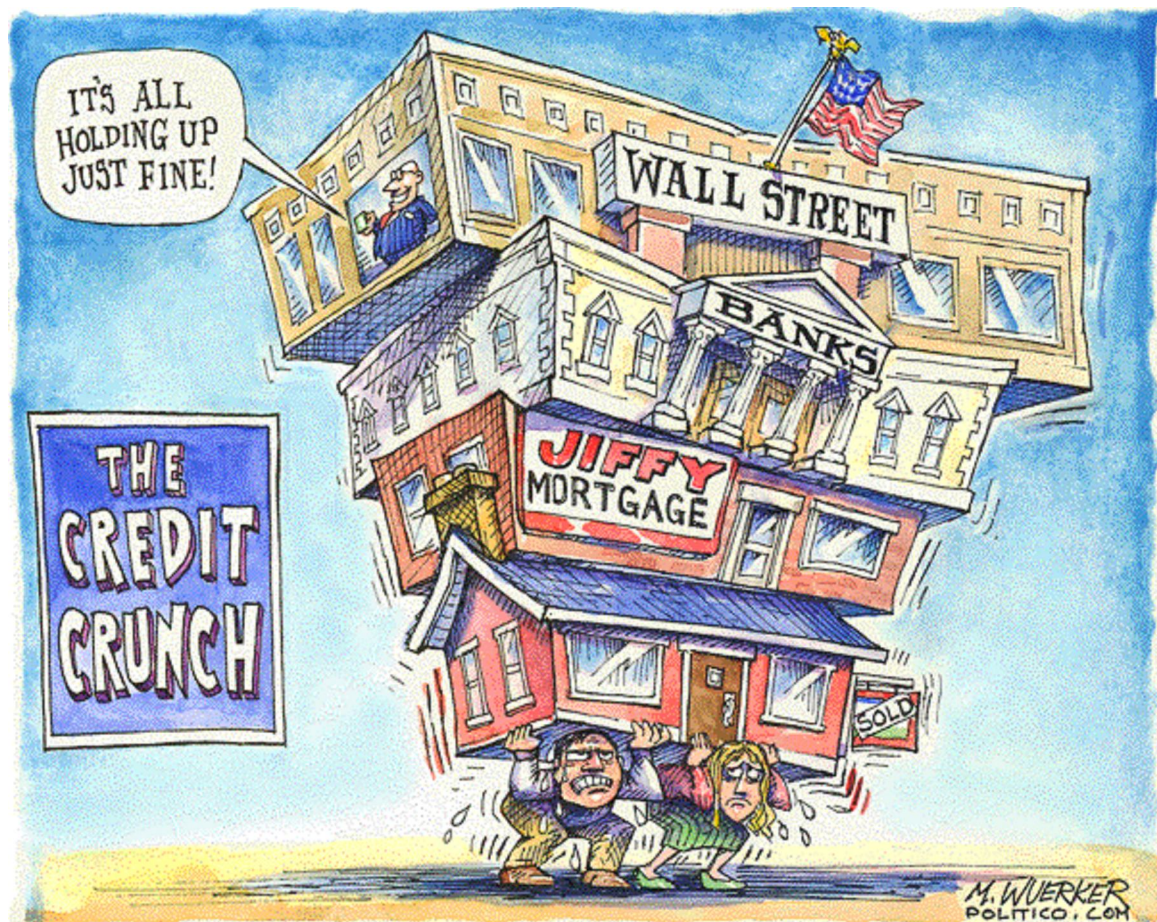


Subprime crisis: the lay-out of a puzzle

An empirical investigation into the worldwide financial consequences of the U.S. subprime crisis

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Abstract:

This paper gives an overview of the worldwide financial crisis that shook the world from 2007. It tries to capture all factors that are important in this crisis and bring them together. It starts with an analysis of the bubble in the U.S. housing market. After that the mechanics of the hedge fund market are examined. An in-depth elaboration into the mortgage-backed security-market and securitization of it is given. The riskyness of these markets is discussed as well. The last part of the theoretical framework of this paper is about the contamination of the rest of the financial world, for instance after the Lehman Brothers meltdown and the Icelandic bankruptcy. The empirical part of this investigation contains a balance sheet approach of four U.S. banks and four Dutch banks and a comparison between the theoretical part of this paper with crisis factors at three major banks. Critical success factors for the three banks are transparance at SPVs and a thorough risk management section.

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‘ *The word ‘credit’ originates from Latin. ‘Credere’ means ‘trust’.* ’

Section 1: Introduction

The financial crisis that shocked the world in 2007 and 2008 caused a lot of trouble for people in the world. Households could no longer afford their mortgages, people lost their jobs as a result of cost savings at companies. Companies suffered losses which were never seen before in the history of the economic world. Financial funds collapsed, banks defaulted as a result of a collapsing housing market and a perished confidence in the financial system. This is all the result of an exploded bubble on the United States (U.S.) housing market. Resulting from this bubble was a global economic crisis that was not be seen since 1930. Securitization of the mortgage loans at banks was the main cause for these troubles, as trust soared from the financial markets and stocks fell. This caused companies to lay-off people which deepened the crisis.

In this paper the situation from the beginning of the crisis (December 2006) until February 2009 is investigated. Despite the fact the end of the crisis was not even in sight, this timeframe is chosen due to practical reasons. Waiting with finishing this paper until the end of the crisis would mean a severe delay in the students study-process. On beforehand the recommendation can be made to other researchers to investigate the whole crisis after the end of it. Perhaps this can lead to new insights about the start and unfolding of the global problems.

In this paper the following research question is answered: *What were the causes and effects of worldwide financial crisis and which factors are critical success factors for U.S. and Dutch banks in fighting the crisis?*

The process of answering the research question is done with help of popular, non-scientific sources as well as scientific sources. Due to the topicality of this subject, fewer scientific sources were available than for a regular research. Where possible, these sources are used, but also lots of newspaper and (economic) magazine articles are quoted.

This paper starts with an elaboration on the U.S. housing market. The bubble that was formed on this market was the start of all misery. Geographical and social studies on the housing subject are used to clear things regarding the foreclosures of houses.

In section 3 the hedge funds are the main topic. The second phase of the crisis stepped in, the hedge funds played a major role in this 'globalisation of the crisis'. Some general remarks about these funds are made, and the role of the hedge funds within the crisis is discussed.

Section 4 is reserved for the mortgage-backed securities-market. Securitisation will be explained, as well as special features in this market, like collateralised debt obligations, mortgage-backed securities and asset-backed securities. Also special purpose vehicles and other financials like government sponsored enterprises are reviewed. The role of these instruments in the crisis are discussed as well.

Section 5 is all about risk. As risk is important in almost every crisis, so it is in this crisis too, the section uses studies to elaborate on the various types and the purposes of risk management. Also the Basle II-agreements are used to clarify risk management practices.

Section 6 describes the growing problems of the crisis for the US and the rest of the world. The Icelandic situation is reviewed, and the problems regarding the asset size of the bank and the GDP of its originating country is described. The full economic crisis is further explained and the World Financial Outlook for 2009 by the International Monetary Fund (IMF) is reviewed.

Section 7 is the empirical investigation of this paper. Eight bank corporations' balance sheets are examined during a period varying from 16 to 4 years ago until 2007. Four banks are American. These are: Bank of America Corp., Citigroup Inc., J.P. Morgan Chase & Co, Wells Fargo & Company. The other four banks are Dutch banks: Fortis Netherlands, ING N.V., Rabobank Group Netherlands, SNS Bank N.V.. All these banks have invested in bad U.S. subprime mortgages. A balance sheet analysis will be performed. Two things are examined. First, are there any major differences existing between the Dutch and American peer group. This analysis is performed by using 5 different ratios. Second, an empirical analysis of the factors described in sections 2-6 is performed for 3 banks individual (J.P.

Morgan Chase, Citigroup and Rabobank N.V.). Can the puzzle pieces that are formed in the previous sections be layed out over the banks performances?

This paper contribution is to make a complete puzzle of the subprime crisis. On every puzzle piece exists more papers and researches. But there exists no research about all puzzle pieces together, linked to a topicality as the subprime crisis. As a result of the summary-and-puzzle-function of this paper, the empirical research is subordinated to the theoretical part of this paper.

The findings of the paper are that this subprime crisis is a complicated, deep crisis that has not been seen since 1930. Lots of factors contribute and have contributed to outcome of the crisis as it is known right now. The housing bubble was the large catalyst behind the start of the troubles in the United States. Hedge funds caused the crisis to jump to the global (macro) economy. Mortgage-backed securities, varieties on that, it's issuers and it's features took care of the rapid acceleration of the crisis over the world and deep into the companies. Several other smaller problems arose from it, for instance troubled GSEs, and a bankrupt Iceland. In the empirical part it is made clear that the three investigated banks followed similar paths as the rest of the world, but that their critical success factors were their transparance over its SPVs and the awareness of its importance and influence of their risk management practices.

‘
*The sky is the limit if
you have a roof over your head.*
’

Sol Hurok (1888-1974), Ukrainian/American impresario

Section 2: U.S. housing market

In this section the problems regarding the housing prices is described. The housing bubble was the cause of the start of the crisis in the United States. In part 2.1 the importance of housing prices on the economy is discussed. In paragraph 2.2 is elaborated on (historical) housing prices. Section 2.3 is about the role of the housing bubble in the crisis. Paragraph 2.4 draws conclusions.

2.1 Housing prices and the economy

The housing market is one of the most important instruments to look at the state of an economy. It is often called ‘the economy’s engine’. Why the housing market is so important is described in this section.

Real estate is one of the most stable investment products people can step into. This is because homes always have a relative high value: a home of \$ 800,000 does not become almost worthless the next week (unless it catches fire or is demolished, but these events are not included). So investors know that they will keep a fair share of their investment, even if the market goes down. The other side is also positive: when the economy is booming, the real estate market booms even more, because people always want to move to a larger house when they have excess money on their bank account. Most of your time is spent in your house, so people are keen to improve their living standard. That is why this market is so interesting for speculators: when the economy goes down, the real estate market drops less. When the economy flourishes, the real estate market flourishes more. But, as it is a liquid market, investors can still lose a lot of money when the market turns against them.

The housing market is also a benchmark for the economy. The expectations about the future state of the economy are represented in the housing market. When investors expect that the economy will expand, investments in real estate will expand heavily. The demand

rises, and prices will start rising as well. When the economy slows down, the demand drops, and so will the prices. But most of the time the real estate prices do not drop, but only grow slower. An interesting rule of thumb is that housing prices peaks on average three quarters before the start of a recession (Poole, 2007)¹.

This view is also shared by President of the Federal Reserve Bank of San Francisco, Janet L. Yellen. In a speech at the Stanford Institute for Economic Policy Research on April 3, 2008, she mentioned: *'Looking ahead, it seems likely that the period of house price declines will not be over very soon, since some models of the fundamental value of houses suggest that prices are still too high, and futures markets for house prices indicate further declines this year. This trajectory of house prices plays a critical role in the economic outlook (...)*²

2.2 The development of housing prices

The development in housing prices in the United States has been a story of ups and downs the last years. A good measure of the housing prices is the Standard & Poor's Homebuilding Index. This is a industry-specific portion of the S&P Total Market Index (TMI). The Homebuilding Index is weighted market capitalization of companies in the TMI related to construction of homes. Therefore it is an excellent measure for the development of the housing industry. The development of the Homebuilding Index can be found in figure 2.1.

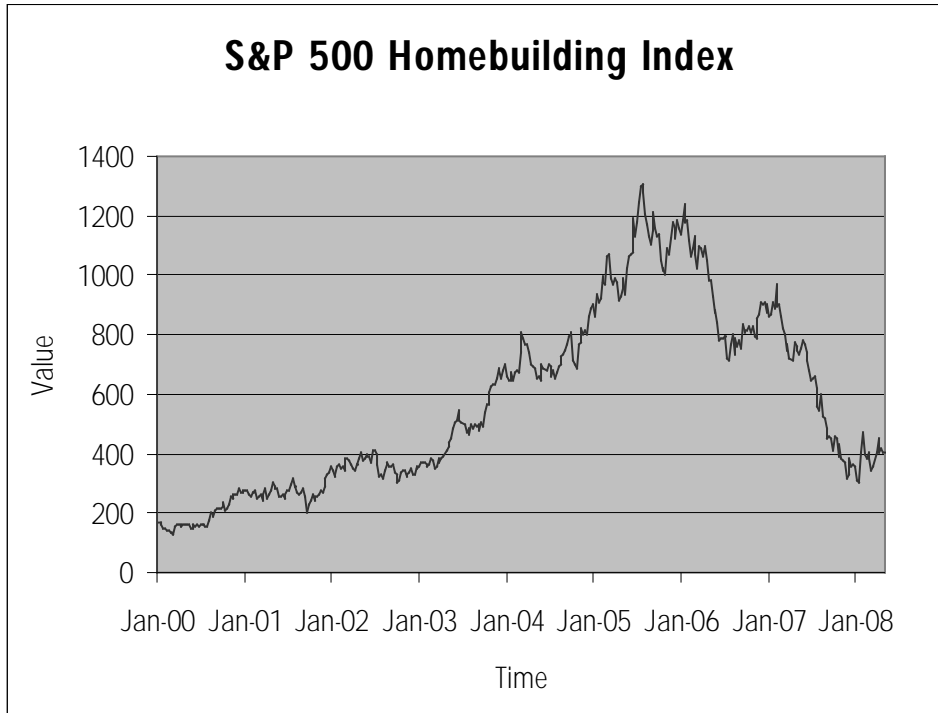
As can be observed in the graph, the new millennium began good. In 3 years the index rose steadily. After the tech bubble bursted in 2000, people looked for new markets. One of these was the housing market, which increased spectacularly from then on. In the summer of 2002 the index has doubled since 2000. And at the end of 2003 it even tripled. It became a booming business when the economy boomed in the years 2003 and further. More houses were built, so businesses in the Homebuilding Index saw their profits and value rising through the roof. But after a first great correction in 2006, it became slowly clear that the

¹ Poole, William, 2007. 'Real Estate in the U.S. Economy'. *Industrial Asset Management Council Convention*. St. Louis (MO), U.S.A., October 9, 2007. President of Federal Reserve Bank of St. Louis: St. Louis (MO). Retrieved on May 8, 2008 via: http://www.stlouisfed.org/news/speeches/2007/10_09_07.html.

² Yellen, Janet L., 2008. 'The Financial Markets, Housing, and the Economy'. *Speech to the Stanford Institute for Economic Policy Research*. Stanford (CA), U.S.A., April 3, 2008. President of Federal Reserve Bank of San Francisco (CA). Retrieved on May 8, 2008 via: <http://www.frbsf.org/news/speeches/2008/0403.html>

US housing market was a bubble. This bubble burst in the summer of 2007, resulting in that housing-related companies saw their value vanishing.

Figure 2.1: S&P 500 Homebuilding Index³



Another important index which shows us that the housing market was a booming business until 2007 is the Standard & Poor's Case/Shiller U.S. National Home Price Index. This index can be found in figure 2.2.

The Standard & Poor's Case/Shiller Home Price Indices are indices which measure the growth in value of residential real estate in various metropolitan regions in the United States. Two metropolitan composite indices are calculated, one based on 10 metropolitan areas and one based on the previous metropolitan index of 10 areas plus 10 additional areas. These areas are large cities and their suburbs including Boston, Chicago, Denver, Las Vegas, Los Angeles, Miami-Fort Lauderdale, New York, San Diego, San Francisco and Washington. The 10 additional areas to form the Composite 20 Home Price Index include Atlanta, Dallas-Fort Worth, Minneapolis-St. Paul.

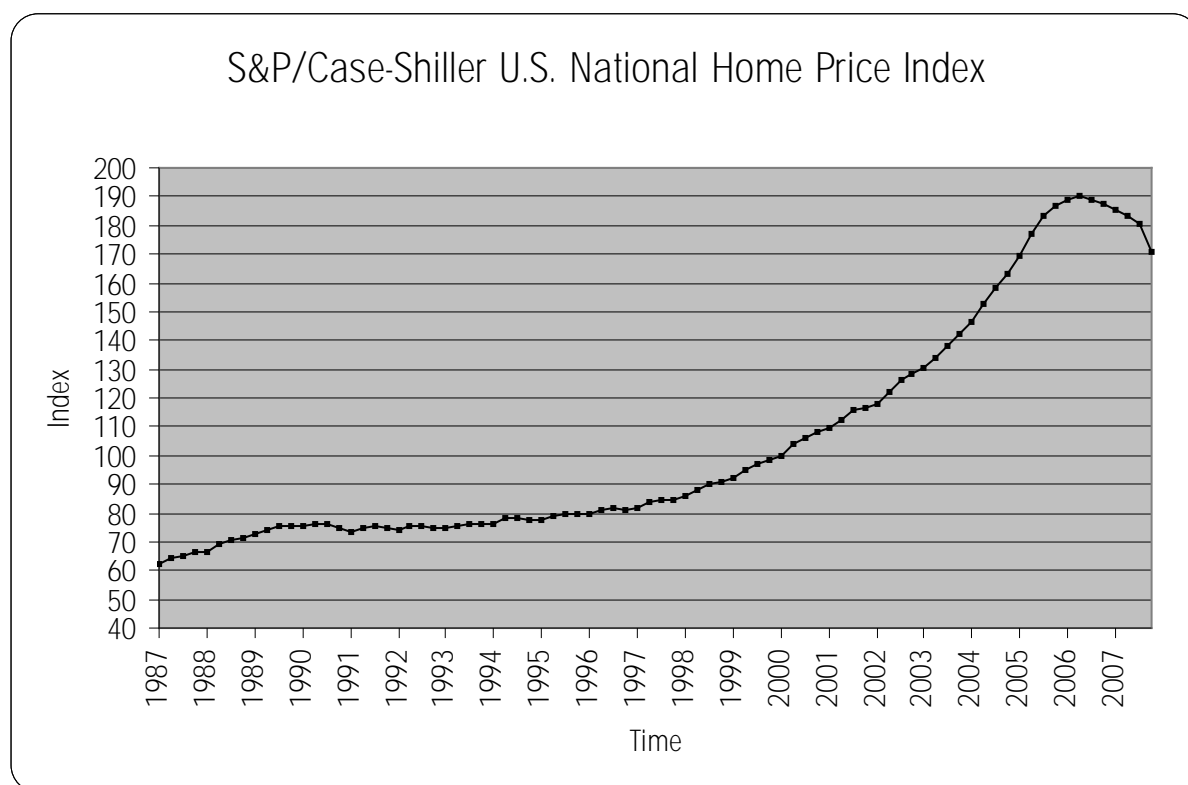
³ Standard & Poor's. 2008. *S&P 500 Homebuilding Index closing prices*. Retrieved on March 25, 2008 via: Datastream on Erasmus University, Rotterdam, The Netherlands.

There is also a National Home Price Index, which is calculated quarterly. The National Home Price Index is based on the nine census divisions. Regions include New England, Middle Atlantic, Pacific. Different states are pooled together in a region based on geographical position. The index was developed by Karl E. Case and Robert J. Shiller and uses the repeat sales pricing technique, which is considered to be the most accurate calculation. When a house is first sold a first 'data point' is made. When the same is resold, after a certain period, the second 'data point' is linked to the first and forms a 'sale pair'. All sale pairs in the region are measured and indexed. Data which can misform the sale pair are excluded. For instance foreclosures, family transactions and outliers which misrepresent the data⁴.

Figure 2.2 shows the same as figure 2.1. After a stable period, prices begin to rise fast at the end of the previous century. In 2007 the bubble bursts, causing housing prices to fall. The difference between the two graphs is that the second is more realistic, as it represents official housing prices. Both graphs clearly show a bubble. A bubble is defined when there is 'trading in high volumes, which causes prices to rise quickly, until this suddenly stops, for instance due to a loss in confidence, which causes it to burst'. This was obviously the case in the housing market.

⁴ Standard & Poor's. 2008. *Case/Shiller Home Price Indices Factsheet*. Retrieved on March 26, 2008 via: <http://www2.standardandpoors.com/portal/site/sp/en/us/page.article/0,0,0,0,1145771405992.html>

Figure 2.2: S&P/Case-Shiller U.S. National Home Price Index



2.3 Housing prices and the global credit crisis

As mentioned before, the crisis started because the U.S. housing bubble collapsed. In this section the connection between the global crisis and the U.S. housing market is made.

2.3.1 Federal funds rate

The problems were initiated by the collapse of another bubble, the dot-com (or techno) bubble in 2001. In this bubble the stocks and value of IT-related companies quickly peaked, and after that dropping rapidly. This bubble formed because of a worldwide belief in IT-companies. As a result more and more people started such a company, which overflowed the market. This helped a bubble to form. Investors believed that tech companies represented huge values, which vaporised when people realised that this was not the case, as the tech market had become crowded. The bubble burst when the stock markets fell deep as a result of this realisation by the investors.

To revive the economy after this blow-out, the Federal Open Market Committee (FOMC) of the U.S. Federal Reserve (Fed) lowered the federal funds rate step by step from 6.5% on

January 3, 2001 to 1.75% on December 11, 2001. On June 25, 2003 it bottomed at 1%⁵. The federal funds rate is the rate against which banks or institutions can loan from other banks or institutions to keep their reserves at the required Fed-rate. The rate at which this happens is set by the borrowing and lending bank. The average of all these rates is known as the effective federal funds rate. The Fed can control the nominal federal funds rate. The effective rate should be within an certain range of the nominal rate. By this way, the Fed can control the cash flows from banks, and so control the cash flow in the economy. The federal funds rate can be compared with the London Interbank Offered Rate (LIBOR), established by the British Bankers' Association.

By lowering the federal funds rate, the Fed stimulated the banks to borrow more money from other banks and lend more money to other banks, which could be lend to customers and companies. In this way the economy was boosted. The effectiveness of the federal funds rate change is criticized by Lown & Morgan (2002)⁶. After seeing only a small change of the gross domestic product to a change of the federal funds rate, they conclude '*...that part of the impact of the 'monetary' policy is really overlooked, or misidentified...*'.

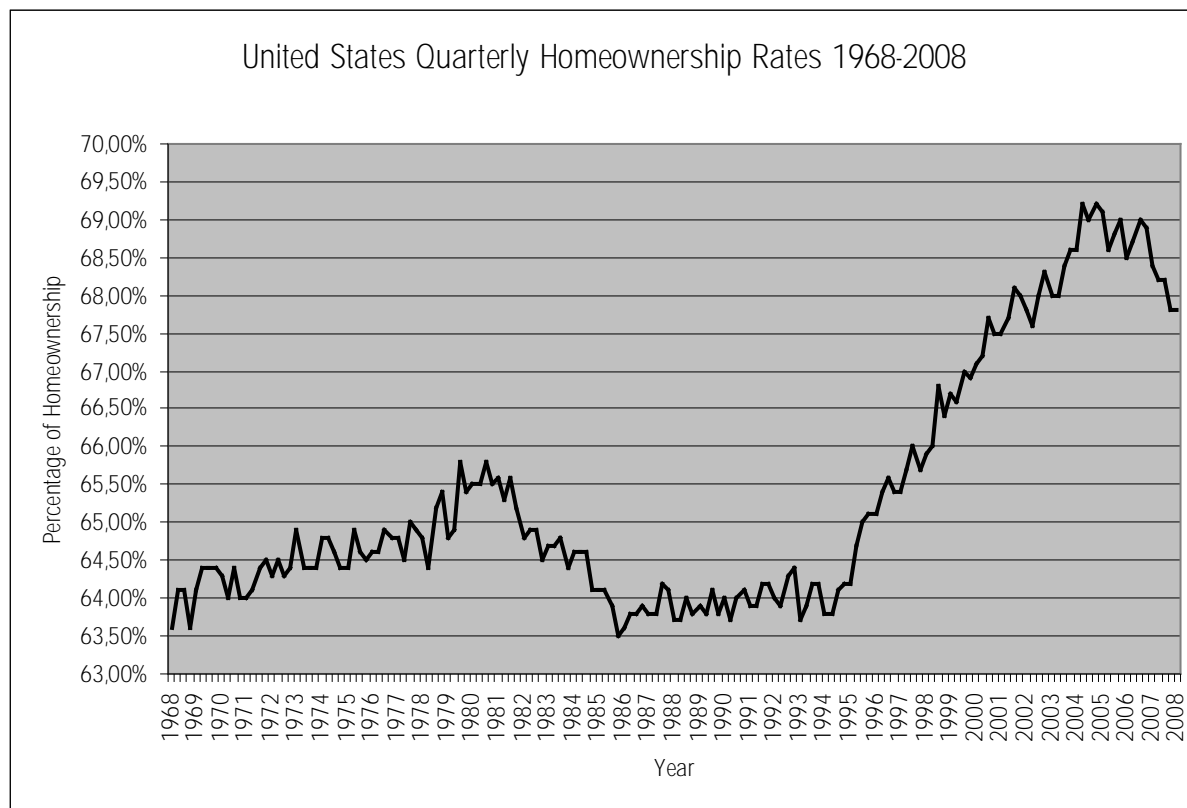
The federal funds rate drop ended on 1% on July 25, 2003. The discount rate, the rate at which banks or institutions could loan from the Fed directly, was low as well. The federal funds rate and discount rate follow each other closely. But the discount rate is always a bit higher, because the Fed's loans are more certain and so have a higher premium. As a result of these low rates, it was easy and cheap for people to borrow money. Lots of people invested this lended money in stable investments, for instance in lending houses. The percentage of homeownership raised the years after the collapse of the techno bubble from 67.5% to 69% (see figure 2.4). Also the number of outstanding mortgages increased these years. The economy had suffered some major collapses (the techno bubble, 9-11, the 'wars against terrorism' in Afghanistan and Iraq), but it recovered a bit the years after. The housing market followed the same steps as the global economy. It experienced a collapse during the small 2003 crisis and post-crisis recovery just as the whole economy. Then the

⁵ Federal Reserve Bank of New York (NY). 2008. *Historical Changes of Target Federal Funds and Discount Rates, 1971 to present*. Retrieved on May 15, 2008 via: <http://www.newyorkfed.org/markets/statistics/dlyrates/fedrate.html>

⁶ Lown, Cara S. & Donald P. Morgan, 2002. Credit Effects in the Monetary Mechanism. *Economic Policy Review*, 8(1), pp. 217-235.

housing bubble itself started a crisis in 2006. Another nice overview of the housing bubble is given by Gramlich (2007)⁷

Figure 2.4: United States Quarterly Homeownership 1968-2008



But as the economy recovered, cash piled up at the banks. It was cheap to borrow from the Fed, and in an attempt to get little profits on their *aggregate liquidity*, banks started to offer ‘subprime mortgages’, so that even the poorest of the society could get a home (Greenlaw et al, 2008)⁸. Ethics played also an important role in this: more people were able to fulfil their ‘American dream’. Subprime mortgages were allowed after the acceptance of the Depository Institutions Deregulatory and Monetary Control Act of 1980⁹. Lenders were allowed to form expensive mortgages when the borrowers’ credit history was weak. Subprime lending took care of 12 million households getting a home. If they had applied

⁷ Gramlich, Edward M., 2007. Booms and Busts: The Case of Subprime Mortgages. *Urban Institute Presentation*. Jackson Hole (WY), U.S.A., August 31, 2007. Senior Fellow of Urban Institute. Retrieved on March 5, 2008 via: http://www.urban.org/UploadedPDF/411542_Gramlich_final.pdf.

⁸ Greenlaw, David, Jan Hatzius, Anil K. Kashyap, Hyun Song Shin, 2008. Leveraged Losses: Lessons from the Mortgage Market Meltdown. *US Monetary Policy Forum Conference Draft*. Retrieved on March 11, 2008 via: <http://faculty.chicagobooth.edu/anil.kashyap/research/usmpf2008confdraft.pdf>.

⁹ Morris, Frank E., 1980. *Depository Institutions Deregulation And Monetary Control Act of 1980 Federal Reserve Bank of Boston (MA)*. Retrieved on March 21, 2009 via: <http://www.bos.frb.org/about/pubs/deposito.pdf>.

for a prime mortgage some years earlier, they would have received nothing from the mortgage issuers. This was also part of a government policy that stimulated poorer people to apply for subprime mortgages and getting a roof over their heads. The Carter-administration wanted to create equality for everyone with this proposal. Cutts and Van Order (2005)¹⁰ state: *for research and other purposes subprime loans are generally defined by the characteristics of the lender (a specialized subprime lender) rather than the loan.*

In the second part of 2003, at the same time the consumers consumed their loans, the inflation rate rised. Of course this was expected by analysts of the Fed, so they started to increase the discount and federal funds rate again. The first increase was on June 30, 2004, approximately a year after the downgrade to 1%. This first increase in 4 years was 25 basispoints, to 1.25%. On June 29, 2006 the federal funds rate stood at 5.25%⁵. In two years the federal funds rate had risen 4%. Effects of the fast increasing federal funds rate were that there was a smaller supply of funds available. This increased the short-term interest rates for customers. People who had loans at banks, faced a higher interest. Many of these loans were subprime, so people who are in the lower income classes suddenly had to pay more for their loans and their struggling worsened.

2.3.2 Expiring step-up period

Another problem facing the poorest of the society was the problem of the step-up loan of their adjustable-rate mortgage (ARM). The subprime mortgages were developed in such a way that it was made attractive for small incomes to get one. Mortgages had a low starting interest fee, which stepped up (change to a sudden higher interest rate) after a period. This period is mostly after 3-5 years, but in 30-year fixed mortgages this step-up period can expire after 9 years. In 2006, the step-up period started, since it was 3-4 years ago since the beginning of the borrow-madness in 2003. Because of rising interest rates people had already problems selling their house, and had to start paying their higher (stepped-up) ARM as well. A killer situation for the (poorer) people that had a mortgage they actually could not afford, as they had no fixed income.

¹⁰ Cutts, Amy Crews & Robert A. Van Order, 2005. On the Economics of Subprime Lending. *Journal of Real Estate Finance and Economics*, 30(2), pp. 167-196.

2.3.3 Flipping

As a result of the rising housing prices, people started to see their homes as investment objects instead of places where you could live. There are stories of people who did not unpack their belongings after a move to a new house, because they knew they were about to move again in a short period. The process of making fast profits on their homes is known as ‘flipping’: people buy a house with a step-up loan, after a short period the value of their home has risen because of increasing housing prices which makes people sell the home again with profit before their mortgage resets to a higher rate. They buy a new home and the cycle starts again. Flipping goes well as long as housing prices are increasing, step-up periods are long and rates stay low. A lot of people were arrested on suspicion of frauding with mortgages, especially with flipping schemes, in order to make a lot of money by selling it to fellow scammers¹¹.

The third condition was not fulfilled as the Fed started to increase federal funds and discount rates. Poorer people who could not longer afford their mortgage started to walk away from loans. They left their house and thus defaulting on their mortgage payment. They went to another bank and received a new subprime mortgage and bought a house with it. But because of the high circulation rate, it had become unclear who owned which property and the second bank was unaware that the mortgage takers already defaulted at another bank. The empty first house became property of the first financial institution. This process is called foreclosure.

2.4 Foreclosure rates

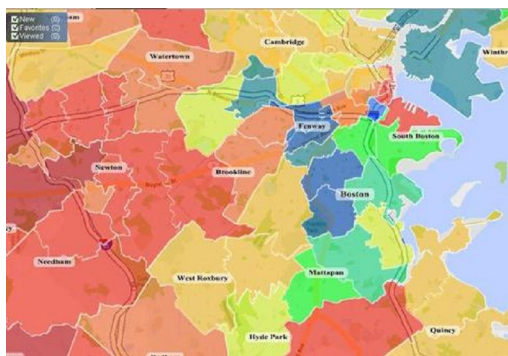
The foreclosure rate rised quickly in 2006 and 2007. The total number of foreclosures in the United States was 2,203,295 in 2007. This is a rise of 75% compared to 2006 and 149% compared to 2005¹². Even more concerning is the number of filings on properties in 2007: 2,203,295 filings on 1,285,873 properties. These numbers suggest that some homes were dispossessed more than once in one year. The number for one month (December 2007) are comparable: 642,150 filings on 215,749 properties. Most properties foreclosed more than two times in one month.

¹¹ Ralph Roberts’ Flipping Frenzy. 2008. *Real Estate and Mortgage Fraud, News and Information*. Retrieved on February 2, 2009 via: <http://www.flippingfrenzy.com>

¹² RealtyTrac. 2008. *U.S. Foreclosure Activity Increases 75 Percent in 2007*. Retrieved on February 24, 2008 via: <http://www.realtytrac.com/ContentManagement/pressrelease.aspx?ChannelID=9&ItemID=3988&acct=64847>.

Geographically there are also some remarkable numbers. The states with the highest foreclosure rates were: Nevada, Florida, Michigan, California and Colorado. The states with the highest foreclosure rates all are situated at either the Pacific or Atlantic Coast regions. The Midwest does not have high dispossession rates. Housing prices in this region seemed to have increased less than in the wealthier coastal states. This is probably a result of living on one of the coasts is more attractive than living in the ‘dull’ Midwest. Looking at city or agglomeration level also some interesting results show up. On map 2.1, the city of Boston, Massachusetts (Atlantic Coast) is divided into neighborhoods. Red neighborhoods mean that the income is high, blue neighborhoods mean that the income is low. Map 2.2 shows the foreclosure rate of Boston. Red means high dispossession rate, blue means low. It is interesting to see that that maps are counterparts of each other. Red areas on map 2.1 are blue areas on map 2.2 and vice versa. This shows that foreclosure rate and income are closely negatively correlated. This is also concluded by a study by Wachter, Russo and Hershaff (2006)¹³, who studied foreclosure and income correlation before signals of a credit crunch were visible. A study by Calem, Gillen and Wachter (2003)¹⁴ concluded this even earlier and made a separation to the race of the neighborhoods’ population. The same is done by Marsico (2007)¹⁵ for New York City. A study by Scheessele (2002)¹⁶ concluded that *borrowers in low-income and predominantly black neighborhoods (...) should be protected against a subset of subprime lenders who engage in predatory lending practices.*

Map 2.1: Boston areas by income



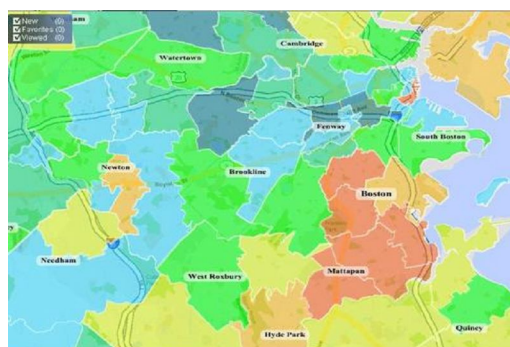
¹³ Wachter, Susan M., Karl Russo, Jonathan E. Hershaff, 2006. Subprime lending: Neighborhood Patterns Over Time In US Cities. *University of Pennsylvania Institute for Law and Economics, Research Paper Series*. Retrieved on November 18, 2008 via SSRN: <http://www.ssrn.com>.

¹⁴ Calem, Paul S., Kevin Gillen, Susan M. Wachter, 2004. The Neighborhood Distribution of Subprime Mortgage Lending. *Journal of Real Estate Finance and Economics*, 29(4), pp. 393-410.

¹⁵ Marsico, Richard, 2007. The Higher Cost of Being African-American or Latino: Subprime Home Mortgage Lending in New York City 2004-2005. *New York (NY) Law School Legal Studies Research Paper Series*. Retrieved on November 18, 2008 via SSRN: <http://www.ssrn.com>.

¹⁶ Scheessele, Randall M., 2002. Black and White Disparities in Subprime Mortgage Refinance Lending. *U.S. Department of Housing and Urban Development Working Paper Series*. Retrieved on November 18, 2008 via: <http://www.huduser.org/Publications/pdf/workpapr14.pdf>.

Map 2.2: Boston areas by foreclosure rate¹⁷



2.5 Aftermath

The result of all these foreclosures were huge write-offs on subprime mortgages by banks and financial institutions. A number of subprime lenders defaulted or filed for Chapter 11 bankruptcy. New Century Financial, American Home Mortgage (\$60 billion loss), Ameriquest, ResMae and the Norwegian fund Terra Securities are the more well-known bankruptcies. Some institutions and banks could only avoid bankruptcy by loaning money from sovereign wealth funds (SWF). Among these are Wall Street giants as Citigroup, Morgan Stanley and Merrill Lynch. The ‘crunch’ in the creditworthiness of the economy caused the stock indices to fall, which deteriorated the crisis. In following chapters there will be elaborated on this subject.

Also housing markets in other countries became troubled after the US meltdown. In China, properties in Shanghai and Beijing have decreased enormously in value since 2006. The United Kingdom also experienced falling housing prices, according to a report from Royal Institution of Chartered Surveyors (RICS)¹⁸, an organisation specialised in property, land, construction and environmental assets. In Spain real estate prices rose 301% from 1995 to 2007¹⁹, but reports showed that the housing market was cooling down rapidly in 2008²⁰.

¹⁷ Blue Massachusetts Group. 2008. *Foreclosure Geography: Heat Map of Boston (MA)*. Retrieved on May 30, 2008 via: <http://www.bluemassgroup.com/showDiary.do?diaryId=11372>.

¹⁸ Royal Institution of Chartered Surveyors, 2008. *Sales continue to dry up but some realism returns to the market - RICS UK housing market survey, July 2008*. Retrieved on September 25, 2008 via: http://www.rics.org/Newsroom/Pressreleases/RICS_JULY_HMS_%2011082008.html

¹⁹ Spanish Ministry of Housing, 2008. *Spain Property Prices 1995-2007*. Retrieved on September 25, 2008 via: <http://www.spainrei.com/MiV-Spain-Property-Prices-95-07-yearly.htm>

²⁰ Spain Real Estate Index, 2008. *Spain Real Estate News 22*. Retrieved on September 25, 2008 via: <http://www.spainrei.com/News.shtml>

‘ *When you combine ignorance and leverage,
you get some pretty interesting results.* ’

Warren Buffett(1930), American investor, businessman and philanthropist

Section 3: Hedge funds

After problems with the US housing market, banks entered a financial storm. They had to do large write-offs on subprime mortgages to keep their balance sheets healthy. Some banks could not handle this financial setback and defaulted. In the subprime crisis of 2007, things started to frighten people globally when two large American hedge funds went belly-up. Two hedge funds which are controlled by the American bank Bear Stearns had problems with their investments. In paragraph 3.1 a brief introduction is given to hedge funds. Paragraph 3.2 describes the role of hedge funds in the subprime crisis.

3.1 Introduction to hedge funds

Hedge funds are traditionally investment vehicles of wealthy private investors. They are not as heavily regulated as other investment funds as a result of the private character. The private character has other pros as well: a high leverage can be possible due to a few wealthy investors, the legal structure deviates from normal investment funds and a different incentive structure often exists as well. As a result of this incentive structure hedge fund often try to reach the highest absolute return²¹. There are different types of hedge funds with each its own strategy. These are discussed in 3.1.1. An elaboration on the different risks hedge funds are exposed is in subparagraph 3.1.2.

3.1.1 Strategies of hedge funds

Hedge funds can have different strategies in their chase for the best risk-return-rate. In this section a number of these strategies will be briefly mentioned and discussed²².

²¹ Fung, William & David A. Hsieh, 1999. A primer on hedge funds. *Journal of Empirical Finance*, 6(3), pp. 309-331.

²² Magnum Funds, 2008. *Synopsis of Hedge Fund Strategies*. Retrieved on July 3, 2008 via: <http://www.magnum.com/hedgefunds/strategies.asp>.

Aggressive growth strategy: This strategy focuses on businesses with high returns. Hedge funds go long in these kind of 'stars'. Also businesses with low earnings will be shorted in this strategy.

Distressed funds strategy: Hedge funds will participate in funds that are highly likely to default. These distressed companies are sometimes undervalued, because the market thinks the company's outlook is worse than in reality.

Emerging markets: Hedge funds can also invest in emerging markets. With this strategy high returns can be generated in a short period, because the growth in emerging markets is usually very high.

Fund of funds: Hedge funds invest in other hedge funds. These different investment are pooled in an own fund. Risk and return can be controlled by pooling the funds. Another strategy is differentiated from this: fund of fund of funds, which diversifies the risks further.

Income: In this strategy hedge funds invest in stable assets, which yield an almost certain income, for instance bonds or fixed income derivatives.

Macro strategy: This strategy aims to profit from shifts in the global economic environment. George Soros became famous with this strategy when his high-profile Quantum Fund profited from a falling sterling.

Market neutral strategy: This strategy focusses on profits made either by arbitrage in a market neutral investment or by arbitrage over time, for instance investing in futures and shorting the underlying. This strategy was obtained by the Long-Term Capital Management fund of Nobel Prize laureates Myron Scholes and Robert C. Merton.

Short selling strategy: The hedge fund shorts securities in expectation of a rebuy at a lower price at a future date. This lower price is a result of overconfidence of the other party, who thought they had bought an undervalued asset.

Special situations: A popular and probably the most well-known strategy is the behaviour of hedge fund in special situations like mergers, hostile takeovers, reorganisations or leveraged buy-outs. Hedge funds often buy stocks from the distressed company, thereby trying to profit from a difference in the initial offering price and the price that ultimately has to be paid for the stock of the company.

Timing strategy: The manager of the hedge fund tries to time his entrance to or exit from a market as good as possible. High returns can be generated when investing at the start of a bull market or exiting at the start of a bear market.

Value strategy: This strategy focusses on out-of-favor or less followed stocks by the market analysts. By buying and paying attention to these stocks, hedge funds try to increase the value of it.

The importance of strategies becomes clear when looking at the different pay-offs of the funds in different economic cycles. Some have high volatility, which implies large losses in downturns and high profits in boom periods. Important for these strategies is the risk attitude of it. In the next part the different types of risk are discussed.

3.1.2 Risks of hedge funds

The riskiness of the business is something that is closely connected to hedge funds. Many different risk types exist. Some types of risk can be damaging to the whole economy. But there are also market-specific risk types. In this paragraph the most common risk types are discussed, to get a clearer view on the situation of hedge funds during the subprime crisis.

Systematic risk: The most common type of risk is that of systematic risk. Systematic is undiversifiable, which means that the entire market is affected by this type of risk. Systematic risks are market crashes, political events, or some nature phenomenons, like El Niño and La Niña. Earthquakes do not belong to systematic risk, because these are regional.

Specific risk: The opposite of systematic risk is specific risk. These risks are specified to market segment, location or nature of business. Lots of different types of specific risk exist.

Below a number of different types of specific risk are discussed. The vulnerability of hedge funds to the different types of risk is discussed as well.

Credit risk: Credit risk is the risk that credit obligations are not payed. This type of risk is present in lots of markets. Government bonds have a low credit risk, whereas junkbond has a high credit risk. Hedge funds are exposed to this type of risk as well, as they invest in different kind of markets, with the risk of losing their money because other parties do not pay their obligations to the hedge fund. *Prepayment risk* is part of credit risk.

Foreign-exchange risk: Foreign exchange risk is the risk that exchange rates move in a negative way. Especially companies that have foreign subsidiaries are vulnerable to this risktype. Foreign-exchange risk is popular nowadays, since the euro-dollar exchange rate is

moving negatively for a lot of European companies. Hedge funds can sometimes become exposed to this risk when doing foreign investments.

Market risk: This type of risk only applies to companies who invest in the stock market or in the option market. Market risk is the daily fluctuation in the market. There is always a possibility that the publicly traded investments go suddenly down. It depends on the volatility of the stock or option if people run a large market risk. Hedge funds who have a strategy of investing in stock and options (like funds who want to generate 'income' for other activities) are exposed to this risk.

Interest rate risk: Is the risk that interest rates change. Hedge funds can be highly vulnerable to this risk, as they can be highly leveraged. When interest rates change, the interest on debt can change as well, imposing money drains on hedge funds.

Systemic risk: Is the risk that one financial institution collapses after another. In many cases the cause of this serie of default is one event with a large impact. Probably the best example is the Long-Term Capital Management (LTCM)²³ case, where a lot of financial institutions collapsed after LTCM did. The collapse of LTCM was caused by the Russian debt crisis.

3.2 Hedge funds during the housing downturn

On June 21, 2007, when the housing downturn was clearly visible, reports came out that some hedge funds had become distressed as a result of bad investments. Two hedge funds of the American investment bank Bear Stearns had to be rescued by loans from Bear Stearns and other banks in order to prevent default.

3.2.1 Collateralised debt obligations

The two hedge funds, the Bear Stearns High-Grade Structured Strategies Credit Fund and the Bear Stearns High-Grade Structured Credit Strategies Enhanced Leveraged Fund were investing in collateralised debt obligations (CDOs). A CDO is an obligation which has a collateral. This collateral is a pool of liabilities formed through different assets. The pool is mostly formed by a liability on a house via mortgages, therefore this type of asset is called a mortgage-backed security (MBS). The difference between a regular obligation and a

²³ Chan, Nicholas, Mila Getmansky, Shane M. Haas, Andrew W. Lo, 2005. Systemic Risk and Hedge Funds. *Massachusetts Institute of Technology Sloan School of Management, Research Paper*. Retrieved on July 8, 2008 via SSRN: <http://www.ssrn.com>.

CDO is the collateral. When a company or government issuing regular obligations defaults, the investors can not claim a part of a collateral; they can only hope they will see part of their investment. In a CDO investment, investors can claim the house which forms the collateral of the loan for homeowners.

The riskiness of a CDO can be determined by the investor. Underwriters pool the mortgages in different classes, called *tranches*. These tranches are often called *senior* (less risky, rated AAA), *mezzanine* (medium risk AA-BB) and *junior* (most risky, below BB). As with every investment, more risky tranches have a higher premium, as a reward for the riskier investment. It depends on the risk attitude of the investor in what type of tranche he will invest in. The investor can also diversify his portfolio by investing in different type of tranches. For CDOs the risk-return trade-off is made slightly difficult because of the presence of the borrower, and his ability to pay the interest and payments of his mortgage. Generally, banks pool their mortgages not only by looking to the wealth of the borrower, but also by looking to his mortgage history. Banks diversify the risks by forming SPVs, so they are less hit in case of a default.

CDOs became popular after the introduction of the Gaussian Copula model (a type of Monte Carlo simulation) in 2001, by David X. Li of The RiskMetrics Group²⁴. With this model it is very easy to price CDOs, although it can also be done in other ways, for instance using other Monte Carlo simulations. The total CDO market was worth \$551,709 million on its height in 2006.²⁵

3.2.2 Bear Stearns

The two Bear Stearns-connected hedge funds that could not meet margin calls anymore, were speculating in the subprime market through complex derivatives. The hedge funds were leveraged with help of CDOs that had a higher income through interest than it had cash outflow via costs of borrowing. So with every CDO it purchased, the leverage grew. The exposure that the fund ran through this construction was hedged with help of a credit default swap (CDS). CDSs are instruments that secure investors against defaults or other credit events. The buyer receives protection, the swap seller guarantees credit in case of an

²⁴ Li, David X., 2000. On Default Correlation: A Copula Function Approach. *The Journal of Fixed Income*, 9(4), pp. 43-54.

²⁵ Securities Industry and Financial Markets Association, 2008. *Global CDO Market Issuance Data Report*. Retrieved on July 13, 2008 via: http://www.sifma.org/research/pdf/SIFMA_CDOIssuanceData2008.pdf.

event and receives a periodical fee (comparable to an insurance premium which is familiar to many people). The positive difference between income through CDOs and expenses of the CDSs and the cost of leveraging is called the *positive carry*.

The positive carry for the two hedge funds would remain positive as long as the market remained stable. Of course the strategy of the hedge fund included some risk, because there is no return without risk. But the downside the managers of the hedge funds calculated in relation to the risk, did not come close to the actual plummeting of the subprime MBS-market in the last part of 2006 and the begin of 2007.

After the housing market collapsed, which is described in the previous section, homeowners did not longer pay interest and the pay-offs on the mortgage. Effectively, they defaulted on their mortgage and left their homes, who became property of the financial institutions. But for MBSs which have mortgages as collateral, for instance CDOs, the defaults on mortgage meant bad news. Especially the large scale on which this process started to unfold in the U.S. was threatening for the financial institutions. So the MBS market took a big hit as a result of the housing downturn. Because MBS are an attractive investment for hedge fund due to their risk-return, hedge funds were hit also. The default of two Bear Stearns-related hedge funds caused that the financial world started to realise that the housing crisis in the US was becoming a worldwide financial subprime crisis.

‘ *Worm or beetle - drought or tempest - on a farmer's land may fall, each is loaded full o' ruin, but a mortgage beats 'em all.* ’

Will Carleton (1845-1912), American poet

Section 4: Mortgage-backed security-market

In the previous section mortgage-backed securities were mentioned already when describing the problems at the two high-leveraged Bear Stearns hedge funds. In this section the mortgage-backed security-market is examined more closely. In paragraph 4.1 is elaborated on securitization. The first MBS-writers are mentioned, as well as the rest of the history of the MBS in paragraph 4.2. In later paragraphs (4.3) the role of MBSs and other investment products in the credit crisis is discussed.

4.1 Securitization

Problems of the hedge funds in the MBS-market worsened because this market is highly *securitized*. Financial institutions who had outstanding mortgages did sell these loans to other banks, who in their turn sold the loans to other financial institutions. The process of buying loans from other banks is called securitization. Securitization is often seen as a risky business as it becomes unclear who owns what. Keys et al. (2008)²⁶ showed that portfolios who were securitized default around 20% more than portfolios who were not securitized. Ashcraft & Schuermann (2008)²⁷, added frictions to the securitization process of subprime ABS and MBS for principals and agents. This is done with help of a specialized subprime example from 2006.

²⁶ Keys, Benjamin J., Tanmoy Mukherjee, Amit Seru, Vikrant Vig, 2008. Did Securitization Lead to Lax Screening? Evidence From Subprime Loans. *University of Chicago (IL) Working Paper*. Retrieved on March 20, 2009 via SSRN: <http://www.ssrn.com>.

²⁷ Ashcraft, Adam B., & Til Schuermann, 2008. Understanding the Securitization of Subprime Mortgage Credit. *Federal Bank of New York (NY) Staff Report*. Retrieved on March 19, 2009 via SSRN: <http://www.ssrn.com>.

4.1.1 History of securitization

The first type of securitization was done in 1970 by the Government National Mortgage Association (GNMA), which was called Ginnie Mae as a derivation from its abbreviation. Ginnie Mae had packed mortgages and sold them as the first MBS in the world. The interest payments and principal amount of the mortgages were passed through to investors. Soon after other corporations like Ginnie Mae followed this type of pass through. These other institutions were Fannie Mae (Federal National Mortgage Association, FNMA, who was at first part of Ginnie Mae until its privatization) and Freddy Mac (Federal Home Loan Mortgage Corporation, FHLMC). Until today, these government-sponsored enterprises (GSEs) are some of the largest mortgage associations in the financial world. When U.S. banks sell a mortgage to a home owner, the banks go to one of the mortgage associations. They buy the mortgage and resell it as part of package of mortgages. The new, re-packed mortgages are sold in various types of risk: the supposed 'good' mortgages are pooled as the high-graded AAA CDOs, the supposedly bad mortgages are pooled and sold as low-grade, junk CDOs.

The reason for the U.S. Federal Housing Administration (FHA) to support these mortgage lenders is two-sided. The first role is to help more people to a mortgage. Especially poorer people are in need of (subprime) mortgages, and by bundling the governments' and commercial powers, the FHA hoped to get more poor people to a home, and with it offering more security and stability in their lives. This could help in lowering the number of people who lived under the normal standards. The other side of the creation of GSEs was the fact that the mortgage market could be better controlled and monitored by the government. Mortgage market mostly are vague, with all kinds of issuers offering mortgages against false pretences. By setting up its own mortgage issuer, the FHA hoped to prevent this. The effectivity of GSEs in reaching lower incomes has been discussed throughout the years. For instance Bunce and Scheessele (1996)²⁸ find that despite room for improvement, *GSE lag other market sectors in the share of their funding of affordable loans (...) Freddie Mac lags both Fannie Mae and depositories*. The results of the goal of reducing costs and preventing wild growth on the mortgage market are discussed by many

²⁸ Bunce, Harold L. & Randall M. Scheessele, 1996. The GSEs' Funding of Affordable Loans. *U.S. Department of Housing and Urban Development Working Paper Series*. Retrieved on March 19, 2009 via: <http://www.huduser.org/Publications/pdf/gsewp.pdf>.

authors. For instance Naranjo and Toevs (2002)²⁹, Passmore, Sparks & Ingpen (2002)³⁰ argue that GSEs helped in reducing mortgage costs. Other authors, for instance Roll (2003)³¹ add to this by including portfolio benefits for borrowers, that incur at GSEs. An & Bostic (2008)³² include other variables like unemployment and income per capita and find that there is a trade-off between GSEs affordable housing goals and FHAs activity-goals like unemployment and income per capita.

The profit for the associations is the spread between the return rate for the banks (for instance 3.5%) and the return rate for the association (for instance 3%). The spread of 0.5% is the profit. Ginnie Mae, Fannie Mae and Freddy Mac were and still are one of the best examples of securitization in the MBS-market, despite reports that came out in the early summer of 2008 that the GSEs had problems with their funds and investments. The US government had to lend billions of dollars to keep the mortgage associations alive.

Securitization is commonly used, not only in the MBS market but also in the rest of the financial world. The positive side of securitization for banks is that they pass the risk of default to other parties. The negative side of securitization is that the financial industry becomes non-transparent: because of the large number of outstanding loans it becomes unclear which transaction is done and between which parties this transaction is done. This is called information asymmetry and can lead to agency problems. Most of the time special purpose vehicles (SPV) are formed, to mitigate the risks for the parent company. SPVs also have tax advantages, which make the transaction more interesting for the investors. Gorton & Souleles (2005)³³ discuss the advantages of using of SPVs in securitization. They find that the reduction of bankruptcy costs is essential in the choice for using an SPV. Companies using SPV for securitization should pay attention to pricing of debt and bailout-practices by investors.

²⁹ Naranjo, Andy & Alden Toevs, 2002. The Effects of Purchases of Mortgages and Securitizations by Government Sponsored Enterprises on Mortgage Yield Spread and Volatility. *The Journal of Real Estate Finance and Economics*, 25(2), pp. 173-195.

³⁰ Passmore, Wayne, Roger Sparks & Jamie Ingpen, 2002. GSEs, Mortgage Rates, and the Long-Run Effects of Mortgage Securitization. *The Journal of Real Estate Finance and Economics*, 25(2), pp. 215-242.

³¹ Roll, Richard, 2003. Benefits to Homeowners from Mortgage Portfolios Retained by Fannie Mae and Freddie Mac. *Journal of Financial Services Research*, 23(1), pp. 29-42.

³² An, Xudong & Raphael W. Bostic, 2008. GSE Activity, FHA Feedback and Implications for the Efficacy of the Affordable Housing Goals. *The Journal of Real Estate Finance and Economics*, 36(2), pp. 207-231.

³³ Gorton, Gary & Nicholas S. Souleles, 2005. Special Purpose Vehicles and Securitization. *Federal Reserve Bank of Philadelphia (PA) Working Paper Series*. Retrieved on September 21, 2008 via SSRN: <http://www.ssrn.com>.

4.1.2 Securitization's role during the subprime crisis

Securitization helped worsen the crisis because also the healthy banks got involved in the crisis, initially without even knowing. Only a small number of mortgage underwriters and banks started to offer subprime mortgages. But as a result of securitization of the MBS-market, non-subprime offering banks got 'infected' with bad loans. As a result of these interbank loans, the crisis could spread rapidly from countries with a less regulated financial system and a high percentage of subprime investments to countries with a more regulated financial system and a low percentage of subprime investments. Many good banks had to do write-offs on their MBS portfolio, weakening their credit structure and their forecast of future creditworthiness by the rating agencies. Securitization caused a lot of information asymmetry in the financial sector, which took the perfectly healthy banks down as well.

4.1.3 Agency theory

The agency theory, developed in 1976 by Michael C. Jensen and William H. Meckling³⁴, describes the relationship between the principal and the agent. The agent acts on behalf of the principal and is rewarded for this. As a result of different interests, the agent's actions are not always in line with the principal's goals. This problem is called the agency problem. It is used in many parts of the modern society, as well as in various parts of the economy.

In the subprime crisis, agency problems had a large influence as well. As mentioned earlier, information asymmetry led to the first agency problems, between the management and shareholders and between management of bank X and management of bank Y. The latter included excessive risk taking, as this risk did not show in the books of bank X, but in the books of bank Y, who did not notice the agency problem. The same agency problem exists between the management of a large bank and the central bank. As the management knows the central bank will bail out the important banks, they might be taking excessive risk. This agency problem is called moral hazard.

Other agency problems exist between management and employees. The reward scheme for employees could mean that employees could take excessive risks while management is unaware. Employees and managers sometimes are rewarded when they make a high return

³⁴ Jensen, Michael C. & William H. Meckling, 1976. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, 3(4), pp. 305-360.

on an investment. In order to receive that bonus, high returns are tried to be made by taking high risks. Criticism on these bonuses grew after some companies that announced major losses and lay-offs still rewarded board members and high managers with bonuses as they met their own targets, while the overall company failed. In The Netherlands a code on bonuses was already existing (The Tabaksblat Code), but seemed to be useless, as bonuses still shook up the society in 2008 and 2009. The Obama-administration announced that companies who announced losses and bonuses at the same time would be punished through tax measures or withdrawals of support from the U.S. government³⁵. The Dutch Minister of Finance announced he would investigate if something equal was able under Dutch jurisdiction.³⁶

4.2 Riskier MBSs

The American investors had an easy time investing in MBSs, because the three GSEs guaranteed payment of interest and principal amount of the pooled mortgages to the investors. The only risk that the investors had to take was the prepayment risk. This is the risk that the underlying mortgage is prepaid, or refinanced. The investor receives the remaining principal amount of the mortgage in the MBS at the moment of prepayment or refinancing. The remaining future interest payments on the mortgage expires. The option to prepay a mortgage can be seen as a callable bond from the home-owner's view. In times of rising housing prices the prepayment risk is greater than in times of falling housing prices, because when prices rise, it is more interesting to prepay (in case of a move to another house or to make the house mortgage free) or refinance (at a lower interest) the mortgage. Fermanian (2008)³⁷ has tried to develop a model that manages different risk types (including prepayment risk) in MBS, ABS and CDO of ABS. Because of the low liquidity in these markets a simple but effective mathematical model was built. With help of this model, riskiness of difficult securities can be better understood in the future, preventing crises like this happening again.

³⁵ Braithwaite, Tom & Greg Farrell, 2009. Obama signals bonus clawback support. *Financial Times Online*, March 19, 2009. Retrieved on April 8, 2009 via: <http://www.ft.com/cms/s/0/231acf54-1487-11de-8cd1-0000779fd2ac.html>.

³⁶ Vogels, Peet, 2009. Bos doet bonus in de ban. *Algemeen Dagblad*. Retrieved on April 8, 2009 via: http://www.ad.nl/economie/3097687/Bos_doet_bonus_in_de_ban.html.

³⁷ Fermanian, Jean-David, 2008. A top-down approach for MBS, ABS, and CDO of ABS: a consistent way to manage prepayment, default and interest rate risk. *BNP-Paribas and Crest Working Paper*. Retrieved on September 25, 2008 via SSRN: <http://www.ssrn.com>.

When other investment banks and financial institutions (non-GSE), started to issue MBSs, this risk-free image of this type of investment started to fade. Big, American investment groups and banks like Citibank, Nationwide and Country Financial also started to sell MBSs. They called them asset-backed securities (ABS) instead, to mention the difference in riskiness between the two. The commercial MBS differed in collateral: MBS could only have mortgages as collateral, ABS could have any asset as collateral, as long as it represented enough value to the loan. Different from MBSs, an ABS does have credit risk, as it is not supported by the government through an GSE. The most interesting part of an ABS is the construction in which the issuing company can lose asset value from its books. To create an ABS, assets are sold to SPV, who use them as collateral for the ABS. For the selling company this method is convenient when capital is needed for other purposes. The structuring into different tranches is the same as with MBSs. Vink and Thibeault (2008)³⁸ have done an industry analysis of these different securities. They focus on the pricing of these securities and concluded that pricing characteristics differed significantly.

4.2.1 Write-downs and capital raised

As mentioned in section 4, the failing hedge fund of Bear Stearns was investing with help of a special type of MBS, the CDO. After defaulting on these investments, the financial world woke up. They suddenly saw that their ‘safe investments’ in CDOs were not so safe after all. They started to write-down on their investments one after another. A write-down is an accounting measure to lower the value of an investment in the company’s books. Mostly the investment does not disappear from the books (this is called a write-off), only the value of the investment is reduced by a write-down. The opposite of a write-down is a write-up, in which accounting value is added to the investment. Balance sheets before and after a write-down can be seen in figure 4.1 and 4.2.

As can be noticed from both balance sheets, the equity is reduced with the amount of the write-off, in the case of Investment Bank X, 20. These simple balance sheets could also be applied to other cases for instance at large American investment banks. They had to do write-downs as well, which gnawed to the equity of the firms.

³⁸ Vink, Dennis & André E. Thibeault, 2008. ABS, MBS and CDO compared: an empirical analysis. *The Journal of Structured Finance*, 14(2), pp. 27-45.

Figure 4.1: Simple balance sheet before the write-down on the CDO.

Assets	Investment Bank X		Liabilities
Collateralized debt obligation	100	Equity	100

Figure 4.2: Simple balance sheet after the write-down of 20 on the CDO.

Assets	Investment Bank X		Liabilities
Collateralized debt obligation	80	Equity	80

Besides the massive amount of write downs, financial firms were able of raising almost an equal number of capital. As can be observed in figure 4.3, 40 billion less than all writedowns were raised by the companies in the list. Companies acquired this money mostly through new (preferred) stock offerings. Capital is received from investors who buy these new stocks. Problem of this type of capital acquisition is the fact that the value of the older stock becomes less, as more stocks are receiving dividend. The stock market values these new stock offerings often as negative, which caused stocks to fall. Falling stocks results in a lower value of the company. So a company under pressure from falling stocks, rasied capital, but causes stocks to fall further. Another consequence of the huge amount of capital raised, banks started to calculate these costs through to their customers. Higher interest rates applied for investors, households and businesses³⁹.

Other ways of raising capital is by demanding help from (local) governments. This is done by the Big Three in the U.S. The Big Three are the three largest automobile producers of the U.S., and also the part of the largest companies in the world. Ford, General Motors and Daimler-Chrysler each receiving billions of government support to keep their companies alive.

Mentioned earlier in this research are sovereign wealth funds (SWF). These funds are governmental investment funds. The largest and richest SWF are controlled by countries that have a great number of natural resources in their possession. For instance Norway and Saudi-Arabia have the largest SWF, formed from gas returns and oil profits. Banks that had a desperate need for money after the crisis went to these SWF to collect some billions. Daimler, mentioned before, were saved in March 2009 by Aabar Investments, a SWF from

³⁹ Ablan, Jennifer & Lilla Zuill, 2008. New capital raising to be costly for banks. *Reuters*, April 1, 2008. Retrieved on April 22, 2009 via: <http://www.reuters.com/article/reutersEdge/idUSL0155325320080401>.

the International Petroleum Investment Company from Abu Dhabi, one of the United Arab Emirates (UAE)⁴⁰. A risk of getting involved with these SWF are the politics between the concerning governments. Looking at the Daimler-example, the government of the UAE has a large stake in a German powerhouse, which could cause political issues if problems arise in the deal.

Figure 4.3: Writedowns and capital raised by financials worldwide⁴¹

Firm	Country	Writedown & Loss (\$ billion)	Capital Raised (\$ billion)
Wachovia Corporation	U.S.A.	97.9	11.0
Citigroup Inc.	U.S.A.	85.4	109.3
Merrill Lynch & Co.	U.S.A.	55.9	29.9
UBS AG	Switzerland	48.6	32.1
Washington Mutual Inc.	U.S.A.	45.6	12.1
Bank of America Corp.	U.S.A.	40.2	78.5
HSBC Holdings Plc	United Kingdom	33.1	4.9
JPMorgan Chase & Co.	U.S.A.	29.5	44.7
National City Corp.	U.S.A.	26.2	8.9
Morgan Stanley	U.S.A.	21.5	24.6
Wells Fargo & Company	U.S.A.	17.3	41.8
Lehman Brothers Holdings Inc.	U.S.A.	16.2	13.9
Deutsche Bank AG	Germany	15.8	5.9
Royal Bank of Scotland Group Plc	United Kingdom	14.8	50.1
Barclays Plc	United Kingdom	14.7	27.6
Credit Suisse Group AG	Switzerland	13.7	11.7
IKB Deutsche Industriebank AG	Germany	13.4	11.0
ING Groep N.V.	Netherlands	12.3	19.0

⁴⁰ Schäfer, Daniel, 2009. Daimler's move possible 'blueprint' for carmakers. *The Financial Times*, March 22, 2009. Retrieved on April 22, 2009 via: http://www.ft.com/cms/s/0/6891ece8-170c-11de-9a72-0000779fd2ac.html?ncllick_check=1.

⁴¹ Yap, Rodney & Dave Pierson, 2009. Banks' Subprime Market-Related Losses, Top \$815 Billion: Table. *Bloomberg Online*, February 9, 2009. Retrieved on March 19, 2009 via: <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aQBNVIONOiAc>.

HBOS Plc	United Kingdom	9.3	23.2
Credit Agricole S.A.	France	8.9	11.6
Fortis	Belgium	8.5	20.9
Mizuho Financial Group Inc.	Japan	8.1	6.6
Societe Generale	France	7.8	10.8
Goldman Sachs Group Inc.	U.S.A.	7.1	20.5
PNC Financial Services Group	U.S.A.	7.1	8.1
Bayerische Landesbank	Germany	6.8	19.3
Canadian Imperial Bank of Commerce	Canada	6.8	2.6
DZ Bank AG	Germany	6.7	0.0
SunTrust Banks Inc.	U.S.A.	6.0	4.8
BNP Paribas	France	5.5	3.3
Hypo Real Estate Holding AG	Germany	5.2	0.0
Indymac Bancorp	U.S.A.	4.9	0.0
Fifth Third Bancorp	U.S.A.	4.8	6.0
KBC Groep NV	Belgium	4.7	7.2
Banco Santander SA	Spain	4.7	18.6
Dresdner Bank AG	Germany	4.7	0.0
Natixis	France	4.5	7.5
Landesbank Baden-Wuerttemberg	Germany	4.3	0.0
Nomura Holdings Inc.	Japan	4.2	5.9
E*TRADE Financial Corp.	U.S.A.	4.2	2.2
UniCredit SpA	Italy	4.1	9.8
HSH Nordbank AG	Germany	3.8	1.6
Bank of China Ltd	China	3.7	0.0
Lloyds TSB Group Plc	United Kingdom	3.7	13.2
U.S. Bancorp	U.S.A.	3.5	6.6
Bear Stearns Companies Inc.	U.S.A.	3.2	0.0
Rabobank	Netherlands	3.2	0.0
WestLB AG	Germany	3.1	6.5
Commerzbank AG	Germany	2.8	23.8

Royal Bank of Canada	Canada	2.7	2.1
Sovereign Bancorp Inc.	U.S.A.	2.4	1.9
Landesbank Sachsen AG	Germany	2.3	0.0
Marshall & Ilsley Corp.	U.S.A.	2.2	1.7
ABN AMRO Holding NV	Netherlands	2.0	0.0
KeyCorp	U.S.A.	1.8	4.2
Mitsubishi UFJ Financial Group	Japan	1.8	10.5
Industrial & Commercial Bank of China	China	1.7	0.0
Huntington Bancshares	U.S.A.	1.6	2.0
Bank Hapoalim B.M.	Israel	1.6	2.2
Dexia SA	Belgium	1.5	8.3
BB&T Corp	U.S.A.	1.2	3.1
Sumitomo Mitsui Financial Group	Japan	1.1	12.6
Alliance & Leicester Plc	United Kindgom	1.1	0.0
Bank of Montreal	Canada	1.1	0.8
Groupe Caisse d'Epargne	Spain	1.0	0.0
Bank of Nova Scotia	Canada	1.0	0.2
Sumitomo Trust and Banking Co.	Japan	1.0	2.0
Gulf International Bank	Bahrain	1.0	1.0
National Bank of Canada	Canada	0.7	1.0
DBS Group Holdings Limited	Singapore	0.2	3.7
Other European Banks	Europe	8.2	3.9
Other Asian Banks	Asia	5.3	11.2
Other US Banks	U.S.A.	2.1	2.1
Other Canadian Banks	Canada	0.5	4.0
Total		815.6	855.7

4.2.2 Accounting problems

A problem in comparing the American problems with the European problems are the accounting differences between the continents. The U.S. compliances with the United States Generally Accepted Accounting Principles (US GAAP). The European banks report according to the International Financial Reporting Standards (IFRS, formerly known as International Accounting Standards (IAS)). These two methods are together the most important financial reporting methods. Many European firms reported until January 1, 2005 in compliance with the local GAAP (for instance Dutch GAAP, or German GAAP). These local GAAP was made by national government and accounting boards. For the uniformity of Europe and better comparable annual reports the European Commission has decided that from January 1, 2005 every listed firm in Europe had to report in compliance with IFRS. This meant for many companies a huge switch.

The differences between IFRS and US GAAP are small, but notable. IFRS has a more principle-based approach, which means that there are less guidances. US GAAP is more rule-based, and therefore has more specific application guidances. There are also some small differences for instance when determining inventory value: IFRS prohibits LIFO, US GAAP does not. In banking terms differences exists between the inclusion of cash overdrafts, tax reportings, lease disclosures and the qualification of SPE's. But as stated earlier, differences are minimal so IFRS and US GAAP can be compared really well.⁴² Ryan (2008)⁴³ has added to the discussion regarding accounting's contribution to the subprime crisis. Ryan describes different aspects of the subprime crisis, in combination with some Financial Accounting Standards (FAS)-rules. Especially the 'fair value-subject' that is under discussion now. Should balance sheets contain only fair values or is cost accounting and sale accounting good as well? Ryan does not draw any hard conclusions about the role of accounting in the crisis, but mentions the role of the crisis for accounting standards in the future: *Accounting standard setters need to consider what guidance and disclosures to require. Preparers need to provide these disclosures in an informative fashion, and users must analyze them carefully and dispassionately. Accounting researchers and teachers can contribute to all of these processes.*

⁴² Deloitte & Touche, 2005. Some Key Differences Between IFRS and US GAAP as of August 2005. Retrieved on February 7, 2009 via: <http://www.cs.trinity.edu/~rjensen/Calgary/CD/JensenPowerPoint/IAS%20Plus%20-%20Comparison%20of%20IFRSs%20and%20US%20GAAP.htm>.

⁴³ Ryan, Stephen G., 2008. Accounting in and for the Subprime Crisis. *Stern School of Business Working Paper*. Retrieved on February 23, 2008 via SSRN: <http://www.ssrn.com>.

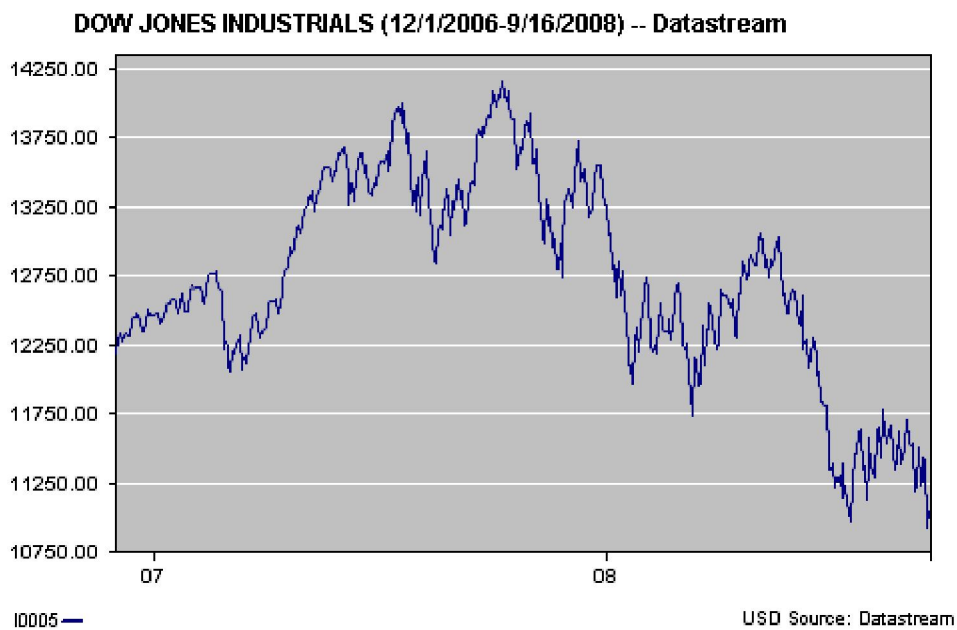
This difference in accounting standards is also an important factor in the empirical part of this research. It determines differences in balance sheets of European and American banks.

4.3 Role of MBSs and ABSs in the credit crisis

The large securitization of the MBS and ABSs by the investment banks, enhanced the growing negative feelings in the market. As a result of the securitization, almost no investor could tell what kind of risk his company had in its portfolio, nor could they tell what kind of loans they had securitized at other financial institutions. This led to an increasing negativism in the financial world.

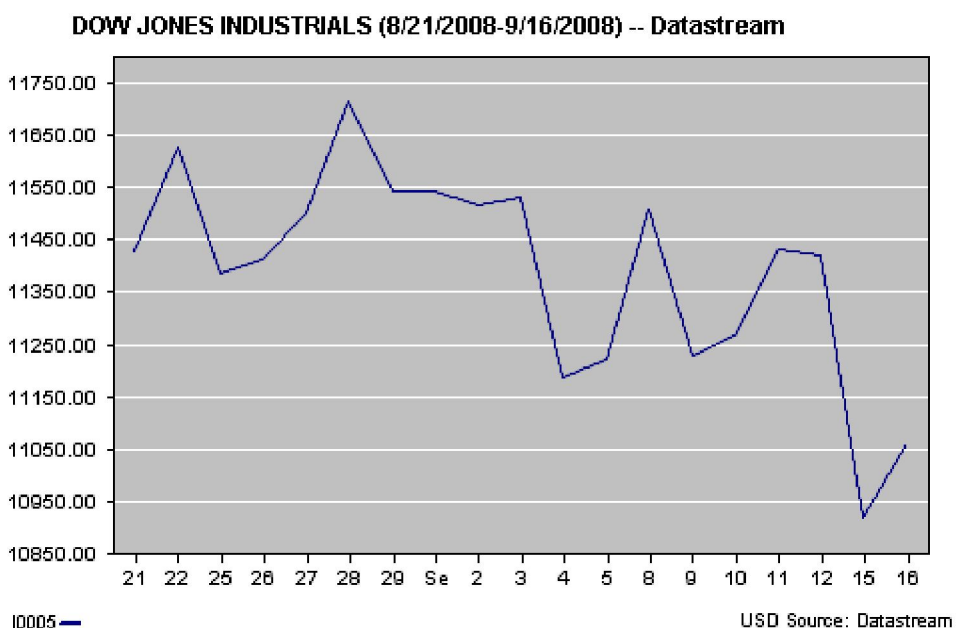
The stock market is very vulnerable to sentiments. When numbers about customer confidence become known, the stock market responds heavily to it. This was also the case when the negative spirits from the widespread securitization of different types of MBSs (including the well-known CDOs) entered the stock market. The stocks fell hard, which caused the whole world to see the effects of a small housing crisis in a part of the U.S. But as a result of plunging stocks, the company equity was eroded, which led to a higher leverage, and more uncertainty. If the central banks did not interfere, the financial system would go down very quickly. Central banks started to pump money in the financial system, to calm it down and making sure enough money was available to save some struggling banks, like Citigroup and Merrill Lynch. The crisis seemed controllable in beginning of 2008, but as a result of continuing defaulting of mortgages and bad investments, some banks and insurance companies became distressed. The best examples are Lehman Brothers (which filed Chapter 11 bankruptcy), Merrill Lynch (which was bought by Bank of America) and the American Investment Group (AIG), who was in desperate need of money. On September 16, 2008, the various central banks pumped huge amounts of money in the system again. The European Central Bank (ECB) pumped a total of 100 billion euro in the market between September 15 and September 16. The Japanese central Bank provided 2.5 trillion yen, which accounts for 17 billion euro and the British National Bank added 25 billion pound, almost 32 billion euro to the economy in just two days. The development of the stock market can be observed in figure 4.4.

Figure 4.4: Dow Jones stock chart 1 December 2006 – 16 September 2008



The value of the Dow Jones index in the period between 21 August and 16 September, the period that that the central banks interfered largely in the financial world, can be observed in figure 4.5. The Dow Jones reacted strongly on the news of the large American banks and insurance companies who had become distressed. It seriously decreased in value. On September 15, the trend shifted up, after the central banks had pumped money in the economy.

Figure 4.5: Dow Jones stock chart 21 August 2008 – 16 September 2008



“ You have to know what risk you are managing, or else risk you will manage nothing at all. ”

Section 5: Risk management

In the previous section the troubles surrounding the MBS and ABS investments were described. Questions regarding risk management and risk appetite may have arisen, so in this section the role of risk management is described. Paragraph 1 elaborates on risk management practices. Section 5.2 describes the Basle agreements, which took care of more regulation in the financial world. In 5.3 there is elaborated on risk management at banks. Scientific research is reviewed in the wake of the recent events. Paragraph 5.4 looks at risks in the subprime crisis. Paragraph 5.5 specifies the regulator's and ratings agency's role in the crisis.

5.1 Early practices

The practice of risk management is widely accepted within the financial world. The importance increased in the early 1990's, because the shocks of Black Monday on 19 October 1987 were still felt 3 years later, for instance the recession in Japan. Risk managers started thinking of systems that could prevent such large losses. The cooperation between large financial institutions, the financial market and financial theories led to RiskMetrics' Value-at-Risk (VaR) in July 1993.

VaR uses a quantitative approach to risk management, using normal distribution, standard deviation, volatility from a simulation to measure the maximum loss that will not be exceeded during a given period, given a certain probability. For instance: the VaR shows that in the following 3-months a bank will not lose more than 15 million with a probability of 95%. In the same 3 months the same bank will not lose more than 55 million with a probability of 99%. The goal of VaR is to give financial institutions an amount they have to

reserve for ‘special days’: days in which losses can be extremely high. So high that badly risk-managed companies can become distressed due to a sudden shortage of funds.⁴⁴

Risk management has become since one of the most important parts of a financial institution. It has been implemented in nearly every part of every publicly traded company. Private companies are using it nowadays in large numbers as well. When determining the Value-at-Risk of an investment, possible future values of the investment must be estimated (if necessary, with help of a (Monte Carlo) simulation), which yield a distribution of the values of the investment. This distribution yields a VaR at a chosen probability (for instance the 95%-VaR), which represents a number. This number is maximum loss that will not be exceeded during a specified period, given the chosen probability.

Of course assumptions are made in calculating the VaR. The most important and perhaps most logical is that the investment or portfolio of which the VaR has been calculated does not change over the period. This assumption is hard to maintain when working with investments over longer periods. Therefore VaR is more appropriate for calculating intra-day portfolio's.

5.2 Basle agreements⁴⁵

The use of VaR in the commercial bank industry is nowadays widely accepted and implemented. With the signing of the the Basle I and Basle II-accords the importance of VaR became clear. The Basle I and II-accords are proposed by the Bank for International Settlement (BIS) in 1988 and 1996 respectively. Basle II replaced the Basle I-agreement. The main focus of Basle I is that the BIS-ratio of 8% must be achieved at every loan that goes out of a bank. So 8 cents in the dollar has to be put aside when banks lend money. With some types of loans this ratio can be lower. For instance mortgages and obligations, who have a higher certainty of repayment the reserved amount can be halved, because only 50% of the loan has to be backed by reserves. The big disadvantage of this system is that

⁴⁴ Hull, John C., 2005. *Fundamentals of Futures and Options Markets*. International 5th ed. Upper Saddle River (NJ), U.S.A.: Pearson Prentice Hall.

⁴⁵ Bank for International Settlements – Basel Committee for Banking Supervision, 2004. *International Convergence of Capital Measurement and Capital Standards – A Revised Framework*. Retrieved on October 12, 2008 via: <http://www.bis.org/publ/bcbs107.pdf?noframes=1>.

every loan is treated the same way (except the mortgages and obligations), and that it is an incentive to take excessive risk to achieve the BIS-ratio.

In Basle II, this disadvantage is been solved by agreeing that banks can use their own rating system to valuate the risk of a loan. With help of their own rating system (IRB) and the risk assessment, money will be reserved to form a buffer for bad periods. Also a standardized approach can be followed, where standard ratings can be used.

The Basle agreements focus on three pillars: capital reserves in the wake of risk management, the control proces of controlling institutions and the transparancy in the information stream of banks. The Basle II agreement focused on improvements made on the first pillar.

5.3 Risk management at commercial banks

Banks mostly have their own risk department. According to Oldfield & Santomero (1997)⁴⁶ there are several reasons to justify risk management. The reasons are:

- Managerial self-interest. Managers cannot diversify risk fully at commercial banks. This is due to limited wealth and limited possibilities of investment opportunities. Risk management can help managers to create more a certain and stable income from their investments.
- Tax effects. When the volatility of investments is reduced through risk management, this can lower the tax burden on the bank.
- The cost of financial distress. With adequate risk management, banks can prevent from becoming financially distressed in case of an event.
- Capital market imperfections. With risk management banks protect themselves from imperfections as transaction costs or non-transparent information from competitors and other players in the market environment.

⁴⁶ Oldfield, George S. & Anthony M. Santomero, 1997. Risk Management in Financial Institutions. *Sloan Management Review*, 39(1), pp. 33-46.

As is discussed in Santomero (1997)⁴⁷ these actions are rational to follow as, according to standard economic theory, managers ought to maximise expected profit with respect to the variability around its expected value.

Commercial bank risks can be divided into three groups:

- Risks that can be eliminated or avoided by simple business practices. In order to minimize the losses that do not have anything to do with the banks businesses, three types of practices can be applied. These are: standardization of the financial process, portfolio constructions to diversify and incentive contracts for managers. These practices lead to a prevention of risks being taken that are not necessary.
- Risks that can be transferred to other participants. By using derivatives and duration approximations risk can be transferred to other participants, which mitigates the risk for the commercial banks. This is something that has been done extensively recent years. This transferring of risks lead to a highly securitized market environment.
- Risks that must be actively managed at the firm level. Some risks belong to the activities of the bank and can only be limited at the firm level. For instance with complex investments that have small secondary markets. Important in this group is effective monitoring and managing risk, with help of instruments like Value-at-Risk. Also moral hazard is important to take care of, especially when dealing with insurances of customers. Sometimes it is needed to take risks at firm level, because this is the reason that banks exist. It is part of their job as a bank, as customers transfer the risk to the bank. See for instance Calomiris (1999)⁴⁸ for a more detailed view into incentives as means for safe banking strategies.

Banks have several options in how they manage the risk to which they are exposed:

- By setting standards and demanding reports. When banks adapt a risk management strategy in which openness and transparent information flows are normal, its strategy has a chance to succeed. But banks must be open and transparent before any 'risky' transaction is done. This can be done by setting clear guidelines for their

⁴⁷ Santomero, Anthony M., 1997. Commercial Bank Risk Management: An Analysis of the Process. *Journal of Financial Services Research*, 12(2), pp. 83-115.

⁴⁸ Calomiris, Charles W., 1999. Building an incentive-compatible safety net. *Journal of Banking and Finance*, 23(10), pp. 1499-1519.

risk managers and demanding reports about the risks from them. Also regular audits are a helpful tool. In this way, management is able to check the actions of the risk department. This gives also more information to the outside world, which can increase the status and value of the company.

- By setting position limits and other rules for transactions. By restricting managers in their actions regarding risk, management can protect the company for burdening too much risk. This can be done by imposing limits (maximum and minimum) on the positions managers are able to step into. This is helpful for different kinds of risk, as discussed in section 4.1.2 (regarding hedge funds), and different types of market players.
- By setting investment guidelines and strategies. Another way of coping with risk for commercial banks is setting investment guidelines and strategies. When all managers are forced to follow these guidelines and strategies a more unequivocal policy is created, which favors the transparency of the risk management activities for the bank's management. The guidelines can also lead to firm-wide diversification. Also ethical codes can be added to the guidelines.
- By rewarding with incentive schemes. Rewarding managers with incentive schemes is almost always a good way of preventing a risk manager becoming risk loving. By connecting his payoff to the risk borne by the manager can lead to lower risk management costs. But, these managers still need to be controlled, as they can become risk loving in their hunger to higher profits, which can lead to higher payoffs and bonuses for the managers.

The different ways of managing the risk are not exclusive. Sometimes combinations of possible ways to perform risk management can prove to be successful. The first two points of the enumeration are basic tools that are used in almost every financial institution. The last two are less used, but can still make the difference between AAA and AA-rating.

These are the most important reasons, exposures and treatments of risk and risk management for commercial banks. This enumeration can be applied to a lot of sectors within an economy, but are especially important for commercial banks, because they have large amount of cash outstanding and are vulnerable to sentiments. Sentiments like trust and confidence are important for banks, because that is an important factor for people and

businesses to go to that bank. When these sentiments are negative for a bank, it soon loses customers and with it the profitability.

5.4 Risk management during the credit crunch

As mentioned before risk management is an important part of a financial institution. As the crisis worsened it became clear that the risk management practices at companies did not fulfill their purpose. Which mistakes and wrong assumptions commercial banks made by setting their VaR? Did regulators and market analysis companies made any mistakes regarding risk management practices.

The problem of fat tails in the distribution of the VaR is a commonly made error. Fat tails result in a underestimation of the maximum loss. A normal distribution can be drawn with an end value which lies beyond the 95%-loss-value. When a distribution has fat tails, the end value of the loss lies much further beyond the 95%-line. For instance when the 95%-loss line lies at 100, in 5% of the cases the loss is larger than 100. But fat tails result in a uncertainty if this 5% loss is 110, 200 or 1000. That is what happened in the credit crunch. Because the distributions had fat tails commercial banks underestimated their losses in 5% of the cases.

How about the regulation by the central banks and governments regarding risk management? In finding an answer to the credit crisis central banks and governments acted individually when setting standards and regulations for commercial banks. As was concluded by a G20-summit in Washington in November 2008⁴⁹, the credit crisis could be taken down more efficient when all parties involved started to work together. When the financial sector becomes more transparent, the regulations and standards would become more efficient. The G20 also agreed in setting standards for bonuses and rewards for top managers, something that differed a lot in various countries. As discussed earlier in this research, excessive bonuses and incentives trigger managers to take a lot of risk on the company's balance sheet to get a high short term profit.

⁴⁹ Council on Foreign Relations, 2008. *Statement from G-20 Summit, November 2008*. Retrieved on October 29, 2008 via: <http://www.cfr.org/publication/17778/>.

5.5 Regulator's and rating agency's role in the crisis

It is clear that risk management practices at most commercial banks were not effective enough, as the crisis caused a lot of defaults and salvage operations by central banks and governments. As the crisis unfolded through time, criticism on regulators and market analysts regarding wrong assumptions and regulations became larger. For instance, the Securities and Exchange Commission (SEC), who should keep an eye on the financial market did warn very late for a growing bubble and the red-hot market which was about to collapse. Also rating agencies did not understand the risks which was taken by the investments done by banks and listed companies in the build-up to the crisis. This section is about the mistakes regulators and rating agencies made.

5.5.1 Financial market regulation

The U.S. financial market are controlled and regulated by a number of organs. The most important regulator is the SEC, who is the official Federal Agency. Other minor regulators on financial markets are the U.S. Treasury's Financial Crimes Enforcement Network and the Office of the Comptroller of the Currency. These have more to do with criminal acts like fraud, secrecy scandals and counterfeiting. There are regulators of futures trading (Commodity Futures Trading Commission) and credit granters (National Credit Union Administration). But the most important regulators is the SEC. It's job is *to protect investors, maintain fair, orderly, and efficient markets, and facilitate capital formation. All it's actions are to promote capital formation that is necessary to sustain economic growth*⁵⁰. As the SEC is the Federal Regulator it is obliged to keep itself to U.S. laws.

In this crisis, the SEC did fall short on a number of occasions and situations. If they had not made these, the crisis probably would have been smaller and less spread. The most important mistake was made long before this crisis strated. The cause of this crisis lies on the U.S. mortgage market for subprime loans. People who had no collateral at all were granted a high mortgage for a house. When looking at that mistake now, former Fed chairman Alan Greenspan acknowledges that this is the biggest mistake the SEC made⁵¹. Also Greenspan's yo-yo-ing with interest rates caused markets to respond heavily on

⁵⁰ U.S. Securities and Exchange Commission, 2008. *What We Do*. Retrieved on April 22, 2009 via: <http://www.sec.gov/about/whatwedo.shtml>.

⁵¹ Myers, Lisa, 2008. Greenspan admits 'mistake' that helped crisis. *MSNBC Online*, October 23, 2008. Retrieved on April 22, 2009 via: <http://www.msnbc.msn.com/id/27335454/>.

demand from investors. Rates were slashed quickly after 9/11 and the war on terror. When the market rose in 2003, rates were kept too long too low, causing frenzy on the housing market, because this is a lucrative business as rates are low. When the Fed saw that the rates had to rise, they did this too fast, resulting in defaulting investors who could no longer afford their mortgage. In a statement made in front of the Committee of Government Oversight and Reform, which was looking at the role of regulators, Greenspan pointed out that on the point of risk the Fed and SEC regarded this as a problem of underwriters and did not see the underpricing of it⁵².

Former Secretary of Treasury John W. Snow stated the *underpricing of risk (..) led to new, exotic and opaque financial instruments*, which were difficult to regulate. In combination with the lack of transparency in secondary markets, which *left policy makers and regulators unable to discern the true nature and extent of systematic risks that continued to build*. Snow testified that he warned in April 2005 for *GSE-related hedges*. In September 2003 he already *urged on enactment on legislation to protect taxpayers*. He also acknowledged that *the regulatory system had contributed to the lack of transparency because of a bewildering array of federal and state authorities, with no one regulator having a full view*. In the Treasury Department he also started *an initiative with the UK and EU to make sure they were prepared for a financial crises*⁵³.

Both Greenspan and Snow also pointed a finger to rating agencies, who wrongly judged the risks present in the market.

The third witness in the hearing by the Committee was Christopher Cox, chairman of the SEC. He pointed out that in his view *securitization spread the problem to broader markets*. GSEs became a *magnet for the creation of enormous volumes of increasingly complex securities*. Cox says on the role of rating agencies in the 'blind' pricing of MBSs: *the credit rating agencies, which until late September 2007 were not regulated by statute, notoriously gave AAA ratings to these structured MBSs. (...) the ratings agencies sometimes helped to*

⁵² Greenspan, Alan, 2008. Testimony for the Hearing 'Financial Crisis and the Role of Federal Regulators'. U.S. House of Representatives Committee on Government Oversight and Reform Hearing Document. Retrieved on April 22, 2009 via: <http://oversight.house.gov/documents/20081023100438.pdf>.

⁵³ Snow, John W., 2008. Testimony for the Hearing 'Financial Crisis and the Role of Federal Regulators'. U.S. House of Representatives Committee on Government Oversight and Reform Hearing Document. Retrieved on April 22, 2009 via: <http://oversight.house.gov/documents/20081023100505.pdf>.

*design these securities so they could qualify for higher ratings. Cox' SEC had ratings incorporated in his risk-models.*⁵⁴

So, it is evidently that the SEC made mistakes regarding the pricing of risk in the market and the control on the role of large players in the mortgage market like GSEs. The Fed made mistakes in the process of shifting the interest rates and the regulation of the mortgage market. But all witnesses named the power of rating agencies as a concerning one.

5.5.2 Rating agency's mistakes⁵⁵

The Committee on Government Oversight and Reform also had a hearing day on the subject of rating agencies. This committee obtained some confidential e-mails between employees of rating agencies and between customers and rating agencies. This adds a lot to the interest of the story of the role of rating agencies in the subprime crisis.

There are three large rating agencies on Wall Street. These are Standard & Poor's (S&P), Moody's and Fitch Ratings. Their job is to evaluate all investments that are tradeable on Wall Street. Stocks are rated by looking at the debt of the company, MBSs are rated by looking at the collateral. Ratings vary from AAA (investment grade) to D (junk grade). Fitch slightly differs in the name tags placed on investments. When the rating agencies lower a rating for a product, this has large consequences for the product. The demand falls and prices rise as a result. If a product or company is rated AAA this gives advantages. Companies have more access to cheap debt and products are sold for higher prices. So the power of these agencies is very large. And despite this power, the SEC does not actually regulate these agencies, even as they made faults in the Enron and Worldcom-scandals.

In the testimonials of the executives of the rating agencies the same conclusions spring into view. They all say, that they did not see this huge crisis coming and therefore they could

⁵⁴ Cox, Christopher, 2008. Testimony for the Hearing 'Financial Crisis and the Role of Federal Regulators'. *U.S. House of Representatives Committee on Government Oversight and Reform Hearing Document*. Retrieved on April 22, 2009 via: <http://oversight.house.gov/documents/20081023100525.pdf>.

⁵⁵ Waxman, Henry A., 2008. Opening Statement for the Hearing 'Credit Rating Agencies and the Financial Crisis'. *U.S. House of Representatives Committee on Government Oversight and Reform Hearing Document*. Retrieved on April 22, 2009 via: <http://oversight.house.gov/documents/20081022102221.pdf>. All quotes originate from this source, as this is a summary of preliminary research before the actual hearing.

not have anticipated it in their ratings. But as chairman Henry A. Waxman of the Committee points out, this is not true, as obtained e-mails show other information was present long before the crisis. In one of these e-mails one executive talks about a conversation with a Fortis trader. The trader thinks ratings are useless, as they are not correct at that time. The stock and investments of Fortis should be rated higher. Also e-mail conversation to and from Ray McDaniel, CEO of Moody's show that they already know that their ratings are incorrect: *The real problem is not that the market (...) underweight(s) ratings quality but rather that in some sectors, it actually penalizes quality. (...) It turns out that ratings quality has surprisingly few friends: issuers want high ratings; investors don't want ratings downgrades; short-sighted bankers labor short-sightedly to game the ratings agencies.*

McDaniel also warned that competitors are rating in a wrong way: *What happened was, it was a slippery slope. (...) What happened in '04 and '05 with respect to subordinated tranches is that our competition, Fitch and S&P, went nuts. Everything was investment grade. It didn't really matter. (...) We tried to alert the market. We said we're not rating it. This stuff isn't investment grade. No one cared because the machine just kept going.*

Also e-mails between Frank Raiter, a former executive of S&P and Richard Gugliada, managing director of S&P, are typical for the situation in the agencies. Raiter is asked to rate an early CDO. He asked for collateral tapes, so that he could judge the creditworthiness of the home loans backing the CDO. The answer from Gugliada to this request: *Any request for loan level tapes is TOTALLY UNREASONABLE!!! Most investors don't have it and can't provide it. Nevertheless we MUST produce a credit estimate. (...) It is your responsibility to provide those credit estimates and your responsibility to devise some method for doing so.* Raiter replied: *This is the most amazing memo I have ever received in my business career.*

It is obvious that the power of rating agencies is a bad thing. But when rating agencies are only busy trying to win market share in the rating-marketplace, the quality of these ratings will inadvertently drop. This has effects on the quality of the ratings of other companies, as they monitor each other closely. This affects whole Wall Street and other global tradefloors. Some interesting facts from the statement by Waxman: *The leading credit rating agencies grew rich rating MBSs and CDOs. (...) total revenues for the three firms doubled from \$3*

billion in 2002 to over \$6 billion in 2007. At Moody's, profits quadrupled between 2000 and 2007. In fact, Moody's had the highest profit margin of any company in the S&P500 for five years in row.

Possible solutions to these problems are difficult and perhaps unthinkable, but the best solutions would be that there is one rating agency, which is semi-controlled by the U.S. government. It should have the characteristics of the SEC. It should not have a profit motive, so that it does not matter if a company is downgraded, because the rating agency will not lose a 'customer'.

‘ *It is said that the world is in a state of bankruptcy, that the world owes the world more than the world can pay.* ’

Ralph Waldo Emerson (1803-1882), American essayist, philosopher and poet

Section 6: Growing problems

In previous sections the problems on the American part of the world were discussed. There is elaborated on problems in the US house market (flipping, default on mortgages and foreclosures). The problems regarding the hedge funds were discussed next, with some high-profile casualties (Bear Stearns) and the Fed's actions to that. In Section 4 the mortgage-backed security and the securitization problem were discussed. The previous section zoomed in on risk management at commercial banks. In this section the next step of credit crunch is discussed. How did it spread to Europe, and how did it become an all-economic crisis. Also the importance of the stock market is examined.

6.1 Minor US effects

After reports from the American continent over its housing problems and troubled hedge funds, economists warned already for a massive economic crash as early as January 2008. The Bear Stearns hedge fund collapsed in June and July 2007. In the second half of 2007 reports became public that major US banks had to do massive write-offs in order to keep their balance sheets healthy. Europe was looking frightened to the left, despite its protection measures did not make headlines of the newspapers, with the result that a lot of people thought it was still far away.

6.1.1 Monoline insurers⁵⁶

Another important signal that the financial system was seriously disrupted was the downgrading of monoline insurers Financial Guaranty Insurance Company (FGIC), Ambac and MBIA in January 2008⁵⁷. Standard & Poor's, Moody's and Fitch were all downgrading the financial services companies from AAA to something below that (mostly AA). This downgrading had been done after the insurers announced that they were looking for capital for continuing to be able to pay their customers. They also announced they would stop insuring obligations in the next six months. The functions of a monoliner is taking care of timely payments of the principal amount of an obligation when an issuer cannot fulfil its obligation⁵⁸. It is absolutely vital that these monoliners keep the best rating possible, because it is a really negative signal when the insurer of obligation payments is subject of a credit event (default or downgrading). This is also the reason no monoline insure company ever had a credit event before 2007. As a result of the first ever downgrading of a obligation insurer more than 100,000 bonds had to be downgraded, as they were less certain to be repayed or insured.

These credit events did make the headlines in Europe, but did not cause much panic in the market, as many people did not realise the great importance of these monoliners. But those who did monitor the financial credit crunch closely, knew that it would only be a matter of time before Europe would start to feel the problems. This wake-up call from the United States can be seen in the difference between the development of the leading stock indices in the US and Europe, in figure 6.1.

In March and April the indices in London (FTSE100), Paris (CAC40) and Amsterdam (AEX) all had a larger dip in their price charts than the most important American index, the Dow Jones Industrial. The Dow remains stable around 92%, while the European indices fall from 90% until 85% (FTSE) or fall from 85% until 80% (CAC40 and AEX). Such a

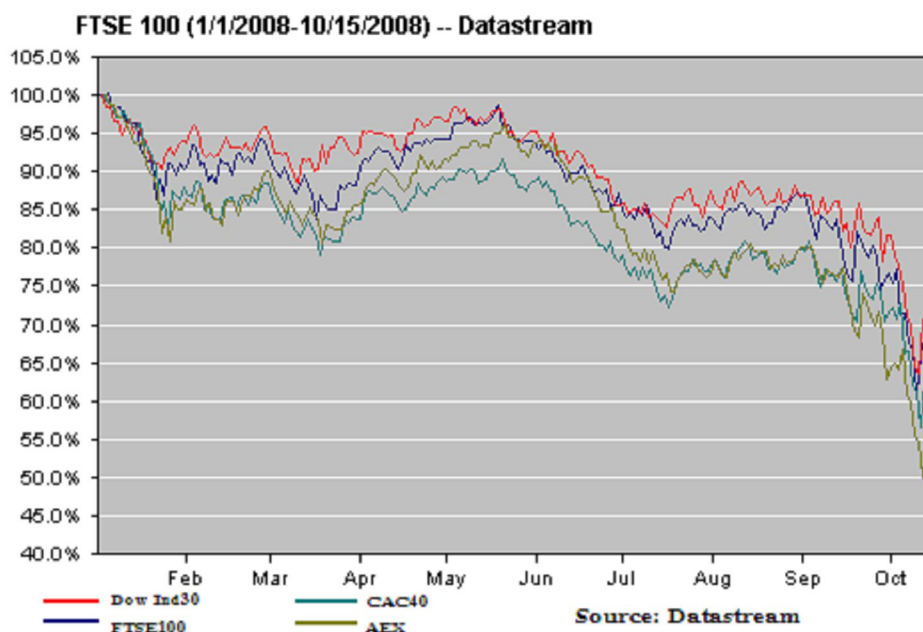
⁵⁶ Rasul, Sohail, 2005. Monoline financial guaranty insurance in structured credit markets. *XL Capital Assurance White Paper*. Retrieved on September 26, 2008 via: <http://jobfunctions.bnet.com/abstract.aspx?docid=151042>.

⁵⁷ Richard, Christine, 2008. Ambac's Insurance Unit Cut to AA From AAA by Fitch Ratings. *Bloomberg Online*, January 19, 2008. Retrieved on September 24, 2008 via: <http://www.bloomberg.com/apps/news?pid=20601087&sid=asLtTQyLRQOs&refer=home>

⁵⁸ Hyder, Iftikhar, 2002. Collateralised debt obligations and the role of monoline insurers. *XL Capital Assurance White Paper*. Retrieved on September 26, 2008 via: <http://www.securitization.net/pdf/EuromoneyHandbook2003.pdf>.

difference had been made earlier in the chart as well, in January 2008. The drop in the European charts is larger than the American. All indices start at 100%, but the European indices have lost more of their value when February starts. This is the result of the fact that American index has suffered more corrections in 2007 than the European. The European indices were firmly corrected in the first half of 2008.

Figure 6.1: Price chart US and European indices



6.1.2 GSEs in trouble

Adding to the growing uncertainty in the market after the monoliners were downgraded, was the problems surrounding the GSEs Freddie Mac, Fannie Mae and Ginnie Mae. The purpose of these GSEs is explained earlier in this paper, but in short it becomes clear that they are semi-governmental companies who are the major mortgage writers. They buy the mortgages from households and other secondary markets, re-pack them into packages and sell these on the financial market.

On 13 July 2008 a first rescue attempt was been done by Treasury Secretary Henry Paulson. In the week before this rescue attempt shares of the GSEs had fallen by almost 50% from 2008 highest value. The three-point plan for immediate actions was as follows: GSEs are granted a larger line of credit from the Federal Reserve. The second point was that the Federal Reserve could take a share in the GSEs if they were in need of cash. Third and last, Congress plans to reform GSEs are pushed through, in order to prevent systemic

risk⁵⁹. The second point of the action plan from Paulson was brought into effect on 7 September 2008, when director James B. Lockhart III of the Federal Housing Finance Agency (FHFA) announced that two of the four GSEs (Fannie Mae and Freddie Mac) would be controlled by his organisation, as a result of court order⁶⁰. This is called conservatorship. The FHFA is a part of the Federal Reserve. With this action, the Fed tried to calm the financial markets. It signalled to the investors that things at the GSE were safer than ever before, because the U.S. Government backed them with money.

6.2 Europe is feeling it too

As mentioned earlier in this paper, the European central banks interfered with lots of capital injections in the market in 2007 and some minor interest rate changes. When Bank of England Governor Mervyn King announced these interest rate changes, they were *a bolt out of the blue*⁶¹. When 2008 began, the crisis still was an American problem. American mortgage suppliers were troubled, American hedge funds defaulted and the Fed had to take actions in order to calm the market. Besides the failed German hedge fund, Northern Rock's *run-on-the-bank* and some 'minor' capital injections, Europe did not worry.

6.2.1 Lehman Brothers

This was until 15 September 2008⁶². Then, on the other side of the Atlantic, the trusted century-old bank Lehman Brothers filed for bankruptcy. The bank was founded in 1850 and was long seen as one of the most reliable banks of the world. Despite the September 11 attacks, which completely destroyed its headquarters located in the World Trade Center in New York, the bank kept its reputation by relocating its businesses rapidly in the days following. It was also involved in a settlement with the US Securities and Exchange Commission in 2003, which costed the firm \$80 million dollar.

⁵⁹ Paulson, Henry M., 2008. Paulson Announces GSE Initiatives. *U.S Department of the Treasury Press Room*. Retrieved on October 6, 2008 via: <http://www.treasury.gov/press/releases/hp1079.htm>.

⁶⁰ Lockhart, James B., 2008. Statement of FHFA Director James B. Lockhart. *Federal Housing Finance Agency Statement*. Retrieved on October 5, 2008 via: <http://www.ofheo.gov/media/gsesign.pdf>.

⁶¹ Brummer, Alex, 2007. Fasten your seatbelts. *ThisIsMoney.com, November 15, 2007*. Retrieved on October 9, 2008 via: http://www.thisismoney.co.uk/news/article.html?in_article_id=426335&in_page_id=2

⁶² Dougherty, Carter & Katrin Bennholt, 2008. For Europe, the credit crunch is here. *International Herald Tribune Online, October 10, 2008*. Retrieved on October 18, 2008 via: <http://www.iht.com/articles/2008/10/10/business/crunch.php>.

The subprime crisis hit the investment bank harder. It reported a \$3 bln loss in its second quarter of 2008. The already weak stock of Lehman further was put under further pressure by a \$6 bln stock offering. Bad investment in the subprime market forced the company to do heavy write-offs. The third quarter was not anything better, reporting a loss of \$3.9 bln. The same day its shares lost 45% after reports came out that the bank had spoken with the Korean Development Bank about an acquisition. Five days after these numbers were made public, it filed for Chapter 11 bankruptcy. A testimony by University of Chicago professor Luigi Zingales for the Committee on Oversight and Government Reform regarding the causes and effects of the Lehman Brothers failure, gave some interesting insights in this process. Zingales stated that multiple factors were the cause of the collapse. *The extremely high leverage of leverage (asset-to-equity ratio) and the strong reliance on short-term debt financing, was the most important contributing factor, but also a bad regulation which relied heavily on credit-rating agencies measures of risk without understating the incentives this creates on the regulated to game the system and lobby the credit-rating agencies for sweet deals* was criticised by Zingales. Too few transparency and market complacency were also important in the bust *as the market for CDS grew unregulated from almost zero to more than \$44 trillion (more than twice the size of the U.S. stock market) (...) The same is true for the MBS-market (...) Most of these securities were issued under the 144A rule, with limited disclosure.* Zingales thinks that the Lehman bankruptcy *forces the market to reassess risk.* Zingales compares it to a flood: *after a major flood people start to buy flood insurance. After the demise of Lehman the market started to worry about several risks previously overlooked.*⁶³

European banks (including the Dutch banks that are investigated in this paper), which had investments at Lehman Brothers, became worried that they might not see parts or their invested capital back. European stock markets fall.

6.2.2 European death spiral

Suddenly Europe became nervous. Lots of banks and financial institutions in Europe had CDOs or other MBSs outstanding at Lehman Brothers. The already panical American banking sector dragged Europe into the financial confidence crisis. European banks started

⁶³ Zingales, Luigi, 2008. Causes and Effects of the Lehman Brothers Bankruptcy. *Testimony before the Committee on Oversight and Government Reform of the U.S. House of Representatives.* Retrieved on November 6, 2008 via SSRN: <http://www.ssrn.com>.

to distrust each other and stopped with lending each other money. Lehman Brothers did have some European subsidiaries, who were bankrupt now too, which sucked liquidity and confidence out of the market.

More and more banks had to write-off huge amounts of money in order to keep the balance sheets healthy. Stock markets plummeted, which can be observed in figure 6.1. The falling stocks caused more panic, which caused more distressed banks, which caused less confidence and liquidity, which caused more panic. This 'spiral of death' could cause the financial system to fail without interference from central bank and the International Monetary Fund (IMF).

The interferences in September and October of 2008 made the capital injections of August 2007 look like peanuts. Billions of money (nobody knows exactly how much was reserved) were pumped into the system to ensure liquidity. Other billions of dollars were reserved for banks as central banks tried to revive the confidence in the market. Once banks would trust each others balance sheets again, they would start lending money to each other, which restarted the engine of the economy. 'Money has to flow' is an appropriate proverb⁶⁴.

6.3 Iceland's banking system: too big to fail

But not only the banking sector had troubles. Also macro-economical problems arised from the credit crunch. The main now-known victim of this crisis is Iceland. The island in the Atlantic Ocean with 319,000⁶⁵ inhabitants reported financial troubles in the first days of October 2008. The three major banks are nationalised since.

The economy of the island between the US and Europe had been small ever since, but since the privatising and forming of three commercial banks (Kaupthing, Glitnir and Landsbanki) in the 90's it has grown to one of the wealthiest countries of the world, looking at the GDP per capita. But its current account deficit also grewed rapidly. Due to attractive interest rates and fiscal conditions it loaned domestic investors and companies much money. Therefore it had to go to the foreign money market to borrow the money. A lot of money. So much, that nowadays Icelandic banks' foreign loans are approximately 10 times the

⁶⁴ Algemeen Nederlands Persbureau, 2008. Bos: 'Overheid wil vertrouwen banken herstellen'. *Z24 Business Nieuws Online*. Retrieved on October 22, 2008 via: http://www.z24.nl/bedrijven/finance/artikel_35257.z24.

⁶⁵ Statistics Iceland, 2009. *Key figures*. Retrieved on March 20, 2009 via: <http://www.statice.is/?PageID=1390>.

GDP of the country itself. The positive thing about the banking system of Iceland is that the banks did not have any large exposures to high-risk investments, as the investment climate in the country itself is good enough. But when the credit crisis reached Europe, the banks could not roll over their foreign loans. Iceland could not save the banks when they collapsed as they represented 10 times more value than the GDP. Iceland did not have enough money available to bail out the banks, which for instance could be done by The Netherlands in the Dutch part of Fortis.

Another influence of the worsening state of Iceland's economy is the policy of Seðlabanki Íslands (Central Bank of Iceland). Seðlabanki tried to maintain the inflation within limits with help of interest rate changes. This is a common policy which is executed by many central banks. Inflation is high as a result of the huge amount of foreign assets; to maintain a reasonable debt/equity ratio Seðlabanki printed more Icelandic Krona (ISK) than was good for the economy. This boosted inflation, which they tried to calm with interest rates. As a result of the high inflation it was cheap for Icelandic households and companies to borrow in foreign currency. Also currency traders came in to make profit from the weakened ISK. The large influx of foreign money pushed the value of the ISK up, forming another bubble in the global economy. This exchange rate rise caused for more inflation. The policy of Seðlabanki, which has a doubtful governance structure as well, combined with the '10-times-GDP-banking' sector, led to a downfall of the Icelandic financial system, which actually was too big to fail. Herbertsson (2008)⁶⁶ has given a more detailed insight in the Icelandic case. Table 6.1 shows more banks in Europe that are too big to fail: when they fail, its home-nation cannot burden the debt of the fallen angel alone.

From table 6.1 can be observed that a lot of banks have more assets than their home country. The banks total assets are included, so also foreign subsidiaries are accounted. When these banks fail, a country cannot save it alone, therefore other countries of SWFs have to support. This does not only count for banks with a GDP / assets percentage above 100%. When *Crédit Agricole* fails, France cannot save it, despite is 87% multiple. Its rescue operation would ask too much of the French economy. These 'too big to fail' banks

⁶⁶ Herbertsson, Tryggvi Thor, 2008. *The Icelandic Banking Collapse: A Story of Broken Promises*. *Reykjavik University Working Paper*. Retrieved on February 20, 2009 via SSRN: <http://www.ssrn.com>.

can trigger *moral hazard*, as is pointed out by Goodhart and Huang (2005)⁶⁷. They state that many banks will take excessive risks, as there is always a *lender of last resort*: the central banks will always rescue the large banks, as its collapse could cause the financial system to fall apart. This is also concluded by Dell’Ariccia, Schnabel and Zettelmeyer (2006)⁶⁸.

Table 6.1: Too big to fail?⁶⁹

Country	Bank	Total assets 2007 (€bln)	GDP 2007 / Total assets (%)
Iceland	Kaupthing	53	623
Switzerland	UBS	1,426	484
Iceland	Landsbanki	32	374
Switzerland	Crédit Suisse	854	290
Netherlands	ING	1,370	290
Belgium / Luxembourg	Fortis	886	254
Cyprus	Bank of Cyprus	32	253
Spain	Banco Santander	913	132
Great-Britain	Royal Bank of Scotland	2,079	126
Netherlands	Rabobank	571	121
France	BNP Paribas	1,694	104
Ireland	Bank of Ireland	183	102
Belgium / Luxembourg	KBC	356	102
Ireland	Allied Irish	178	99
Great-Britain	HSBC	1,608	98
Great-Britain	Barclays	1,542	94
France	Crédit Agricole	1,414	87
Germany	Deutsche Bank	1,917	86
Austria	Erste Bank	206	85

⁶⁷ Goodhart, Charles A.E. & Haizhou Huang, 2005. The lender of last resort. *Journal of Banking and Finance*, 29(5), pp. 1059-1082.

⁶⁸ Dell’Ariccia, Giovanni, Isabel Schnabel, Jeromin Zettelmayer, 2006. How Do Official Bailouts Affect The Risk of Investing in Emerging Markets? *Journal of Money, Credit and Banking*, 38(7), pp.1689-1714.

⁶⁹ O’Murchu, Cynthia & Emma Saunders, 2008. Are European banks too big to fail? *The Financial Times*, 30 September 2008. Retrieved on October 23, 2008 via: http://www.ft.com/cms/s/0/61d7e148-8f15-11dd-946c-0000779fd18c.html?nclink_check=1.

Italy	Unicredit	1,022	80
Iceland	Straumur	6	73
Spain	BBVA	502	73
Portugal	Millennium BCP	88	67

The government in Reykjavik decided to nationalise Kaupthing, Landsbanki and Glitnir, and freezing the accounts. Other European countries, especially Great-Britain and the Netherlands were hurt by these actions as Icesave, a popular Internet saving bank, affiliate of Landsbanki, had many customers in these countries. Icelandic Prime Minister Geir Haarde spoke of a ‘national bankruptcy’. Analysts expect Iceland to recover as they have enough natural resources and a healthy workforce⁷⁰. More problems can be expected in Europe, especially in Turkey, where the same problems are visible with a falling Lira and in the Baltic and Balkan states, which also have large current account deficits. Globally, South Africa can become troubled⁷¹.

6.4 Full economic crisis

After these massive shocks analysts started to talk about a full economical crisis. Not only credit crunch or financial systems were failing, but also other parts of the economy could slow down or come to a halt. Employment could rise, consumer confidence could drop, order books of construction companies could become less filled and then consumption will slow down. These macro-economic factors can contribute to a full economical crisis.

An economic crisis is often defined from negative growth. When the growth in GDP shrinks two quarters in a row, people speak of a recession. A depression is when the economy shrinks with approximately 10 percent (there is no specific rule of thumb for a depression). The last worldwide depression was in the 1930, the Great Depression, after the stock market crash in the United States. The situation preceding the Great Depression is the same as it is now, but in the 1930s the signals and crash were much larger. The Great

⁷⁰ Danielsson, Jon, 2008. Why raising interest rates won't work. *BBC News Online*, October 28, 2008. Retrieved on November 1, 2008 via: <http://news.bbc.co.uk/2/hi/business/7658908.stm>

⁷¹ Evans-Pritchard, Ambrose, 2008. Iceland contagion may spread far and wide. *Telegraph Online*, March 28, 2008. Retrieved on November 1, 2008 via: <http://www.telegraph.co.uk/finance/newsbysector/banksandfinance/2787052/Iceland-contagion-may-spread-far-and-wide.html>

Depression lasted about a decade, being the painful example of how hard an economic crisis can strike the world, when improper actions are taken to recover from it.

6.4.1 World Economic Outlook 2009⁷²

The expectations for the current crisis are not as bad as they once had been. For 2009, analysts of the IMF expect a recession for many nations of the world. The growth will slow down (which equals a recession) and the IMF does not expect the economy to recover until mid-2009. In the second half of 2009 a light recovery is expected. Highlighted in the World Economic Outlook for 2009 are the following macroeconomic issues: more housing corrections, overstretched commodity markets, inflation, fiscal policy and current account balances.

Housing corrections maintain causing problems globally .The IMF recognizes that the housing market in various regions was overvalued, and in 2009 corrections remain being made. The commodity markets are always an issue. Since the oil crises in 1973 and 1979 the world is aware of the huge power oilproducing countries like Saudi-Arabia, Kuwait, Iran, Venezuela and Cuba have. This ever-present insecureness can drive prices in a short time to high levels. Also nature has a severe influence on these prices through hurricanes and earthquakes. As the price of the most wanted commodity –oil– rises, other products become more expensive as well. This results in a higher inflation. Also the interest rate changes by central banks contribute to this. As inflation is more difficult to control in uncertain times, fiscal policies by governments are more important than ever. By taxing the household for the right amount, countries can avoid a lot of nasty side-effects from the credit crunch. Taxes must be high enough to keep a country financially healthy, but must not become too high so that households are getting into financial troubles. Taxes are important for a country's income. Taxes are a powerful tool to keep the difference on the current accounts manageable. As mentioned earlier in this section, lots of countries in Eastern Europe and emerging markets in Asia have large current account deficits, which harm their economy. This causes much uncertainty in the financial world, which is not good. The IMF calls on financial leaders to review these issues. Only then the world economy can recover from the credit crunch.

⁷² International Monetary Fund , 2008. *World Economic Outlook, October 2008*. Retrieved on October 21, 2008 via: <http://www.imf.org/external/pubs/ft/weo/2008/02/pdf/text.pdf>.

‘ *Copy from one, it’s plagiarism;
copy from two, it’s research.* ’

Wilson Mizner (1876-1933), American playwright and entrepreneur

Section 7: Investigation of banking sector

In this section the empirical part of this paper is documented. After the large meltdown in 2007 and 2008 banks reported huge losses on their balance sheets. The empirical research of this paper focusses on the balance sheets of banks. First, a short glance is given to the U.S. financial sector. In paragraph 2, the purpose of this empirical research is given. In paragraph 3 the banks that are investigated are introduced. An elaboration about the data and possible methodological problems is given in paragraph 4. Paragraph 5 goes about the ratios that are investigated. The peer group analysis is done in paragraph 6, while in paragraph 7 the individual (time) analysis is done. This section is concluded with important tables.

7.1 U.S. financial sector

The American financial sector is the largest financial sector in the world. The commercial bank industry has total assets worth of over \$11 billion⁷³. The number of U.S. bank offices has grown from 14,146 (14,146 institutions, 0 branches) in 1934 to 86,150 (7,283 institutions, 78,867 branches) in 2007⁷⁴. This shows that the number of independent banks has declined. Lots of small banks merged or were acquired by larger ones. In 1934 every institution had only 1 bank. For instance the Farmers and Merchants Bank had one office, in Los Angeles. It later merged several times to become part of the large Security Pacific bank, which incorporated lots of small banks on the Pacific Coast. Nowadays there are less institutions, but these have a lot of offices. For instance, Citigroup has offices in almost every large U.S. city.

⁷³ Federal Deposit Insurance Corporation, 2008. *Statistics on Depository Institutions*. Retrieved on January 10, 2009 via: <http://www2.fdic.gov/SDI/main4.asp>.

⁷⁴ Federal Deposit Insurance Corporation, 2008. *Statistics on Depository Institutions*. Retrieved on January 10, 2009 via: <http://www2.fdic.gov/hsob/hsobRpt.asp>.

The list of largest banks (table 7.1) has seen large changes. J.P. Morgan Chase passed Citigroup as largest bank on September 30, 2008 after it purchased the \$307 billion assets of the defaulted bank Washington Mutual for \$1.9 million. Of course it had to do some write-offs on the assets, but it let to a change of guard at the top. Citigroup itself had to do some major write-offs in 2007 and 2008 on its own investment portfolio. The bank that has seen the least problems so far is the Wells Fargo Bank, no. 5 of the list. It has a stable risk management policy, and a well-diversified portfolio.

Table 7.1: The top-7 of largest U.S. banks, per September 30, 2008

Bank	Total assets (\$)
J.P. Morgan Chase	2,251,469,000
Citigroup Inc.	2,050,131,000
Bank of America Corp.	1,836,452,425
Wachovia	760,558,000
Wells Fargo	622,361,000
Taunus Corp.	613,058,000
HSBC North America	467,739,691

7.2 American banks vs. Dutch banks

For the empirical research in this paper two peer groups are formed. The American group is the group that contains the banks that operate in the United States of America. The Dutch group is the group that contains the banks that operate in the Netherlands.

The purpose of this empirical research is to compare the over- and underperformers in both groups. As a result of the media attention to this subject, hypotheses can be easily drawn on beforehand about which banks are overperformers and which ones are underperformers. More interesting is to compare the underperformers in both groups which each other and to look at differences and similarities. The same goes for the overperformers. After that conclusions about the importance of some factors can be made and perhaps some prediction can be made about the future of other banks.

7.3 Banks in peer groups

The American group contains the largest banks in the world, seen in table 1. J.P. Morgan Chase, has taken over the number 1-position measured in total asset size from Citigroup, after a acquisition of a smaller, distressed bank. The fact that J.P. Morgan Chase saw profiting opportunities in the acquisition in these days signals that it is a strong bank. Looking in it's books will show if this true or not. Citigroup had to do large write-offs, which can indicate it is seriously hurt by the problems surrounding the financial market. Bank of America does have almost the same story as J.P. Morgan Chase, with acquisitions of Countrywide Financial and Merrill Lynch in difficult times. But it had to bailed out by the US government early January 2009, after revealing its number over 2008. Especially the acquired Merrill Lynch division reported massive losses, as a result of earlier operations. The fourth bank that will belong to the US peer group will be wells Fargo, one of the banks which did not report large problems in 2007 and 2008. It even acquired Wachovia in October 2008. It seems to survive the crisis really well, but in October 2008 it received \$25 billion as a lending in the form of a preferred-stock sale to the US government, also to support Wells Fargo after the acquisition of Wachovia.

The Dutch group contains the banks with the most offices. The first is the internationally focussed ING Bank. It has weathered the storm well, but had to ask for a support of €10 billion from the Dutch government, who reserved money for banks, to restore liquidity in the market and with it the confidence between banks. The second bank in the peer group is the AAA-rated Rabobank. It is not publicly owned, so does not have the disadvantages of transparency and shareholder-value. This advantage of privately owned helped them in these rough years. The fourth is the nationalised bank Fortis. Its origins lie partly in Belgium (it was formed by merging AMEV (Dutch insurer), VSB (Dutch bank) and AG (Belgian insurer)), but after a failed acquisition of the Dutch part of ABN Amro, it was bailed out and nationalised by the Dutch government on October 3, 2008⁷⁵. The last bank in the peer group is SNS Bank (is a Dutch abbreviation for Co-operating Dutch Savingbanks), which is part of SNS Reaal. The bank offers lots of mortgages to all kind of people, as well as companies. The expectation is that SNS Reaal could be one of the underperformers

⁷⁵ Fortis Bank Nederland, 2009. *Geschiedenis van Fortis*. Retrieved on February 3, 2009 via: <http://www.holding.fortis.com/nl/algemeen/geschiedenis.asp>.

(together with Fortis) of the Dutch peer group, as they requested for government support of €750 million on January 19, 2009⁷⁶.

7.4 Method of retrieving data

The data of the two peer groups is retrieved through Bankscope⁷⁷. Bankscope is an electronic database which has facts and figures of 28,000 banks worldwide. Also Fitch ratings are shown of these banks, as well as other data like addresses, staffmembers and so forth. It also has a large history of these 28,000 banks, with annual reports going 16 years back in time. It also has consolidated annual reports and ownership reports. Also stockinformation about companies is shown and newsresults for banks. So when looking for data about a certain bank, everything is available through a well-organized interface.

7.5 Balance sheet determinants

When looking at the balance sheets of the peer groups, different factors of the balance sheet spring into view. Some are more important for bank than other, but together they form the asset and liabilities for it. In this paragraph the most important factors of the balance sheet are discussed. Other recent papers exist about balance sheet analysis, but they do not look specific at banks' balance sheets (Allen et al., 2002)⁷⁸, or only look at the structure of different banks' balance sheets (Roma, 2006)⁷⁹. These factors are used for comparison between the bank and peer groups. Analysts like Minyan Peter⁸⁰ look at balance sheets and forecast economic activity from it.

⁷⁶ Het Financieele Dagblad, 2009. SNS Bank gebruikt garantieregeling Nederlandse overheid. *Het Financieele Dagblad*, January 19, 2009. Retrieved on February 6, 2009 via: <http://www.fd.nl/artikel/10883629/sns-bank-gebruikt-garantieregeling-nederlandse-overheid>.

⁷⁷ Bankscope (Bureau Van Dijk), 2009. *World banking information source - Bank report*. Retrieved on January 25, 2009 via: <https://bankscope.bvdep.com/version-200934/cgi/template.dll?product=4&user=ipaddress> (subscription through Erasmus University, Rotterdam).

⁷⁸ Allen, Mark, Christoph Rosenberg, Christian Keller, Brad Setser, Nouriel Roubini, 2002. A Balance Sheet Approach to Financial Crisis. *International Monetary Fund Working Paper*. Retrieved on January 28, 2009 via SSRN: <http://www.ssrn.com>.

⁷⁹ Roma, Antonio, 2003. Common factors and balance sheet structure of European banks. *Banca Nazionale del Lavoro Quarterly Review*, 59 (237), pp. 123-170.

⁸⁰ Shedlock, Mike, 2007. Bank Balance Sheets and Earnings. *Mish's Global Economic Trend Analysis*. Retrieved on January 28, 2009 via: <http://globaleconomicanalysis.blogspot.com/2007/09/bank-balance-sheets-and-earnings.html>.

- *Net income / total assets (Return on Assets, ROA):* The net income is the lifeline of banks. With revenue they generate through financial operations after the deduction of all expenses like overhead, financing expenses etc. the net income results. The net income compares banks over their profitability, or in which factor their could control the costs when revenue soared. As a percentage of the total assets a comparison between the peer banks can be better made. This is called the return on assets, a well known comparable in the investment world.
- *Loan loss provision ratio:* The loan loss provision is a provision for defaulting customers of the bank. For each loan they write, a small amount goes into this provision. When times are good, these percentages are smaller. The loan loss provision also depends on riskiness of the bank's outstanding loans. So the comparable element in this factor is riskiness and amount of losses a bank is expecting to take from the loans. As a percentage of the total loans this provision is better comaprable between banks. In the world of microcredit banks this is common use⁸¹.
- *Tier 1-ratio:* Tier 1-capital is the core capital of a bank. It's made up by cash reserves and equity capital. The Tier 1-ratio is the Tier 1-capital as percentage of the debt. The Tier 1-ratio can be adjusted in two ways: by adding money to the Tier 1-capital, for instance by printing irredeemable long bonds. This adds money to the Tier 1-capital, with the result that the Tier 1-ratio grows. A bank can also pay off some of it's debt. The British and Dutch government thought this was the solution to the problems of 8 British banks and 1 Dutch bank. The governments lended money to these banks to raise their Tier 1-capital, to ensure faith in the markets.

In this analysis also some self calculated ratio's are compared. These ratio's are:

- *Current ratio:* The current ratio is defined as Total Current Assets / Total Current Liabilities. This ratio is obviously preferred to be at a minimum of 1, but is for normal companies most of the time 1.5. The ratio for banks lies closer to 1 than to 1.5, as a result of the social function of banks.

⁸¹ Butts, David, Thomas Coleman, Christina Dimolina, Laurie Herrick, Nancy McDonnell, Kathy Weber, 2004. CAMELS for Microcredit. *Global Development Research Center Working Document*. Retrieved on January 28, 2009 via: <http://www.gdrc.org/icm/micro-camel.html>.

- *Quick ratio:* The quick ratio for banks is hard to calculate, as it is the (Total Current Assets – Illiquid Assets) / Total Current Liabilities. The quick ratio is calculated for cases which firms' or companies' creditors are at the gates requesting for money. Only liquid assets can be sold quickly enough to pay these creditors. From a bank balance sheet it is hard to determine what illiquid assets are, but it is assumed that Fixed Assets and Non-Earning Assets are illiquid. So the formula for the quick ratio becomes: Total Earning Assets / Current Liabilities.

7.6 Peer groups analysis

In this section the data is retrieved from BankScope and the factors are filled in for the different peer groups. This is done in two tables. Table 7.2 is the American peer group. Table 7.3 is the Dutch peer group. This is done to compare the banks in one peer group with each other and to compare the banks in the other peer group with each other.

Table 7.2: Balance sheet factors for American peer group (31 December 2007)

	Bank of America Corp.	Citigroup Inc.	J.P. Morgan Chase & Co.	Wells Fargo & Company
Return on assets	0.873%	0.165%	0.998%	1.414%
Loan loss provision ratio	0.970%	2.287%	1.197%	1.218%
Tier 1-ratio	6.90	7.10	8.44	7.59
Current ratio	1.094	1.055	1.086	1.091
Quick ratio	0.881	0.887	0.946	0.927

Table 7.3 : Balance sheet factors for Dutch peer group (31 December 2007)

	Fortis Bank Nederland	ING Bank N.V.	Rabobank Group Nederland	SNS Bank N.V.
Return on assets	0.482%	0.372%	0.467%	0.385%
Loan loss provision ratio	0.025%	0.024%	0.071%	0.058%
Tier 1-ratio	30.70	7.00	10.70	8.40
Current ratio	1.090	1.028	1.058	1.032

Quick ratio	0.886	0.981	1.014	0.972
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Now the results for the peer groups are compared with industry standards. After this comparison the performance of the peer groups as a whole and the individual banks can be judged.

7.6.1 Return on Average

Looking at the ROA-percentages of the different peer groups, the ROA is significantly higher in American peer group than in the Dutch peer group. The differences between the banks are also larger in the American group. A report from Robert R. Moore from the Federal Reserve Bank of Dallas shows that in the period 1980-1995 when, there was also a minor downturn on the financial markets. The Dallas-report showed the ROA-percentages for three groups: American small banks, American large banks and all of the Eleventh district (Dallas district) banks. At the height of that downturn all three groups were maximising the ROA around -1%. In the months and years before it, ROA was around 0%-0.5%, with smaller banks returns even a bit higher. When looking at the results of the two peer groups, these can be compared with the 1985 situation in Dallas. Especially in the Netherlands the result are average. In the US, Wells Fargo is a positive outlier, with over 1.4% ROA. Citigroup is a underperformer here, with only 0.165 % ROA.

7.6.2 Loan loss provision

The loan loss provision fluctuates with the state of the economy. As Handorf and Zhu (2006)⁸² point out, Basle II includes banks to take 1.25% of their Tier II capital as a loan loss provision. Loan loss provision are procyclical from nature. When the economy flourishes, small provisions are made, supporting the economy. But when the economy contracts, larger loan loss provisions are made, eating up reserves and worsening a contraction. The Basle II-allowance received therefore much criticism. Berger and Udell (2004)⁸³ even pointed out that the procyclical nature of loan loss allowances can create a 'credit crunch'. It is nice to investigate whether the loan loss provisions of the banks in the peer groups changed much over time and if it is different in different countries. A paper

⁸² Handorf, William C. & Lili Zhu, 2006. US Bank Loan-Loss Provisions, Economic Conditions, and Regulatory Guidance. *Journal of Applied Finance*, 16(1), pp. 97-114.

⁸³ Berger, Allen N. & Gregory F. Udell, 2004. The institutional memory hypothesis and the procyclicality of bank lending behavior. *Journal of Financial Intermediation*, 13(4), pp.458-495.

from Hasan and Wall (2003)⁸⁴ discusses for instance loan loss allowances in Finland, and is a nice example of such an investigation. This investigation is done further on in this section.

Looking at the difference between the American and Dutch peer group, there can be observed that the loan loss percentage is higher in the US than in the Netherlands. This is a result of the depth of the crisis in both countries. In the Netherlands, the banking sector is hit hardest by the subprime crisis, as a result of defaulted subprime loans. In the US the whole society is struck by the crisis, partly as a result of the financial crisis, but largely the result of the collapsed housing market. In the US all type of loans are polluted, but (for the time being) in the Netherlands only bad American subprime loans are polluted. Therefore the US peer group has made higher provisions in their loan portfolios.

For this factor of the balance sheet analysis it is more interesting to look at the development over time than to look at the major differences between the peer groups.

7.6.3 Tier I-ratio

Few differences regarding the Tier I-ratio between the peer groups. A outlier is Fortis Bank with a Tier I-ratio in excess of 30%. This is a result of the nationalisation of this Bank by the Dutch government. With this there has been a growth of Tier 1-capital and a decrease in the debt, as the government has paid off some of Fortis' (bad) loans.

The reason for the minimal differences is the strict prudence from the Bank of International Settlements (BIS), which is responsible for the Basle II-accords. In these accords the minimal amount of Tier I-capital is prescribed to financial institutions and banks. As almost all banks are highly leveraged, but there are differences in US and European leverage. European banks are much more leveraged (up to 53:1) than US Banks (max. 20:1). As a result of the higher debt, the European's Tier I-capital must be higher, so that the ratio remains the same.

⁸⁴ Hasan, Iftekhar & Larry D. Wall, 2003. Determinants of the loan loss allowance: some cross-country comparisons. *Bank of Finland Discussion Paper*. Retrieved on February 3, 2009 via SSRN: <http://www.ssrn.com>.

7.6.4 Current ratio

The current ratio lies for all banks in the peer group above 1. This means that all banks can pay off their liabilities with their assets, if necessary. As stated earlier, the industry average value lies closer to 1 than it lies to 1.5. This is a result of the social function of banks. Banks sometimes have more liabilities than they ought to, as a result of their social function as finance company. This does not hold for all banks involved in this research, as some American banks are investment banks. This is probably the main reason for the US peer group having higher current ratios than the Dutch peer group.

7.6.5 Quick ratio

The quick ratio is almost identical to the current ratio, except all illiquid assets are left out of the calculation. It is good to see which banks' portfolio contains a lot of illiquid assets. The American peer group have relatively high current ratios but relatively low quick ratios. This is a result of higher illiquid assets. The reasoning behind this is a logical one. As the American market was hit harder than the Dutch, its credit vaporising was larger than the vaporising in the Netherlands. More assets became illiquid as credit disappeared, which resulted in lower quick ratios.

On peer group level, the Dutch Rabobank is the only bank that passes the test. It is the only bank that can pay off its liquid assets and with this money is able to satisfy all creditors who are requesting money quick. In a growing economy the value of the quick ratio (or acid test as it is called as well) is in almost all cases equal or higher than 1⁸⁵, because assets are liquid. As economies come to a standstill, these quick ratio value can drop below 1 for quite a while. This is of course a worrying situation, but in most cases when the quick ratio does not drop far below 1, this is sustainable, as no creditor request for its money suddenly. The creditors do know that an economic downturn is temporarily and that they will see their money back when economies expand. That is why the governments try to calm the market, to restore confidence and not having creditors (often other banks) requesting their money back.

⁸⁵ Accounting for Management, 2007. *Liquid or Liquidity or Acid Test or Quick Ratio-Formula*. Retrieved on February 4, 2009 via: http://www.accountingformanagement.com/liquid_ratio.htm.

7.7 Individual banks analysis

In this section the in-depth performances of three individual banks are discussed. J.P. Morgan Chase (JPM), Citigroup and Rabobank are the banks that are more closely examined. The factors contributing to the crisis that is discussed in this paper, are compared to the banks actions and balance sheets. How did these banks repond to the housing crisis, was it involved in hedge fund related activities and how was the exposure to the MBS-market. What risk management practices did it have and did the bank use models that included rating agencies' vision to investments. Did it notice anything from the monoline and GSE-problems and how are the company's corporate governance structures. By collecting parts of these puzzle for the investigated companies, a comparison can be made between the good and bad performers in this industry sector.

7.7.1 Housing crisis

JPM and Citigroup both had large exposures to the U.S. housing market. Both banks offered mortgages to people via a mortgage underwriter. They also repacked these mortgages and sold these as MBSs to other investors. JPM is the largest bank of America, so has a high exposure to real estate properties and receivable loans. On June 30, 2008 JPM held an aggregate \$19.5 billion of prime and Alt-A mortgage (which is between prime and subprime) exposure, \$1.9 billion of subprime mortgage exposure, and \$11.6 billion of commercial MBS exposure⁸⁶. In its annual report over 2008, JPM states it wrote-off \$2.4 billion on home equity, compared to \$ 564 million in 2007. It wrote-off \$933 million on subprime mortgages in 2008 (\$157 million in 2007) and that it wrote-off \$526 million on prime quality mortgages (2007: \$33 million)

Citigroup had large exposures as well in this market. Although these exposures are not as large as JPM's, it caused the need for serious write-downs on their mortgage portfolio. It also announced plans to relief distressed borrowers from the tight terms of their mortgages⁸⁷. This reduces the future potential losses on mortgages. JPM already made similar plans, after the acquisition of Bear Stearns and Washington Mutual and it's bad

⁸⁶ Wenzel, Robert, 2008. More JP Morgan Writedowns. *EconomicPolicyJournal.com*, August 12, 2008. Retrieved on April 23, 2009 via: <http://www.economicpolicyjournal.com/2008/08/jpmorgan-loses-15-billion-since-july.html>.

⁸⁷ Dash, Eric, 2008. Citigroup Offers to Ease Mortgage Terms. *The New York Times Online*, November 10, 2008. Retrieved on April 23, 2009 via: <http://www.nytimes.com/2008/11/11/business/11bank.html>.

mortgage portfolios. Citigroup wrote down \$1.6 billion dollar on Alt-A mortgages alone during the first quarter of 2008. This is still nothing compared to the total write-downs of \$85.4 billion.

Obvious from these two cases is that the fall of the U.S. housing market is the big cause behind this crisis. As concluded in this first section of this research, it accounted for the mess in the mortgage- and MBS-markets. This lead to huge write-downs on these investment portfolios for bank, gnawing in their equity. The first step of the process is the same for both U.S. banks. But how did Rabobank perform?

Rabobank is sometimes seen as the promotor of the Dutch housing bubble, offering a multiple array of mortgage products in the 90's, when the process behind it was not completely clear. Perhaps as a result of this leading strategy, the bank first-mover advantage pays-off now: it only had to write-down 20% on it's American mortgage portfolio⁸⁸. This resulted from a sharp move away from SPV's in 2007. Rabobank decided not to use these SPV as a partner for mortgage investments. This perhaps saved them a lot of money, as later SPVs appeared to be very unreliable. The hardest hit is perhaps still waiting for Rabobank. Because the Dutch housing market waited with falling until 2009, Rabobank avoided the problems. But as Rabobank is the largest mortgage lender of the Netherlands, it could become distressed as the housing market collapses. Reports that came out in April 2009 showed that there was almost no building activity in the Netherlands, showing the state of the housing market⁸⁹.

7.7.2 Hedge fund activity

The three banks have hedge funds and are actively using them to make profit, but they did not play a major role in the subprime crisis for them. JPM owns America's largest hedge fund, with \$34 billion of assets in 2007. Citigroup prevented withdrawals from its hedge fund in February 2008, as a result of bad results over 2007. It tried to stabilise the hedge fund with an \$100 million 'money injection'. Rabobank had relatively few problems regarding its hedge funds.

⁸⁸ Ouray, Duns, 2009. Rabobank geeft andere banken een duwtje. *Het Vrije Volk*, February 1, 2009. Retrieved on April 23, 2009 via: <http://www.hetvrijevolk.com/?pagina=7827>.

⁸⁹ Nederlandse Verzekerings Maatschappij, 2009. Dieptepunt op woningmarkt lijkt bereikt. *NVM Nieuws* April 9, 2009. Retrieved on April 23, 2009 via: <http://www.nvm.nl/nvm/index.jsp?navid=nvm092289&doelgroep=woningmarkt&itemid=nvm103785>.

But on the other side, banks did lose a great deal of confidence from the investors as a result of problems with hedge funds. JPM was left in the cold after Carlyle Capital Group defaulted on its margin calls. Citigroup overrated a hedge fund that failed several months later. These actions lowered the confidence of investors in the banking sector and these banks specifically.

But it is clear that the hedge funds did not play a major role in the crisis. It helped the fire to spread, but it did not start the fire. This is in line with the conclusions drawn earlier in this research. Falling hedge funds stirred up the marketplace as this is an uncommon event in the financial world.

7.7.3 Infected MBSs

As mentioned earlier in this section, all banks had exposures in the MBS market through subprime mortgages. In this part is investigated the size of these exposures, if they did get problems with MBSs through securitization and if banks had other similar products like ABSs in their investment portfolios. Problems that surrounded the MBS-market like the troubled GSEs and monoline insurers are examined from the banks side of view. Also is looked at the Icelandic bankruptcy. Did the banks notice anything on their balance sheets from these problems?

Obvious, both American banks had a huge MBS portfolio. As these banks were the most important mortgage sellers to house owners, their MBS portfolios were formed by their own investments. They probably had some difficulties with infected MBSs from other banks, but these MBS are a minority in the total amount of bad MBSs. Besides the subprime mortgage investments, both banks had huge stakes in the consumer lending business through ABS-investments⁹⁰. This investment segment received big hits as well, as a lot of customers defaulted on their credit card bills. Both banks also had ABS-investment in other lending-products, for instance car loans for households. With these loans, people can do larger expenditures, for instance for a new car or a washing machine. In the Netherlands, Rabobank has a much smaller exposure to these kind of activities, as it is not in the bank

⁹⁰ Leinfuss, Nancy, 2009. JPMorgan bullish on credit card ABS despite stress. *CNN Money.com*, April 16, 2009. Retrieved on May 4, 2009 via: http://money.cnn.com/news/newsfeeds/articles/reuters/MTFH79235_2009-04-16_19-28-44_N16189432.htm.

portfolio. Credit card receivables is a much smaller post, because the lending appetite differs between the Dutch and US citizens. Also the car loans is a small part of Rabobank's activities. This is the result of a highly competitive market in The Netherlands, with lots of financial institutions offering attractive interest rates for these loans. The Dutch government has imposed more rules for this segment since the start of the subprime crisis.

Reports surrounding monoline insurers and GSEs affected the American banks largely. When the monoline insurers reported financial difficulties and were downgraded by the rating agencies, this affected all investment products that were insured by these monoliners. Downgrading of these agencies leads to a further loss of trust in the financial market. The result of loss of trust are known by know. In Europe, these monoliners have a smaller influence, but Rabobank did feel consequences of the downgrade as well, as they too suffered a loss of trust from others. It also was obliged to have larger reserves under the Basle II-rules. It's spent a paragraph on the monoline problems in its annual report over 2008. It also shows a table regarding the money flows after monoline-downgrades.

Citigroup and JPM were also largely affected by GSE. The GSEs take care of credit flow to and from mortgage underwriters. They are a bit of a cushion for banks with respect to the mortgages they issue. When these cushions reported troubles, it resulted in problems with banks too. A lot of investments became unsecured and trust in financial markets deemed again. The same holds for the troubles in Iceland. All these small troubles made it difficult for banks to make their investment portfolio profitable.

7.7.4 SPV-exposure

Lots of banks used SPVs to manage these problems in their investments, which lead to a high exposure to these SPVs. JPM does not use these SPVs as much as other banks, which limits their exposure and increases transparency. This high level of transparency is critical in regaining the trust of investors and other customers. Jamie Dimon, CEO of JPM, regarded this as an advantage compared to other competitors⁹¹. Citigroup reduced these

⁹¹ Schmidt, Christian, 2007. JPMorgan Chase CEO Jamie Dimon speaks at Spangler Auditorium. *The Harbus*, December 3, 2007. Retrieved on May 4, 2009 via: <http://media.www.harbus.org/media/storage/paper343/news/2007/12/03/News/Jpmorgan.Chase.Ceo.Jamie.Dimon.Speaks.At.Spangler.Auditorium-3126137.shtml>.

exposures as well around the same time⁹². These off-balance transactions were necessary as SPVs gained a bad name as purposes to dump cheap, short-term debt on the market to finance higher-yielding, longer-term assets. This mismatch results in a roll-over on the long term, with problems arising then. No one wanted to buy from these SPVs, and they were a heavy burden for the banks. SPVs also were closely followed by the rating agencies. A downgrade on the SPVs could mean downgrades for the owner of the SPV as well. An early write-down perhaps saved them a lot of money in the future, when other write-downs had to be done on other investments. Perhaps this gave these banks a decisive edge in their sectors.

Rabobank withdrew its SPVs as well. In its annual report it writes: *As early as in the first quarter of 2008, due to the scarcity of funding opportunities for Structured Investment Vehicles – i.e. off-balance sheet investment vehicles – the remaining SIV Tango assets managed by Rabobank were taken on the balance sheet. This put an end to the active existence of this SIV. Following its inclusion on the balance sheet, the size of this portfolio shrunk as a result of currency effects and selling to EUR 3.8 billion as at the end of 2008. Otherwise, Rabobank no longer has any investments in SIVs.*

7.7.5 Risk management: a leading strategy?

When looking at the risk management practices at the three banks, one thing stands out: all three banks' risk management practices a top of the bill. Starting with Rabobank, it's AAA-rating has everything to do with their large reserves, sustainable banking and responsible investments. It is the first bank in The Netherlands to use an Extensive Risk Management (ERM)-scan in its investments. This scan can also be used by clients and businesses that invest through Rabobank. In its annual report, the bank writes about risk management: *At the highest level, the Executive Board determines the risk strategy, policy principles and limits, under the supervision of the Supervisory Board.* At many financials it is standard that the Risk Management Department determines the risk strategy, with the Executive Board in a advisory role. Rabobank board choose to determine the strategy itself. Rabobank is also aware that risk management should be solely used to protect the bank

⁹² Davies, Paul J., David Wighton & Adam Jones, 2007. Citigroup offloads assets from SIVs. *The Financial Times Online*, December 10, 2007. Retrieved on May 4, 2009 via: <http://www.ft.com/cms/s/0/e35b3628-a769-11dc-a25a-0000779fd2ac.html>.

balance sheet, and not to make profit out of it, as it writes: *The primary objective of risk management is the protection of Rabobank Group's financial strength.*

Rabobank's risk management practices helped them to weather the crisis. In its annual report it writes: *In the first quarter of 2008, two Asset Backed Commercial Paper (ABCP) structures – i.e. collateralised investment vehicles – were phased out, in part following the introduction of the new Basel II regulation.* Rabobank follows the Basle II regulations closely, and tries to follow guidelines of it as soon as possible. Receiving credit from Rabobank has also become more difficult. It assesses new clients with help of three committees, who look at credit size, collateral and credit history. The executive board itself decides on the largest request. Resulting from the crisis, Rabobank also made larger loan loss provisions. On December 31, 2007 the loan loss provision was 50% of the total amount of loans outstanding. On December 31, 2008 this percentage has increased to 68%. Rabobank also has separate departments for other risks like country risk, liquidity risk, market risk and operational risk. All these types of risk are controlled and judged by different sections, preventing an overflow of information to a section and maintaining high standards for risk assessment.

J.P. Morgan and Citigroup have equal high standards concerning risk management. JPM states in its annual report that *early in the crisis (...) they made considerable risk management changes.* Citigroup states regarding risk management: *the company believes that effective risk management is of primary importance to its success.* As crisis-fighting risk assessment methods, JPM uses an increased threshold for new customers who apply for a credit card loan. The company also increased due diligence, and extended documentation and auditing rules. It used VaR as a result of Basle II-requirements, and will continue to do so. Commenting on the derivatives business that JPM has, it comments to the downfall of AIG, the former largest insurer in the world. JPM states that its downfall had nothing to do with the nature of derivative products, but more with AIG's risk management.

Citigroup has also increased its risk management, even by writing a new risk policy. It enhances previous risk management tools and creates new, tighter guidelines and behavioural codes of conduct. Citigroup obviously underwrites the importance of risk

management in its annual report over 2008, as every type of risk is clarified and is linked to a risk management process of the bank. JPM does the same in its report.

It is now clear, with hindsight to the first year of the crisis, that risk management is a critical success factor when bank want to survive and maintain competitive in the marketplace. Rating agencies examine the ability of banks to pay off their short-term debt, but should look more into the risk management processes of banks. This is critical for future debt payments and for debt payments in times when a crisis occurs.

“ *A conclusion is the place
where you got tired of thinking.* ”

Arthur Bloch (1948), American writer

Section 8: Conclusions

In this section the subject of the paper is summarized, and conclusions are drawn about the current situation on the financial markets. The research question is answered as well with help of a summary of the most important factors contributing to the crisis.. The research question is: *What were the causes and effects of worldwide financial crisis and which factors are critical success factors for U.S. and Dutch banks in fighting the crisis?*

8.1 Theoretical research

The financial turmoil that troubled the markets in 2007, 2008 and 2009 was caused by the collapse of the housing bubble on the American market. This crash was caused by the offering of subprime mortgages to poor households, who had no collateral for the mortgages. As housing prices started to rise, these household started to renew their mortgages to higher mortgages with their previous, lower mortgage as a collateral (flipping). It goes well as long as housing prices keep on rising. Relatively poor people can pay their too high mortgage because the value of the collateral keeps on rising. Demand for houses keep rising in this situation, which takes care of rising prices. In this way a bubble formed. As soon as investors and financial analysts realised this, prices fell, which left a lot of poor people with an expensive house they could not afford. They were obliged to move as their mortgage underwriter demanded ownership of the property. This is called foreclosure. The number of foreclosures rose spectacularly at the end of December 2006 and the beginning of 2007.

Lots of banks and investment funds had invested in the US housing market through a CDO. Certain CDO-types, like MBS and ABS are investments in a pool of mortgages brought together by an underwriter. Mortgages of equal riskyness are pooled together in a tranche. Banks and other investors invest in these MBS and ABS tranches, and pool them into comparable tranches as well, and sell them to customers. This securitization is risky

because it became unclear who owns what, but there is always the security of seeing back a large part of the money, as not all investors will default.

As a result of the widely securitised MBSs the banking and investment sector started to lose trust in the other investors in the sector. The loss of trust led to a lower liquidity in the sector: banks did not want to loan money to each other, fearing they would suffer from counterparty-risk. Many types of risk exist in the financial world, but one of the most important types these days is the systemic risk: the risk that the whole financial system would collapse.

Governments started to restore confidence in the financial market by pumping money in the economy. For instance the European Central Bank financed the write-off of thousands of subprime mortgage investments from various banks, hedge funds and other financial institutions. The same was done by the Federal Reserve in the US and the Bank of England. As the troubles continued, governments started to nationalise (part of) banks. This was for instance done by The Netherlands and Germany, who nationalised important banks. This was done to prevent more damage was done to households, who were already suffering from higher interest rates and a loss of income, due to lay-offs in the workforce of these countries.

Another large problem in the crisis in Europe was the bankruptcy of Iceland. The largest bank of Iceland had to nationalise its three largest banks, as they did not have enough funds to roll over their loans. But the country itself had not enough resources to nationalise the banks, so it went bankrupt. After Iceland, several other Eastern European countries reported possible problems. This urged the European Union for further rescue operations and liquidity solutions. After the Icelandic bankruptcy, more reports showed that more banks are too big to be rescued would the financial situation demand this.

8.2 Empirical research

All these events drew questions to the financial world. Could anyone have expected this crisis? Were there signals that the crisis would be this deep and this long? What is the solution that will end this crisis? A possible help for these questions are researched in this paper. The empirical part investigates whether balance sheets from 8 large banks showed

signs of an upcoming crisis. This is done with help of 5 variables, which are examined in groups and individually over time.

The results of the peer group research are comparable with the last crisis that struck the financial markets. The US peer group had on average higher Return on Asset-percentages. This is due to the fact that the American banks are more investment banks than the investigated Dutch banks, which are more savingsbanks. The loan loss provision ratio clearly shows that the US is deeper in the crisis than Europe. The loan loss provision ratio are all much higher in the US than in the Netherlands. In the US peer group, the bank that has the lowest ROA, has the highest loan loss provision ratio. The Tier I-ratio lies for almost all banks around the average number. As mentioned earlier, as a result of the higher leverage in Europe, European banks need to have a higher Tier I-capital to maintain the same Tier I-ratio as the U.S. banks. Differences between the peer groups are in this case on average not large.

The current and quick ratio are more difficult to evaluate, as every bank balance sheet policy is different. Some banks assign assets earlier to the 'illiquid assets'-post. Industry averages for the current ratio is between 1 and 1.5, but closer to 1 and for the quick ratio it is above 1 for growing economies and below 1 for decreasing economies. So the quick ratio is a good ratio to measure the state of the economy. Looking at the peer groups both groups are close to the industry average, with the current ratios being slightly higher in the US than in the Netherlands. This is probably due to differences in reporting method.

After these balance sheet analysis, for three banks the most important topics discussed in the preceding sections were compared to the real-time performances of the banks. This is done with help of the annual reports over 2008 and newspaper and magazine articles. It showed that banks had the same problems as the bunch of the financial world, and in the same time frame and sequence. It also became clear that the transparency over its SPVs and risk management was the critical success factor at these banks. The three made special programs, policies and guidelines during the crisis that secured their risk management practices.

8.3 Possibilities for future research

After each research that is done, there remains room for further research. Due to the topicality of this subject, there remain a yawning hole here. When the financial markets reach their pre-crisis levels, and the upward slope of the conjuncture is found again, a total summary of the crisis can be made. Studies can be made about the signals from the market that a crisis is approaching. How should the financial market respond to these signals? Also a very interesting study can be made about the power of certain parties in the wake of the crisis. Rating agencies, central banks, governments, GSEs, all had critique about their role and performances during the crisis. Also the structure of the financial market can be examined, which could help in preventing a next crisis.

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