fellow Federal Reserve governor, the late Edward Gramlich, also reported that Greenspan had no interest in looking into growing signs of predatory behavior in the sub-prime industry. (Morris, 2008, p.69)

d) Ignored Worries About Hedge Funds Growth

Among quants, some recognized the gathering storm. Mr.Lo, the director of M.I.T. Laboratory for Financial Engineering, co-wrote a paper that he presented in October 2004 at a National Bureau of Economic Research conference. The research paper warned of the rising systemic risk to financial markets and particularly focused on the potential liquidity, leverage and counterparty risk from hedge funds. Over the two years, Mr.Lo made presentations to Federal Reserve officials in New York and Washington, and before the European Central Bank in Brussels. Among economists and academics, he said, the research was well received but on the industry side it was dismissed.

e) Ignored Concerns About Special Purpose Vehicles

In 1999, The New York Times reported that with the corporation's move towards the sub-prime market "Fannie Mae is taking on significantly more risk, which may not pose any difficulties during flush economic times. But the government-subsidized corporation may run into trouble in an economic downturn, prompting a government rescue similar to that of the savings and loan industry in the 1980s." Alex Berenson of The New York Times reported in 2003 that Fannie Mae's risk is much larger than is commonly held. Nassim Taleb wrote in The Black Swan: "The government-sponsored institution Fannie Mae, when I look at its risks, seems to be sitting on a barrel of dynamite, vulnerable to the slightest hiccup. But not to worry: their large staff of scientists deems these events "unlikely".

In 2003, the Bush administration recommended significant regulatory overhaul of Fannie Mae and Freddie Mac. However, both Republicans and Democrats opposed that proposal, fearing that tighter regulation could sharply reduce financing for low-income housing, both low and high risk. Under immense lobbying pressure from Fannie Mae, Congress did not introduce any legislation aimed at bringing this proposal into law until 2005.

In 2006, the Federal Housing Enterprise Regulatory Reform Act of 2005, first put forward by Sen. Charles Hagel where he pointed out that Fannie Mae's regulator reported that profits were "illusions deliberately and systematically created by the company's senior management". However, this legislation too met with opposition from both Democrats and Republicans. This bill was passed by the House, but was never presented to the Senate for a vote.

3. MARKET AND MARKET PLAYERS

‘’Alan Greenspan said that this crisis is "a once-in-a-century credit tsunami".

With structured finance, derivatives markets, new products were to be developed everyday after 1980s and 1990s. New tools for finance were on stage. Growth was enormous. In year 2000 derivatives market volume was only 20 trillion usd. In year 2007 it has reached 120 trillion usd where the global world economy is just 56 trillion usd.

New actors were also on stage hedge funds which have no binding regulation acting freely for which everybody calls it ‘’carry trade’’. They were like mushrooms growing so quickly from 400 billion usd in 2000 to 1.4 trillion usd in 2006 and to 2 trillion usd in 2007.

Aggregate global CDO issuance totaled US$ 157 billion in 2004, US$ 272 billion in 2005, US$ 549 billion in 2006 and US$ 503 billion in 2007. Research firm Celent estimated the size of the CDO global market to close to $2 trillion by the end of 2006.

Banks were also using some kind of insurance called CDS (credit default swaps). They were initially created to insure blue-chip bond investors against the risk of default. In recent years, these swap contracts have been used to insure all manner of instruments, including pools of sub-prime mortgages. These swap contracts are between two investors: typically banks, hedge funds and other institutions. The face value of the cds market has soared to an estimated 55 trillion usd.

All these derivatives were not traded in exchanges and mostly were done in otc markets which have caused lack of transparency of the trades volume and counterparty risk.

With all these creations financial sector was growing taking more share of the country’s GDP’S. The figure 3-1 represents the increases of the share of the financial sector in GDP (in percent) since 1985.

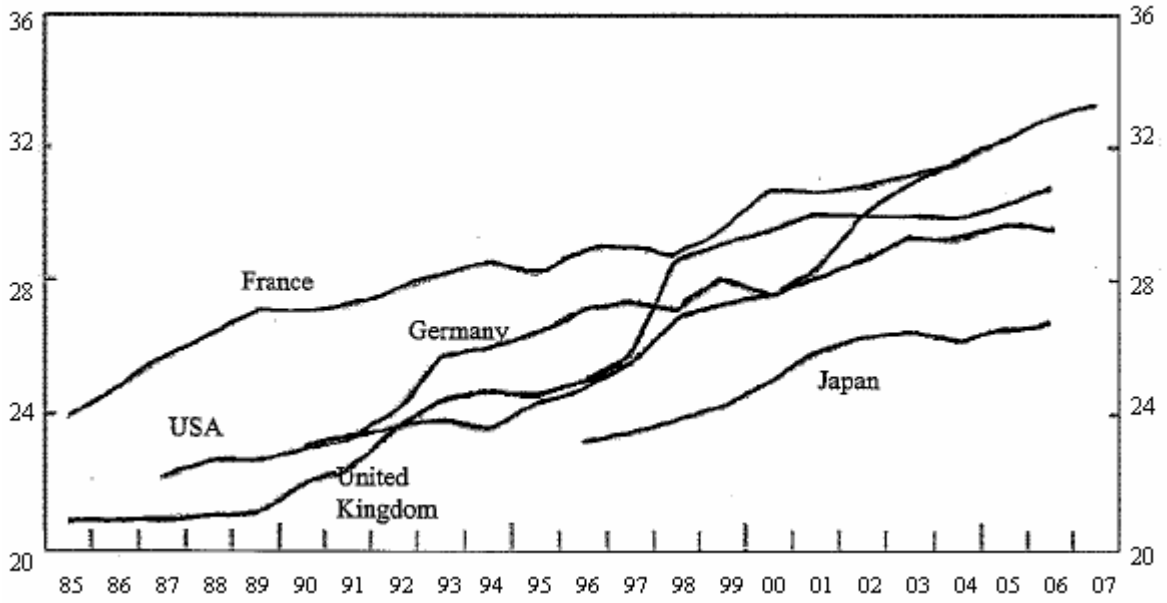

Figure 3-1 Share of the Financial Sector* in GDP (in percent)

*Financial sector comprises financial intermediation, real estate, renting and business activities.

3.1 Banking Sector

The biggest share in figure 3-1 was belonging to the Banking sector. With the help of these new tools: derivatives, securitization and cds markets, their asset sizes went on increasing. This increase can also be tracked in the latest IMF report.

Table 3-1 Summary of Global Capital Markets (billion usd)

	GDP	Currency Reserve	Assets of Bank	Bill,bond,etc.
World	**55.545**	**6.448**	**84.785**	**144.927**
EU	**15.689**	**280**	**43.146**	**42.952**
U.S.A	**13.808**	**60**	**11.194**	**42.952**
Japan	**4.382**	**953**	**7.839**	**49.802**
Emerging Countries	**17.282**	**4.910**	**15.003**	**28.771**

When we look at the World's total asset sizes of banks, calculated as 84.8 trillion usd, have far exceeded the World's Gdp which is only 55.6 trillion usd. In Euro zone the estimated asset size of Banks are almost triple of their total Gdp's, being the most critical and naïve part of the overall banking industry. In Japan it is almost double whereas in US and in

emerging market economies the sizes are about 81-87% of their Gdp's which are also high and a threaten to overall economies.

Today when we look at these figures we can understand the bubbles more easily.

In fact all new inventions in structured finance were due to necessities and had reasons to be created. New inventions followed one another.

In the case of increased volume of mortgages, financial institutions started to issue mortgage-backed securities to finance their activities. These mortgage-backed securities helped banks to:

1. transform relatively illiquid, individual financial assets into liquid and tradable capital market instruments.
2. allow mortgage originators to replenish their funds, which can then be used for additional origination activities.
3. can be used by Wall Street banks to monetize the credit spread between the origination of an underlying mortgage (private market transaction) and the yield demanded by bond investors through bond issuance (typically, a public market transaction).
4. are frequently a more efficient and lower cost source of financing in comparison with other bank and capital markets financing alternatives.
5. allow issuers to diversify their financing sources, by offering alternatives to more traditional forms of debt and equity financing.

allow issuers to remove assets from their balance sheet, which can help to improve various financial ratios, utilize capital more efficiently and achieve compliance with risk-based capital standards.

So financial firms have seen the advantage of these MBS and made sales through special purpose vehicles. The risk was now transferred to these MBS and in case of defaults losses would be absorbed by sub-prime mortgages which have made a false buffer for the senior tranches.

In order to give more loans to customers investment banks either securitized or sold their existing mortgage loans which gave way to get more funds. So they went on disbursing these loans.

Some banks were keeping some of these assets in their balance sheet. According to April 2008 IMF report, Banks are estimated to have 740 billion of net subprime exposure, US banks (53%), European (41%), Asian (5%) and Canadian (1%) . In such cases they were buying some kind of insurance like credit default swaps which they were transferring some of the risks to counterparty.

In fact it is is widely accepted that banks can be a major source of systemic risk. (Jakas, 2008) Paradoxically they are also the front-line protection against system failures. This is because of the different functions banks perform in the financial system. Banks participate in the creation of money by way of deposit liabilities. They manage or take part in the payments system by providing a sound and stable mechanism to allow payments. Through the creation of indirect financial securities they are pivotal financial intermediaries between lenders and borrowers. Banks may also be regarded as agents of information who contribute to the supply of information. Economic actors may choose to limit the availability of public information, but are nonetheless willing to share it with a bank in order to obtain the requisite finance. Finally banks are maturity transformers, which mean that they take liquid deposits and invest part of the proceeds in the form of illiquid assets. By doing so, banks pool risk and enhance economic welfare.

When we talk about banking sector, we also have to pay attention to recent regulatory changes concerning banking side, especially to Basel II which has become a common standard to be followed by most banks in the World.

a) Basel II regulation

Basel II is an accord providing a comprehensive revision of the Basel capital adequacy standards issued by the Basel Committee on Banking Supervision.

Basel I, 1988 agreement, sought to decrease the potential for bankruptcy among major international banks. After Basel I, regulators came together to form a new measure more

sensitive to risks Banks are exposed to. This new regulation came after years of research with best practices adopted from member Banks. Basel II guidelines are to regulate capital using the default models to predict and manage risk. In other words this new regulation was giving banks a play ground where they will be using their own internal estimates if validated by their regulatory bodies. This new regulation, in order to differentiate risks, were dividing Bank's risks into 3 categories: Credit, Market and Operational risks, which does not count for cross correlation affects between these risks and building silos between them.

Basel II regulation imposes sequentially higher-risk weights on capital once the securitization is rated below investment grade or unrated. For originating banks holding equity tranche exposure, these low-rated or unrated assets may become very costly in terms of capital charges, particularly if they remain unhedged. For example, under the internal-ratings-based approach for long-term debt, a bank holding an instrument rated BB faces risk weights of 425 percent. Yet, for the riskiest assets, the risk weight reaches 1,250 percent. Further, Basel II rules require that banks must prove that "significant credit risk" has been transferred to a third party in order to achieve capital relief through securitization. It is unlikely that the originating bank's on-balance-sheet holdings of the riskier equity tranche investments will meet these criteria.

Likewise, as investors, banks under Basel II must hold capital against securitized instruments on their balance sheet. With charges of 650 percent for exposures rated BB–, the cost of holding below-investment-grade paper can be so expensive. Investment-worthy assets and the associated reduced risk weights for investment-grade assets provide banks with a less costly alternative in terms of capital, thereby increasing the incentive to move away from low-grade instruments.

Most banks issuing in these markets would likely use the internal-ratings-based approach but in order to lower risk weighted assets, were selling the riskier trances while keeping the high rated instruments.

b) Increased Leverage in the Banking Industry

After Basel II started to be applied, banks have started to use internal and external ratings in the calculation of their risk weighted assets. This gave way to an increase in their leverage ratios.

1) Investment Banks

In the following table I am giving you the leverage ratios of 5 investment banks by dividing debt over equity. Each of the five largest investment banks took on greater risk leading up to the sub-prime crisis. Taking these illiquid and toxic assets into their balance sheet even though some were with AAA rating their leverage had increased dramatically. The datas show us that these firms have significantly increased their leverage ratios where a high leverage ratio indicates more risk. For a typical risk averse firm this ratio is generally between 10 -15. Here we see that these firms had ratios closer to 30.

Table 3-2 Investment Bank Leverage Ratios

	Year		Assets	Debt	Equity	Leverage
Lehman Brothers	2003		312,061	298,887	13,174	22.7
	2004		357,168	342,248	14,920	22.9
	2005		410,063	393,269	16,794	23.4
	2006		503,545	484,354	19,191	25.2
	2007		691,063	668,573	22,490	29.7
Bear Stearns	2003		212,168	204,698	7,470	27.4
	2004		255,950	246,959	8,991	27.5
	2005		292,635	281,844	10,791	26.1
	2006		350,433	338,304	12,129	27.9
	2007		395,362	383,569	11,793	32.5
Merrill Lynch	2003		480,233	451,349	28,884	15.6
	2004		628,098	596,728	31,370	19.0
	2005		681,015	645,415	35,600	18.1
	2006		841,299	802,261	39,038	20.6
	2007		1,020,050	988,118	31,932	30.9
Goldman Sachs	2003		403,799	382,167	21,631	17.7
	2004		531,379	506,300	25,079	20.2
	2005		706,804	678,802	28,002	24.2
	2006		838,201	802,415	35,786	22.4
	2007		1,119,796	1,076,996	42,800	25.2
Morgan Stanley	2003		603,022	578,155	24,867	23.2
	2004		747,578	719,372	28,206	25.5
	2005		898,835	869,653	29,182	29.8
	2006		1,121,192	1,085,828	35,364	30.7
	2007		1,045,409	1,014,140	31,269	32.4

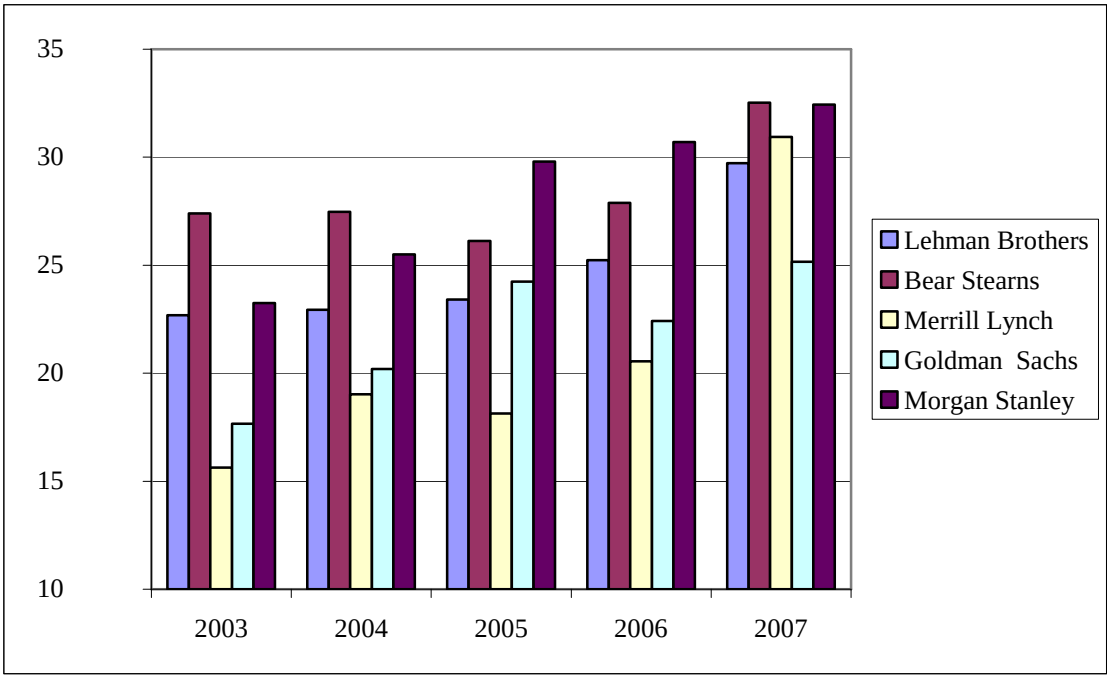

Figure 3-2 Investment Bank Leverage Ratios Yearly Comparison

2) Banks in US and Europe

Table 3-3 Leverage Ratios of Banks in USA

Bank	**Assets**	**Shareholders Equity**	**Ratio**
Bank of America	$1,715B	$146.8B	10,68
Citigroup	$2,187B	$113.6B	18,25
JP Morgan	$1,562B	$123.2B	11,68
Wells Fargo	$ 575B	$47.6B	11,08

We see that the three big US banks have balance sheets that represent 40% of US GDP.

Table 3-4 Banks in Europe

Bank	Assets	Shareholders Equity	Ratio
Deutsche Bank	€ 2,020B	€ 38.5 B	51,47
UBS	Fr 2,272B	Fr 42.5 B	52,46
Credit Suisse	Fr 1,360B	Fr 59.88B	21,71
Fortis	€ 871B	€ 34.28 B	24,41
Dexia	€ 604B	€ 16.4 B	35,83

BNP Paribas	€ 1,694B	€ 59.4 B	27,52
Barclays	£ 1,227B	£ 32.5 B	36,75
RBS	£ 1,990B	£ 91.48 B	20,75

Clearly leverage levels in Europe and the UK are markedly higher. More staggering is the size of the balance sheets. Deutsche Bank's is almost as big as those of Bank of America and JP Morgan combined. In fact we were aware of the Euro zone asset size growth which was triple of their Gdp and now we also realized that banks were also lacking equity. So we can consider Euro zone maybe more riskier than the entire world, together with US.

In the well-worn language of financial economics, increasing leverage was a positive NPV decision when it was made, but obviously ex post it was a costly decision as it meant that when assets fell in value, the fund's equity fell in value faster than it would have with less leverage.

3.2 Rating Agencies

There is a very big issue concerning these agencies because most investors and financial institutions gave too much importance to their calculated PD's. They were using it for their investment decisions, to price their holdings, to make risk adjusted return calculations and even in determination of their capital levels. Everybody's reliance on Rating Agencies was so important that even Basel II Directives were based on these estimates. With good ratings you needed to hold less capital and more with the bad ones.

Also on the industry side everybody trusted the rating agencies. The reputation of outside bond ratings was so high that if the risk department had ever assigned a lower rating, their judgment would have been immediately questioned. It was assumed that the rating agencies simply knew best.

These agencies were giving investment-grade ratings to securitization transactions (CDO's and MBS's) based on sub-prime mortgage loans. So everybody was confident in entering bigger and bigger positions in sub-prime mortgages.

So with these incentives the world seemed almost riskless. These high ratings encouraged the flow of investor funds into these securities, helping finance the housing boom. The reliance on ratings by these agencies and the intertwined nature of how ratings justified led many investors to treat securitized products — some based on sub-prime mortgages — as equivalent to higher quality securities and furthered by SEC removal of regulatory barriers and reduced disclosure requirements in the wake of the Enron scandal.

Credit rating agencies are now under scrutiny for giving investment-grade ratings to securitization transactions (CDO's and MBS's) based on sub-prime mortgage loans. Higher ratings were believed justified by various credit enhancements including over-collateralization (pledging collateral in excess of debt issued), credit default insurance, and equity investors willing to bear the first losses.

Downgrade of Assets

As seen from the figure 2-1 on page 3, after 2004 the government started to increase interest rates which made a peak in June 2006 and after that falling ever since which is at zero levels now. During these interest rate changes the mortgage owners have started to default while home prices were coming down with increased ted spreads. At this time rating agencies were not aware of the coming storm and banks were still comfortable sitting on these MBS and other mortgages in their portfolio. The ratings were not good estimates of the risks which the investors were exposed to.

They were almost seemed to be designed to be used in boom and bubble times but would fail to perform during crisis.

Starting from the 3rd quarter of 2007 rating agencies have started to lower MBS. Rating agencies lowered the credit ratings on $1.9 trillion in mortgage backed securities from Q3 2007 to Q2 2008. (Figure 3.3) This places additional pressure on financial institutions to lower the value of their MBS. In turn, this may require these institutions to acquire additional capital, to maintain capital ratios. If this involves the sale of new shares of stock, the value of existing shares is reduced. In other words, ratings downgrades pressure MBS and stock prices lower.

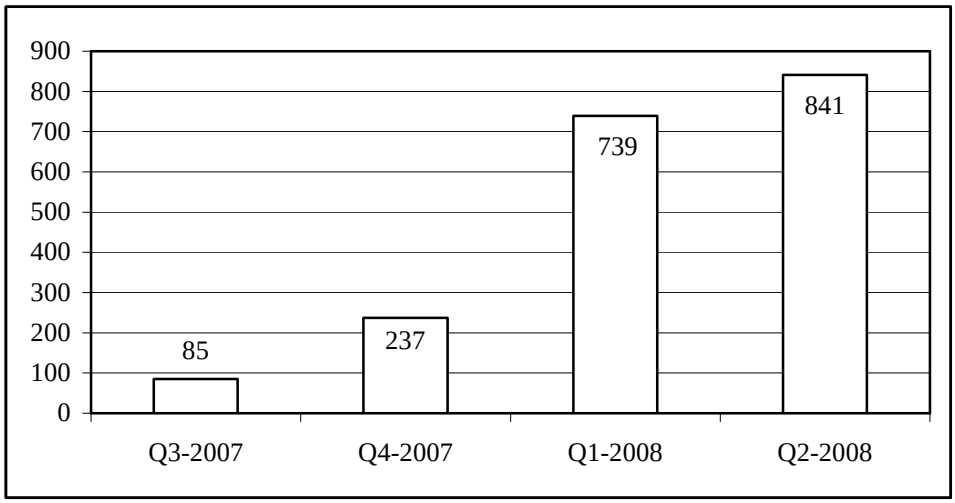

Figure 3-3 Mortgage-Backed Securities (MBS) Downgrades (Billions $)

As of July 2008, Standard & Poor's (S&P) had downgraded 902 tranches of U.S. residential mortgage backed securities (RMBS) and CDO's of asset-backed securities (ABS) that had been originally rated "triple-A" out of a total of 4,083 tranches originally rated "triple-A;" 466 of those downgrades of "triple-A" securities were to speculative grade ratings. S&P had downgraded a total of 16,381 tranches of U.S. RMBS and CDO's of ABS from all ratings categories out of 31,935 tranches originally rated, over half of all RMBS and CDO's of ABS originally rated by S&P. Since certain types of institutional investors are allowed to only carry investment-grade (e.g., "BBB" and better) assets, there is an increased risk of forced asset sales, which could cause further devaluation.

3.3 Monoline insurance

Monoline insurers guarantee the timely repayment of bond principal and interest when an issuer defaults. They are so named because they provide services to only one industry.

The economic value of bond insurance to the governmental unit, agency, or company offering bonds is a saving in interest costs reflecting the difference in yield on an insured bond from that on the same bond if uninsured. Insured securities range from municipal bonds and structured finance bonds to collateralized debt obligations (CDO's) domestically and abroad.

Until 1989, multiline insurance companies were permitted to guarantee municipal and other bonds, in addition to their other businesses such as property/casualty and life insurance.

Under New York State's Article 69, passed in 1989, multiline insurance companies are not permitted to engage in financial guaranty businesses (and vice versa). A cited rationale was to make the industry easier to regulate and ensure capital adequacy.

After 1989, insurance regulations prevent property/casualty insurance companies, life insurance companies, and multiline insurance companies from offering financial guaranty insurance. The monoline industry claims that it has the advantage over multilines of sole focus on capital markets.

As the number and size of insured bond issues grew, regulatory concern arose that bond defaults could adversely affect even a large multiline insurer's claims-paying ability. In 1975, New York City teetered on the edge of default during a steep recession after years of financial mismanagement; in 1983 the Washington Public Power Supply System (WPPSS) defaulted on $2billion of revenue bonds from a troubled nuclear power project.

a) Ambac

The first monoline, or bond insurer Ambac Financial Group Inc, was formed in 1971 as an insurer of US municipal bonds.

The Ambac Financial Group, Inc., generally known as Ambac, is an American holding company whose subsidiaries provide financial guarantee products, such as bond insurance and other financial services to clients in both the public and private sectors around the world. Ambac is regulated by the insurance commission of Wisconsin. Through its financial services subsidiaries, the company provides investment agreements, interest rate swaps, investment advisory and cash management services, primarily to states, municipalities and their authorities.

b) MBIA

A consortium of four insurance companies formed the Municipal Bond Insurance Association (MBIA Inc) a financial services company in 1973 to diversify their holdings in municipal bonds. The company went public in 1987. The companies sought to help regional public administrators get better access to cheaper funding. MBIA is the largest bond insurer.

c) Credit rating downgrades of Monoline Insurers

Maintaining a high credit rating is critical for bond insurance firms. Companies and governments buy insurance to reduce their borrowing costs by assuming the higher rating of the insurer. Keeping up this rating is thus the basis of the insurer's business model.

However due to sub-prime mortgage crisis, this advantage has been lost because of the credit rating downgrades of these insurers. No monoline insurer had ever been downgraded or defaulted prior to 2007.

In 2007, during a housing market decline, monoline insurers suffered losses from insurance of structured products backed by residential mortgages. Defaults soared to records on sub-prime mortgages and innovative adjustable rate mortgages, such as interest-only, option-ARM, stated-income, and NINJA loans (No Income, No Asset) which had been issued in anticipation of continued rises in house prices.

Ambac and other bond guarantors, such as MBIA, were hit hard by the 2007 sub-prime mortgage financial crisis, and, on January 18, 2008, its Fitch credit rating was lowered from AAA (the highest) to AA when its plans to raise two billion dollars in new capital failed. Due to the very nature of monoline insurance the downgrade of a major monoline triggered a simultaneous downgrade of bonds from over 100,000 municipalities and institutions totaling more than $500 billion.

Moody's and S&P, however, chose to affirm Ambac's AAA with their agencies after it succeeded in raising $1.5 billion in new capital in March 2008. In early 2008, major bond guarantors failing to be able to pay off insurance claims on a trillion dollars of securities back by sub-prime mortgages and other securitized debt led to attempts to shore them up

with infusions of capital. On June 19, 2008 Moody's downgraded Ambac's credit rating three notches to Aa3.

On April 4, 2008 Fitch Ratings cut MBIA's Insurance Corp rating to AA from AAA with a negative outlook. Fitch issued the new, lower rating even though MBIA had asked the ratings company, the month before, to stop assessing its credit worthiness.

On June 4, 2008 Moody's Investors Service announced that it would review MBIA's rating for possible downgrade for the second time in the year. Four months before this announcement, on February 2008, Moody's had affirmed the AAA rating after MBIA raised $2.6 billion in capital and announced that would stop insuring structured finance securities for six months.

On June 6, 2008, despite having affirmed MBIA's AAA rating on February 2008, Standard and Poor's decided to downgrade MBIA's insurance financial strength rating from AAA to AA.

On June 19, 2008 Moody's downgraded MBIA's credit rating 5 notches to A2.
On November 7, 2008 Moody's further downgraded to "Baa1" from "A2" the insurance financial strength rating.

Rating agencies have come under increasing scrutiny by regulators for their methods as bond insurers lend their high credit ratings to securities issued by others in return for a fee. By January 2008, many municipal and institutional bonds were trading at prices as if they were uninsured, effectively discounting monoline insurance completely. The slow reaction of the ratings agencies in formalizing this situation echoed their slow downgrading of sub-prime mortgage debt a year earlier.

Commentators such as investor David Einhorn have criticized rating agencies for being slow to act, and even giving monoline’s undeserved ratings that allowed them to be paid to bless bonds with these ratings, even when the bonds were issued by credits superior to their own.

3.4 Hedge Funds

Government interest rate policies led to cheap and plenty borrowing opportunities which motivated hedge fund industry which is the leader of the most speculative group of investors. The underlying reason in the accelerated growth of hedge funds in 1990's was due to their passive investment strategies in which one could earn high profits even when the markets go down despite the investment funds that could only make profit when the markets are booming. The reason of their name being hedge was that they could make profit without being affected from market risk and markets rising and falling. They were accepting investors who have more than 1 million usd. Hedge fund owners were also taking mutual risk with investors by adding their own holdings to the funds. Taking huge amount of loans from banks and making investments greater than their funds size was maybe their most important feature. They could act very fast and react so quickly to instant changes in the expectations which were causing big turbulences in the markets. Failure of LTCM which was one of the most famous hedge funds in history was the main reason of the global crisis of 1998.

After 2001 developed countries starting to lower interest rates and therefore decreasing financial returns, investors could not get satisfied with the classical investment strategies. They turned their face to hedge funds which were professionally managed and offering high returns in such an environment. So this way hedge funds grew in numbers. Fund managers whom were working in big investment banks previously started to quit one by one and started to found hedge funds. In year 2000 their numbers were 4 thousand with almost 400 billion usd volume. In year 2006 they became close to 14 thousand in numbers with 1.4 trillion usd volume. Some investment banks started to found their own hedge funds within their organizations either to get a piece of the cake or not to loose their genius managers.

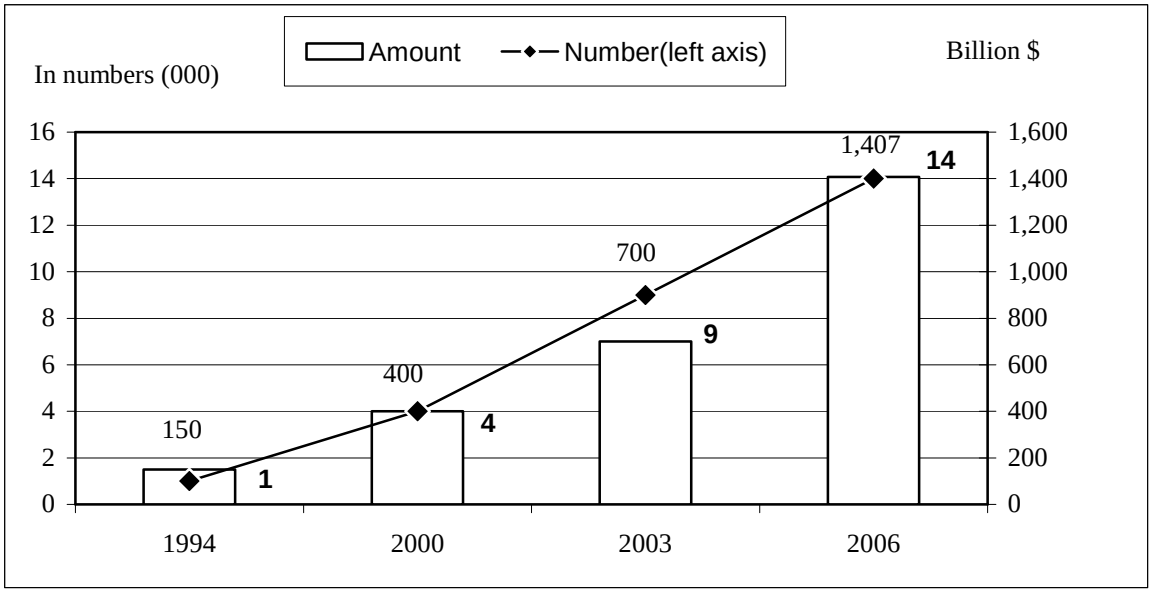

Figure 3-4 Hedge Funds Development

By not being audited or actions being not restricted with certain rules they could take every kind and risky investment all around the world. In fact they could only make profits by taking some portion of the additional returns they could make in excess of the reference returns like USA stock exchange. So they had to enter markets and instruments which many investors were avoiding to enter and had to take more risks. After they gained more and cheaper opportunities for borrowing they quickly headed towards the emerging countries which were promising higher interest rates and increasing stock market potential.

Table 3-5 Capital Inflow to Emerging Market Economies

(Billion USD)	2000	2003	2005	2006	2007
Total capital inflow	300	415	760	1.185	1.929
Foreign Direct Investment Capital Inflow	212	204	374	464	533
Portfolio investment	95	85	201	337	442
Other investment	-7	127	185	384	955

As can be seen from the table, total capital inflow to emerging markets have increased enormously from 300 billion usd in 2000 to 1.929 billion usd in 2007. The biggest

increases were due to other and portfolio type of investments, leaving foreign direct investment increase amount negligible.

After they invested in the currencies, Eurobonds, bonds and stocks of these countries in big amounts, their currencies appreciated very quickly and also did their stocks and bond prices. So margins started to get lower and lower everyday.

EMBIG spread which shows the difference of US and emerging markets bonds interest rates differences of the same maturities, declined to the lowest levels in its history.

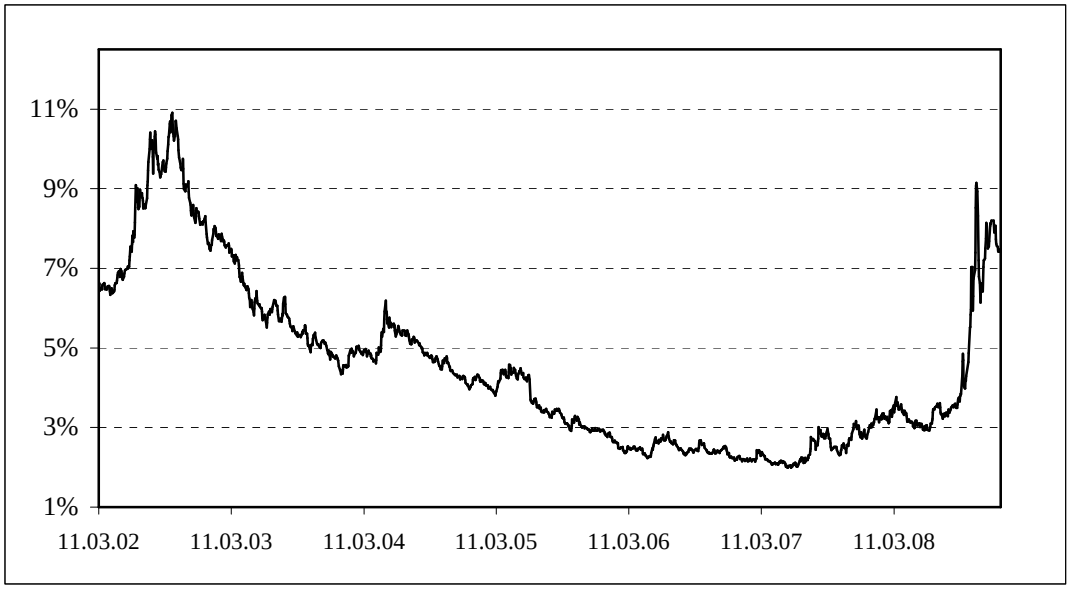

Figure 3-5 EMBI+ Index

Maybe the macroeconomic structural positive changes in emerging countries which were made at the same time interval may have made demands towards financial markets and instruments also seem reasonable. The increase in global liquidity with cheap and plenty of borrowing opportunities were obviously supporting the demands towards these markets. The demand was covering almost all the emerging countries without any consideration.

One of the most popular funds was quant fund which was trying to earn money through automated buying and selling that were fully dependant on mathematical models. These funds were acquiring the analysts who have a high level of mathematical and statistical knowledge. These funds were trying to detect the distances in the values of financial

instruments from the value they had to be with the most complicated models and were taking positions accordingly. First they were trying to detect the risk factor which affects the underlying instrument and find out how these factors have affected them by using historical data and buy/sell automatically with the buy and sell warnings produced by models. In a way human factor was left out. When arbitrage opportunities appear they were being closed automatically. After the number of quant funds grew in number, the same type of models lowered arbitrage opportunities. Cheap and plenty of financial opportunities were still giving way to high leverage levels and they still went on making profits despite of narrowing margins.

Given the role that hedge funds have begun to play in financial markets—namely, significant providers of liquidity and credit—they now impose externalities on the economy that are no longer negligible. In this respect, hedge funds are becoming more like banks. The fact that the banking industry is so highly regulated is due to the enormous social externalities banks generate when they succeed, and when they fail. But unlike banks, hedge funds can decide to withdraw liquidity at a moment's notice, and while this may be benign if it occurs rarely and randomly, a coordinated withdrawal of liquidity among an entire sector of hedge funds could have disastrous consequences for the viability of the financial system if it occurs at the wrong time and in the wrong sector. (Khandani and Lo 2007)

While some academics may have warned that systemic risk in the hedge-fund industry has been on the rise (Carey and Stulz, 2007), none of the academic literature has produced any timely forecasts of when or how such shocks might occur. Indeed, by definition, a true "shock" is unforecastable.

A recent study was conducted (Clare & Motson 2008) to investigate the risk taking behaviour of hedge fund managers. They have found out that managers whose incentive option is well in the money decrease risk. Relatively speaking these managers are protecting the value of this option towards the end of the year. For investors who wish their managers to take risks in a consistent manner regardless of the month of the year, this result may come as a disappointment. It suggests that there is an element of "locking in" behaviour particularly towards the end of the calendar year. Perhaps of more interest is the

risk taking behaviour of those fund managers who find their incentive option to be well out of the money. We find that these managers do not "put it all on black" in order to "win" back earlier losses and to increase the value of their incentive option. This should be good news for hedge fund investors. This conservative behaviour may be due to the implicit terms of the manager's contract. As Hodder and Jackwerth (2007) suggest, these implicit terms may include the risk of liquidation as investors withdraw funds and may also be due to the often substantial management stake in the fund that discourages the fund manager from "swinging the bat".

3.5 On the Positive Side

a) Tax and Other benefits of Monoline Insurers

The companies, which must be highly rated by the credit rating agencies to fulfill their role, provide a back-up guarantee to debt issued by lower rated borrowers in exchange for insurance premiums. Thus a city or regional municipal borrower rated A, by paying a premium could enjoy AAA rating. Many more kinds of investors would then buy that bond significantly reducing the interest cost of that debt. Since public administrators often had large balance sheets of real estate assets, monolines soon started building up portfolios of bonds that had real estate assets backing them. The difficulty for analysts has always been understanding how similar are municipal assets often funded from secure tax revenues compared to private asset portfolios funded by profits from a variety of fluctuating markets. To counter criticism, bond insurers claimed they had sophisticated risk management maths and in the event of claims, paid slowly over time to match the profile of the debt issued rather than lump sums.

Taxable investors benefit from the exemption of municipal bond interest from Federal income tax. In many cases local bonds are also free of state and local taxes. Taxable investors face a compelling incentive to purchase local bonds. However, an investor holding a large portfolio allocation in local bonds carries a risk of substantial loss if the local economy becomes depressed, for instance if a local industry declines or a major natural disaster strikes, and defaults ensue. On the other hand, diversifying nationally

causes loss of the tax benefit. If a AAA-rated monoline insurer guarantees a municipal bond, the investor gains the benefit of owning a diversified portfolio and retains the local tax benefit. (The investor is even better off than owning a diversified national portfolio, which might suffer an occasional default: the insured bond can only default if the issuer defaults and the insurer experiences default on its entire portfolio in excess of the insurer's capital).

When insuring taxable bonds, bond insurance is a 'pure credit' business. The insurer seeks to insure credits with a very small likelihood of default, which the market will nevertheless pay a premium to insure, perhaps because of investor restrictions on the amount they can invest in non-AAA credits.

Also companies and governments buy insurance to reduce their borrowing costs by assuming the higher rating of the insurer. Keeping up this rating is thus the basis of the insurer's business model.

3.6 On the Negative Side

a) Conflict of Interest in Rating Agencies

There are also indications that some involved in rating sub-prime related securities knew at the time that the rating process was faulty. Internal rating agency emails from before the time the credit markets deteriorated, discovered and released publicly by U.S. congressional investigators; suggest that some rating agency employees suspected at the time that lax standards for rating structured credit products would produce widespread negative results. For example, one 2006 email between colleagues at Standard & Poor's states "Rating agencies continue to create and even bigger monster—the CDO market. Let's hope we are all wealthy and retired by the time this house of cards falters."

This was done due to conflict of interest arising since rating agencies are paid by the firms that organize and sell the debt to investors, such as investment banks. On 11 June 2008 the U.S. Securities and Exchange Commission proposed far-reaching rules designed to address

perceived conflicts of interest between rating agencies and issuers of structured securities. The proposal would, among other things, prohibit a credit rating agency from issuing a rating on a structured product unless information on assets underlying the product was available, prohibit credit rating agencies from structuring the same products that they rate, and require the public disclosure of the information a credit rating agency uses to determine a rating on a structured product, including information on the underlying assets. The last proposed requirement is designed to facilitate "unrequested" ratings of structured securities by rating agencies not compensated by issuers.

b) Giving Permissions to be Highly Leveraged

2007 saw a crystallizing crisis in US sub-prime mortgage related bonds. The spillover into broader structured credit markets had a huge impact on bond insurers. The worst hit was RADIAN Group which insured mortgage-backed debt. Shares in Radian Group tumbled by over 67 per cent in the space of months. The falling share price reflected the almost nine fold rise in the cost of protecting debt against default. Bond insurers have a tiny capital base compared to the volume of debt insured.

In recent years, much of the monolines growth has come in structured products, such as asset backed bonds and collateralized debt obligations (CDO's), and the total outstanding amount of paper insured by monolines reached $3.3 trillion in 2006. This contingent liability is backed by approximately $34 billion of equity capital.

In fact high leverage was covering almost all of the market players as well as monolines as I have mentioned before.

Unregulated nature of hedge funds was also giving way to their increased leverages. They were playing in big amounts and highly leveraged in order to chase higher and higher profits.

Banks were becoming more and more leveraged every year, increasing their systemic risk to the entire economy.

Even public sector entities like Fannie Mae and Freddie Mac were also in the same position, being unprotected to potential losses with inadequate capital cushions.

c) Ignored the huge growth of Hedge Funds and connected risks

The growth of hedge funds was a potential threat to all the market participants and especially to governments. As I mentioned already, they were highly leveraged, taking excessive risks than they could afford. They were everywhere, without binding regulations, causing systemic risks to rise. In fact some people warned of the rising systemic risk to financial markets and particularly focused on the potential liquidity, leverage and counterparty risk from hedge funds.

d) Regulatory Bodies Fault in De-regulation

These were all done as a result of the government policies. So there is blame on the regulatory bodies allowing for such leverage ratios which is another sign which shows the deregulation of the market. In fact all the bubble was based on these improper settings. Without these lax regulations, it would be impossible to support such an environment where everybody were allowed to take excessive risks than they were able to and made huge profits by these leverages.

e) Basel II reliance on ratings

Although the initial purpose of the new regulation was to enhance the bank's capital adequacy ratios to be more sensitive to their risk taking, it became the vice versa. Since all the system was based upon internal estimates or external ratings, it did not help its cause. Internal ratings seemed to be structured according to boom periods and there is also blame on rating agencies which have given false ratings due to their conflicts of interest.

In fact Basel II proposals were also covering economic downturns and stress tests but the banks seemed not to apply these in their calculations and forecasts.

4. ROLE OF RISK MANAGEMENT

I will define the role of Risk Management as a starting point.

4.1 What is Risk Management

The COSO Enterprise Risk Management framework (2003) explicitly defines risk management as a high-level strategic activity, contributing to board-level decision making, planning and performance measurement. This role requires that senior risk officers possess an understanding of key strategic uncertainties and that they communicate these to senior management and the business lines.

In an organization the chief risk officer is responsible for:

a) Establishing risk management policies, methodologies, and procedures consistent with firm-wide policies,

b) Reviewing and approving models used for pricing and risk measurement,

c) Measuring risk on a global basis as well as monitoring exposures and movements in risk factors,

d) Enforcing risk limits with traders,

e) Communicating risk management results to senior management.

Figure 4.1 describes the centralization of the risk management function under an executive vice president or chief risk officer. The figure shows the units reporting to this new function.

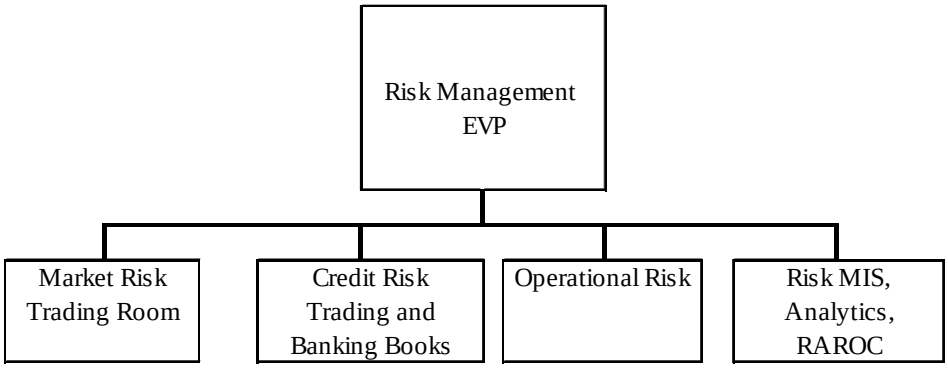

Figure 4-1 Risk Management Organizational Structure

To CRO report market risk management, which monitors risk in the trading book; credit risk management, which monitors risk in the banking and trading books; operational risk management, which monitors operational risks; and systems. The latter unit deals with risk management information systems (MIS), which include hardware, software, and data capture; analytics, which develops and tests risk management methodologies; and RAROC, which ensures that economic capital is allocated according to risk. (Jorion, 2003, p.579)

We all know that risk management in financial companies have been developing over a long period of time, restructuring and re-regulating after each crisis and we now expect the role and influence of risk management and also the regulations to increase in the near future after 2008 crisis.

Most of the financial institutions were depending heavily on risk management systems in their business decisions, determination of capital levels. They were also heavily investing to improve their risk management systems. Some of these were done because of regulatory necessities, like Basel II/CRD and some were to gain competitive advantage to improve their (MIS and management purposes) systems in order to calculate Risk Adjusted Return on their business lines, risk adjusted pricing and also to implement active credit portfolio management.

With so much heavily relied in risk management systems and having spent huge amount of money for these systems many have blamed risk managers since they did not see the crisis coming and have led to this financial turmoil.

Here I am going to give you a survey result performed at June 2007, just before the crisis. The aim of the survey was to identify risk managers role in organizations and different implementation practices of the industry. So that will give us a clear understanding of the Risk Managers status in the beginning of the credit and liquidity crunch.

4.2 A Snapshot of Risk Management Organizations June 2007

A recent research (Mikes, 2008) was made to assess the roles of risk functions and, in particular, senior risk officers play in fifteen large international banks. Because the research was carried out between June 2006 and June 2007, it offers a rare snapshot of the 'calm before the storm' the state of risk management at fifteen large players before the liquidity and credit crunch became apparent in the second half of 2007.

According to the study 4 types of risk manager roles are adopted by organizations. These are:

a) Compliance champion

The risk function is focused on complying with pressing stakeholder requirements, keeping up with new regulations, and building and safeguarding the risk management framework, a policy framework that determines what risks must be addressed and by whom. Senior risk officers oversee the development of risk measurement tools for each risk type included in the risk management framework and provide assurance to senior management that adequate controls and processes are in place.

b) Modelling expert

The risk function is focused on highly sophisticated risk- modelling and on delivering the most advanced measurement and compliance options from the regulatory menu. Senior risk officers initiate the implementation of firm-wide risk models that are capable of giving an aggregate view of financial risks in the business, focusing on quantifiable market and credit risks.

c) Strategic advisor

Senior risk officers gain board-level visibility and influence largely due to their command of business knowledge and their experience of what can go wrong. Their role is to bring judgment into high-level risk decisions, challenge the assumptions underlying business plans, and use traditional risk controls and lending constraints to alter the risk profile of particular businesses.

d) Strategic controller

Having built sophisticated firm-wide risk models, capable of giving an aggregate view of the financial risks, the risk function enables the company to operate a formal risk-adjusted performance management system. Senior risk officers preside over the close integration of risk and performance measurement, and ensure that risk-adjusted metrics are reliable and relied on. They advise top management on the absolute and relative risk-return performance of various businesses, and influence how capital and investments are committed.

It is a fact that the compliance champion role is within the mandate of all modern-day risk functions though the modelling expert role appears to be optional.

The strategic advisor role requires an intimate knowledge of the business and what can go wrong: experience, which managers earn through long service, having lived through organizational successes, losses and crises. The strategic controller role assumes a sophisticated risk modelling capability, which is foundational to risk-based performance management.

More than half of the surveyed risk functions were still engaged in finalizing various modelling initiatives at the onset of the credit crisis. Figure 4.2 shows the status in the credit risk area.

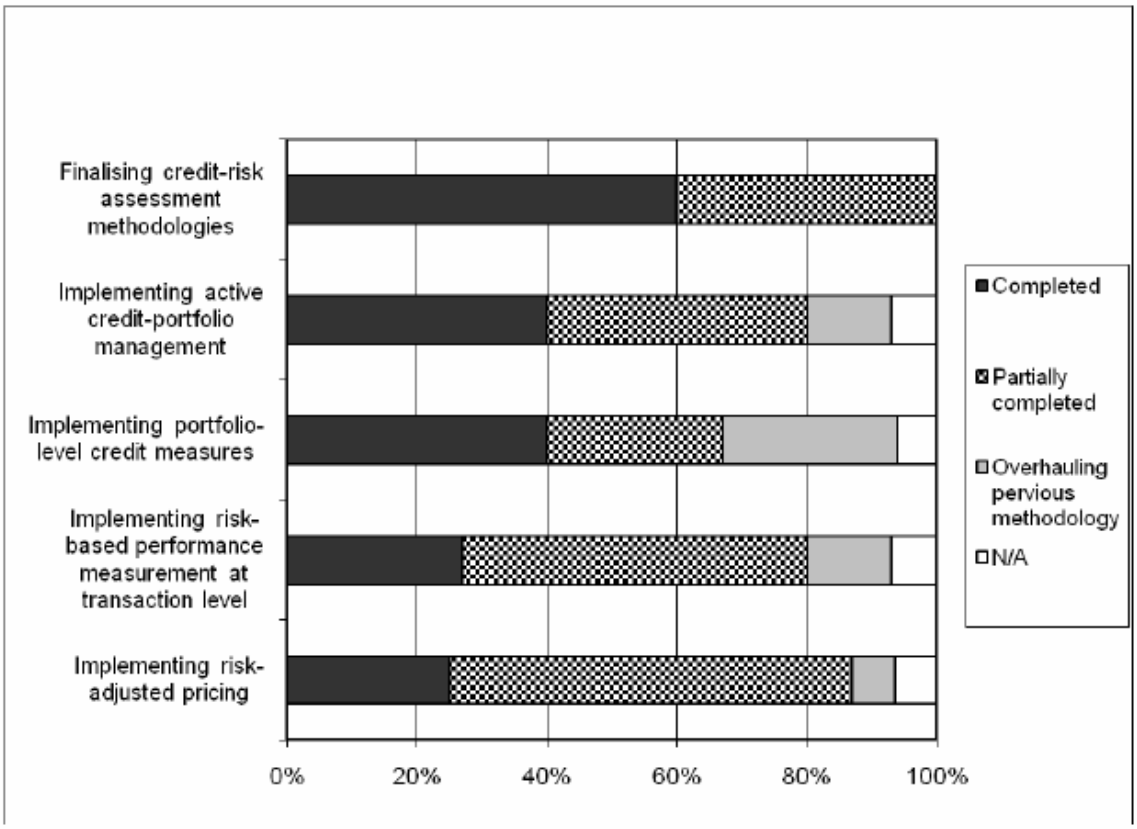

Figure 4-2 Modelling and credit risk exposures

In general, fewer than half of the respondents had completed the credit risk initiatives they had started: portfolio-level credit measures (40 per cent), active credit-portfolio management (40 per cent), risk-based performance measurement at the transaction-level (27 per cent) and risk adjusted pricing (25 per cent). The implementation of credit risk assessment methodologies, however, stood out: 60 per cent of the respondents had declared a victory there.

The figure 4.3 given below shows the state of play in risk modelling other than credit risk management.

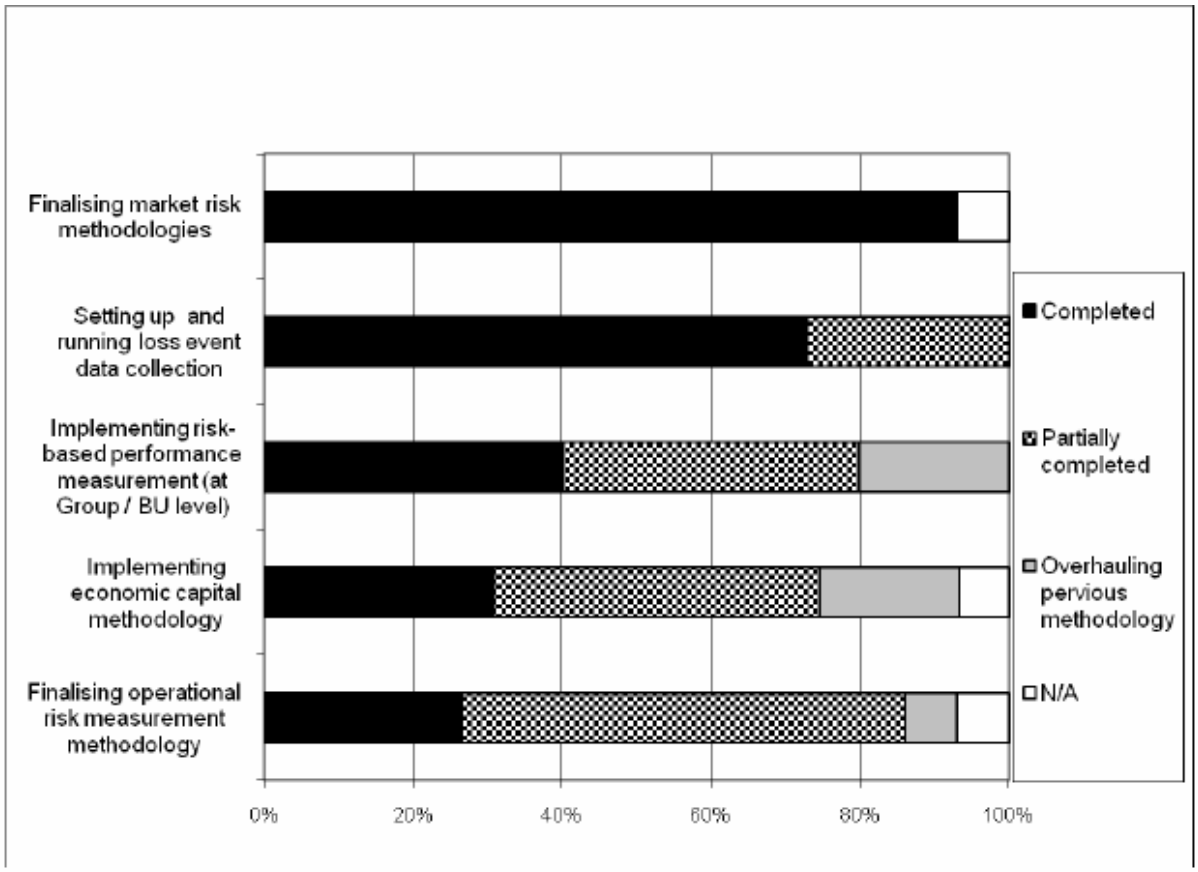

Figure 4-3 Modelling risk, operational risk and risk-adjusted business performance

Market risk was the domain of the completed measurement projects; all respondents agreed that such risks were manageable by analytic models and reported that, where applicable, such models had been completed and were running smoothly. Operational risk measurement proved to be a more difficult area. Interestingly, while half of the respondents agreed that quantitative risk modelling was essential to the control of operational risks, the rest believed that risk quantification was not the answer here. Moreover, a quarter of the responding CRO's believed that regulatory compliance was the main reason to perform risk quantification in the operational risk area. Unsurprisingly, less than one-third of the surveyed banks said they had completed their operational risk measurement initiatives. However, in line with the Basel II regulatory requirements, most respondents had successfully set up their loss-event data- collection systems and processes (over 70 per cent).

Finally, most banks launched a series of risk-modelling projects to gather the aggregate risk content and the risk-adjusted performance of their business units and the entire

organization. However, only a third of the respondents had completed a formal measurement infrastructure (30 per cent had completed economic capital models for the assessment of risk profiles and 40 per cent ran risk-based performance measures as part of their regular business appraisals).

The strategic involvement of CRO's were questioned by noting if they were actively engaged in risk anticipation, had a formal process in place for due diligence during mergers and acquisitions, and were frequently involved in internal consulting and board-level strategic decision making. Among 15, 8 CRO's reported directly to the CEO and/or had access to the ears of the board and the chairman. They were actively involved in planning and executing important strategic moves.

In order to determine CRO's strategic involvement conditional on the high modelling propensity and analytical capabilities of the risk function modelling propensity was assessed as the weighted number of completed projects (each 'completed' project was weighed by 1) and project overhauls. (Each model overhaul was weighed by 0.5) in relation to the risk management modelling initiatives discussed previously.

Figure 4.4 suggests that the necessity of this condition is not clear since four CRO's reporting high strategic involvement did not depend on the completeness of the surveyed risk models; neither did they rely on the integration of risk-based performance measures into the performance management infrastructure.

The quadrants in Figure 4.4 correspond to the four types of risk management functions discussed previously.

The CRO's in Quadrant I and II have seem to complete their risk- based performance measurement whereas Quadrant II CRO's strategic involvement was comparatively low and not sufficient to perform the strategic-controller function like Quadrant I CRO's.
Quadrant III is composed of banks of which the main focus of their risk function was to put in place an adequate compliance infrastructure demonstrating the compliance champion role.

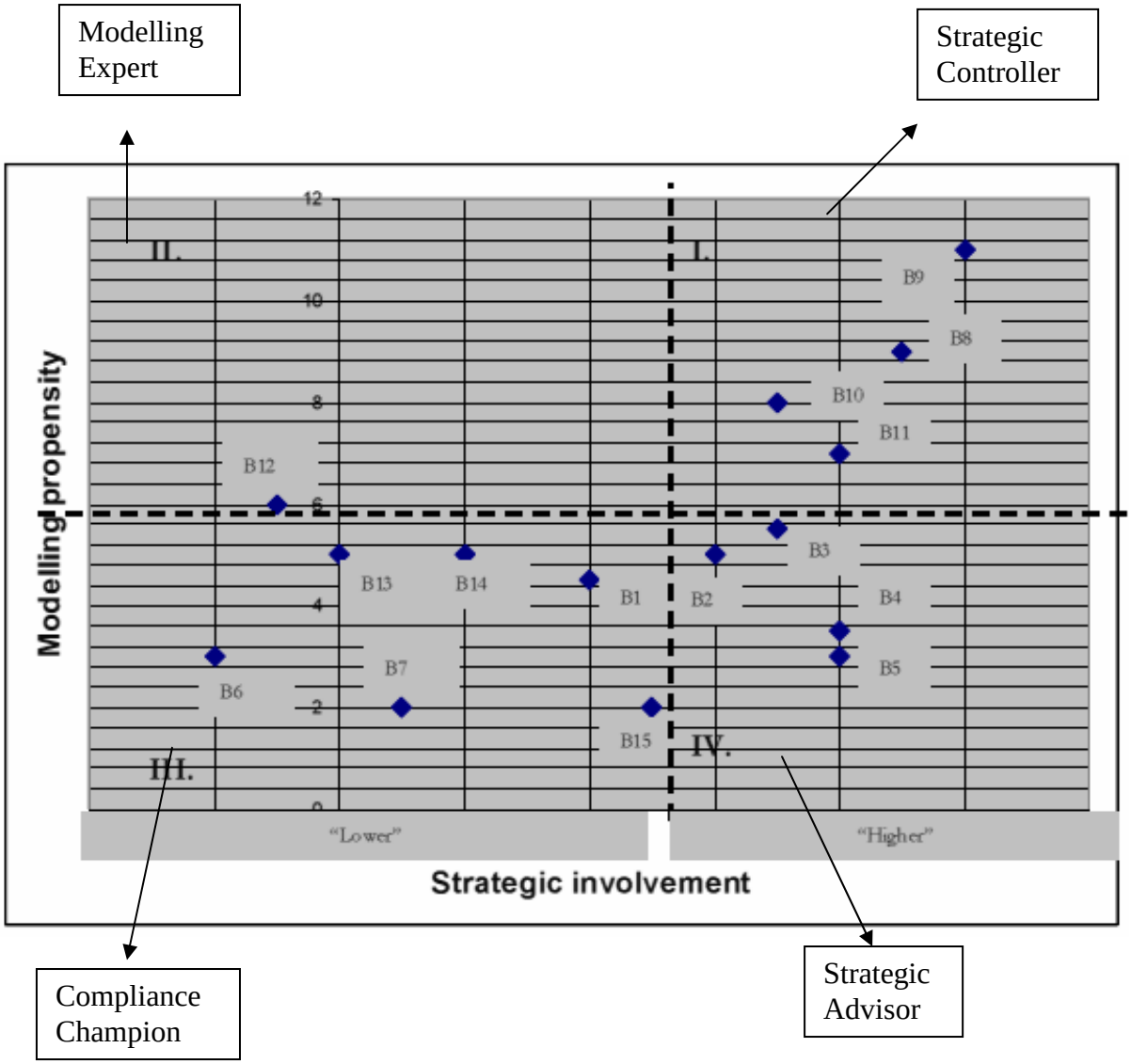

Figure 4-4 The strategic involvement of the CRO and the modelling propensity of their risk function

The CRO's in Quadrant IV (banks 2-5) realized the role of the strategic advisor. They all felt part of the top team and were influential in all major board-level decisions affecting their banks. They were highly sensitive to the existence of non-quantifiable risks. They brought to the top table extensive compliance experience and their long institutional memories knowledge of issues that can address what can go wrong in the business and in the sphere of compliance.

In this study two types of calculative cultures have emerged in the risk management field:

Quantitative enthusiasm: Quantitative enthusiasts aim to replace judgmental risk assessments with risk quantification. They believe that risk measures are capable of reflecting the underlying economic reality reliably enough to induce requisite economic behaviours. They also seek to extend risk modelling if complemented with qualitative methods, to strategic and operational risk issues.

Quantitative skepticism: Adherents turn to risk modelling with caution and are wary of managing risks by numbers. Quantitative skeptics regard risk measurements as trend indicators and they see little benefit in applying risk models in the areas of operational and strategic risks.

Both calculative cultures in risk management presuppose the existence of risk modelling; indeed, the development of analytical models is at the heart of the risk management industry. The difference lies in the way risk managers use risk models and make them count in business decisions.

The present study allows us to compare the fundamental attitudes, notions and methodological judgments that CRO's bring to the management and modelling of risk. The CRO's appeared to cluster in two sub-groups: Among the fifteen respondents who undertook the attitude survey and discussions, eight appeared to be proponents of quantitative enthusiasm, and the other seven displayed views more consistent with quantitative skepticism.

CRO's tend to agree on certain issues. In the case of consumer-credit modelling, for example, most risk officers tend towards quantitative enthusiasm. However, there are 'grey area' risk decisions. CRO's held particularly contrasting views on the applicability of models to operational and strategic risks. In line with quantitative enthusiasm, half of them agreed that risk modelling can usefully be extended to strategic and operational risk issues, albeit complemented with qualitative methods. However, the other half of the respondents declared that risk modelling in these areas was simply 'not helpful'.

In order to decide whether personal beliefs about the manageability of risks in fact relate to the risk modelling propensity of the function, several questions were asked regarding their beliefs in risk modelling. It is found out that the group of quantitative skeptics indeed

displayed a lower modelling propensity whereas the group of quantitative enthusiasts split into two sub-groups; first engaged with high risk quantification than the second group.

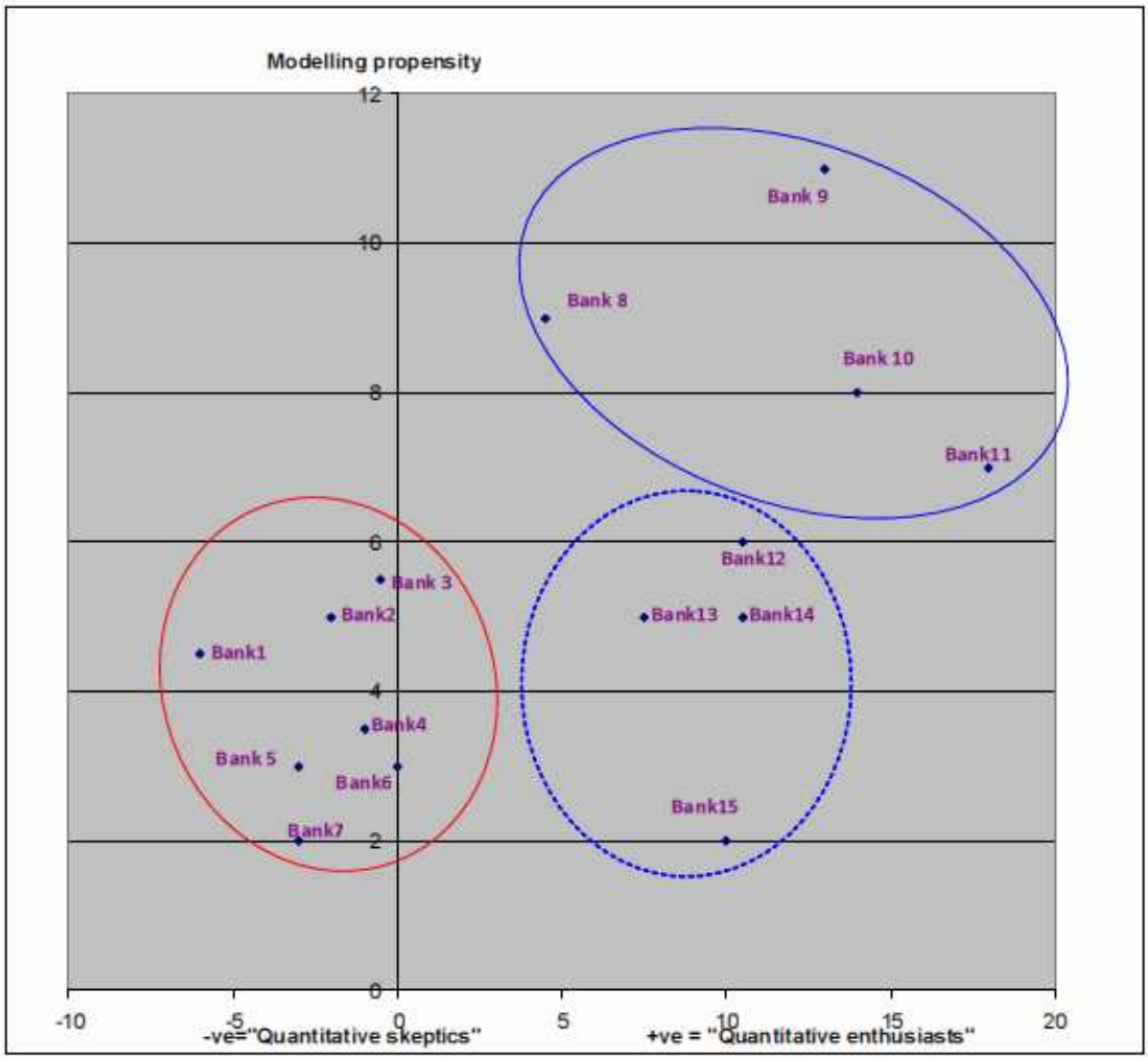

Figure 4-5 Calculative cultures and modelling propensity

The apparent divergence of CRO's views on risk management approaches shows the risk profession at a crossroads. Also we have to keep in mind that regulatory force can drive the eventual convergence of approaches in the risk-modelling domain in the near future.

Noticeably, the very nature of a bank's business portfolio guides these approaches. The CRO's with the strongest quantitative enthusiasm come from banks with significant investment-banking operations. Investment banks were the first to adopt risk analytics for

the treatment of market risk (value-at-risk) and continued to refine and extend the methodology for other risk types throughout the 1990s. Their exposure to quantifiable market risk and the need to gain an aggregate view of their risk portfolios made them particularly open to advances in risk measurement and modelling. Thus, in several large banking groups it was the investment-banking operation that took responsibility for the development of the enterprise-wide risk management framework. Introduced by CRO's and senior risk officers coming from an investment-banking background, these group risk functions became champions of quantitative enthusiasm and spread advanced modelling methodologies to other areas of risk control.

Risk management is becoming increasingly model-driven in retail banking as well. Banks are implementing modelling tools to automate such lending decisions, particularly in largely homogeneous retail portfolios (e.g., credit cards), where a long history of data is available. However, unlike the value-at-risk methodology used in investment banks, retail credit-risk methodologies may not be applicable to the other risk areas. In particular, while some quantitative enthusiasts maintained that sophisticated credit-risk models are capable of adequately pricing the risk of commercial loans to corporations, others fervently disagreed.

In particular, large lending requests in corporate banking remain associated with case-by-case, judgmental decisions about the risk and return characteristics of the deals. The chief credit officer of a universal lending bank warned: 'The real danger of using models is that, in certain circumstances, it actually encourages people not to look at the case financials closely.' Thus, there is a rather strong case for a certain group of banks to maintain their skepticism toward risk modelling. These banks tend to manage more traditional banking lines (where investment banking is not a strong element in the mix) and rely less on risk modelling, drawing more on case-by-case judgments and the guidance of experienced senior decision-makers.

In investment banks and large retail-focused banks, quantitative enthusiasm tends to have a strong following. Many of these banks had started to change authority structures in the lending process, allowing an increasing number of decisions to take place based on model responses, with little oversight from humans. Overall, different calculative cultures foster

different degree of reliance on risk models, varying the application of these across institutions, business lines and decision situations.

Given the different CRO attitudes to risk modelling, one expects variations in the degree of strategic-level involvement of CRO's.

As illustrated by Figure 4.6, the findings suggest that there are strategically highly involved CRO's emerging in both camps.

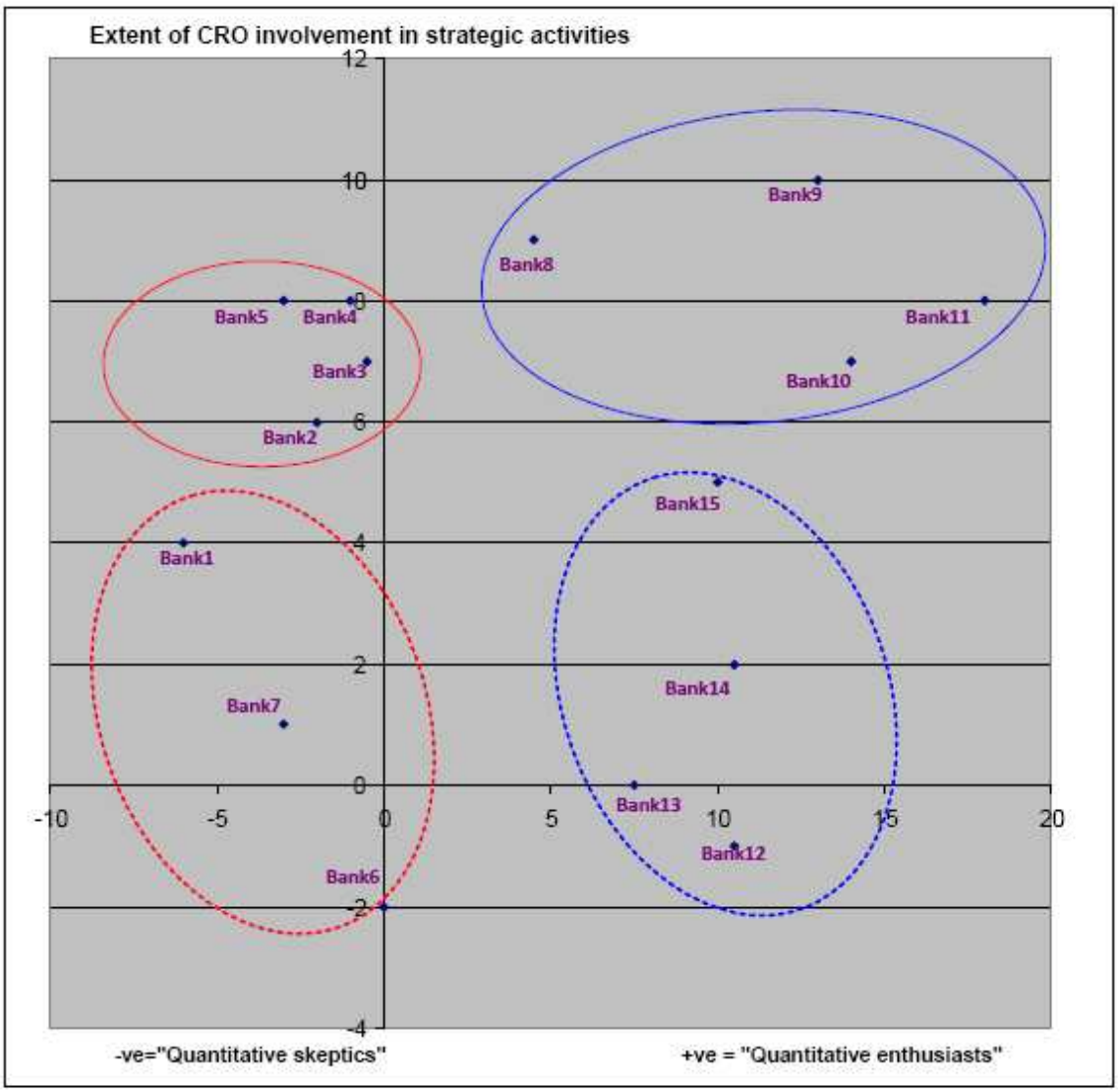

Figure 4-6 Calculative cultures and CRO involvement in strategic activities

The CRO's who reported the highest strategic involvement among the quantitative skeptics (in banks 2-5) turned out to be those previously identified as the strategic advisors. Models played a role in their judgment but did not drive it.

Among the quantitative enthusiasts, the CRO's who reached the strategic levels of their organization (in banks 8-11) were the same as the previously identified strategic controllers. These CRO's had secured a seat at the top table and an important say in high-level performance discussions; they thus enacted the role of the strategic controller.

A common structural decision made by strategically highly involved CRO's was to delegate the oversight of routine, measurement-and-reporting activities to another high-level risk officer (e.g., the Group Head of Risk-management Architecture). The role-split enabled the CRO to devote more time to board-level strategic discussions and to become more externally oriented, gaining parity with executive-level peers. Two-thirds of these CRO's reported directly to the CEO, suggesting that the reporting line, to some degree, reflects the executive support and strategic involvement granted to the CRO.

In the study it was determined that senior risk officers, no matter what particular calculative culture they foster, are trying to balance three conflicting objectives in risk modelling: (1) cost reduction by automating decision making; (2) retaining deal and model familiarity to inform expert judgment; and (3) achieving an aggregate view of risks. Striking the right balances in this ''trade-off triangle' (see Figure 4.7, below) remains a challenge for all CRO's, as their choices must be congruent with their organizations' decision-making, risk-taking and modelling cultures. It also requires a differentiated approach across various business lines and risk areas.

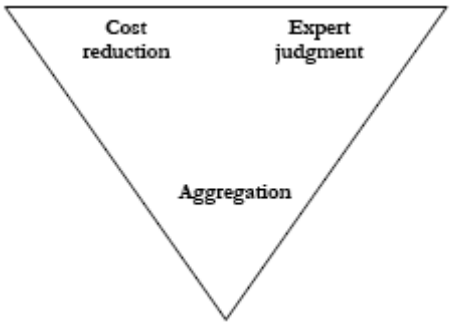

Figure 4-7 Trade-off triangle

The findings suggest that the role of chief risk officers (CRO's) had expanded dramatically. However, various compliance and risk-modeling initiatives was still works-in-progress in the majority of these banks at the onset of the market turmoil. CRO's voiced divergent views on the uses, benefits and limitations of risk models, suggesting that they promoted different calculative cultures.

These differences in calculative cultures suggest that they interpret and realize the business partner role (as defined in COSO) of their function differently.

On one side there is one group of CRO's who were committed to extensive risk-modelling and fostered a culture in which risk models were regarded as robust and very relevant tools in decision making (quantitative enthusiasm) and on the other side another group of CRO's took a more cautious view, emphasizing that risk models are useful tools for managing a narrower set of risks, and fostered a culture in which the judgment of veteran experts was called upon in a wide array of risk decisions (quantitative skepticism).

The achievements of these roles in banks seem to call for a clarification of stakeholder expectations on risk management. This would reduce the danger of an expectations gap opening around particular risk management approaches that are adequate for certain banks but ill-suited for others.

So we see that there is no unity between CRO's in the beginning of the credit crunch.

5. WAS IT A FAILURE OF RISK MANAGERS

Having seen the reasons behind this crisis we can now come to evaluate the risk managers' performances. In order to make an objective ground I will lay down both the positive and negative sides which I have found out during my study.

5.1 On the Negative Side

a) Some of the Early Warning signs Ignored by Risk Managers

After all everyone now can easily see the early warning signs but it was important to see it beforehand. Here I will lay down some of the early signs before the crisis has taken place.

Housing Market Correction

According to Schiller's study (2005), taking 1890 home price index as 100 for the starting point with more than 100 years of data it is obviously seen for many years real home price index which is adjusted by consumer price index have stayed around 100 whereas with the housing bubble have increased abnormally giving way to a big crisis. Starting from 2000 it almost doubled in year 2006.

Table 5-1 Real Home Price Index

Year	Real Home Price Index	Real Building Cost Index	U.S. Population Millions	Long Rate
1996	109,92	77,89	269,71	5,65
1997	109,64	79,39	272,96	6,58
1998	113,07	78,79	276,15	5,54
1999	119,48	78,98	279,33	4,72
2000	126,30	78,72	282,43	6,66
2001	133,04	76,64	285,36	5,16
2002	142,05	76,81	288,24	5,04
2003	153,10	76,34	291,09	4,05
2004	168,37	80,77	293,71	4,15
2005	189,15	85,39	296,60	4,22
2006	202,82	82,73	299,50	4,42
2007	195,89	81,82	300,80	4,76

A risk manager should have been well aware of boom and bust cycles and take these into consideration during construction of their models. In history there always ups and downs in the economic cycles and should be prepared for it.

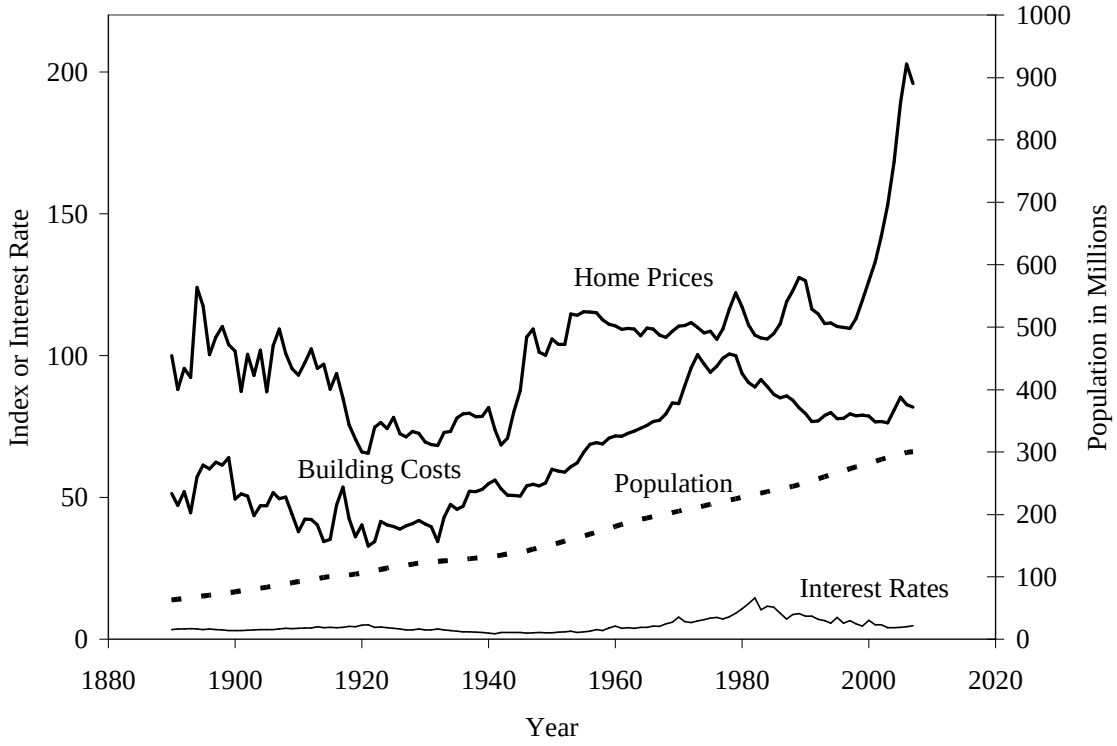

Figure 5-1 Housing market correction

Ted spread

TED spread is calculated as the difference between the three-month T-bill interest rate and three-month LIBOR.

The TED spread is an indicator of perceived credit risk in the general economy. This is because T-bills are considered risk-free while LIBOR reflects the credit risk of lending to commercial banks. When the TED spread increases, which is a sign that lenders believe the risk of default on interbank loans (also known as counterparty risk) is increasing. Interbank lenders therefore demand a higher rate of interest, or accept lower returns on safe investments such as T-bills. When the risk of bank defaults is considered to be decreasing, the TED spread decreases.

The long term average of the TED has been 30 basis points with a maximum of 50 bps.

During 2007, the sub-prime mortgage crisis ballooned the TED spread to a region of 150-200 bps. On September 17, 2008, the record set after the Black Monday crash of 1987 was broken as the TED spread exceeded 300 bps. Some higher readings for the spread were due to inability to obtain accurate LIBOR rates in the absence of a liquid unsecured lending market. On October 10, 2008, the TED spread reached another new high of 465 basis points.

But as can be seen in the following figure, the spread had been rising since mid-2007 while staying at above average levels since than. This was a serious warning for the markets. Risk managers should have paid attention to this increase in credit risk perceived in the market.

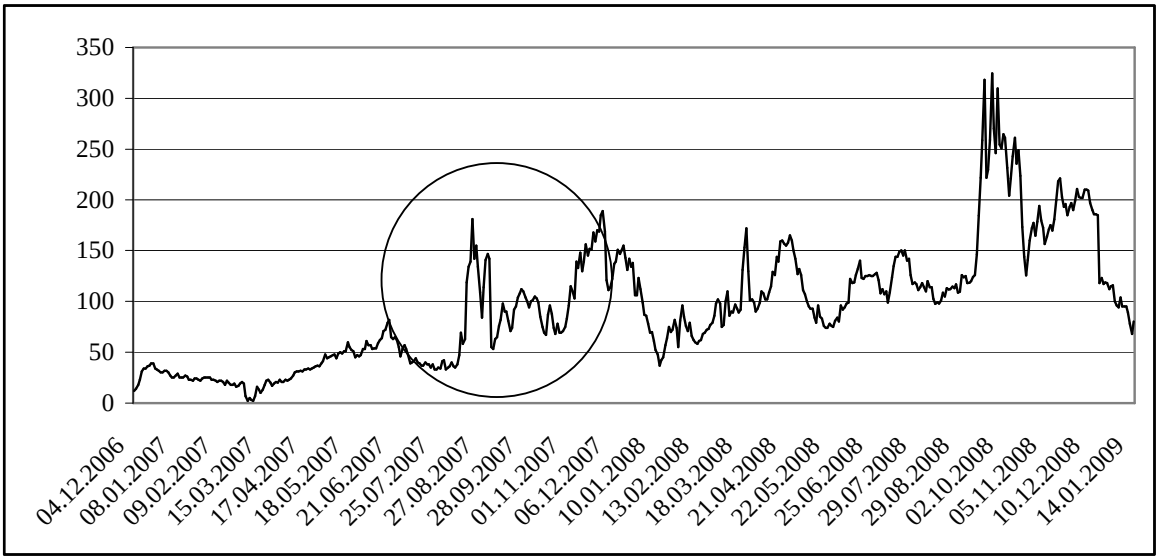

Figure 5-2 Ted Spread

No crisis comes (Neil, 2008) completely out of the blue; there are always clues and advance warnings if you can only interpret them correctly. It was the hiccup in the structured-credit market in May 2005 which gave the strongest indication of what was to come. In that month bonds of General Motors were marked down by the rating agencies from investment grade to non-investment grade, or "junk". Because the American

carmaker's bonds were widely held in structured-credit portfolios, the downgrades caused a big dislocation in the market.

In May 2005 AAA tranches went down in price and non-investment-grade tranches went up, resulting in losses as the positions were marked to market.

This was entirely counter-intuitive. Explanations of why this had happened were confusing and focused on complicated cross-correlations between tranches. In essence it turned out that there had been a short squeeze in non-investment-grade tranches, driving their prices up, and a general selling of all more senior structured tranches, even the very best AAA ones.

That mini-liquidity crisis was to be replayed on a very big scale in the summer of 2007. But risk managers had failed to draw the correct conclusions. They should have insisted that all structured tranches, not just the non-investment-grade ones, be sold.

As a result;

Failing to ignore these first and also some other signs, at last bubble bursts, housing prices start to fall, sales volumes sharply reduced. There were also the domino effects: Downgrades of assets and institutions ratings, Lehman Brothers bankruptcy, Hedge Funds failures, and government interventions to economy and bailouts to institutions which have potential systemic risks. (Too big to fail companies)

And finally On December 1, the National Bureau of Economic Research officially declared that the U.S. economy had entered recession in December, 2007.

The Labor Department said that the US lost 533,000 jobs in November, 2008, the biggest monthly loss since 1974. This raised the unemployment rate from 6.5% to 6.7%.

b) Omitted the warning speeches

Warning speeches which I have given already were clearly showing that there were worries about the ongoing mortgage business, cds market and hedge funds. With a good

understanding of these risk factors it could have helped to warn the senior management timely to leave the business or to strengthen the capital levels in order to survive through bust cycles.

c) Lack of a macro view of the general economy

According to my point of view which I will also mention later, risk managers must have a good understanding of the macro economy, not only concerning their business but to see the big picture like we face now. I don't say they do not understand it at all but it is obvious that they did not put these assumptions into their stress tests or scenario analysis which reflects sudden downturns in economy because otherwise they would not have held such huge positions in prime and sub-prime mortgages.

d) Did not learn from history

Everybody and especially risk managers must have a good knowledge of the history especially the previous crisis with all their details. The reason is that without knowing the breakdowns in the economy, its signals, its effects and the economic cycle, nobody can really create a good crisis scenario which has to be done on a continuous basis by risk managers on a firm wide basis. With the help of understanding history, risk managers should have been aware of the bubbles like 1997 Asian crisis and other as well. Than they would have known about bubbles and would have known that boom market will not go on forever and they should have warned the senior management when the time had come.

e) Lack of stress tests (covering correlations)

Stress test is one of the important milestones in risk management. After LTCM going bankruptcy it has been a major tool to for risk managers besides their ordinary Var estimates. Also in LTCM case it was seen that VAR is not a good measure during times of stress. Var measures are good estimates in normal times but during crisis it fails to capture jump processes, breaking correlations. The only available tool to manage Var's short coming is the establishment of a good scenario analysis. Then risk managers will be aware of the weaknesses and vulnerabilities they are exposed to.

Besides these new instruments did not have a long history data to use. Risk managers must have been aware of these and have made some assumptions about possible downturns in the economy.

In a recent interview with a risk manager (Neil, 2008) they did not believe that AAA assets could fall by more than 1% in price. A %20 drop on assets with virtually no default risk seemed unbelievable, though this eventually occurred.

They also failed to model correlations between these derivative instruments.

f) Too much reliance on models

A recent survey (Mikes, 2008) has shown that especially investment banks and also some other types of commercial banks were relying too much on model outputs. But relying so much on models for these types of instruments which especially were lacking historical data was too dangerous.

In a recent article (Lohr, 2008) for today's economic turmoil financial engineering is to be accused which is a blend of mathematics, statistics and computing. Its practitioners devised not only the exotic, mortgage-backed securities that proved so troublesome, but also the mathematical models of risk that suggested these securities were safe.

The models, according to finance experts and economists, did fail to keep pace with the explosive growth in complex securities, the resulting intricate web of risk and the dimensions of the danger.

In the same article Andrew W. Lo, an economist and professor of finance at the Sloan School of Management of the Massachusetts Institute of Technology said that "Innovation can be a dangerous game," "The technology got ahead of our ability to use it in responsible ways."

Also it is mentioned that math, statistics and computer modeling seemed also to fell short in calibrating the lending risk on individual mortgage loans. In recent years, the securitization of the mortgage market, with loans sold off and mixed into large pools of

mortgage securities, has prompted lenders to move increasingly to automated underwriting systems, relying mainly on computerized credit-scoring models instead of human judgment and ‘’The danger is that the modeling have become too mechanical.”

A recent paper by four Federal Reserve economists, “Making Sense of the Sub-prime Crisis,” found another cause. They surveyed the published research reports by Wall Street analysts and economists, and asked why the Wall Street experts failed to foresee the surge in sub-prime foreclosures in 2007 and 2008. The Fed economists concluded that the risk models used by Wall Street analysts correctly predicted that a drop in real estate prices of 10 or 20 percent would imperil the market for sub-prime mortgage-backed securities. But the analysts themselves assigned a very low probability to that happening.

The miss by Wall Street analysts shows how models can be precise out to several decimal places, and yet be totally off base. The analysts, according to the Fed paper, doggedly clung to the optimists’ mantra that nominal housing prices in the United States had not declined in decades — even though house prices did fall nationally, adjusted for inflation, in the 1970s, and there are many sizable regional declines over the years.

The Wall Street models, said Paul S. Willen, an economist at the Federal Reserve in Boston, included a lot of wishful thinking about house prices. But, he added, it is also true that asset price trends are difficult to predict. “The price of an asset, like a house or a stock, reflects not only your beliefs about the future, but you’re also betting on other people’s beliefs,” he observed. “It’s these hierarchies of beliefs — these behavioral factors — that are so hard to model.”

Indeed, the behavioral uncertainty added to the escalating complexity of financial markets help explain the failure in risk management. The quantitative models typically have their origins in academia and often the physical sciences. In academia, the focus is on problems that can be solved, proved and published — not messy, intractable challenges. In science, the models derive from particle flows in a liquid or a gas, which conform to the neat, crisp laws of physics.

Not so in financial modeling. Emanuel Derman is a physicist who became a managing director at Goldman Sachs, a quant whose name is on a few financial models and author of

"My Life as a Quant — Reflections on Physics and Finance" (Wiley, 2004). In a paper that will be published next year in a professional journal, Mr. Derman writes, "To confuse the model with the world is to embrace a future disaster driven by the belief that humans obey mathematical rules."
The focus of both internal risk managers and supervisors has tended very much to outputs of calculations, rather than on taking a step back to look at where they were going.

I think people have been overwhelmed with a model building imperative and inevitably that can crowd out the step back and think about it component of risk management which is a very important part of any proper risk framework.

Rather than to use it like a tool, taking the outcomes for business decisions have shown that was a very big mistake.

g) Models Failed to Capture Risks Associated with Crisis

Existing risk models are generally not designed to capture risks associated with crises and to help firms manage them. These models use historical data and are most precise for short horizons – like days. With short horizons, crises are extremely rare events. Yet, when we consider years, crises are not extremely rare events. Months and years are a better horizon to evaluate risk when it comes to crises for at least two reasons. First, as evidenced since the summer of 2007, crises involve a dramatic withdrawal of liquidity from the markets. The withdrawal of liquidity means that firms are stuck with positions that they never expected to hold for a long time because price pressure costs involved in trading out of these positions are extremely high. Positions whose risk was evaluated over one day because the firm thought it could trade out of these positions suddenly became positions that had to be held for weeks or months. Second, during crisis periods, firms will make multiple losses that exceed their daily VaR's and these losses can be large enough to substantially weaken them. As a result, risk measures have to consider the distribution of large losses over time rather than over one day.

Crises involve complicated interactions across risks and across institutions. Statistical risk models typically take returns to be exogenous to the firm and ignore risk concentrations across institutions. Such an approach is appropriate for many institutions, but it is

insufficient for institutions that, for whatever reasons, are important in specific markets and whose actions affect security prices. For instance, it is well-known that LTCM had extremely large positions in the index option market where it was short. During the crisis, it had little ability to change these positions because it was so large in that market.
Typical risk management models would not account for the fact that if the institution is large in a market, its losses can lead to more losses. As a firm makes a loss, it may drag down prices for other institutions and make funding more costly across institutions, which can have feedback effects for the institution. Ignoring these potential feedback effects may lead to an understatement of the risk of positions in the event of a crisis.

There is little hope for statistical risk models relying on historical data to capture such complicated situations.

h) Improper Model Assumptions

In a recent study (Rajan, Seru & Vig, October 2008) it was discovered that credit score which was used for sub-prime mortgage ratings was designed to measure the probability of a negative credit event only over a two-year horizon. Holloway, MacDonald and Straka (1993) have show that the ability FICO scores observed at loan origination to predict mortgage defaults falls by about 25 percent once one moves to a three-to-five year performance window. Mortgage lenders should be interested in credit risk over a much longer period of time.

Also there was an increase in the proportion of loans with low (i.e., limited or no) documentation, from about 25% in 1997 to about 45% in 2006, which is consistent with a worsening quality of loans over time with increasing volume of subprime mortgages.

On the credit derivative side modeling due to the fact that most of the credit derivatives deal with low credit risk profiles of their entities extraordinary default events have been neglected. One possible way to extend the model is to implement jump arguments. (Broll, Gilroy & Lukas, 2005)

Table 5-2 Sample Characteristics

Year	Number of Loans	% Low Documentation
1997	24,067	24.9%
1998	60,094	23.0%
1999	104,847	19.2%
2000	116,778	23.5%
2001	136,483	26.0%
2002	162,501	32.8%
2003	318,866	38.9%
2004	610,753	40.8%
2005	793,725	43.4%
2006	614,820	44.0%

i) Too involved in the implementation of Basel II

Risk Management has gained more importance than ever after the issuance of Basel II/CRD Directive. Now the most important ratio was under their control and supervision. The new capital adequacy calculation was challenging from many aspects. It was leaving the control of your assets, riskiness and leverage to the Bank's internal calculation which has increased the playground of banks. But in order to get the benefits you must validate that your calculations by the local authorities which at the end could get you extra advantage. Basel II gave way to increase the Bank's leverage by holding investment grade assets in your balance sheet and making securitizations at the same time increasing your capital adequacy ratio.

So the banking industry was overwhelmed and immediately started to prepare their advanced measurement calculations in order to validate and use them. Huge amounts of money were spent and banks were becoming more confident in their model outputs as the time passes.

This caused risk managers to be seen as Basel II implementers in most of the Banks forgetting their real existence reason which is to protect the shareholders interest in every way. This has weakened their status in the bank.

The banking industry's love affair with quants and models didn't come from nowhere-and for many observers the blame lies partly with Basel II. The new framework calls for

regulatory capital to be set aside for market, credit and operational risk, three apparently distinct risk types. The rules encourage banks to calculate their exposure to each of these risks in a certain way, with the possibility of capital relief acting as an incentive to develop discrete internal models. No-one should be surprised if banks failed to cope with a crisis in which market and credit risks overlapped with and reinforced liquidity and funding risks, argue some- they were busy implementing their capital calculation systems.

In fact Basel II is a gathering of the best practices of the member banks. It was a very good opportunity for them setting rules for regulatory capital regime aligned with the way banks allocated capital internally.

j) Lack of communication

Risk management is an activity undertaken to enable the firm to maximize shareholder value by taking optimal decisions across the firm. Therefore, risk management has to provide timely information to the board and top management that enables them to make decisions concerning the firm's risk and to factor the firm's risk in their decisions. In order for the board and the top management to understand the risk situation of the firm, this situation has to be communicated to them in a way that they can understand properly. If a firm has perfect risk systems, but the board and the top management cannot understand the output of these systems because the risk manager cannot communicate this output properly, the firm's systems may do more harm than good by inspiring false confidence in the performance of risk management. Even worse, information can arrive to top management too late or too distorted by intermediaries.

Communication failures seem to have played a role in the most recent crisis. For example, the UBS report to its shareholders explains that "A number of attempts were made to present Sub-prime or housing related exposures. The reports did not, however, communicate an effective message for a number of reasons, in particular because the reports were overly complex, presented outdated data or were not made available to the right audience." (p. 39). An industry commission that drew lessons from the crisis emphasized communication issues as well. It concluded that "risk monitoring and management reduces to the basis of getting the right information, at the right time, to the right people, such that those people can make the most informed judgments possible."

Finally, a report from the Senior Supervisors Group, which includes top regulators from the U.S., England, and Germany as well as other countries, also emphasized communication issues, stating for instance that “In some cases, hierarchical structures tended to serve as filters when information was sent up the management chain, leading to delays or distortions in sharing important data with senior management.”

On the other side: In most banks in order to develop complex models many quants were hired from universities which were lacking business knowledge at the very first place. They knew the assumptions underlying the models and their limits.
One of the most important things in an organization is communication of data to senior managers at the right time.

In a recent interview (Lohr, 2008) it was said that the larger failure was human- in how the risk models were applied, understood and managed.

Some respected quantitative finance analysts, or quants, as financial engineers are known, had begun pointing to warning signs years ago. But while markets were booming, the incentives on Wall Street were to keep chasing profits by trading more and more sophisticated securities, piling on more debt and making larger and larger bets.

But risk managers were considered ‘’quants’’ and dismissed by senior management.

k) Left the basics (like leverage, liquidity & concentration)

Too much reliance on models and enjoying the benefits of Basel II directives, bankers had all left the ‘’Basic rules of Banking’’

Focusing too much on models and Basel II must have made the senior management so blind that they seem to have lost their common sense.

With so much complex trading instruments and complicated models it is very hard for senior managers and also board members to understand this new structured products and their calculated VaR measures and how reliable they are. Due to lack of available data and

with the wind of a good weather the models gave illusions of confidence, with low default rates and with good ratings.

Rather than giving decision-makers numbers such as Var which show how much money can be lost by a single trader, desk or portfolio at a given level of confidence, banks should have spent time looking at gross exposure numbers instead. They needed to ask what were their total exposure to US sub-prime market, and than decide whether it was a good thing for them to have such an exposure, regardless of what the models were telling them.

They also seem to forget the basic rules of banking like leverage and liquidity levels. They should have looked at the gross amount of illiquid assets in their portfolio and had to count for liquidation price estimates in case of a liquidity crunch. They should look at their own leverage levels regardless what the models or Basel II results are telling them. Besides their own leverage they should also had to look at their counterparties and even PSE's like Fannie Mae and Freddie Mac and monoline insurers as well.

Fannie Mae's total assets were 882.5 billion usd and its equity was only 44 billion usd and same way Freddie Mac's total assets were 794.4 billion usd and its equity was only 26.7 billion usd in 2007. Also Banks in Europe and investment Banks in US were over leveraged.

As of 2008, Fannie Mae and the Federal Home Loan Mortgage Corporation (Freddie Mac) owned or guaranteed about half of the U.S.'s $12 trillion mortgage market.

By this way they would be able to see the real picture of the risks they are faced to.

l) Failed to Establish Enterprise Risk Management

The Hunt Brothers silver crisis of 1979/80; the U.S. savings and loan crisis in the 1980s; the Mexican Default and the Latin American Debt Crisis starting in 1982; the failure of Continental Illinois in 1984; the Bank of New York systems failure resulting in a $24 billion overnight overdraft at the Federal Reserve Bank of New York in 1985; the Stock Market Crash of 1987; the equity market and property price collapse in Japan and the bankruptcy of Drexel Burnham in 1990; the Salomon Brothers treasury scandal in 1991;

the Metalgesellshaft heating oil trading losses in 1993; the U.S. and European bond market crashes of 1994; the Orange County derivatives losses in 1994; the Mexican devaluation of the peso and the beginning of the Tequila crisis in 1994; the Barings failure and Daiwa trading scandal in 1995; the Sumitomo copper metal trading scandal in 1996; the Asia Crisis of 1997; the Russia and Long-Term Capital Management Crises in 1998; the dramatic stock market drop in the wake of 9/11; the Enron bankruptcy in 2001; the Allied Irish Bank trading losses in 2002; the Refco bankruptcy in 2005; the rapid demise of the hedge fund Amaranth in 2006; the sub-prime, credit, liquidity, and quantitative equity crises of 2007: the litany of financial crises and economic losses caused by failed financial institutions during the last quarter century has given a major impetus to the design, development, and implementation of robust enterprise-wide risk management systems. (Kindleberger & Aliber 2005)

Of 48 senior executives from 36 major banks around the world questioned by Ernst & Young, (2008) just 14% say they have a consolidated view of risk across their organization.

Organizational silos, de-centralization of resources and decision-making, inadequate forecasting, and lack of transparent reporting were all cited as major barriers to effective enterprise-wide risk management.

The study suggests banks are attempting to tackle risk management but their efforts are flawed. A massive 86% say their banks are implementing a variety of projects designed to provide a more comprehensive approach to risk, yet only 16% said they have a well-defined, shared vision of what it would look like.

Respondents agree greater transparency, faster delivery and better synthesis of data must be top priorities and around two thirds say they are underway with the process of implementing consolidated risk reporting across their organizations. However, only nine per cent feel they have truly been able to aggregate data across the enterprise.

To develop an enterprise-wide view, 75% of respondents also say it is vital to create a risk-aware culture throughout the bank.

Bill Schlich, leader, global banking and capital markets practice, Ernst & Young, says: "In light of recent events, there was strong agreement that managing risk effectively requires both top-down oversight and bottom-up involvement from front-line risk takers."

In a recent article (Neil, 2008) a risk managers mentions about the credit and market risk management gap in a typical bank. He says that the focus of their risk management was on the loan portfolio and classic market risk. Loans were illiquid and accounted for on an accrual basis in the “banking book” rather than on a mark-to-market basis in the “trading book”. Rigorous credit analysis to ensure minimum loan-loss provisions was important. Loan risks and classic market risks were generally well understood and regularly reviewed. Equities, government bonds and foreign exchange, and their derivatives, were well managed in the trading book and monitored on a daily basis. He added that the gap in their risk management only opened up gradually over the years with the growth of traded credit products such as CDO tranches and other asset-backed securities. These sat uncomfortably between market and credit risk. The market-risk department never really took ownership of them, believing them to be primarily credit-risk instruments, and the credit-risk department thought of them as market risk as they sat in the trading book.

m) Too much reliance on rating agencies

All the financial system seemed to sit under the comfort of the Rating Agency’s evaluations believing their estimates are accurate. They paid high attention to their calculated PD’s and based their management decisions heavily on their ratings. With good ratings and thereby with low probability of default financial institutions could carry huge volumes of assets. Indeed Basel II’s credit risk approach gave way to this. All the system of Basel II was based upon credit ratings calculated either internally by banks or given by Rating agencies.

Also risk managers believed in them. they mostly paid attention to non-investment grades and generally sold them while keeping the senior tranches. By doing so they have also missed the cross correlations between tranches. Also the reputation of outside bond ratings was so high that if the risk department had ever assigned a lower rating, their judgment would have been immediately questioned. It was assumed that the rating agencies simply knew best.

On the other side rating agencies biggest revenue part had become these CDO ratings. For example for giving a rating for a 500 million usd CDO, they were earning up to 600 thousand usd. As CDO's went on growing, these had become a major revenue component of rating agencies. %51 of Fitch's revenue was due to rating process of CDO's and mortgage backed securities in 2006. So there was a conflict of interest which will prevent the objectiveness of the rating processes.

n) Did not learn from past risk management failures (LTCM) and did not implement best practices (CRMPG report)

The story of Long-Term Capital Management (LTCM) is well-known. In 1994, ex-Salomon Brothers traders and two future Nobel Prize winners started a hedge fund, the Long-Term Capital Fund. LTCM was the company that managed the fund. The fund performed superbly for most of its life: Investors earned 20% for ten months in 1994, 43% in 1995, 41% in 1996, and 17% in 1997. In August and September 1998, following the default of Russia on its ruble denominated debt, world capital markets were in crisis and the hedge fund LTCM lost most of its capital. Before its collapse, LTCM had capital close to $5 billion, assets in excess of $100 billion, and derivatives for a notional amount in excess of $1 trillion. By mid-September, LTCM's capital had fallen by more than $3.5 billion and the Federal Reserve Bank of New York coordinated a rescue by private financial institutions that injected $3.65 billion in the fund.

The near-failure of the hedge fund Long-Term Capital Management (LTCM) also led to useful lessons for the industry. The Counterparty Risk Management Policy Group (CRMPG) was established in the wake of the LTCM near-failure to strengthen practices related to the management of financial risks.

The CRMPG consists of senior-level practitioners from the financial industry, including many banks that provided funding to LTCM. The industry came under criticism for allowing LTCM to build up so much leverage. Apparently, loans to LTCM were fully collateralized as to their current, but not potential exposure. In fact, it was the fear of disruption of markets and the potential for large losses that led the New York Federal Reserve Bank to orchestrate a bailout of LTCM.

In response, the CRMPG report provides a set of recommendations, summarized as follows.

1. Information Sharing

Financial institutions should obtain more information from their counterparties, especially when significant credit exposures are involved. These include the capital condition and market risk of the counterparty.

2. Confidentiality

As some of this information is considered confidential, institutions should safeguard the use of proprietary information.

3. Leverage, Market Risk, and Liquidity

Financial risk managers should monitor the risks of large counterparties better, focusing on the interactions between leverage, liquidity, and market risk.

4. Risk Management Expertise

Financial institutions should ensure that risk managers have the appropriate level of experience and skills.

5. Liquidation-Based Estimates of Exposure

When exposures are large, information on exposures based on marked-to-market values should be supplemented by liquidation-based values. This should include current and potential exposures.

6. Stress-Testing

Institutions should stress test their market and credit exposure, taking into account the concentration risk to groups of counterparties and the risk that liquidating positions could move the markets.

7. Collateralization

Loans to highly leveraged institutions should require appropriate collateral, taking into account liquidation costs.

8. Valuation and Exposure Management

Institutions should recognize the cost of credit risk in capital charges and continuously monitor their exposures using, if possible, external valuation services.

9. Management Responsibilities

Senior management should convey clearly its tolerance for risk, expressed in terms of potential losses. The function of risk managers is then to design a reporting system that enables senior management to monitor the risk profile.

10. Large Exposure/Risk Reporting Senior management should receive regular reports on large exposures.

11.Concentration Analysis

Senior management should be informed about concentrations of market and credit risk due to positive correlations between the firm's own principal positions and counterparties positions.

12. Contextual Information

Senior management should be able to assess key assumptions behind the analysis.

In addition, the report makes a number of other recommendations related to market practices and conventions, as well as regulatory reporting. In particular, the report identifies areas for improvements in standard industry documents, which should help to ensure that netting arrangements are carried out in a timely fashion.

Perhaps the most important lesson from LTCM for brokers is the relationship between market risk and credit risk. The G-30 report recommended the establishment of market and credit risk functions, but did not discuss integration of these functions. When LTCM was about to fail, brokers realized that they had no protection for potential exposure and that many of their positions were similar to those of LTCM. Had LTCM defaulted (a credit event), brokers could have lost billions of dollars due to market risk.

The required integration of market and credit risk seems recognized in a recent survey by Capital Markets Risk Advisors, which revealed that the proportion of institutions having integrated the two functions rose from 9 percent before 1998 to 64 percent after the crisis.

The second lesson is the need for risk managers to make adjustments for large or illiquid positions. The third lesson from LTCM is that institutions should perform systematic stress tests, as VAR models based on recent history can fail to capture the extent of losses in a disrupted market. This seems obvious, as VAR only purports to give a first-order magnitude of the size of losses in a normal market environment. (Jorion, 2003, pp:569-571)

In the light of this crisis, we see that these recommendations have not been followed by market players.

o) Lack of Integrating Market and Credit Risks of their counterparties on a firm-wide basis in a short period of time

In a recent article (Davidson, 2008, pp: 59-61) it was amazing to read that one major bank was reported to have taken a week to calculate its exposure to Bear Sterns when the red alert sign began flushing. Many firms are also far from being able to complete exposure calculations overnight.

In other cases, firms are believed to be conducting dangerously few Monte Carlo simulations of their counterparty exposures, meaning they are not being able to obtain meaningful statistical results. One bank, for instance, is reported to have reduced the number of simulations below 500 as its volumes grew where as regulators and practitioners alike are beginning to coalesce at 5.000 scenarios with at least 100 time steps with 60 in the first year to measure exposure with fine granularity.

In the industry it is viewed that Monte Carlo simulation, complemented by a variety of stress scenarios, is the most appropriate methodology to accurately calculate credit exposure and understand the underlying sources of risk, especially for derivatives portfolios.

Now Counterparty Risk Management Policy Group (CRPMG) made a recommendation to banks to make accurate and detailed estimates of market and credit risk exposure data across all counterparties within a few hours. Now this seems unlikely for most of the banks and it has been told that even if banks make this their priority, it could be achieved within a three to five year timescale.

5. 2 On the Positive Side

a) Even Some Economists Failed to See

In fact even some economists had failed to see the crisis coming. Of course many people including risk managers simply knew that this boom in markets will end some day but nobody, excluding a few who realized the coming storm. Indeed nobody can really know the exact time of the crisis to happen. Even most respected economists admit that, it is still a very hard task to understand the real impact of a crisis and its domino effects before it happens although you can realize that it is coming. (Paul Krugman, Nobel award winner, US) Even Mr. Arrow who is also a Nobel award winner admits that he can not understand the fluctuations in markets and financial assets. He does not understand the fluctuations of an asset to be higher than its earnings since an asset price is an estimated average of discounted future earnings. He also don't seem to understand the fluctuations in reel economy and adds that answers to underlying causes to conjuncture movements can not be answered with the help of today's theories.

b) Fuzzy role in corporate governance

In the wake of a new regulatory period and recent market pressure in financial services, senior risk officers are under pressure to demonstrate how they are realizing the risk oversight potential of their function. As a professional group, risk managers need to accommodate the demands of various stakeholder groups: regulators, corporate executives, shareholders, debt holders and the general public.

Accountability to such diverse stakeholder groups requires that the risk function have a clear, well-defined position in the organizational governance process. Senior risk officers increasingly consider the CEO and the board to be their primary customers. It is seen in the survey that the ideas and practices of risk management, unlike those of long-established professions, have not yet codified into a unified domain. As a result, risk practitioners have a fuzzy role in corporate governance.

c) Cultural position of the risk function

Many CRO's felt there is a tension between their regulatory-compliance projects and their ultimate aim to provide enhanced risk oversight. Several of the modelling initiatives they discussed were deemed necessary for compliance but not sufficient to enable the risk function (or the business lines) to understand the true risk implications of their decisions.

Some senior risk officers had found that large compliance initiatives can backfire; they tend to produce a 'big bureaucracy that can get in the way of getting the risk job done.' Recognizing that most risk initiatives were works-in-progress and heavily 'reliant on the regulatory support', several CRO's expressed their concern about the 'cultural position' of the risk function.

Notwithstanding the authority given on CRO's by regulators, their influence on the business lines depends on another kind of authority- the quality and credibility of their insights in strategic discussions.

The response of Goldman Sachs and other firms to their experience in 1998 was to place greater reliance on stress tests and scenario analysis over longer time horizons in managing trading risks. For example, a credit spread widening scenario over a three month horizon was used to set risk limits for Goldman Sachs credit sensitive fixed income positions. The process of establishing trading limits based on stress testing credit spreads established a risk culture at Goldman Sachs that controlled its exposure to the subprime mortgage crisis in the summer of 2007. Unfortunately, such elementary risk controls were apparently not in place at Merrill Lynch, which wrote down subprime mortgages by $7.9 billion, and Citgroup, which stated in November 2007 that it might suffer a write-down for subprime losses of $12 billion. The Chairman and CEO of Merrill Lynch, Stanley ONeal resigned and was replaced by John Thain, who as the CFO at Goldman Sachs, encouraged the use of stress test limits for fixed income securities in the third quarter of 1998. The chairman of CEO of Citigroup, Charles Prince, also resigned. Nevertheless, firms continue to use VaR implemented with historical variances and covariances because of the analytical tractability of this model in aggregating risk across different types of trades; and its mechanistic appeal to regulators. (Litzenberger & Modest 2008)

d) Senior management incentives

In a study (Hodder & Jackwerth 2008) holding restricted shares and/or an employee stock option position has important implications for how our manager exercises control at the firm as well as how he manages his external wealth. When the manager has only restricted shares, there is a significant incentive problem with his seeking to reduce firm risk as much as possible. This illustrates both the importance of potential constraints on managerial control and

the role of employee stock options for inducing more willingness to undertake risky firm investments. Adding an employee stock option provides an incentive for greater risk-taking in the manager's control of firm investment positions. Absent an incentive option, he tries to indirectly reduce the risk of his overall portfolio by decreasing the firm's risk.

Perks represent a priority claim held by the managers, larger perks align their incentives more closely with these of debt holders in their choice of investment risk – with the implication that managers may skip risky but value-enhancing projects to protect their perk consumption. Better investor protection, on the other hand, lowers the optimal level of perks, causing managers to be less risk-averse and better aligned with shareholders in their investment risk choices. The basic predictions are that managers residing in better-protected investor regimes will take on more value-enhancing risks and achieve faster firm growth. (John, Litov & Yeung, 2004)

CRO's have a very hard task in the face of unfavorable incentive systems. The explicit objective of many senior risk officers is to help business line managers understand the cost of risk taking and the long-term risk-adjusted profit implications of their actions. Unfortunately, current incentive schemes tend to reward bold, short-term risk-taking and do little to discourage 'betting the enterprise with investments that have high probability of superior returns and a low probability of causing financial distress.

It is been published that 3 billion usd has been paid to 5 Wall Street banks senior managers in the last 5 years. This conflict of interest gave way the senior management the incentive to take more risk and not to give so much importance to warning signals and also their risk managers warnings.

Another article in Fortune magazine (2008) emphasizes the unbelievable amount paid to these CEO's of the most miserable institutions.
Richard Fuld, Jr., Lehman Brothers
What he makes (2007 total compensation, from regulatory filings): $40 million. Fortune recently calculated that Fuld has made $489 million over the past decade cashing in his Lehman stock.
What shareholders have lost since last summer: $26 billion (a decline of 70%)
Daniel Mudd, Fannie Mae; Richard Syron, Freddie Mac

What they make: Mudd, $11.7 million; Syron, $18.3 million
What shareholders have lost: Fannie, $52 billion (83%); Freddie, $36 billion (85%)
Kerry Killinger, Washington Mutual
What he makes: $5.2 million
What shareholders have lost: $27 billion (87%)
John Thain, Merrill Lynch
What he makes: Thain made $17.3 million last year, largely reflecting a $15 million signing bonus.
What shareholders have lost: $47 billion (66%). Bespoke Investment Group notes the company's recent market capitalization, at $25 billion, is less than the $30 billion in capital Merrill has raised.
Rick Wagoner, General Motors
What he makes: $14.4 million
What shareholders have lost: $11.5 billion (65%)
Howard Schultz, Starbucks
What he makes: $10.6 million
What shareholders have lost: $8 billion (44%)
Jeff Immelt, General Electric
What he makes: $19.6 million
What shareholders have lost: $141 billion (33%)

Linking the remuneration of risk takers to long-term, risk-adjusted performance is currently not feasible in any single bank because a deferred-bonus scheme has little attraction to those who can choose between cash offers in a competitive market for deal-origination talent.

But there is still some ground to think if the reality was so well told to them we would expect them to think differently but still senior management is also to blame.

e) Moral Hazard

In a recent study (Rajan, Seru & Vig, October 2008) the reasons for the failure of sub-prime mortgage default models was tried to be examined. The percentage of loans securitized in this market grew from about 30% in 1997 to almost 85% in 2006.

As a fact mortgage default models severely underestimated defaults in the sub-prime sector in the 2002–07 period. The analyze data on securitized sub-prime loans covered the ones issued in the period 1997–2006 and was almost covering over 90% of the sub-prime loans that were securitized.

They have found out that fundamental cause for this failure was that the models relied entirely on hard information variables and ignored changes in the incentives of lenders to collect soft information about borrowers.

Hard information covers borrowers' credit scores and loan to value ratios. A FICO score is a summary measure of the borrower's credit quality. These scores are calculated using various measures of credit history, such as types of credit in use and amount of outstanding debt, but do not include any information about a borrower's income or assets.

The loan-to-value ratio (LTV) of the loan, which measures the amount of the loan expressed as a percentage of the value of the home, also serves as a signal of borrower quality. Since the FICO score does not include information about the borrower's assets or income, the LTV ratio provides a proxy for the wealth of the borrower. Those who choose low LTV loans are likely to have greater wealth and hence are less likely to default was one of the assumptions used in this study.

Soft information includes, for example, the likelihood that the borrower's job may be terminated, or other upcoming expenses not revealed by her current credit report. It also includes information about the borrower's income or assets that is costly for investors to process. Since soft information is costly a lender chooses to bear the cost of acquiring soft information if the hard information signal is imprecise and the lender plans to keep the loan on its balance sheet. When we think of a regime in which loans are securitized; i.e., sold to an investor rather than being kept on the books of the lender. Securitization increases the distance between the originator of the loan and the party that bears the default risk inherent in the loan. Since soft information cannot be verified by an independent observer, and the price investors offer for a loan (or pool of loans) must depend only on the associated hard information. The model implies that the set of borrowers who receive loans

changes in a fundamental way across securitization regimes. This creates a moral hazard problem for the lender.

f) Risk Management Does not Prevent Losses

In his present study (Stulz, October 2008) he mentions that risk management does not prevent losses. With good risk management, large losses can occur when those making the risk-taking decisions conclude that taking large, well understood risks creates value for their organization and they decide to take the associated risks in order to get the high profit.

g) Arising conflict when there is lack of enough historical data

When there is lack of enough historical data like in sub-prime mortgage history statistical risk management techniques reaches its limits and risk management goes from science to art. Proper understanding of risks involves an assessment of the likelihood of a decrease in real estate prices and of the economic impact of such a decrease on the prices of securities. Such probability assessments have a significant element of subjectivity. Different risk managers can reach very different conclusions.

There is a fundamental problem with the performance of risk measurement when assessments become subjective. Suppose that all parties agree that an established statistical model works well. There is then little room for people to disagree. However, subjective forecasts are easily questioned. Why would a risk manager have a better understanding of the probability of a drop in real estate prices than experts in real estate? If experts in real estate conclude that a sharp drop in prices is unlikely, why would an organization then listen to a risk manager who wants to spend a large amount of money on a stress test to figure out the impact of such a large drop? As risk management moves away from established quantitative models, it becomes easily involved in conflicts. At that point, the outcome for the firm depends much more on the firm's risk appetite and on its culture than on its risk management models.

h) All Risks Can Not be Accounted For

Typically, traders have a compensation formula that involves an option payoff – they receive a significant share of the profits they generate, but they do not have to give back the losses. If only some of the risks of a trader are monitored, he can increase his expected compensation by increasing the risks that are not monitored, without suffering any of the consequences.

Accounting for all the risks in risk measurement is a difficult and costly task. Problems of aggregation were important at various stages of the sub-prime crisis as well. In particular, the management of UBS sent a report to its shareholders explaining why the bank had such large write-downs. In this report, UBS explains that "Efforts were made to capture sub-prime holdings by mid-February 2007, however, materials did not effectively include the Super Senior and Negative Basis positions." (p. 39). It is interesting to note that, according to the report, the Super Senior positions were not included because they were hedged and hence were assigned no risk by the risk models – an evaluation which was consistent with past data used by many risk managers.

The unknown risks that represent risk management failures are risks that, had the firm's managers known about them, their actions would have been different. Risk managers have to look out for unknown risks, but once everything is said and done, some risks will remain unknown. Because of this, they have to conclude that they do not capture all risks in their models and, therefore, some capital has to be made available to cope with unknown risks.

i) Quick Changing Risk Characteristics

Risk management is responsible for making sure that the firm takes the risks that it wants to take and not others. As a result, risk managers must constantly monitor the risks the firm is taking. Further, they have to hedge and mitigate known risks to meet the objectives of top management.

But as market instruments were becoming more complex everyday, the risk properties of portfolios of derivatives can change very rapidly with no trading whatsoever. This is because complex derivatives often have exposures to risk factors that are extremely sensitive to market conditions.

When the risk characteristics of securities can change very rapidly, it is challenging for risk monitors to capture these changes and for risk managers to adjust hedges appropriately. As a result, risk managers may fail to adequately measure risks or hedge risks simply because risk characteristics of securities may change too quickly to enable these managers to assess these characteristics properly or to put on correct hedges.

In large complex organizations, it is also possible for individuals to take risks that remain hidden for a while. A trader might have constructed a complicated position that only he understands. This position might be such that under some circumstances it could lead to large losses. The position might use securities that are not incorporated in the risk management systems. At all times, organizations face tradeoffs. Risk management might be structured to know everything at all times. However, if risk management were organized that way, it would prevent innovation within the firm and hamper the competitiveness of the firm. In fast moving markets, employees have to have flexibility. However, that flexibility makes it possible for unobserved pockets of risk to emerge. When these risks show themselves, it is not clear that they represent a risk management failure. Risk management could have made sure that these risks were not taken, but ex ante shareholders would have been worse off. Besides eliminating flexibility within the firm, risk monitoring is costly so that at some point, tighter risk monitoring is not efficient.

The effectiveness of risk monitoring and control depends crucially on an institution's culture and incentives. If risk is everybody's business in an organization, it is harder for pockets of risk to be left unobserved. If employees' compensation is affected by how they take risks, they will take risk more judiciously. The best risk models in a firm with poor culture and poor incentives will be much less effective than in a firm where the incentives of employees are better aligned with the risk-taking objectives of the firm.

j) Daily Var is Known to be a good estimate for Short Horizons

Value--at-risk (VaR) is currently the most popular risk metric used by global financial institutions to report their firm-wide risk exposure. (Jorion, 2007) VaR is an estimate of the loss threshold such that at a designated confidence interval, $1 - \alpha$, the probability of a loss greater than the threshold, over a specified horizon, is equal to α (e.g. 1% or 5%). There are two main alternative methods used for computing VaR: a parametric approach and a

non-parametric approach. The former is based on the estimated standard deviation of the current portfolio and a parametric assumption about the distribution generating future returns. The commonly used assumption of normality simplifies the analysis since the sum of normally distributed random variables is normal, and hence the procedure works equally well with individual securities and portfolios. However, this approach does not reflect the empirical observation that returns have fat left tails. The non-parametric approach takes the current portfolio and generates a history of what the profit and loss for this portfolio would have been over a specified past period. To compute the appropriate VaR, one then reads off the relevant percentile from the constructed hypothetical historical P&L distribution. In general, the non-parametric approach is also unable accurately to reflect fat tails because of the relatively short data histories used.

Short-run VaR measures can be low and the firm can appear to do an extremely good job with them, yet it can fail.

UBS reported in its annual report for 2006 that it never had a loss that exceeded its daily VaR. In contrast, in 2007, it reported in its annual report that it exceeded its daily VaR 29 times. The results for 2007 show that fundamental changes were taking place in the economy that made it difficult for risk managers to track risk on a daily basis. However, such a large number of VaR exceedances provide little or no information about the implication of these exceedances for the financial health of UBS. It could be that the exceedances were really small and that there were many large gains as well because volatility increased rapidly. Alternatively, there could have been very large losses and few large gains. In the former case, the firm could be ahead at the end of the year. In the latter case, it could be in serious trouble. Consequently, focusing on the daily market VaR, though intellectually satisfying for risk managers because the most up-to-date quantitative techniques can be brought to bear on the problem, can only be one part of risk management and not the one that top management should focus on. Top management has to focus on the longer-run implications of risk.

VaR does not capture catastrophic losses that have a small probability of occurring.

One reason is that one of the short coming of the VaR framework is that it does not reflect the actual magnitude of the losses in the lower tail. Expected Tail Loss (ETL) is therefore a

better measure of downside risk than VaR since it accounts for the distribution of losses in the lower tail. It measures the expected loss conditional on the loss being greater than the specified α loss-threshold. (Artzner, Delbaen, Eber & Heath, 1999) The use of ETL coupled with the assumption of normally distributed returns merely applies a multiplier to the standard deviation to generate the risk metric. Hence, its value as a risk measure hinges on the non-normality of returns and is especially beneficial in the presence of fat left hand tails.

To assess risk, firms have to look at longer horizons and have to take a comprehensive view of their risks. A one-year horizon is widely used in enterprise risk management for measures of firm-wide risk.

A high target credit rating effectively means that the firm tries to avoid default in all but the most extreme circumstances. If a firm aims for an AA credit rating, it effectively chooses a probability of default which is such that it would default less frequently than one year out of a thousand.

Crises occur much more often than that, so that the firm has to have a strategy which allows it to survive crises. Further, the probability of a crisis is difficult to estimate precisely, so that even if the estimate of the probability is very small, estimation error could be such that the true, unknown, probability is much higher. Consequently, the firm has to focus on crisis events in its risk measurement and management.

k) Predatory Trading

A large institution can be exposed to predatory trading – i.e., of trades made by others designed to exploit its problems. An example of predatory trading is a situation where traders from other institutions benefit from pushing a price down if they can because it might force a fire sale. Typical risk management models would not account for this.

l) Vanishing of Liquidity Risk Premiums

In the market's liquidity risk premiums seem to have vanished in recent years. It is an important input in pricing the financial instruments which reflect the liquidity risk of the traded or held instrument.

In a recent study, (Rephael, Kadan & Wohl, August 2008) researchers have found evidence that both the sensitivity of returns to liquidity and liquidity premia have significantly declined over the past four decades to levels that cannot be statistically distinguished from zero.

In their research they used NYSE common-stock data between 1964 and 2005. They suggested two possible explanations related to changes and innovations in financial markets in recent decades for diminishing of the liquidity premia.

For their first explanation they suggested that hedge funds investments being locked for long periods allow them to maintain relatively long investment horizons. In the presence of liquidity premia, a natural strategy for hedge funds is to short liquid stocks and long illiquid stocks, holding this position for an extended period of time. The long trading horizon enables the hedge-fund to benefit from the liquidity premium without having to liquidate the short position early.

Long-short equity-neutral trading strategies associated with liquidity hedges have become very popular in hedge-funds. Hedge funds provide liquidity to markets. They buy illiquid stocks and sell liquid stocks, and the liquidity premium shows up in the return they provide to their investors. So by this way, the huge growth of hedge funds and the high arbitrage activity of this kind are expected to diminish the liquidity premium. Put differently, higher competition in the hedge fund industry reduces profit margins in the "business" of providing liquidity to markets. Their hypothesis was that the growth of hedge funds in the past few decades has contributed to the decline in liquidity premia.

Their second explanation was that many investors have moved to investing in illiquid stocks indirectly through index funds and Exchange-Traded Funds, bypassing the high transaction costs, and prolonging the investment horizon of the marginal investor in these stocks.

So liquidity risk premium which is an important component of pricing, have seem to vanish in the market which made indifference in holding positions of liquid and illiquid position instruments.

m) Pressure on Risk Departments by Business Lines

In a recent article (Neil, August 2008) a risk manager was telling that the pressure on the risk department to keep up and approve transactions was immense. Psychology played a big part. The risk department had a separate reporting line to the board to preserve its independence. This had been reinforced by the regulators who believed it was essential for objective risk analysis and assessment. However, this separation hurt their relationship with the bankers and traders they were supposed to monitor.

In their eyes, they were not earning money for the bank. Worse, they had the power to say no and therefore prevent business from being done. Traders saw them as blockers and an obstacle to their ability to earn higher bonuses. They did not take kindly to this. Sometimes the relationship between the risk department and the business lines ended in arguments. They often had calls from their own risk managers forewarning that a senior trader was about to call to complain about a declined transaction. Most of the time the business line would simply not take no for an answer, especially if the profits were big enough. They, of course, were suspicious, because bigger margins usually meant higher risk. Criticisms that they were being “non-commercial”, “unconstructive” and “obstinate” were not uncommon. It has to be said that the risk department did not always help its cause. Their risk managers, although they had strong analytical skills, were not necessarily good communicators and salesmen. Tactfully explaining why they said no was not our forte. Traders were often irritated as much by how they were told as by what they were told.

At the root of it all, however, was—and still is—a deeply ingrained flaw in the decision-making process. In contrast to the law, where two sides make an equal-and-opposite argument that is fairly judged, in banks there is always a bias towards one side of the argument. The business line was more focused on getting a transaction approved than on identifying the risks in what it was proposing. The risk factors were a small part of the presentation and always “mitigated”. This made it hard to discourage transactions. If a risk

manager said no, he was immediately on a collision course with the business line. The risk thinking therefore leaned towards giving the benefit of the doubt to the risk-takers.

Collective common sense suffered as a result. Often in meetings, their gut reactions as risk managers were negative. But it was difficult to come up with hard-and-fast arguments for why you should decline a transaction, especially when you were sitting opposite a team that had worked for weeks on a proposal, which you had received an hour before the meeting started. In the end, with pressure for earnings and a calm market environment, they reluctantly agreed to marginal transactions.

n) Other Issues related to positive side

As a fact everything was a result of the government policies. There is also blame on regulators, deregulating the market participants causing and permitting their excessive risk taking such as banks, public sector entities, monolines and hedge funds. They also ignored huge growth in derivative markets especially in abs, cds and cdo's markets. Rating agencies also deceived investors and other counterparties affected by their conflict of interests. Senior managers' incentives also played a big part since nobody would listen to a risk manager when advising not doing business which is profitable or demand to increase equity will cost to a firm when economy is booming.

5.3 Crisis perception of Turkish financial sector

We made a survey among finance professionals in Turkey, between April and May 2009, to understand their crisis perception. We had 11 respondents all working in finance sector of which majority consists of bank employees. 2 respondents were working in finance sector other than banking. 7 respondents were senior managers.

We first asked whether risk managers in Turkey were successful in the prediction of the crisis or not. 6 of the respondents told that risk managers in Turkey have forecasted 2008 crisis, 3 of them disagreed and 2 respondents did not answer. The respondents who have answered yes have given different answers for the forecasting interval. 1 of them said it was 2006, 2 of them said 2007 and 3 of them said 2008.

So the majority of risk managers in Turkey seem to predict the coming storm. In connection with this, majority of them have told that they were not accused of anything after the crisis. Only 1 respondent said yes and told that var limits and capabilities have been questioned and also added that stress tests has gained importance. 2 respondents did not answer to this question. These answers have supported that risk managers in Turkey seem to perform well during this turmoil.

We also asked if managements view towards risk managers has changed after crisis? Again 9 of them have told that they have become more important after crisis. 1 respondent said there is no difference and 2 respondents did not answer to the same question.

Risk managers in Turkey seem to diverge from some aspects. Their answer to the question about COSO if they have been positioned according to its definition, there was not a unique answer. 4 respondents said yes while 3 of them said no. 3 respondents said partially and mentioned that they believe to be yes in the future. 1 respondent did not answer.

When we asked them to describe their position among Compliance champion, modelling expert, strategic advisor or strategic controller roles, the answers also came differently. Only 2 of them said they have positioned as a combination of all roles while 2 of them said that they are a mixture of strategic advisor and strategic controller. 3 respondents said they are positioned as modelling expert, 1 person as strategic controller, 1 as strategic advisor, 1 moving from modelling expert to strategic controller and 1 respondent did not answer. So we have observed that risk managers have been carrying different roles and these answers are also quite similar to results of the previous survey held in US.

We also asked similar questions for financial institution professionals who have executive powers other than risk managers. The answers were interestingly different. Only 2 respondents said financial institutions forecast the crisis, but 7 has answered no to this question. 2 of them said partially. Among those who said yes or partially, 3 respondents said they forecasted in 2007 and 1 said 2008 for the forecasting time.

We also asked what kind of measures they took when they realized the coming storm. Some gave general information concerning the markets like: mergers and acquisitions took place but not systematically, institutions lowered growth attempts, some took help from the

government, the other smaller firms were either acquired, merged or went bankruptcy. The other answers were concerning firms attempts to increase liquidity levels. 2 respondents said they supported liquidity and headed towards liquid assets, 2 said they recalled loans back, another 2 attendants said they reduced risky loan volume, the others said they took measures to keep asset quality or changed their position like getting rid of risky assets, collect receivables and deposit, try to take first degree collateral for loans and stopped loan disbursement, and central banks gave liquidity to the markets. Some others closed open fx position or buy cds for hedging purposes to manage asset and liability risk.

When we asked whether the measures have reached their goals 6 of them said no, 5 of them said partially. Their answers to what other measures should be taken came also different. Some answers were concerning government interventions like: Fed should have started lowering interest rates earlier, 2 respondents told that more regulation was needed to increase control for financial institutions, they had to protect market liquidity globally, some measures could have been made indirectly and without the knowledge of market players, public authorities and central banks should have intervened and guided the markets previously (systemic problem was not considered), small and medium enterprises could have been protected. Other attendants made some comments about the situation: Financial institutions in Turkey have been squeezed in foreign currency funding, keeping long foreign currency position would have helped, rather than daily or short term measures, long term positive contributing solutions would have helped, increased retail consumption appetite should have to be watched closely since their revenues might not cover their consumption and debts in the same manner, financial institutions must not be evaluated separately than global and national economy.

Then we asked the same questions to risk managers. When we asked what kind of measures risk managers proposed when they realized the crisis, the answers were similar to their previous answers. 1 attendant told that risk managers had warned senior executive managers. Concerning liquidity they proposed measures to keep asset quality, to stop loan disbursement, change position, change to floating interest rate, review loan portfolio and roll syndication loan. 3 respondents told they reduced loan portfolio and another 3 respondents said they increased their liquidity levels. They also mentioned that institutions became more conservative and tried to keep capital adequacy levels, reduced personnel, inform management and point out the most critical areas. 1 attendant mentioned central

banks regulation concerning crisis, 1 respondent gave no answer and another one said no measure was taken.

When they were asked whether these actions have reached their goals, 6 of them agreed that the measures partially reached their goals, 2 of them said yes and 1 respondent said no. 2 respondents' answers was unclear. When they were asked what other measures should be taken the answers were disbursed. Concerning government intervention, 2 attendants mentioned that small and medium enterprises should be supported and deterioration of their financials should be prevented, government had to intervene to increase employment, increasing employment levels should be considered and banking intermediary system tax discounts could have been made. Some respondents made comments rather than giving an answer like: Financial institutions must not be evaluated separately than global and national economy, risk management should have been given importance before the crisis. Other unique answers were: Loan collaterals must be strengthened, early warning models for corporations must be made. 2 respondents made no comment to this question.

When they were asked following crisis which measures were taken in their institution, 2 respondents said they made selective loan disbursement. Concerning loans the other answers were: They increased the quality of their loan portfolio, avoided risky loans, strengthened collaterals, reviewed latest ratings of loan portfolio and acted accordingly. In other institutions again liquidity was the primary concern. They gave importance to stay liquid and increased their liquidity ratio, tried to keep outstanding assets and liability structure, bought government bonds to increase liquidity and made deposit subvention. Since huge companies were in big trouble, institutions another concern was credit risk, especially counterparty side. Related to this they reduced counterparty risk, evaluated and reviewed counterparties and renewed their limits. To control market risk they limit arbitrage transactions during volatile times, decreased stop-loss limits and ignored complex derivatives. The other answers were: they tightened internal controls, took measures for cost reduction and were always cautious. 3 attendants made no comment to this question, 1 respondent told no measure has been taken in their institution, which means they acted same as before.

Their answers whether these measures were adequate were quite disbursed. 2 respondents said yes, 2 other respondents said no and another 2 respondents said they were partially adequate. The other respondents' answers were unclear.

They were asked if there were any proposals made by risk management and accepted by Board of Directors due to crisis? (Like counterparty, market & credit risk, concentration risk, limit reductions) 1 respondent said they made proposals that cover all of them, another respondent said all of these were being watched and evaluated daily with senior management. 2 respondents made proposals concerning liquidity management and 1 attendant declared that capital adequacy ratios were watched continuously. For credit risk 3 respondents proposed strengthening collaterals, others gave more importance to firm financial and cash flow analysis, foreign currency index loans concentration have been lowered, the quality of loan portfolio have been increased, risky loans have been avoided, counterparty banks are evaluated and limits have been updated. Concerning market risk, counterparty loss given defaults started to be included in market risk, counterparty, market risk and trader based risk limits have been approved and applied rapidly, complex derivatives are avoided. Another attendant said that they took measures for cost reduction. 3 respondents made no comment.
About the future of risk management profession 2 respondents said it will stay as an important proficiency. All the other respondents said that they believe it will be more important than past. 1 respondent did not answer.

The reasons behind their answers were: After new regulatory arrangements, with the formation of a firm wide risk management culture it will be not just a business of the related risk department. Following crisis it will be more effective, experiences will mature risk management and this will provide them to be an important unit in all sectors. Instead of being a strategic decision maker, they think they'll be directly representative in management level as independent and contributing. It will be more important due to understanding of risk management not just because of Basel II. While taking decisions, their opinions will be asked and if they don't approve, actions will not be taken. Risk return relation will gain more importance in management decisions. Financial engineering, modeling subjects will put considerable outputs in money and capital transfer movements. Risk management will also be important in industry sector, not only in financial

institutions, in the future. 1 respondent said they will be more important in crisis and less in boom periods which is an interesting and meaningful quote.

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6. CONCLUSION & ADVICES

In order to decide whether Risk Managers have fault in 2008 crisis or not, I focused my research on both sides. Positive sides gave us the reasons why Risk Managers can not be accused, due to internal or external reasons whereas negative sides address their weaknesses and guilt.

I have seen that although some risk managers seem to ignore the early warning signs, some others had realized the coming storm who were dismissed by senior managers, being accused by not understanding the business due to their quant profile. Some of these refusals were due to conflict of interest that arose in senior managers compensation structures which motivated them for high risk taking behavior. Some other dismissals, maybe due to communication failures is also another problem to overcome. Traders' compensations like being long in an option also increased their risk appetite.

I also gave a brief summary about a study, which covers the situation of risk managers in 15 large banks, in order to understand where the risk managers were sitting in the banks just before the crisis. Evidences have shown that there is not a unified risk management practice and their involvements in business decisions change from one institution to another. Some were acting as business advisors, participating in business decisions where as the others seem to have strategic controller, compliance oriented roles or just seen as modeling expert.

In fact in most banks risk managers were being seen as Basel II implementers which was not the only thing risk management was established for. Basel II was building silos between risks and were lacking cross correlations between them and also other types of risks like liquidity and concentration. Also Basel II structure, depending heavily on internal and external ratings also gave way to increased leverage in the industry.

This was also caused by rating agencies deceiving investors by giving high ratings to risky instruments due to their conflict of interest.

The deregulation in the market was one of the biggest causes behind this turbulence. This has motivated all the market participants towards excessive risk taking, being highly leveraged. There were no disclosure requirements for even very large hedge funds.

In fact it was a government strategy which supported all types of risky actions in order to avoid a recession like 2001. By this way they were thinking that they could handle this bubble. But it seems that after sometime they have lost the control of it. Until 2003, prices moved in line with employment, incomes and migration patterns, but then they departed from the economic fundamentals.

Market players seem to forget the basic rules of risk taking, by being so leveraged and by taking huge positions in illiquid markets. It's seen that moral hazard had risen due to securitization practices since originators of these loans were taking them out of their balance sheets. The models for sub-prime mortgages were designed to calculate for only two years of probability of default in contrast to the long nature of the loans disbursed and the calculations were done by taking hard information only. Model inputs were lacking soft information data which is so valuable especially in modelling risky type of loans. It was also discovered that as time passes by no documentation loans were growing especially in the higher risk profiles due to moral hazard associated with securitization practices.

Also there seemed to be too much reliance in model outputs. Automated loan disbursements were increasing as if the models knew everything, leaving human factor out of the process. Especially in investment banks all the risk management structure was depending heavily on model outputs as seen in a recent study.

Daily Var is known to be a good estimate for short term risks but it fails to capture risks associated with crisis. Var has many short comings and there is still a long way to establish enterprise risk management systems.

We have evidences to realize that CRPMG recommendations were still not in place. Recommendations were addressing warnings about leverage, liquidity and counterparty risk, concentration analysis, liquidation based estimates of exposure, integration of risks, proper stress testing, all of which would be helpful to prevent losses suffered during this crisis.

On the other side cultural position of the risk function is still not clear. Their duties being regulatory compliant and also providing risk oversight seem to be creating tension. Knowing all risks can not be accounted for and risk characteristics quick changing nature are also obstacles in risk management profession.

It is also impossible for a risk manager to say no in an environment which seems to be risk free and will cause traders and senior managers loose their millions of dollars bonuses.

We made a similar survey like Mikes (2008) in order to understand how the crisis was perceived by financial institutions and by risk managers in Turkey and where the risk managers are sitting in institutions. We made this survey between April and May 2009 with 11 respondents of which majority consists of bank employees. 7 respondents were senior managers.

We have seen that risk managers in Turkey have outperformed their colleagues from many aspects. Majority seems to have forecasted the 2008 crisis and warned senior management accordingly. They have given several advices to senior management which are widely accepted and put into force. Their advices were mainly addressing liquidity and credit risk. Since this was a credit crunch which was lacking liquidity and increasing credit risks, many risk managers have focused on counterparty risks. They went through their ratings and reviewed their limits. On credit risk side they reviewed the current loan portfolio and tried to increase collateral levels and generally stopped loan disbursement. They even advised to reduce risky loan volume and recalled loans back. Concerning liquidity risk, they took measures to increase their liquidity levels and headed towards liquid assets.

Their answer to the question about COSO if they have been positioned according to its definition, there was not a unique answer. When they were asked to describe their position among compliance champion, modelling expert, strategic advisor or strategic controller roles, the answers also came differently. So according to their answers we have concluded that risk managers in Turkey have different roles in different institutions just like survey held in US. (Mikes, 2008)

In the interview majority of risk managers have told that they were not accused of anything after crisis. When they were asked whether managements view towards risk managers have changed after crisis, they have told us that they have become more important since than and they also added that they believe that in the future risk management profession will be much more important than past. They think that rather than Basel II implementers they will be seen as business partners. While taking decisions, their opinions will be asked and if they don't approve, actions will not be taken.

We have seen that although there is still not a common practice between risk managers in Turkey, their advices being accepted and put into action, they seem to be much more involved in business decisions when compared with US institutions. They are not accused for anything after crisis unlike their colleagues from other countries. They have also emphasized that after crisis they have become much more important and think to be more in the future. So when compared with US risk managers in Turkey have much more to say in decision level and risk management culture seem to have been established in Turkish financial sector.

We completed the analyze of risk managers status both inside and outside Turkey. We have seen that common things have also been missing among Risk Managers in Turkey. Therefore we come to the conclusion that without establishing Enterprise Risk Management throughout the organization, risk managers not being seen as business partners but rather seen as Basel II implementers, without a common practice in the Risk Management field and de-regulation of the markets caused mainly by Government policies has all led Risk Managers failure in this crisis. So I find little evidence to accuse them for the happenings. In Turkey we have seen that they were not even accused for anything after the crisis.

I conclude that if risk managers have to be accused for not doing their job properly during 2008 crises, they should have been in a business partner position rather than an advisor or controller. By this way we would be quite sure that they did not do their job although they had the power to do it.

Advices

In order to overcome risk managements short coming issues, I want to give mine and also other people's advices addressing the vulnerabilities of which we have faced in the recent crisis. My advices consist of two parts: In the first part I will give regulatory and in the second part I will give industry side proposals.

On the regulatory side

Proper re-regulation must be in place as the first thing to be done. Nowadays all the worlds regulators have hot discussions concerning this subject. I believe that over regulation is one of the things that must be escaped from nowadays since it will prevent the market players functioning properly especially in times which we are going through. Adequate amount of measures will be more helpful according to my beliefs.

Basel II gaps have to be fulfilled. New amendments have to be made to account for liquidity, market and concentration risk. Maybe it would be better to change Basel II as a whole since it was the best practices of major banks which we have seen as not performing well in times of crisis. In the new practice I shall advice rethinking of all the system which depends heavily upon internal and external risk assessments. When ratings detoriate like we have witnessed, stress tests must be addressed to cover these by tighter scenarios. Besides results of stress tests must be limited to shareholders equity or at least must cover their depositors' money. Regulators must cross check and even investigate when different banks apply different basic parameters in their stress tests. So banks must not be left alone in their stress test calculations and outcomes should be limited to a certain level which will help to protect the rights of shareholders and depositors. This limitation will also prevent the danger of too big to fail companies which have the potential to create systematic risk to the economy.

Another problem with Basel II is that, building silos seems to be a danger which is lacking cross correlation of risks and producing huge gaps between them.

Maybe to overcome external rating problems, rating agencies must be under scrutiny with heavy and binding regulations and ceasing their conflicts of interest by not allowing them to give ratings to their clients which have proven to be subjective.

Also back to basics must be established. Apart from Basel II, Banks and other important market players must demonstrate that they have adequate level of leverage which also has to be determined and watched closely and separately by regulators.

All the conflicts of interest arising in the market must be ceased. Senior management bonuses must be tied to long term performances.

Moral hazard should be overcome in the model building perspective for securitization maybe by giving penalties due to not paying much attention to model settings.

Also disclosure requirements which will bring more transparency to the market, must be brought for market players like hedge funds and others, which have the potential to create systematic risk.

Liquidity reserves must be kept and also regulated. Mr. Gieve (2008) gives Spanish banking system as an example to protect banks from the downturns of the economic cycle.

Spanish system of dynamic provisions requires banks to build a general reserve that can be drawn on in downturns. Each period, banks are required to make general provisions equal to the difference between the "inherent" losses (based on the growth of loans and a long-term average of incurred losses) and the specific provisions on impaired assets for the period. The difference, if positive, is treated as an expense in the profit and loss account. If negative, it is treated as income – provided that the general reserve has been previously built up to the required level.

The specific provisions made by Spanish banks fluctuate substantially through the business cycle, as one would expect, falling during upswings and increasing in downturns. But the flow of general provisions moves in the opposite direction, acting as a countercyclical mechanism. In the last boom, the accumulated stock of total provisions grew steadily between 2005 and 2008, to a level which at the start of this year was twice as large as their non-performing loans. That figure has fallen sharply in recent quarters, in the face of fast-growing credit losses, but it did ensure that Spanish banks were better placed than their counterparts in other countries to absorb such losses without immediately eating into their core capital. The Bank of Spain estimates the current level of general provisions could

absorb losses associated with a doubtful assets ratio of 9% (the current level is 1.5%). The general reserve is also substantial in comparison with the tier 1 capital ratios, representing 1.3% of the risk- weighted assets.

The Spanish example demonstrates that – despite all the technical arguments there might be about the details – a mechanism with broadly the right features is practicable and can generate worthwhile additional reserves against the losses which crystallize in cyclical downturns. It does not require precise estimates of the length of the cycle, or predictions of when the cycle will turn; and it can be capped, so that the reserve does not continue to grow inexorably in an extended upswing. I think it merits serious consideration for more widespread adoption, irrespective of the accounting and tax treatment such reserves might attract.

One key feature of such reserves is that they should be useable. That is, the markets and analysts need to accept that using such reserves to absorb write-offs when losses are high is the natural counterpart of building them up when losses are cyclically low. It is not a sign of weakness or of inadequate capitalization, but of prudent management of the cyclical pattern of losses. From the point of view of market acceptability, separating cyclical reserves from more structural capital requirements seems a valuable idea.

On the industry side

There is a recent study Co Var (Brunnermeier, 2008), where the “Co” stands for co-movement, contagion or conditional. The definition of Co VaR is the VaR conditional on other institutions’ being in distress, more specifically conditional on other institutions’ return being at their VaR level. The percentage difference between the usual VaR and the Co VaR captures the degree to which a particular institution is exposed to risk spillovers from other sectors in times of stress. That is, while VaR captures the tail risk of financial institutions from a partial equilibrium point of view, Co VaR is a simple summary statistic capturing tail risk dependency, arguably a more important measure from a systemic risk point of view. In their study they argue that financial institutions should report Co VaR in addition to VaR, since such risk spillovers are important to understand for portfolio managers, risk managers, and supervisors of financial institutions. The ability to monitor

and potentially hedge risk spillovers can help to optimize portfolio performance, to set risk limits and margins, and to adequately regulate institutions.

Car (Capital at Risk) has been used by David Cowen to measure risk in his hedge funds. (Cowen & Abuaf 2009) Over his two decade trading career he has never satisfied with Var. David set out to find a simplistic method to value the maximum downside to the portfolio. In order to do this he revalue all cash and futures positions to their stop loss levels, he also adds up the total cost of all options based on if revaluation went to zero. He divides the above amount by the total capital of the portfolio. The end result is the maximum amount of loss to the portfolio, Car.

I believe that market players have to go back to basics, analyze their balance-sheet positions by type, size and complexity both before and after they hedge them. Nobody must assume that ratings are always correct and if they are, they should remember that they can change quickly.

All risk managers must study history and learn more from previous crisis and pay attention to recommendations like CRPMG. They must also have knowledge about macroeconomics in order to see the big picture. More attention must be paid to macroeconomics and must be placed in risk management models. Stress tests must be improved by taking forecasts from either internal or external economists' forecasts, since every crisis has its own nature and independent of the previous crises.

Model outputs must be seen as a tool for decision making rather than relying on them too much. Human factor must not be taken out of risk management systems. Risk managers and senior managers must be aware of the models limitations and its underlying assumptions.

Risk managers must also pay extra attention to new products which lack enough amount of historical data. They must use more of their expertise in the decision and calculation processes which is a very challenging task for a risk manager to accomplish.

Illiquid asset taking must be closely monitored and liquidity risk must be accounted in the models. Contingency planning must be in place which will help to protect the institution

from liquidity crunches and counter party failures. This involves monitoring concentration risk more closely and keeping adequate levels of collateral. Collaterals should be closely watched and proper documentation must also be monitored to prevent operational risks arising from inadequate documentation keeping, concerning collaterals and other types of receivables as well.

Enterprise risk management has to be improved in such a way that risk management must not be only the job of risk managers but it must be at the heart of the organization. The structure must be able to address the gaps between different risk classes and decision takers have to act accordingly. Integration of risks must be accomplished. So in a way data must be centralized. This will also enable to calculate aggregated counterparty risk exposures on a firm wide basis in a short period of time which is recently demanded by some of the regulators.

Maybe rather than quants, the profile of risk managers have to change in a way to increase their influence in decision making processes like being as business partners. Changing the qualifications of risk managers may also overcome communication problems arising in financial institutions.

I think there is still a long way to place risk managers in decision making processes more actively but I believe that it will be some day in the future.

‘’No problem can be solved from the same level of consciousness that created it.’’
Albert Einstein

APPENDICES

a) In Depth Interview Questions:

1) Do you think risk managers in Turkey forecast the crisis?
2) If they did, how long before did they forecast the coming crisis?
3) Were they accused of anything after crisis?
4) Did managements view towards them change after crisis? Did they become more or less important?
5) Do you think risk managers have been positioned as defined in COSO?
6) Which one best describes their positioning in their institution: Compliance champion, modelling expert, strategic advisor or strategic controller
7) Do you think financial institutions forecast the crisis?
8) If they did, how long before did they forecast the coming crisis?
9) What kind of measures did they take when they realized?
10) Did the measures reach their goals?
11) What other measures should be taken?
12) What kind of measures did risk managers propose when they realized?
13) Did the measures reach their goals?
14) What other measures should be taken?
15) Following crisis, what kind of measures has been taken in your institution?
16) Do you find the measures adequate?
17) Were there any proposals made by risk management and accepted by Board of Directors due to crisis? Can you please explain? (counterparty, market & credit risk, concentration risk, limit reductions)
18) What do you think about the future of risk management profession? Which position do you think they will be?

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