A critical analysis of the causalities of the sub-prime crisis

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"No man that does not see visions will ever realize any high hope or undertake any high enterprise" – Woodrow Wilson

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Abstract

A trend emerges when comparing the way economic crises of all types over the past century were created. In the past century economic crises have all been the result of financial market booms that occurred in environments of low inflation, low interest rates and rising real GDP growth. A boom in financial markets can lead to the existence of a bubble characterized by asset prices rising independently from their fundamentals. As these booms progress, inflationary pressure builds up and central banks inevitably tighten policy interest rates. Booms inevitably lead to a state of over indebtedness, as agents find themselves unable to service their liabilities due to insufficient cash flow. This opens the door for a crisis situation as market participants start to pull back and as they do, they take with them the liquidity needed to keep financial markets efficient. Economic crises of all types can lead to declining net worth's, bank failures, bankruptcies and an ensuing recession.

The recurrence rate of banking sector problems leading to bank insolvencies and economic crises have increased in recent decades. The study indicated that the sub-prime crisis follow the same pattern as all other historic economic crises and is, therefore, no different than previous economic crises. There might not be a recurrence of the exact events that have led to the sub-prime crisis, but since all major economic crises over the past century follow the same pattern the likelihood of history repeating itself is not farfetched.

The overall aim of the study was to identify the causalities of the sub-prime crisis in order to propose policy recommendations on how to avoid a recurrence of such banking crisis in the future. Future action to avoid the same mistakes made in the sub-prime crisis can only be taken once there is a clear understanding of what actions, taken by which parties, caused the creation of a mortgage bubble. The dissertation consisted of a literature study on the causalities of the sub-prime crisis and paid specific attention to various parties, policies, processes and events in the United States of America that created the sub-prime crisis.

Although various parties played an influential role in creating the sub-prime crisis, the conclusion withdrawn from the study was that the sub-prime crisis was a mortgage bubble boom, and a crash, created predominantly by the Federal Reserve Bank of America. An expansive monetary policy was implemented by the Federal Reserve Bank of America in

reaction to financial turbulence in the aftermath of the dot-com crisis and the September 11 terrorist attack on the World Trade Centre. The expansive monetary policy implemented by the Federal Reserve Bank of America was one of the biggest contributing factors to the sub-prime crisis. The sub-prime crisis was the latest economic crisis in a long line of economic crises, all of which developed during prolonged periods of expansive monetary policy. The study found no evidence supporting any other similarities between the various economic crises experienced over the past century. Therefore, the conclusion withdrawn from the study was that central banks have been fostering conditions for financial market booms through the implementation of an expansive monetary policy. It is, therefore, vital to the stability of financial markets and the global economy that more care should be taken when controlling inflation through the expansion and contraction of the money supply.

Key words: Greed, inflation, liquidity, moral hazard, securitization, sub-prime mortgage origination, the Federal Reserve Bank of America.

Opsomming

Ekonomiese krisisse van alle vorme oor die afgelope eeu volg 'n soortgelyke patroon. In die afgelope eeu was ekonomiese krisisse die resultaat van ’n investeringsopswaai wat plaasgevind het tydens periodes van lae inflasie, lae rentekoerse en stygende reële BBP-groei. 'n Oplewing in finansiële markte kan lei tot die bestaan van ’n investerings-opswaai wat gekenmerk word deur batepryse wat onafhanklik styg van hul grondbeginsels. Namate die investeringsopswaai toeneem begin inflasionêre druk toeneem en sentrale banke word gedwing om rentekoerse opwaarts te verstel wat dan lei tot skerp afnames op finansiële markte. Investeringsopswaaie lei tot ’n toestand van oorverskuldigdheid, indien agente nie in staat is om hul laste as gevolg van onvoldoende kontantvloei te diens nie. Dit kan aanleiding gee tot ’n likiditeitskrisis wanneer investeerders hulle onttrek uit finansiële markte. Wanneer dit gebeur neem investeerders saam met hulle likiditeit wat nodig is om finansiële markte doeltreffend te hou. Ekonomiese krisisse van alle vorme kan lei tot ’n afname in netto waarde, bankmislukkings, bankrotskappe en ’n daaropvolgende resessie.

Die verskynsel van banksektor probleme wat lei tot bank insolvensies en ekonomiese krisisse het in die afgelope paar dekades toegeneem. Die studie het aangedui dat die sub-prima krisis dieselfde patroon gevolg het as alle ander historiese ekonomiese krisisse en is dus identies aan vorige ekonomiese krisisse. Dis hoogs onwaarskynlik om ’n herhaling van die presiese gebeure wat gelei het tot die sub-prima krisis te ervaar. Aangesien alle noemenswaardige ekonomiese krisisse van die afgelope eeu dieselfde patroon gevolg het is die waarskynlikheid daar dat die geskiedenis homself kan herhaal.

Die oorkoepelende doel van die studie was om die oorsake van die sub-prima krisis te identifiseer om sodoende beleidsaanbevelings te formuleer om ’n herhaling van so ’n bankkrisis in die toekoms te kan vermy. Toekomstige optrede om dieselfde foute te voorkom, wat gelei het tot die sub-prima krisis, kan slegs uitgevoer word indien daar ’n duidelike begrip is van die betrokke partye se aksies wat ’n investeringsopswaai veroorsaak het. Die verhandeling bestaan uit 'n literatuurstudie wat fokus op die oorsake van die sub-prima krisis. Spesifieke aandag is gegee aan die verskillende partye, beleide, prosesse en gebeure in die Verenigde State van Amerika wat die sub-prima krisis tot gevolg gehad het.

Hoewel verskillende partye ’n invloedryke rol gespeel het in die ontstaan van die sub-prima krisis het die studie bevind dat die sub-prima krisis ’n investeringsopswaai is wat hoofsaaklik geskep en ontlont is deur die Federale Reserwebank van Amerika. ‘n Uitbreidende monetêre beleid is toegepas deur die Federale Reserwebank van Amerika in reaksie tot die finansiële onstuimigheid wat gevolg het na die dot-com krisis en die 11 September terroriste-aanval op die World Trade Centre. Die uitbreidende monetêre beleid wat deur die Federale Reserwebank van Amerika toegepas is was een van die grootste bydraende faktore tot die sub-prima krisis. Die sub-prima krisis is die jongste ekonomiese krisis in ’n lang lyn van ekonomiese krisisse, waarvan almal ontwikkel het gedurende periodes waar ’n uitbreidende monetêre beleid toegepas was. Die studie bevind geen bewyse van enige ander ooreenkomste tussen die verskillende ekonomiese krisisse wat oor die afgelope eeu plaasgevind het nie. Die gevolgtrekking van die studie is dat sentrale banke kondisies geskep het wat tot die ontstaan van investeringsopswaaie gelei het weens die implementering van ’n uitbreidende monetêre beleid. Dit is dus noodsaaklik dat die inkrimping en uitbreiding in die geldvoorraad so sorgvuldig moontlik gedoen word om inflasie te beheer om sodoende finansiële markte stabiel te hou.

Sleutelwoorde: Gierigheid, inflasie, likiditeit, morele gevaar, sekuritering, sub-prima verband inisiëring, die Federale Reserwebank van Amerika.

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Chapter 1: Introduction

1.1 Background on historic economic crises

According to Reinhart (2008:1) and Bordo (2008:2), economic crises of all types over the centuries followed a similar pattern. Evidence indicated that in the past century economic crises have been the result of financial market booms that occurred in environments of low inflation, rising real GDP growth and low policy real interest rates (Bordo & Wheelock, 2007:115). Financial market booms have all been propagated during periods of expansive monetary policy implementation that lowers interest rates and encourages borrowing beyond prudent limits to acquire the asset (Schwartz, 2009:45).

As these booms progress, inflationary pressure builds up and central banks inevitably tighten their policy rates contributing to the ensuing financial market crash (Bordo & Wheelock, 2007:115). Depending on the size of the bubble a crash in financial markets usually result in a economic crisis situation.[1] Economic crises have been linked to the emergence of various new innovations, for instance, a new tool of science of industry, such as the diving bell, steam engine, or the radio. Fisher (1933:348) calls these innovations a displacement[2] that leads to an investment boom financed by bank money and the creation of new financial innovations. In recent years these innovations have taken the form of tools of financial engineering, such as the joint-stock company, "junk" bonds, or collateralized debt obligations (CDOs)[3]. Barnes (2007:4) describes these innovations as:

"A natural extension of capitalism, where greed can inspire innovation."

Reinhart (2008:1) continued by saying that investors are at first extremely cautious about these new innovations, but as soon as they witness the exceptional returns these new instruments have to offer they all rush in. According to Bordo (2008:7), the boom usually leads to a state of euphoria where investors have difficulty distinguishing between sound and unsound decision-making. Determined not to lose out on the profits to be made on these new financial instruments, financial intermediaries, banks and investment companies stretch their balance sheets as far as possible.

[1] See Sections 2.2 and 2.3 for an explanation of the financial concepts "bubbles" and "crashes".
[2] A displacement refers to an exogenous event that provides new profitable investment opportunities.
[3] See Section 4.2 and Figure 4.3.

An asset boom can lead to the existence of a bubble characterized by asset prices rising independently from their fundamentals, but as these asset prices continue to escalate, financial market participants as well as policy makers become adamant that *"this time it is different"*, and argue that the old rules have been rewritten, risk has been tamed and leverage has been rewarded. Seldom do they protest that perhaps the world has not changed and that the old rules of valuation still apply (Reinhart, 2008:1-2). Booms inevitably lead to a state of over indebtedness, as agents find themselves unable to service their liabilities due to insufficient cash flow. This opens the door for a crisis situation as market participants all start to pull back and as they do, they take with them the liquidity needed to keep financial markets efficient. The resulting crisis can lead to declining net worth's, bank failures, bankruptcies and an ensuing recession (Bordo, 2008:7). If a strategy or instrument is misused or *"overcooked"* and left unchecked, major market forces will be required to restore balance to the financial system (Barnes, 2007:4).[4] Reinhardt (2008:1-2) is of the opinion that the old rules still apply and that the spectacle repeats itself in the various types of crises, most relevant to the present is the aftermath of banking crises.

Bordo (2008:7) describes the occurrence of banking crises as being a well known tradition in monetary economics, which goes back as far as the nineteenth century. Demirgüç-Kunt, Detragiache and Gupta (2006:703) define a banking crisis as a period during which segments of the banking system become illiquid or insolvent. Oviedo and Sikdar (2008:2) classify a banking crisis as a costly and in some countries a recurring phenomenon that delivers serious adverse macroeconomic consequences and has enormous negative effects on fiscal balances.

In a study conducted on 36 banking crises in 35 countries between 1980 and 1995, Demirgüç-Kunt *et al.* (2006:715) found that the most common macroeconomic consequence of banking crises is sharp declines in output growth rates. Romer (1993:19-20) suggests that the harmful macroeconomic consequences of banking sector problems, such as the banking crises of 1931, was a crucial cause of the Great Depression in the United States of America. The recurrence rate of banking sector problems leading to bank insolvencies have increased in recent decades in developed and developing countries, affecting both the entire financial intermediary system and/or individual financial institutions (Caprio & Klingebiel, 1996a:1; Oviedo & Sikdar, 2008:1). From studies conducted by Lindgreen, Gillian and Saal (1996:3) and Caprio and Klingebiel (2003:1), it is clear that these crises have become more and more common over the past few decades.

[4] As was seen with the dot-com crash, long-term capital management's collapse and the hyperinflation of the early 1980s.

According to Lindgreen *et al.* (1996:3), out of 181 International Monetary Fund (IMF) member countries, 130 of them experienced significant banking sector problems, including numerous banking crises between 1980 and 1996. Caprio and Klingebiel (2003:1) reported that there were 117 systemic banking crises[5] and 51 cases of borderline or non-systemic crises in 93 developed and emerging market countries since the late 1970s. Sánta (2007:31) provides the following three reasons for the increase in banking crises:

- Macroeconomic, or structural/institutional factors (for example, inadequate regulation during financial liberalization);
- Microeconomic causes (such as excessive growth and inefficient risk management methods); and
- External shocks (for example, sharp commodity price increases) and cross border banking group mergers and acquisitions (as seen in Europe).

Studies conducted by Caprio and Klingebiel (1996b:1) and Honohan and Klingebiel (2000:3) found that governments end up bearing most of the direct costs of banking crises. Alexander (2009:86) and Beenstock (2009:65) specify that the funds used by government to restore liquidity during bank restructuring programs is in actual fact funds obtained through taxes. Bankers take on increasing amounts of risk since they are well aware that they will be bailed out by government (with taxpayers' money) in the event that they should encounter liquidity shortages. Government regulation and intervention, therefore, induces moral hazard within the banking sector (Beenstock, 2009:61). In most cases an overall estimate of the amount of resources involved in bank restructuring programs can be as much as 40 to 55 percent of a country's GDP (Caprio & Klingebiel, 1996b:1; Honohan & Klingebiel, 2000:3).

Sánta (2007:31) and Crotty (2008:25) state that in today's modern banking systems the basic underlying reasons for banking crises are the inefficient and imperfect functioning of financial markets combined with a lack of transparency in these markets. The creation of increasingly complex financial products such as CDOs is another reason for an increased occurrence of banking crises (Sánta, 2007:31). In recent years risk management procedures, Credit Rating Agencies (CRAs) as well as institutional investors in CDOs have all been struggling to keep up with the complexity of structured products. Their lack of product knowledge has, therefore, contributed to the severity and the recurring nature of banking crises (Eavis, 2007a:6; Sánta, 2007:31; Van Vuuren, 2009a). This concludes the

[5] Defined as a significant portion of banking capital being exhausted.

introduction and emphasis is placed on the following aspects regarding economic and banking crises over the past century:

- Economic crises of all types over the centuries follow a similar pattern;
- All economic crises have been the result of financial market booms that occurred in environments of low inflation, rising real Gross Domestic Product (GDP) growth and low policy real interest rates;
- Greed is one of the main drivers behind economic crises;
- Recent economic crises came forth in the form of banking crises;
- The recurrence rate of banking crises have been on the increase in previous years;
- Moral hazard has been contributing to greater risk taking activities amongst banks;
- The complexity of financial innovation and the lack of transparency is a key driver behind the increasing number of economic crises resulting from the banking sector; and
- All banking crises have had a negative impact on the global economy.

The above mentioned aspects will be discussed in greater detail throughout the study and will provide insight as to how economic crises (including the sub-prime crisis that forms the focal point of this study) have been created over the past century. The following section provides a discussion on the most recent banking crisis that has occurred, the sub-prime crisis. The aim of this discussion is to provide a short introduction on how the sub-prime crisis was formed, as well as to establish whether or not there are any evidence suggesting that the sub-prime crisis is no different from any other economic crises throughout history.

1.2 Background on the sub-prime crisis

The economy of the United States of America was at risk of falling into a deep recession in the aftermath of the dot-com crisis in early 2000 (Petroff, 2007:1). The situation was intensified by the September 11 terrorist attack on the World Trade Centre in 2001. The Federal Reserve Bank of America (FED) responded to the situation in an attempt to stimulate an ailing economy through a reduction in the federal funds interest rate, which created capital liquidity. The Federal Reserve Bank of America began lowering the federal funds interest rate dramatically during 2001 and by 2003 the federal funds interest rate decreased from 6.25 percent to a mere 1 percent (Barnes, 2007:1-2; Butler, 2009:55). The goal of a low federal funds interest rate was to expand the money supply and to encourage borrowing, which should then stimulate spending and investing. The expansive monetary policy implemented by the Federal Reserve Bank of America worked and the United States

of America's economy steadily began to grow in 2002 (Petroff, 2007:1). The increase of the money supply, as a result of the reduction in the federal funds interest rate, broadly depressed risk premiums which led investors to seek higher returns through riskier investments (Petroff, 2007:1). Traditionally investors would have bought Treasury bills from the Federal Reserve Bank of America (a very safe investment), but given the very low return on investment, investors were looking for higher returns by taking on risk elsewhere (Crotty, 2008:3). At the same time, mortgage originators (lenders) had more funds available to lend due to central banks creating capital liquidity and like investors they also had an increased willingness to take on additional risk to increase their investment returns. Originators encouraged mortgage brokers to increase mortgage sales and mortgage brokers eagerly obliged as they earned fees in proportion to the volume of mortgages they wrote (Crotty, 2008:3). Hence, most of the blame may be pointed at the mortgage originators as it was they who ultimately lent funds to people with poor credit and a high risk of default (Petroff, 2007:1).

In addition, originators made large profits by making use of the process of securitization to securitize their risky assets (Petroff, 2007:1; Crotty, 2008:3). Originators did this by taking risky sub-prime mortgage loans off of their balance sheets by moving their high risk sub-prime mortgage pools to a Special Purpose Vehicle (SPV). Once moved to the SPV the loans/assets were repackaged to form a CDO. Originators kept on servicing the pooled mortgages contained in the CDO after they were moved to the SPV (Ashcraft & Schuermann, 2007:10). The general consensus surrounding these mortgages was that originators transferred most of these mortgages and, therefore, also the risk involved to capital markets in the form of CDOs. Hence, it was perceived that these asset-backed securities[6] had a very low probability of default. Credit rating agencies, therefore, assigned ratings as high as "AAA" or "A+" to these securities and offered investors higher returns than equivalently rated corporate bonds (Crotty, 2008:3; Demyanyk & Van Hemert, 2008:26).[7] The low federal funds interest rate constrained the yields on corporate bonds offered by the United States of America's Government. As a result, the demand for these complex and risky products by institutional investors such as hedge funds, pension funds and insurance companies grew immensely (Dodd, 2007:17; Brunnermeier, 2008:6-7; Demyanyk, & Van Hemert, 2008:26). The demand for these securities also meant that originators had to expand their lending activities in order to keep up with the demand from investors. As the

[6] Asset backed securities (ABSs) are securities where the underlying asset being financed acts as collateral to the holder of the security against default (Brunnermeier, 2008:2; Barnes, 2008:2).

[7] Dissimilar returns on products carrying the same risk ratings should have signalled that something was seriously wrong with the way markets priced the risks involved with these securities.

number of prime mortgagors were starting to diminish originators began to increase their lending activities to sub-prime borrowers[8] (Crotty, 2008:3). Meanwhile, as a result of the increased liquidity in the market, investment banks and other large investors were able to borrow excessive amounts of capital from the Federal Reserve Bank of America (increased leverage). This allowed originators to create additional and riskier investment products. As a result the amount of precarious sub-prime mortgages included in CDOs began to increase dramatically (Crotty, 2008:3).

Originators made it possible for mortgagors (especially sub-prime mortgagors) to acquire a mortgage through non-traditional mortgages, such as 2/28, 3/27[9] and interest-only mortgages (Ashcraft & Schuermann, 2007:21-22; Petroff, 2007:2). These mortgages offered low introductory interest rates and minimal initial costs, for example no initial deposits. Continued house price appreciation would have allowed sub-prime mortgagors to refinance their mortgage to another mortgage offering a lower interest payment (Ashcraft & Schuermann, 2007:21-22; Petroff, 2007:2; Nagy & Szabó, 2008:35). Originators based their risk modelling on the assumption of continued house price appreciation. Many sub-prime mortgagors would have been able to afford their mortgage if this assumption held true (Butler, 2009:55).

However, instead of continued appreciation the housing market collapsed and house prices declined rapidly. The decline of house prices was attributed to inflationary pressures that started to build due to the expansive monetary policy implemented by the Federal Reserve Bank of America (Bordo, 2008:8-9). As a result monetary policy tightened in reaction to rising inflation, which caused the federal funds interest rate to be adjusted upwards (Bordo, 2008:8-9; Wray, 2008:3). Many mortgagors were forced to default on their mortgages as they could not meet their financial obligations as a result of the increases in the federal funds interest rate. The situation was intensified by the losses incurred by mortgage originators and investors in securities containing sub-prime mortgages. This was mainly due to the declining value of the property they held and investors became extremely cautious about the quality of the assets contained in the securities they were buying (Bordo, 2008:8-9). Hence, trading effectively ceased and in turn financial markets became illiquid (Dodd, 2007:19). The liquidity shortages forced perfectly solvent banks to write down some of their assets to a large degree and some banks even had to declare bankruptcy (Myddelton, 2009:108). This

[8] Sub-prime borrowers are borrowers who have question marks surrounding them regarding certain aspects, such as a weak credit rating or inability to prove income earnings (Ashcraft & Schuermann, 2007:7; Smith, 2007a:1-2).
[9] Sub-prime 2/28 and 3/27 were the names given to two separate mortgage products offered to sub-prime mortgagors. See Section 5.2.2.

triggered all sorts of crisis arrangements and came to be known as the sub-prime crisis. This concludes the brief background discussion on the sub-prime crisis. The following conclusions are withdrawn from this section:

- The sub-prime crisis occurred in environments of low inflation, rising real GDP growth and low policy real interest rates and therefore follow the same pattern as all other historic economic crises as discussed in Section 1.1 (See Demyanyk & Van Hemert, 2008);
- The reason for the implementation of an extravagant expansive monetary policy by the Federal Reserve Bank of America needs to be assessed;
- Financial innovation in the form of the securitization of risky sub-prime mortgages by originating institutions has served as the catalyst in the creation of a mortgage bubble;
- Greed played an integral part in inflating the mortgage bubble beyond prudential limits; and
- Various parties have been involved in the creation of the sub-prime crisis and more attention would need to be given to identify the mistakes made by the relevant parties.

The remainder of the chapter provides a framework for the rest of the study and indicates the research question, motivation and objectives for the study.

1.3 Research question

The research question investigated in this dissertation is as follow: What are the causalities of the sub-prime crisis and how can a recurrence of such banking crisis be avoided in the future?

1.4 Motivation

Section 1.1 emphasized the impact that banking crises can have on a country's economy as well as on the global economy. It also shows that all economic crises follow the same pattern and that the sub-prime crisis, as a banking crisis, is no exception. Recommendations on how to avoid a recurrence of the events that created the sub-prime crisis can only be provided once there is a clear understanding of where and how crucial mistakes were made that contributed to a mortgage bubble boom.

Recent economic crises came forth in the form of banking crises and the recurrence rate of such banking crises have been on the increase over the past few decades. The sub-prime crisis is the latest of a long list of banking crises. Seeing that all banking crises follow the same pattern it becomes a necessity to understand their mechanism. Only then will their warning signs become clear and can a possible crisis situation be corrected or avoided.

It is, therefore, crucial to identify the mistakes made in the past. This will allow for appropriate measures to be taken in order to ensure that the mistakes made during previous banking crises will not be repeated in the future.

1.5 Objectives

The primary objective of the study is to assess the mistakes made by the various parties responsible for the creation of a mortgage bubble in order to make policy recommendations to prevent a recurrence of the events that led to the sub-prime crisis. This may be achieved by reaching a number of secondary objectives:

- Determining the relevant role-players and processes responsible for the sub-prime crisis;
- Determining how the actions of the relevant role-players inflated the mortgage bubble; and
- Determining the correlation between historic banking crises and the sub-prime crisis.

1.6 Demarcation of the study

This dissertation consists of a literature study on the causalities of the sub-prime crisis and will pay specific attention to various parties, policies, processes and events in the United States of America that created the sub-prime crisis.

1.7 Chapter division

- Chapter two explains the financial concepts “bubbles” and “crashes”. Bubbles and crashes are the two phenomena that have created every major historical economic crisis. The term “mortgage bubble” will also be explained, since the origin of the sub-prime crisis lies within the United States of America’s mortgage market.

- Chapter three outlines the relevant events that led to the sub-prime crisis, namely the dot-com crash and the September 11 terrorist attack on the World Trade Centre. In the aftermath of these events the Federal Reserve Bank of America implemented an expansive monetary policy in an attempt to circumvent a possible recession.

- The focal point of chapter four revolves around three relevant financial concepts that have contributed to the sub-prime crisis, namely: The process of securitization, mark-to-market accounting and the Basel II Capital Adequacy Ratios. Mark-to-market accounting goes hand-in-hand with the process of securitization and together these two concepts contributed significantly to the creation of the sub-prime crisis. Regulatory failure in the form of the Basel II Capital Adequacy Ratios has also been linked to the sub-prime crisis.

- Chapter five contains an in-depth discussion surrounding the mortgage originators, mortgagors, investors and credit rating agencies and how their actions have contributed to the creation of the sub-prime crisis.

- Chapter six will explore the contributions made by the United States Government and the Federal Reserve Bank of America to the mortgage bubble boom that led to the sub-prime crisis.

- Recommendations and a summary for the study are presented in chapter seven.

Chapter 2: Understanding the terms bubbles and crashes

2.1 Introduction

As mentioned in Section 1.5, the primary objective of the study is to assess the mistakes made by the various parties responsible for the mortgage bubble boom. Once this has been established policy recommendations can be presented in order to prevent a recurrence of the events that led to the sub-prime crisis. This study will commence with a discussion on bubbles (Section 2.2), crashes (Section 2.3) and mortgage bubbles (Section 2.4). Bubbles and crashes are the two phenomena that have created every major historical economic crisis (Bordo & Wheelock, 2007:115; Reinhart, 2008:1). It is essential to understand these terms as a better understanding of what bubbles are, how they are formed and how they function will provide a framework on how the sub-prime crisis was created out of certain events and actions taken by various parties.[10]

2.2 Bubbles

A bubble will occur when investors place so much demand on, for example a stock, that they push the stock price beyond any accurate or rational reflection of its fair value (Reinhart, 2008:1; Tirole, 2008:60). A bubble is, therefore, an investment phenomenon that manifests itself through the frailty of some facets of human emotion, with the most relevant weakness being greed (Barnes, 2007:4). An accurate value of a stock's price should be determined by inter alia the performance of the underlying company or asset, in context with the prevailing economic conditions, and not by sentiment. With an investment bubble it often appears as though the stock price will keep increasing, but since the stocks foundation is not based on merit, it eventually bursts. When an investment bubble bursts the money invested in that stock evaporates, which is also referred to as a crash in financial markets (Bordo, 2008:7; Reinhart, 2008:1-2). All major historical financial market crashes that have resulted in economic crises precipitated from a bubble (Bordo & Wheelock, 2007:115; Reinhart, 2008:1).[11] Section 2.3 explains the concept of a financial market crash in more detail.

[10] The relevant parties responsible for the mortgage bubble boom that led to the sub-prime crisis will be discussed in Chapters five and six.

[11] Some examples include The Tulip and Bulb Craze (1637), The Great Depression (1929), The Crash of 1987, The Asian Crisis (1997) and the dot-com crash (2000). The dot-com crash is a prime example of a market crash that has precipitated from a bubble. See Section 3.2 for a discussion on the dot-com crash.

2.3 Crashes

When an investment bubble "bursts" it is usually accompanied by a crash in financial markets (Bordo, 2008:7). A crash then refers to a substantial decline in the total value of a stock market. A crash will result in a situation where the majority of investors will try to exit the market simultaneously, due to the rapid decline in the value of their portfolios. Seeking to avoid further massive losses, investors during a crash, revert to panic selling of their stock in an attempt to offload their declining stocks in the stock market (Bordo, 2008:7). The panic selling usually result in a declining stock market, which eventually crashes and affects all market participants (Bordo, 2008:7). The effects of these crises have been strongly correlated with the size of the bubble. Hence, the bigger the bubble the more profound the effects of the crisis would be (Bordo, 2008:7; Reinhart, 2008:1-2).

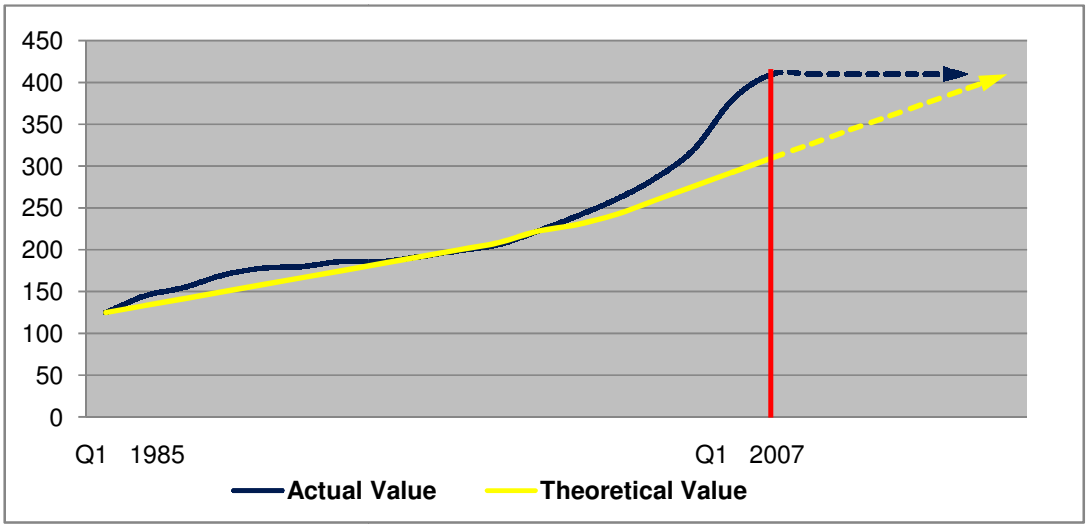
As mentioned in Section 1.1 economic crises have been linked to the emergence of various new innovations. In the case of the sub-prime crisis the crisis can be linked to financial innovation within the United States of America's mortgage market (Crotty, 2008:3-4; Butler, 2009:51-52). One of the conclusions drawn from Section 1.2 was that the sub-prime crisis is identical to historic crises and has also precipitated from a bubble. Section 2.4 will, therefore, explain mortgage bubbles and how these bubbles are formed. It is important to understand the mechanics behind mortgage bubbles since an investment boom in the real estate market resulted in the sub-prime crisis.

2.4 Mortgage bubbles

Homeowners usually assume that recent price performance will continue into the future, without first considering the long-term rates of price appreciation and the potential for mean reversion (Nielsen, 2010a:1).[12] This is evident in the real estate market where price levels follow this law of mean reversion (Bessis 2007:265). Real estate prices can remain constant until the long-term average is reached or it can rise or fall rapidly until aligned to the long-term average (Nielsen, 2010a:1). This effect can be illustrated in Figure 2.1, where there were rapid increases in real estate prices (blue line), during the mortgage bubble boom, up until the crash during the second half of 2007. Thereafter, it is suggested that prices will decrease and fall back in line with the estimated long-term real estate price average (yellow line) for the United States of America (Nielsen, 2010a:1).

[12] The laws of finance state that markets going through periods of rapid price depreciation or appreciation will, over time, return to a price level in line with where their long-term average rates of appreciation suggest they should be (Bessis 2007:256).

Figure 2.1: Long-term average real estate price estimates for the United States of America



Source: Nielsen (2007a:2).

This fluctuation in real estate prices is driven by supply and demand factors, just like the price of any good or service in a free market (Nielsen, 2010a:1). When demand increases and/or supply decreases, prices will tend to increase. There are nine causes for an increase in real estate demand, as defined by Nielsen (2010a:2):

- Low interest rates levels, particularly short-term interest rates that make real estate more affordable;
- An increase in the growth rate of the population;
- An increase in the growth rate of the economy;
- Innovative mortgage products with low initial monthly payments and zero deposits that make real estate more affordable.[13] Easy access to credit (a lowering of underwriting standards) that brings more buyers to market;
- High-yielding structured mortgage bonds, as demanded by investors, which make more mortgage credit available to borrowers;
- Speculative and risky behaviour by property investors and home buyers, encouraged by unrealistic and unsustainable real estate price appreciation estimates;
- A potential mispricing of risk by mortgage bond investors and mortgage lenders that expands the availability of credit to borrowers;

[13] See Section 5.2.2 for discussions on the various mortgage products.

- Excessive risk-taking and a lack of financial literacy by mortgage borrowers; and
- The short-term relationship between a borrower and a mortgage broker, under which borrowers are sometimes encouraged to take excessive risks.

These variables can combine to cause a mortgage bubble. In the case of the sub-prime crisis, virtually all of the above factors were present and contributed to the creation of a mortgage bubble (Nielsen, 2010a:2). As with all bubbles, the boom usually leads to a state of euphoria where excessive risk-taking and speculative behaviour by all market participants including buyers, borrowers, lenders, builders and investors increase dramatically (Bordo, 2008:7). A mortgage bubble will crash when excessive risk-taking becomes pervasive throughout the real estate system. This happens while the demand for real estate decreases and the supply of real estate is still increasing, thus resulting in declining prices (Nielsen, 2010a:2). This pervasiveness of risk throughout the system is set in motion by losses suffered by homeowners, mortgage lenders, as well as mortgage and property investors. Losses could be triggered by a number of factors, as indicated by Nielsen (2010a:3):

- Increasing interest rates will increase the mortgage repayment of current real estate owners. This might lead to default and foreclosure activities, which eventually increases the real estate supply;
- Decreasing demand for real estate will bring supply and demand into equilibrium. This will decrease the pace of real estate price appreciation that some property owners, particularly speculators, count on to increase the equity within their property.[14] Therefore, speculators investing in property would only be able to finance the property if real estate price appreciation continued over the long-term. Hence, they might lose their homes if rapid price appreciation stagnates. This will also increase the real estate supply in the property market; and
- A decline in general economic activity that leads to less disposable income, job loss and/or fewer available jobs, which will also lower the demand for real estate.

2.5 Conclusion

The primary objective of the study is to assess the mistakes made by the various parties responsible for the creation of a mortgage bubble. Once these mistakes have been identified policy recommendations can be provided to prevent a recurrence of the events that led to

[14] Equity in this context refers to the difference between the market value of a property and the claims held against it. This implies that with an increase in the market value of a property, with the claims against the property remaining constant, will result in an increase of an individual's equity (assets).

the sub-prime crisis. Bubbles and crashes are the two phenomena that have created every major historical economic crisis, including the sub-prime crisis. Chapter two contained discussions on bubbles (Section 2.2), crashes (Section 2.3) and mortgage bubbles (Section 2.4). A better understanding of these concepts is crucial in order to comprehend how the actions of various parties created a mortgage bubble and how this bubble eventually crashed.

There are several other aspects regarding the formation of a mortgage bubble in the United States of America's mortgage market that needs to be discussed before the discussions on the actions of the parties responsible for the mortgage bubble boom can commence. Chapter three contain discussions on two relevant events that occurred in the United States of America that have set a platform for an expansive monetary policy implemented by the Federal Reserve Bank of America. Their expansive monetary policy ultimately opened the door for the formation of a mortgage bubble. These two events are the dot-com crash (Section 3.2) and the September 11 terrorist attack on the World Trade Centre (Section 3.3). Chapter three will explain how these two events contributed to the formation of a mortgage bubble that led to the sub-prime crisis.

Chapter 3: Relevant events contributing to the sub-prime crisis

3.1 Introduction

The focal point of this study is to identify and correct the mistakes made by the parties responsible for the sub-prime crisis. Chapter two explained the concepts of bubbles and crashes, the two phenomena that have created every major historical economic crisis, including the sub-prime crisis. A better understanding of these concepts mentioned in chapter two is crucial in order to comprehend how the actions of various parties created a mortgage bubble and how this bubble eventually crashed. Following the explanation on the financial concepts, bubbles and crashes, is a discussion on the relevant events that occurred in the United States of America that led to the implementation of an expansive monetary policy by the Federal Reserve Bank of America. The expansion of credit as a result of the expansive monetary policy was one of the largest contributing factors to the formation of a mortgage bubble (Schwartz, 2009:49). The two relevant events that necessitated an expansion in the money supply are the dot-com crash and the September 11 terrorist attack on the World Trade Centre. The combined effects of these two events, illustrated how an expansive monetary policy was implemented in order to avoid a recession. The expansive monetary policy created a platform for various parties to create a mortgage bubble (Petroff, 2007:1; Butler, 2009:55). Chapter three will commence by providing an in-depth discussion on the two relevant events, which provided a significant contribution to the sub-prime crisis. These events are the dot-com crash (Section 3.2) and the September 11 terrorist attack on the World Trade Centre (Section 3.3). Section 3.4 will conclude chapter three.

3.2 The dot-com crash

According to the study of Bram (2003:2), the 1996 to 2000 economic boom in the United States of America was entirely the result of transitory events and financial market cycles. Much of the income growth generated by the boom was due to spectacular increases in Wall Street earnings (Bram, 2003:2). The main cause for these excessive Wall Street earnings was the development of the internet by the United States of America's military, who greatly underestimated the number of people who wanted to make use of this new innovation. By 1995 the internet had an estimated 18 million commercial users and the number of users was growing at a tremendous rate (Beattie, 2002:1). The growing demand for the internet meant a large unexploited international market (Beattie, 2002:1). During this time investors, driven by greed, were more open for big ideas than solid business plans, in an attempt to make large profits (Beattie, 2002:1). Billions of Dollars in venture funding were thrown at any

entrepreneur, with little or no market experience, who had a business idea to sell (Yann, 2005:1). Innovations like the internet, networking, new paradigm, tailored web experience, information technologies, and consumer-driven navigation created an unstoppable demand for the initial public offerings (IPOs) of internet companies (Beattie, 2002:1).

Bram (2003:2) and Yann (2005:1) emphasise the strong economic growth experienced in the United States of America during the dot-com bubble. Private-sector employment grew on average by 2.6 percent annually between 1996 and 2000 (Bram, 2003:2). The boom was just as strong on the income side as wage and salary earnings in the private sector expanded on average by 9.6 percent annually during the same time period. The bustling investment drive pushed the stock valuations of Internet companies through the roof (Bram, 2003:2). On the contrary, as Yann (2005:2) states, by November 1999 there were warning signs that many companies would fall out of the dot-com business model by 2001, seeing that as many as 75 percent of projects failed to be delivered. Investors began to question the dot-com business fundamentals and their loss of confidence in the business model resulted in the dot-com bubble crash in March 2000 (Yann, 2005:1). After the dot-com bubble crash many of the internet companies reported huge losses and some closed doors within months of their IPOs.

In the aftermath of the dot-com crash stock prices on NASDAQ[15] reached their peak at 5,048.62 on 10 March 2000, marking the end of the dot-com era (Yann, 2005:1). The dot-com crash spanned between March 11, 2000 and October 9, 2002 and during this time period the NASDAQ Composite suffered a 78 percent loss in its total value, from peak to bottom, as it fell from 5046.86 (this market value was more than double its worth just 14 months ago) to 1114.11 (Yann, 2005:1). In just one year the Dow Jones Composite Internet Index collapsed from a peak of 450 in January 2000 to below 50 by August 2001 (Peristiani, 2003:1). In an attempt to counter the recession the Federal Reserve Bank of America implemented an expansive monetary policy to restore liquidity to financial markets (Butler, 2009:55).

Section 1.2 emphasized the effect of a crash on the United States of America's economy. There are two important conclusions to be drawn from this section. The first being that the dot-com crash is a classic example of an economic crisis containing all the characteristics as described by Fisher (1933:348), Bordo and Wheelock (2007:115), Barnes (2007:4) and

[15] The NASDAQ (National Association of Securities Dealers Automated Quotations) Stock Market is an American stock exchange and is the second-largest stock exchange by market capitalization in the world, after the New York Stock Exchange.

Reinhart (2008:1), as stated in Section 1.1. The second conclusion is that the Federal Reserve Bank of America implemented an expansive monetary policy to restore liquidity in financial markets. The relevance of the second conclusion becomes clear in the following section in which the September 11 terrorist attack on the World Trade Centre will be discussed. The effect of the dot-com crash was intensified by the September 11 terrorist attack on the World Trade Centre in 2001 (Petroff, 2007:1). The combined effects of these two events had a crippling effect on the United States of America's economy (Bram, 2003:1-3; Petroff, 2007:1). The following section explores the contribution of the September 11 terrorist attack on the World Trade Centre to the sub-prime crisis.

3.3 The September 11 terrorist attack on the World Trade Centre

The recession after the dot-com crash became more evident in light of the economic disruption caused by the September 11 terrorist attack on the World Trade Centre in 2001 (Bram, 2003:2-3). A mere nine months after the United States of America's economy slipped into a recession, as a result of the crash of the dot-com bubble, the World Trade Centre attack occurred (Bram, 2003:2-3). The economic implications was so severe that post September 11 saw private-sector employment in New York City fall by 51,000 jobs in October 2001 and a further 41,000 jobs through March 2002 (Bram, 2003:3). Action needed to be taken in order to avoid a global economic meltdown.

Interest rate reductions were the response by the Federal Reserve Bank of America to the 2000 dot-com crash and the September 11 terrorist attack on the World Trade Centre in 2001. The reduction of interest rates created capital liquidity (Petroff, 2007:1). The Federal Reserve Bank of America began cutting rates dramatically during 2001, and by 2003 the federal funds interest rate decreased from 6.25 percent to a mere 1 percent (see Figure 6.1) (Barnes, 2007:1-2; Butler, 2009:55). From November 2001 to the end of 2004 the federal funds interest rate were kept at 2 percent or lower (Eavis, 2007a:7). Eavis (2007a:7) and Schwartz, (2009:49) question the extravagant expansive monetary policy and is of the opinion that if a less expansive monetary policy had been conducted that the sub-prime crisis would have been avoided.

The extremely low federal funds interest rate expanded the money supply and provided the platform for a crisis situation once inflationary pressures started to escalate (Butler; 2009:55-56). In response to the rising inflation the Federal Reserve Bank of America had to curb the inflation rate by increasing the federal funds interest rate (Wray, 2008:3). The sudden and continuous increases of the federal funds interest rate caused steep increases on mortgage

payments and many property owners started to default on their mortgage payments as they were not able to afford the higher payments (Barnes; 2007:4-5). Hence, the monetary policy implemented by the Federal Reserve Bank of America has also been described as one of the largest, if not the largest, contributing factor to the sub-prime crisis (Eavis, 2007a:7; Booth, 2009:35; Butler, 2009:51; Greenwood, 2009:37; Schwartz, 2009:49).[16]

3.4 Conclusion

The primary objective of the study is to assess the mistakes made by the various parties responsible for the creation of a mortgage bubble in order to make policy recommendations to prevent a recurrence of the events that led to the sub-prime crisis. In order to understand how various parties have created the mortgage bubble several other aspects had to be explained. The first two aspects were bubbles (Section 2.2) and crashes (Section 2.3), discussed in chapter two. Understanding the mechanics behind these two concepts will allow for greater clarity as to how the two relevant events, as discussed in chapter three, led to an expansive monetary policy. Various parties exploited the expansive monetary policy implemented by the Federal Reserve Bank of America to form a mortgage bubble.

From chapter three the conclusion can be withdrawn that the dot-com crash and the September 11 terrorist attack on the World Trade Centre are two relevant events that led to the implementation of an expansive monetary policy by the Federal Reserve Bank of America. The reduction of the federal funds interest rate meant that mortgages could be obtained at very low interest rates and caused an increasing demand for mortgages. The implementation of an extravagant expansive monetary policy has been described as one of the biggest contributing factors to the mortgage bubble boom.

Chapter four contains the last of the important aspects that needs to be discussed in order to understand how various parties exploited the expansive monetary policy implemented by the Federal Reserve Bank of America to create a mortgage bubble. Chapter four explains the financial concepts securitization, mark-to-market accounting as well as the Basel II Capital Adequacy Ratios. Understanding these three concepts will allow for greater clarity on how the expansive monetary policy had been exploited by various parties by making use of securitization, mark-to-market accounting standards and the Basel II Capital Adequacy Ratios to create a mortgage bubble.

[16] The Federal Reserve Bank of America's contribution and the actions taken by the Federal Reserve Bank of America will be explored in Sections 6.3, 6.3.1 and 6.3.2.

Chapter 4: Relevant processes contributing to the sub-prime crisis

4.1 Introduction

The focal point of this study is to identify and correct the mistakes made by the parties responsible for the sub-prime crisis. Chapter two explained the concepts bubbles (Section 2.2) and crashes (Section 2.3), which are the two phenomena that have created every major historical economic crisis, including the sub-prime crisis. Chapter three gave an important introduction on the dot-com crash (Section 3.2) and the September 11 terrorist attack on the World Trade Centre (Section 3.3). These two events were responsible for the implementation of an expansive monetary policy by the Federal Reserve Bank of America. One of the conclusions drawn from chapter three is that the implementation of an expansive monetary policy by the Federal Reserve Bank of America created a platform for a mortgage bubble boom. Chapter four explores three financial concepts namely, securitization, mark-to-market accounting and the Basel II Capital Adequacy Ratios of the Basel Bank for International Settlements (BIS). A better understanding of these three processes will clarify how mortgage originators made use of securitization, mark-to-market accounting standards and the Basel II Capital Adequacy Ratios to expand their mortgage lending activities to sub-prime borrowers, hence inflating the mortgage bubble in the process.

Chapter four explores how securitization has allowed for more parties to be involved in the creation of the crisis, and how it links various parties with one another. It also allowed mortgage originators to save on regulatory capital requirements against their assets. The process of securitization can be described as one of the biggest catalysts in the creation of the mortgage bubble and the sub-prime crisis (Schwartz, 2009:47). Chapter four further provides an in-depth discussion on mark-to-market accounting standards and the role this method of pricing derivatives played in the sub-prime crisis. Bervas (2008:129), Crockett (2008:17) and Goodhart (2008:13-15) emphasize that the process of marking-to-market (also known as fair value or mark-to-market accounting) contributed to the creation of the mortgage bubble. Mark-to-market accounting also formed the basis for the Basel II Capital Adequacy Ratios for originators (Myddelton, 2009:101). Basel II Capital Adequacy Ratios, along with mark-to-market accounting contributed significantly to the creation of the sub-prime crisis (Goodhart, 2008:12-13). This chapter will commence with a discussion on the process of securitization in Section 4.2. Following Section 4.2 will be a discussion on mark-to-market accounting (Section 4.3) as well as a discussion on the Basel Accord in Sections 4.4 (Basel I) and 4.5 (Basel II), respectively. Chapter four is concluded in Section 4.6.

4.2 The process of securitization

Before a discussion will be provided on the various parties responsible for the creation of the crisis (see chapters five and six), it is important to understand the process of securitization. Securitization has played an important part in the formation and the extent of the mortgage bubble that led to the sub-prime crisis.[17] As mentioned in Section 4.1, the process of securitization can be seen as the catalyst for the crisis as it allowed for more parties to be involved in the creation of the crisis (Schwartz, 2009:47). Securitization linked the various role-players with one another[18] and is also the mechanism that allowed toxic tranches[19] to be dispersed across the globe (Crotty, 2008:3; Schwartz, 2009:47). It is, therefore, a process that has contributed greatly to the extent of the sub-prime crisis.

Brunnermeier (2008:2) and Dodd (2007:15) state that the evolution of financial innovation has led to the creation of a wide variety of securitized assets, the securitization of various risk categories, and to the emergence of off-balance-sheet vehicles (such as SPVs). Traditionally, originators who granted mortgages kept the mortgages on their books until maturity. However, through recent innovative structures the credit risk[20] has been transferred to other financial institutions or investors. Originators have replaced the traditional "originate to hold" banking model with an "originate and distribute" banking model through the process of securitization (Schwartz, 2009:47; Llewellyn, 2009:187; Dodd, 2007:15-16).

Figure 4.1 illustrates the simplistic "originate to hold" banking model (traditional model). Traditionally, originators have financed their mortgage lending through the deposits they received from customers. Monthly mortgage payments were paid to the bank by the mortgagor and the cycle was repeated. This practise has limited the amount of mortgage lending originators could partake in (Dodd, 2007:15-16). As a result, originators turned to the "originate and distribute" banking model (Figure 4.2, sub-prime model) that enabled them to keep sub-prime assets off their books, avoid related capital requirements and to sell mortgages to the bond markets (Dodd, 2007:16).

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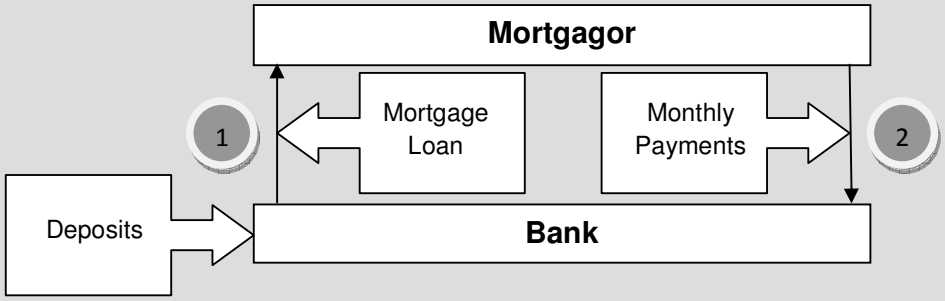
[17] Although various types of assets can be securitized, it should be noted that since the focal point of this study is directed towards the sub-prime crisis, reference as to the nature of the assets being securitized will be from a mortgage point of view.

[18] See Figure 4.4.

[19] Tranches contain securities with different risk categories assigned to each tranche. The securities are sold by mortgage originators to investors according to each investor's risk appetite. The tranching process will be explained in more detail later on in this section. Also see Figure 4.3.

[20] Credit risk refers to a situation where borrowers are unable to comply with their obligations to service debt. When a borrower defaults on a loan repayment a partial or total loss of the loaned amount is lost by the lender (Bessis, 2007:13)

Figure 4.1: Traditional banking model

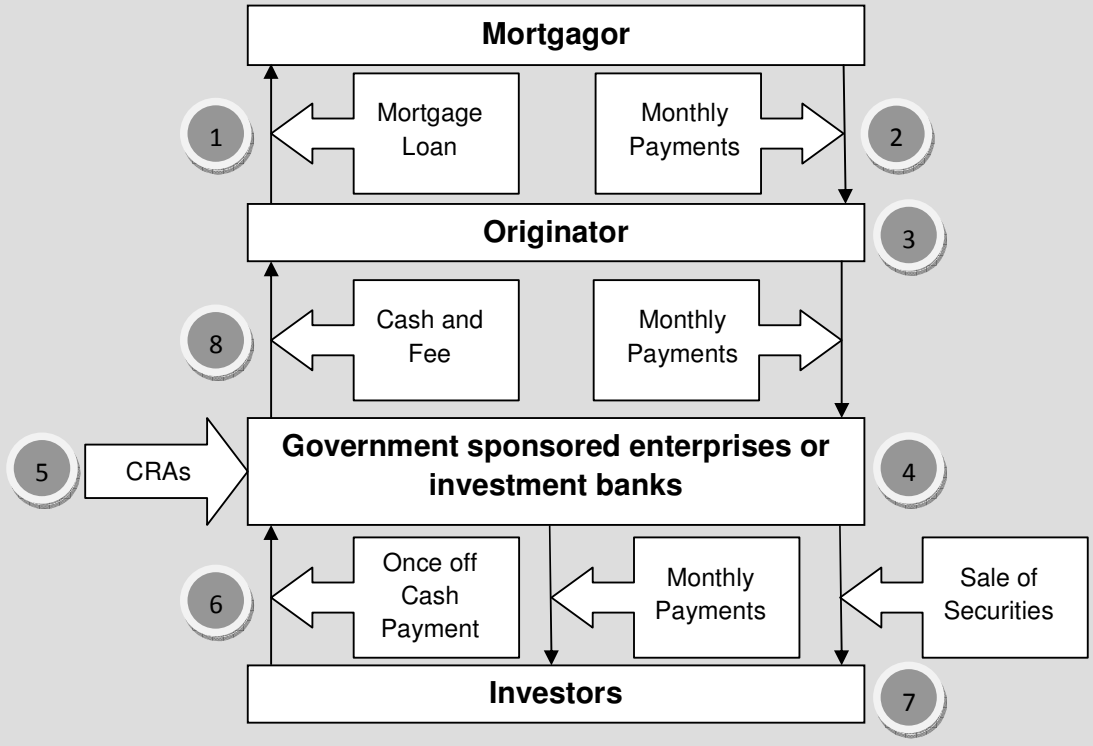


Source: Compiled by author.

Steps in the traditional banking model diagram (Figure 4.1):

1. Banks use deposits to fund mortgage sales.
2. Monthly mortgage payments are paid to the bank by the mortgagor.

Figure 4.2: Sub-prime banking model



Source: Chapman (2011:62).

Chapman (2011:62) explains the sub-prime model with his eight step diagram (Figure 4.2) as follow:

1. A potential mortgagor obtains a mortgage from a mortgage originator (typically a bank). The lender transfers the funds into the mortgagors account. The mortgage may be obtained through an intermediary, for instance a broker.
2. Monthly mortgage payments are paid to the originator by the mortgagor.
3. The originator has two options, keep the mortgage and earn interest on the principal amount over the next 30 years, or it can sell the mortgage to Government Sponsored Enterprises (GSEs) such as Fannie Mae, Freddie Mac[21] or even to investment banks.
4. Investment banks pool their mortgages together and securitize the pooled mortgages. The securities are then sold to investors in secondary markets.
5. Credit rating agencies assign credit ratings to the various tranches during the securitization process according to the risk associated with the securities contained in a specific tranche.
6. The funds obtained by selling the mortgage can be used to fund additional mortgage sales. It should be noted that originators do not need to sell a mortgage bond in order to be able to grant mortgages, as they can use their own funds to issue loans.
7. Demand from investors for these securities has allowed the originate and distribute banking model (sub-prime model) to prosper.
8. When a mortgagor makes a monthly payment the originator takes a fee and sends the rest of the payment to the investment bank. The investment bank also acquires a fee before it passes the remainder of the payment onto the holder (investor) of the security containing the specific mortgage.

The originate and distribute banking model (sub-prime model) has made it much easier for originators to fund additional mortgage sales (Dodd, 2007:16). The originate and distribute banking model further illustrates how securitization allows for more market participants to be involved, thereby creating a much more complex process compared to the traditional banking model (Schwartz, 2009:47). Ashcraft and Schuermann (2007:7-8) describe securitization as the process through which loans are removed from the balance sheet of originators and transformed into debt securities, purchased by investors. The BIS (2001:87)

[21] The Federal National Mortgage Association (FNMA or Fannie Mae) and its younger twin the Federal Home Loan Mortgage Corporation (FHLMC or Freddie Mac) are nonbanking financial firms, also known as government-sponsored enterprises (GSEs). These two institutions were chartered by the United States Congress, but are legally separate from the United States Government. Fannie Mae and Freddie Mac operate solely in the United States of America's mortgage market (Rose & Hudgins, 2005:315-316).

defines securitization as the legal or economic transfer of assets or obligations by an originating institution to a third party, typically referred to as a SPV. The SPV then issues securities,[22] which are claims against specific tranches of the CDO carrying various risk categories.[23] In most cases the securitized assets contained in securities have predictable and similar cash flows for instance, mortgages, loans, corporate bonds, or credit card receivables. In addition, securitization allows originators to earn fee income from their underwriting activities without being exposed to credit, market, or liquidity risks as the loans granted are sold (Dodd, 2007:16). The securitization process compensates investors with cash flows generated by the securitized assets that are sold to investors (Bessis, 2007:744). Based on choice, originators can repurchase the market risk component by buying back the securities that have already been sold. Investors, therefore, gain access to more liquid and more diversified mortgage assets while the mortgage market as a whole obtains greater access to capital (Dodd, 2007:16). Brunnermeier (2008:3) and Crotty (2008:26) state that these asset backed securities come in various forms, such as:

- CDOs, which are the most common. Each CDO consists of a collection of tranches and of an underlying portfolio of debt, such as mortgages. Several thousand mortgages may go into a single mortgage backed security (MBS) and as many as 150 MBSs can be packaged into a single CDO;
- CDO-squared or CDO^2, which consists of a pool of CDOs; and
- CDO-cubeds or CDO^3 which contains tranches of CDOs and CDO^2s.

Higher power CDOs (such as CDO^2 or CDO^3) are particularly difficult vehicles to model, due to the possible duplication of mortgage exposures in the underlying CDOs. Crotty (2008:24) states that financial innovation has progressed to the point where structured financial products such as CDOs are so sophisticated and so unintelligible that they are inherently non-transparent. Due to this non-transparency, these CDOs cannot be traded on standard competitive financial markets. These CDOs, held by a SPV, are sold through direct negotiation between the originating investment bank and a small number of investors over the counter (OTC) in secondary markets.[24]

[22] These securities are asset backed securities (ABSs), which implies that the underlying asset acts as collateral (Brunnermeier, 2008:2; Barnes, 2008:2).
[23] As discussed in Section 1.2, also see footnote number 19. Also see Figure 4.3.
[24] The CDOs described above are all forms of "funded cash CDOs". Funded CDOs are backed by a portfolio of assets that are held by a SPV. The most liquid CDOs are funded and their values are derived from Credit Default Swap (CDS) indices such as the CDX and/or iTraxx. CDX indices contain Emerging Market and North American companies and are administered by the CDS Index Company (CDSIndexCo) and marketed by Markit Group Limited. iTraxx (also owned by Markit Group Limited) consists of companies from the rest of the world (Brunnermeier, 2008:2-3).

According to Bessis (2007:745), an SPV is a financial entity that isolates the pool of assets from the originator during the securitization process. The pool of mortgage loans is typically purchased from the originator by an institution (a third party) known as the arranger or issuer who is responsible for creating an SPV for the pooled mortgage loans (Ashcraft & Schuermann, 2007:10). Ashcraft and Schuermann (2007:10) indicate three important reasons for creating an SPV:

- The issuer consults with credit rating agencies to finalize the details about tranching the mortgage pool. This will enable originators to issue their own securities with various risk classes;
- To make necessary filings with the Securities and Exchange Commission (SEC);[25] and
- Underwrites the issuance of the various tranches by the SPV to investors.

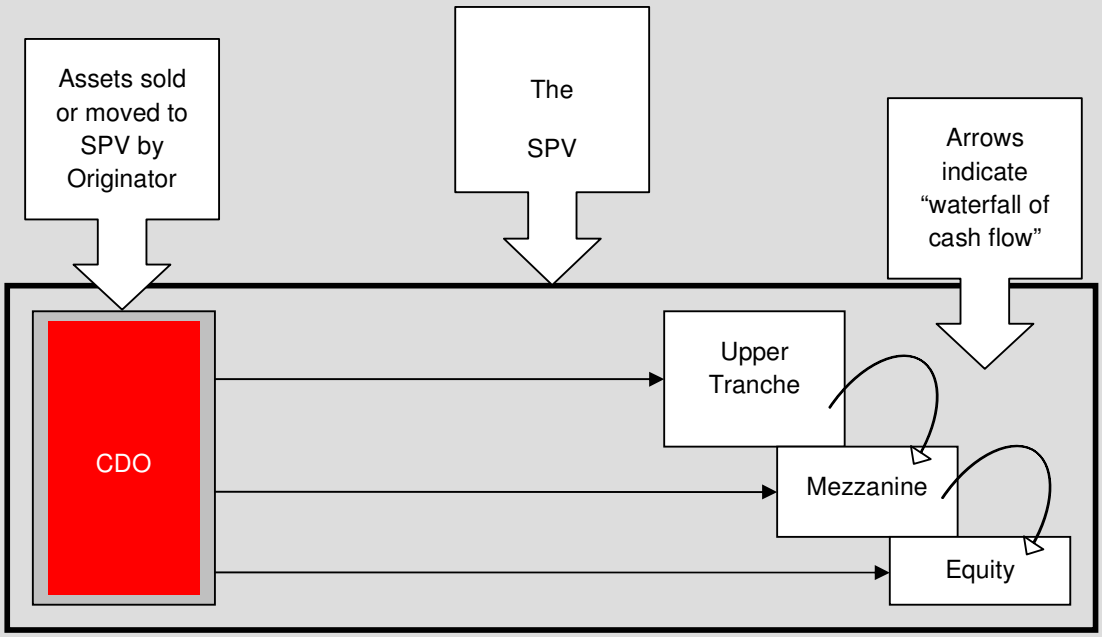
The pooled mortgages held in the SPV are called a CDO. Legally the securitized assets are firstly passed on to an SPV before it is acquired by an investor (Brunnermeier, 2008:3). The issuers will take the CDO and slice it off into different risk classes (process also known as tranching) before selling the securities to various investors in the capital market (Bessis, 2007:744). The purpose of the SPV is to collect principal and interest cash flows from the underlying assets and pass them on to the owners/investors of the securities (Brunnermeier, 2008:3). It should be noted that the originating institution does not have to sell the pooled mortgages to a third party, originators can originate and issue on their own. The main reason why originators opt for selling their mortgage pool to a third party is to offload risk and to obtain immediate capital in order to acquire additional assets (Rose & Hudgins, 2005:277).

Bessis (2007:747) and Dodd (2007:17) explain the tranching process in a simple three-tranche example. The upper tranche is the least risky tranche, followed by the mezzanine tranche and the equity tranche that carries the most risk out of the three tranches. The least risky or upper tranche, receives the first claim on the payments from the pooled mortgages. The upper tranche also called the senior tranche, has the highest credit rating (can be as high as AAA) and, therefore, the securities contained in this tranche receives the lowest interest rate of all the tranches. Only after investors in upper tranche securities have been compensated in full, payments will spill over to the tranche with the second highest credit rating, called the mezzanine tranche (Bessis, 2007:747). Mezzanine represents greater risk than the upper tranche and, therefore, receives a higher rate of return (Dodd, 2007:17). The most risky tranche, known as the equity tranche, receives payments only after the senior and

[25] The SEC is an independent federal agency that oversees the exchange of securities to protect investors.

mezzanine tranches have been paid in full. It also offers investors the highest rate of return, seeing that it is the tranche with the highest associated risk (Dodd, 2007:17). Equity tranches (also referred to as toxic tranches) are usually unrated (Dodd, 2007:17). Bessis (2007:747) refers to the tranching process as the "waterfall of cash flows", which is depicted in Figure 4.3. Tranching allows an issuer to market different parts of the CDO to investor groups with different risk appetites (Dodd, 2007:17). The originator receives funds it originally expended to acquire these assets and then uses the funds to acquire more assets or to cover its operating expenses (Rose & Hudgins, 2005:277).

Figure 4.3: The tranching process



Source: Compiled by author.

The upper and mezzanine tranches were only allowed to be rated by three credit rating agencies, namely Moody's, Fitch and Standard & Poor's (Van Vuuren, 2009a). The risk involved with the upper tranche is quasi-zero, hence it is almost impossible for losses to reach the upper tranche. As a result the upper tranche received very high credit ratings from the three mentioned credit rating agencies (Bessis, 2007:746; Van Vuuren, 2009a). An originating institution seeking to secure an even higher rating for its tranches had the option to buy a Credit Default Swap (CDS) to insure a tranche. Usually, only the upper tranche gets to be secured with a CDS. An originator who buys a CDS will pay a periodic fixed insurance fee to a protection seller in exchange for a payment by the protection seller contingent upon default by the mortgagor (Brunnermeier, 2008:2). In addition, an issuer can also extend

backup credit/liquidity lines to the SPV to which structured assets have previously been transferred. A liquidity shock that disrupts funding to the assets contained in the SPV would trigger the activation of liquidity lines extended by the issuer to the SPV. A prime example of disrupted funding is if mortgagors miss a monthly payment. This will imply that the holders of the securities containing the mortgages that have been defaulted on will not receive that monthly mortgage payment. The issuer would then need to honour its obligation to the holders of those securities by reimbursing the holders in full via the backup liquidity lines it has provided (Praet & Herzberg, 2008:100; Fisher, 2008:36). The SPV will also receive a higher rating if the issuer provides backup liquidity lines (Ewerhart & Valla, 2008:138).

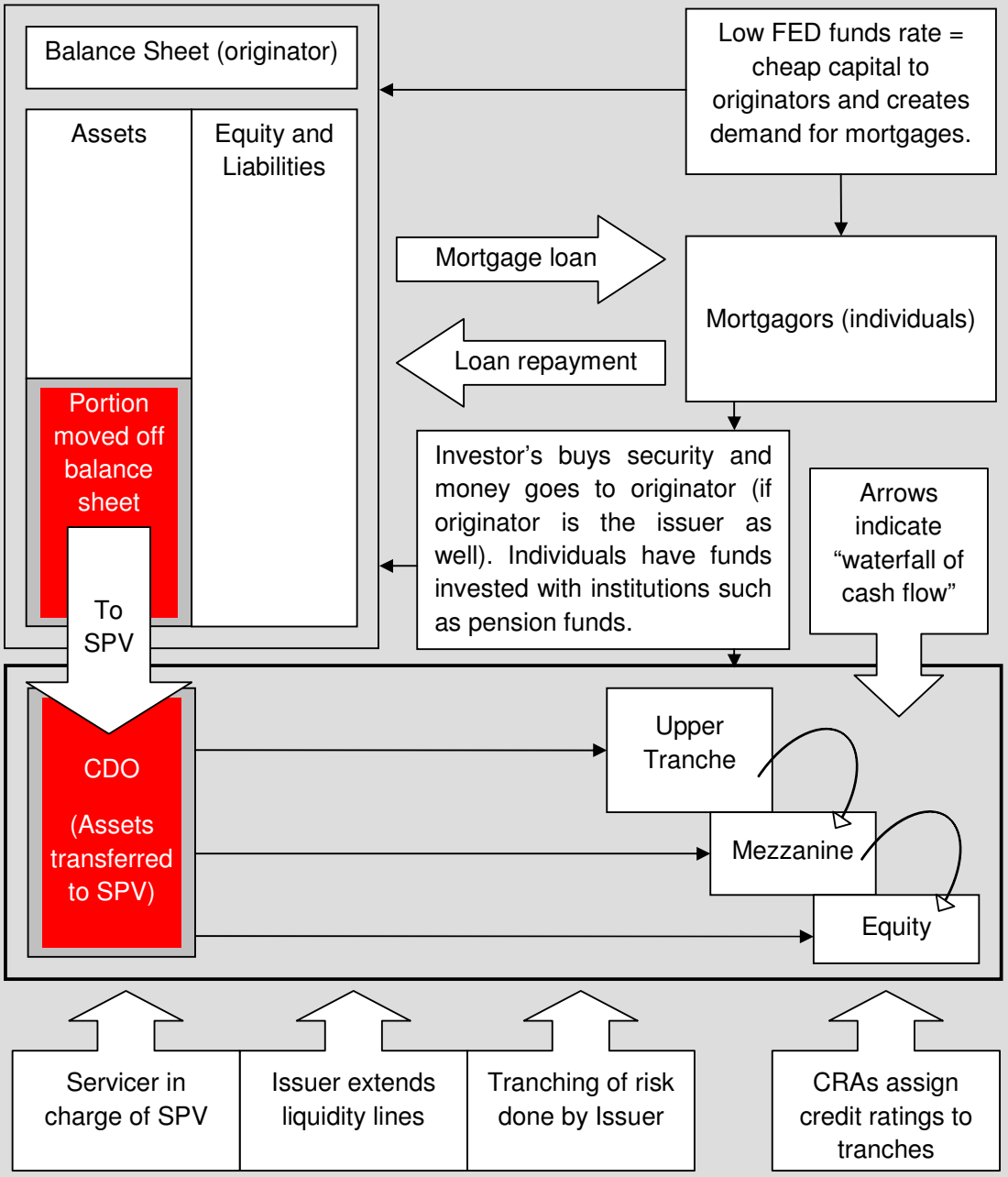
In addition to CDSs and liquidity lines to make securities more attractive to investors and to increase profitability, an originator could earn a further income by agreeing to service the CDO contained in the SPV (Rose & Hudgins, 2005:278; Ashcraft & Schuermann, 2007:12). The servicer is compensated through a periodic fee paid by the SPV. The servicer receives payment before any funds are advanced to investors from the monthly mortgage receipts. The servicing fee is a fixed percentage of the outstanding principal balance of mortgage loans (Ashcraft & Schuermann, 2007:12-13). Ashcraft and Schuermann (2007:12-13) indicate that the servicer or administrator has a number of responsibilities, which include:

- The collection and remittance of loan payments;
- Monitoring the mortgagors' performance in repaying their loans;
- Holding escrow or impounding funds related to payment of taxes and insurance;
- Ensuring adequate collateral is posted to protect the holders of securities;
- Contacting delinquent borrowers; and
- Supervising foreclosures and property disposition.

Until now this section focused primarily on the connection between the originators and investors as well as the parties responsible to oversee the securitization process. The remaining two role-players that need to be connected with one another in order to complete the cycle are the mortgagors and the investors. Mortgagors as well as other individuals (referred to as the working class) are connected to the investors. The following example serves as illustration: The majority of the working class have funds invested (through salary deductions) in many prominent institutions (for example, pension funds) who invest (buys) in the various risk tranches, based on ascribed mandates. Assuming that the tranches generate profits providing returns to the investment institutions, these institutions become more profitable. Since these institutions are more profitable, these profits will also increase

the value of the investments of those individuals who have funds invested in the investment institutions. The opposite is also true, any losses that the investment institutions may realise will spill over to those who invested in the investment institutions, as was the case with the sub-prime crisis (Kiyosaki, 2009:3). In addition to the discussion on the process of securitization and the relevant role-players in the process of securitization, Figure 4.4 illustrates the connection between the various role-players in the securitization process.

Figure 4.4: The securitization process



Source: Compiled by author.

4.2.1 Practical use of securitization

The discussion to follow explains the practical use of the process of securitization, especially by banking institutions, as a means to save on regulatory capital requirements, to offload risk onto a third party and to acquire additional funds to be used for further loans (Rose & Hudgins, 2005:277). The discussion focuses on why securitization is used by banking institutions. As discussed in Section 4.1, it becomes evident that the securitization process is a highly complicated process. Banking institutions will not engage in securitizations if these complex financial innovations were not profitable (Bessis, 2007:744). In addition, some of the specific benefits of securitization can be summarized as follow (Rose & Hudgins, 2005:278; Bessis, 2007:750):

- Through securitization an issuer can arbitrage the cost of funding on-balance sheet items with funds obtained from market participants;
- Credit risk can be off-loaded to an SPV to save on capital requirements associated with credit risk;
- Securitization reduces the originator's need to monitor each individual loan's payment stream;
- Securitization allows originators to hold a more diversified loan portfolio; and
- Securitization can be used as a tool to manage interest rate risk as it aids in adjusting an originator's asset portfolio so that the maturity of the assets approximates the maturity of its liabilities more closely.

The following example by Bessis (2007:751-752) explains how originators save on regulatory capital requirements, acquire funds to make new investments or loans and in the process offload risk to a third party. If a bank has a portfolio of mortgage loans to the value of $1 million and the regulatory weight requirement for these assets is 50 percent, the weighted assets are 0.5×1000 000 = 500 000. With a regulatory capital requirement of 8 percent of risk weighted assets (as depicted in Basel I), the regulatory capital that the originator has to hold against these assets amounts to $40 000 (8%×500 000). If the originator securitizes $100 000 of the mortgage portfolio (which now becomes a CDO) in the following manner: $90 000 of the CDO is placed into the upper tranche, and $10 000 in the lower tranche (we assume only two tranches in this example), the outstanding balance of the originators' loan portfolio decreases from $1000 000 to $900 000. The weighted assets are 0.5×900 000 = 450 000. Thus the required regulatory capital against the assets amounts to $36 000 (8%×450 000). The initial capital requirement has now decreased to $36 000,

implying that the originator saves $4 000. In addition to this $4 000 saving, the originator also receives the amount of $100 000 from the mortgages moved to the SPV. The net result is that the originator now has $104 000, which can be used to acquire new mortgages. The originator would not have had this amount of $104 000 available for reinvestment had it not securitized the $100 000 portion of his loan portfolio. This can also be illustrated in Table 4.1 below:

Table 4.1 Example of how originators save on regulatory capital requirements

Outstanding Balances	Value ($)	Required capital ($)
Initial portfolio	1000 000	40 000
Securitized amount	100 000	-4000
Upper tranche	90 000 (sold)	
Lower tranche	10 000 (sold)	
Final portfolio	900 000	36 000
Total assets	900 000	
Total weighted assets	450 000	36 000

Source: Bessis (2007:752).

To summarize: mortgage originators made use of securitization to sell large portions of their mortgage assets, especially sub-prime mortgages, in the exact same way as depicted in the example above. It is, therefore, crucial to understand the securitization example above in order to comprehend the discussions to follow in Section 5.2. Section 5.2 will focus on the securitization of sub-prime mortgage pools by originators during the prolonged expansive monetary policy implemented by the Federal Reserve Bank of America. The conclusion can, therefore, be made that the securitization of sub-prime mortgage pools played a crucial part in the mortgage bubble that led to the sub-prime crisis. This concludes the discussions on the process of securitization, the following section explores the process of mark-to-market accounting, which also played a crucial part during the formation of the mortgage bubble.

Mark-to-Market accounting is used to price securities, one of the biggest problems with mark-to-market accounting is that the value of the underlying assets are determined by supply and demand factors in the market. This implies that assets are most likely to be overvalued during the boom phase when demand is high and undervalued in the aftermath of a crash when demand decreases. Various other problems have also been associated with the use of mark-to-market accounting during the formation of the mortgage bubble. Section

4.3 will explore the relevant contributing aspects of mark-to-market accounting to the mortgage bubble in more detail.

4.3 Mark-to-market accounting

According to Crockett (2008:17), the valuation of the assets and liabilities held by originators is increasingly based on mark-to-market accounting. The majority of these assets and liabilities are traded OTC in secondary markets. Mark-to-market accounting or fair value accounting requires originators to use the market value of its assets, where the assets have an easily ascertainable market value. This implies that originators use market values and market information in valuing their assets and liabilities (Myddelton, 2009:103). An assessment of an originator's assets and liabilities using information about their market value would determine whether they had sufficient capital to satisfy regulatory liquidity requirements as determined by the Basel II Accord of the BIS (Myddelton, 2009:102). Mark-to-market accounting formed the basis for the Basel II Capital Adequacy Ratios for originators (Myddelton, 2009:101).[26] Another important feature of mark-to-market accounting is that mark-to-market accounting allows the inclusion of hypothetical or unrealized profits, which may not be realized for many years into the future, if ever (Myddelton, 2009:103). The inclusion of unrealized profits through mark-to-market accounting is a concept that has been proven to be a failure under Jeff Skilling, former chief executive of the highly controversial Enron Corporation. The relevant problems associated with mark-to-market accounting are highlighted beneath:

4.3.1 Asset valuations

One of the main problems associated with mark-to-market accounting became evident during the mortgage bubble boom. By using mark-to-market accounting many originators overstated their assets and failed to make proper provision for losses on so-called toxic securities, as discussed in Section 4.2 (Dodd, 2007:17-19). The implication becomes evident in times of economic downturn where losses in financial markets may well occur, and a lack of provision for such an event will ultimately place tremendous strain on the liquidity position of originators (Dodd, 2007:17-19). The securitized debt markets, in which originators have operated and made losses, can become illiquid for a variety of reasons. If trading activities diminish, the price of stocks and bonds can become extremely volatile and cease to reflect an accurate value of the underlying asset (Myddelton, 2009:105-106). The complexity of

[26] The Basel Accord will be discussed in Sections 4.4 and 4.5.

structured financial instruments (such as CDOs), and the desire of originators to reduce their holdings of securities in order to obtain capital for additional investment purposes, has led markets in securitized debt to become very illiquid due to a declining demand for these complex instruments. Illiquidity in financial markets forces the price of securities to decline resulting in a decline in the value of originators' assets on a mark-to-market basis (Dodd, 2007:17-19; Myddelton, 2009:105-106). With its asset values declining, originators become unwilling to take on additional risks resulting in a scenario where originators refuse to participate in the markets for securitized debt, causing further illiquidity (Dodd, 2007:19). The declining market activity ensures that financial markets become even less liquid resulting in a vicious cycle that rapidly start to erode overall liquidity in financial markets (Myddelton, 2009:105-106).

Crockett (2008:17) states that asset valuations can change rapidly when markets are illiquid, creating volatility in the key ratios used to judge originators' strength. In many instances marketable and tradable securities have an easily ascertainable market value (Myddelton, 2009:103). Mark-to-market accounting requires an active market with a large quantity of independent trades and positive market sentiment. Myddelton (2009:103) places strong emphasis on the phenomenon where a complete lack of these conditions is evident in severely distressed markets. Hence, market sentiment is another important aspect affecting the market values of securities, as it affects the valuation of originators' assets and liabilities through the use of mark-to-market accounting (Myddelton, 2009:106). When a bubble starts to emerge within securities markets, mark-to-market accounting can cause investors to overestimate their capital in a bubble. Higher capital estimates falsely encourages investors to become less risk averse in a time when the market might be in an upturn. Similarly, in a downturn, investors may be reluctant to take on risks and contract their business concern at a time when security prices are at their lowest (Myddelton, 2009:106).

4.3.2 Liquidity mismatches

A second problem associated with mark-to-market accounting is that some presumed risk absorbers, such as SPVs in the process of securitization, turned out to be a source of distress contagion between financial markets (Bervas, 2008:129; Crotty, 2008:3). A key reason is that structurally, financial institutions have become more sensitive to fluctuations in market prices with the decline in traditional intermediation. In the case of SPVs, the assets contained in the SPV must be marked-to-market on a frequent basis to estimate the portfolios' net asset value. The problem arises on the balance sheet of SPVs, where the balance sheet is characterized by a duration and liquidity mismatch. Originators would find

themselves locked in rather illiquid positions on the asset side and with short-term/liquid positions on the liabilities side (Bervas, 2008:129). The short-term securities on the liabilities side imply that investors are able to exit their investments easily, while the illiquid positions on the asset side imply that originators are unable to gain quick access to capital when required (Bervas, 2008:129). In an event where a large number of investors are simultaneously exiting the market the originators will face significant liquidity problems as most of their assets are tied up in illiquid positions (Dodd, 2007:19; Bervas, 2008:129). As the mortgage bubble burst, SPVs were unable to roll over their short-term liabilities and they were forced to liquidate their assets at a large discount and to record (on a mark-to-market basis), significant losses in their balance sheets. This was one of the important reasons for the sub-prime crisis (Bervas, 2008:129).

4.3.3 Pro-cyclicality associated with mark-to-market accounting

Bervas (2008:129) and Goodhart (2008:12-13) place strong emphasis on the third problem associated with mark-to-market accounting, namely pro-cyclicality. Mark-to-market valuations are contributing to the pro-cyclicality of financial markets (Goodhart, 2008:12-13). A decline in the value of assets and/or increased risk generates pro-cyclical adjustments in the balance sheets of originators and hence in financial markets, which tends to propagate financial difficulties and may well lead to a liquidity crunch (Bervas, 2008:129; Goodhart, 2008:12-13). Under Basel II, originators are required to increase their capital adequacy ratios when they face greater risks and vice versa. In times of a recession originators will, therefore, need to keep higher capital which will decrease the funds they are able to lend, further aggravating the downturn. Similarly, sellers of protection[27] may well experience immense liquidity strains in times of stress and they themselves would need to obtain liquidity from the markets when it is scarce (Dodd, 2007:19; Bervas, 2008:129).

The pro-cyclical nature of mark-to-market accounting combined with the over-pricing of risk during a recession could potentially aggravate the situation even further. Crotty (2008:30-31) states that risk is always under-priced in a bubble (as revealed by the build up to the sub-prime crisis) and always over-priced in the heat of the crisis and its immediate aftermath. This phenomenon is one of the most glaring flaws associated with the modern financial market theory of financial cycles (Crotty, 2008:30-31). A prime example of this phenomenon is indicated by Myddelton (2009:107-108): Credit losses on toxic CDOs (containing United States of America sub-prime residential mortgages) as a result of defaults on underlying

[27] In many cases originators themselves extended liquidity lines as insurance to the SPVs at an additional cost to the investor, as discussed in Section 4.2.

mortgages could reach an estimate of $195 billion. This amount was much less than the realized mark-to-market loss totaling $310 billion. The gap between the estimated loss and the realized loss stemmed from investors demanding substantial discounts for uncertainty/sentiment regarding the eventual scale of credit losses and illiquidity in the secondary mortgage market. The secondary mortgage market is a large and liquid market where mortgage loans and servicing rights are bought and sold OTC between mortgage originators, CDO issuers and investors. With the illiquidity experienced in financial markets during the sub-prime crash and afterwards, the apparent "fair value" of an asset seemed to be far less than the real economic value of the asset due to the over-pricing of risk in the heat of the crisis and its immediate aftermath (Crotty, 2008:30-31; Myddelton, 2009:107-108).

This concludes the discussions on the various problems associated with mark-to-market accounting. To summarize; mark-to-market accounting standards determined the capital adequacy ratios for originators under the Basel II Agreement (Myddelton, 2009:106-107). Thus the problem scenarios associated with mark-to-market accounting, (described above) where mark-to-market accounting has been used to value CDOs, were not merely a theoretical possibility. During the mid-2007 mortgage bubble crash in August 2007, originators had to write down the value of many financial instruments to reflect the distressed current "market value". Many originators might have opted to hold their financial instruments to maturity, but by law, were not allowed to reclassify any of their financial instruments (Myddelton, 2009:106-107). This had serious financial implications for several large mortgage originating institutions, some of which even having to file for bankruptcy as a result of liquidity shortages (Dodd, 2007:19).

As mentioned earlier in this section, mark-to-market accounting standards determined the capital adequacy ratios for originators under the Basel II Accord. Together mark-to-market accounting and the Basel II Capital Adequacy Ratios made an important contribution to the sub-prime crisis. During the crash numerous flaws associated with mark-to-market accounting and the Basel II Accord were highlighted. Section 4.4 will contain a discussion on the Basel I Accord before the flaws of Basel II will be explored in Section 4.5. The Basel II Accord was seen as an improvement on the Basel I Accord and it is particularly important to understand Basel I, as Basel I formed the basis for the Basel II Accord.

4.4 Basel I

Bessis (2007:27-29) states that risk taking is a normal behaviour of financial institutions, since taking on more risk is predominately accompanied by larger returns. With this in mind, Bessis (2007:27-29) emphasizes several reasons for the need to regulate financial institutions:

- Systemic risk:[28] The failure of a single bank generates a very high probability that other banks that have ongoing commitments with the defaulting bank may experience the same fate. Such a scenario may have devastating consequences on the financial system as a whole;

- The banking system is subject to moral hazard: risk protection provided under the deposit insurance scheme (which protects depositors against bank failures) is an incentive for banks to take on greater risk. Hence, the burden of any major losses realized as a result of reckless business conduct will not fall on their heads but on those of the taxpayer. Regulation is, therefore, required to keep banks' risk appetite at bay and to avoid moral hazard;

- From the previous point it can be argued that if banks were left unregulated their excessive risk taking might well trigger mass withdrawals from depositors, fearing that their money could be at risk. Bessis (2007:29) states that if depositors' money were at risk the functioning of the whole banking system would greatly deteriorate as it will have a negative impact on liquidity;

- Deregulation increases competition among financial institutions as it creates the opportunity for financial institutions to widen the range of products and services they offer, for example, structured transactions, Leveraged Buy-Out loans and the securitization of mortgages. Deregulation also implies that new players can freely enter new markets. Deregulation, therefore, increases competition which translates into increased risk, hence the need for regulation; and

- Harper (2007:1) states that equity = assets – liabilities, for a traditional bank loans granted to borrowers are assets and customer deposits are liabilities. The banking sector is a highly leveraged industry with a debt-to-equity ratio much higher than that of a

[28] Systemic risk refers to a situation where the whole of the banking system fails (Bessis, 2007:27).

corporation. If the assets decline in value, the equity can quickly evaporate. With this in mind, it becomes clear that the highly leveraged banking sector is inherently an extremely risky industry and may well benefit from regulation.

Bessis (2007:32) further states that there is always a trade-off between risk taking and risk controlling. Risk control through capital regulation impairs a bank's ability to expand its business activities. Banks having to keep more capital against their assets (as a result of capital regulation) will erode banks' earnings due to a decline in business activity. In contrast, too little control will create systemic risk (Bessis, 2007:32). Finding the right balance between too much risk control and too little in modern day banking has become an extremely difficult task for regulators (Bessis, 2007:32).

According to Alexander (2009:84), modern day banking capital regulation is an international phenomenon that came about as a result of the 1973-1989 LDC (less-developed-country) debt crisis as well as the 1950-1990 Japanese postwar "economic miracle". Both of these two events were characterized by risky decision-making within the banking sector. Alexander (2009:84) further states that these events paved the way for the creation of Basel I, formulated by international banks and their regulators, through the Basel-based Bank for International Settlements. Formally approved in July 1988, the Basel I capital rules were designed to create a level playing field between originators from various countries and to improve the safety of the banking industry. This could be achieved by ensuring that originators were sufficiently capitalized to protect depositors and the financial system against financial shocks that could exert strain on liquidity needs (Bessis, 2007:27; Alexander, 2009:84). The Basel I Capital Adequacy Ratios were not intended to protect a bank against expected losses, only unexpected losses. Each individual bank was responsible for making provisions and holding sufficient capital reserves to guard against expected losses (Bessis, 2007:31-32). According to Rose and Hudgins (2005:492-493), the Basel I Capital Adequacy Ratios were also designed to catch up with the extreme changes in financial innovation for instance, the enormous expansion of securitization, as well as the off-balance-sheet commitments originators were making. All these aspects necessitated an increase in regulatory capital requirements.

It is important to understand why banks need to hold capital. Lenders (mostly banks) are financial intermediaries, in short their business revolves around taking funds from depositors and lending it to borrowers. Credit risk refers to a situation where borrowers are unable to comply with their obligations to service debt. When a borrower defaults on a loan repayment a partial or total loss of the loaned amount is lost by the lender (Bessis, 2007:13). Given the

risk that some borrowers will be unable to repay their loans or that losses may occur for a variety of other reasons lenders, therefore, need to hold capital reserves in order to protect their depositors against the risk of losing their deposits. This implies that capital reserves acts as a sponge to absorb unexpected losses and hedge against credit risk.

Bessis (2007:30) states that Basel I focused on credit risk with the famous Cooke ratio used to set up minimum required capital as a fixed percentage of assets weighted according to their nature. Basel I announced standard minimum capital-to-asset ratios for banks, building societies and other deposit taking institutions, with a rather simple set of definitions for capital and "risk-weighting" of assets (Alexander, 2009:84). Capital was divided into two classes or "tiers", the first class being high-quality, primary loss-absorbing equity capital called Tier I[29] or "core" capital. The second asset class was called Tier II[30] or supplemental capital (Rose & Hudgins, 2005:493; Alexander, 2009:84). Tier I and Tier II capital added together is known as Total Capital (Rose & Hudgins, 2005:493).

For an originator to qualify as adequately capitalized under Basel I, the ratio of Tier I capital to total risk-weighted assets must be a minimum of 4 percent. The ratio of total capital to total risk-weighted assets[31] must be a minimum of 8 percent, with the amount of Tier II capital limited to 100 percent of Tier I capital (Rose & Hudgins, 2005:494). Under Basel I, capital usually had a 0 percent risk weight while long-term, legally binding credit commitments[32] had a risk weight of 100 percent. In the risk-weighting system, corporate debt was 100 percent risk-weighted, mortgages 50 percent, loans to OECD banks 20 percent and loans to OECD governments 0 percent (Bessis, 2007:33; Alexander, 2009:85).

The risk-weighted assets had obvious financial implications for banks seeing that banks had to keep capital reserves in proportion to the risk-weights assigned to various assets. As mentioned earlier in this section, originators having to keep more capital against their assets as a result of capital regulation will be unable to use the retained funds for further lending. Hence originators' earnings will decrease as a result of a decline in business activity. This

[29] Tier I capital included undivided profits, common stock and surplus, qualifying non-cumulative perpetual preferred stock, minority interest in the equity accounts of consolidated subsidiaries, selected identifiable intangible assets less goodwill and other intangible assets (Rose & Hudgins, 2005:493).
[30] Tier II capital included subordinated debt capital instruments, the allowance for loan and lease losses, mandatory convertible debt, intermediate-term preferred stock, cumulative perpetual preferred stock with unpaid dividends as well as equity notes and other long-term capital instruments that combine both debt and equity features (Rose & Hudgins, 2005:493).
[31] Note that risk-weighted assets refer to a risk-weighting factor assigned to each asset item on the balance sheet of banks as well as each off-balance-sheet commitment made by the bank (Rose & Hudgins, 2005:494).
[32] For instance, credit lines extended to SPVs as insurance to investors against credit risk.

prompted originator to find ways to bypass regulatory capital requirements to enable them to increase their lending activities and, therefore, also their profits. Section 4.4.1 explores how originators avoided the capital requirements instated by the Basel I Accord in an attempt to increase profitability.

4.4.1 How originators avoided the Basel I Accord

Rose and Hudgins (2005:494) state that the Basel I Accord was seen as simplistic, especially with regard to its risk-weightings assigned to various assets. For instance, a loan to a large blue-chip company was statistically far less risky than a loan to a small property developer, but these loans had the same risk weightings assigned to them. This simplistic risk weight allocation under the Basel I Accord resulted in a great disintermediation by originators (Alexander, 2009:88). As a result assets perceived to carry lower risk (such as the blue-chip company mentioned) were being sold off as CDOs to investors. The lower risk assets bypassed the originators and left the more risky, higher-margin assets on the balance sheet of originators (Alexander, 2009:88). The reasoning behind this is very simple and logical, originators need to hold a certain amount of capital for the various risk-weighted assets as indicated in Basel I. Referring to the blue-chip and property developer loans that carry the same risk weights under Basel I, if an originator opts to hold both of these assets on its balance sheet this would imply that the originator would have to hold the same amount of regulatory capital for both these assets. Since it is perceived by the originator that the blue-chip company should actually carry a lower risk weight and thus lower regulatory capital, the originator would, therefore, opt to securitize the perceived lower risk assets. The assets would then be sold to investors in the form of a CDO. By selling the assets the originator would not need to hold this large amount regulatory capital for assets believed to be wrongfully allocated under the non-elastic risk-weights of the Basel I Accord (Alexander, 2009:88). It can, therefore, be argued that the Basel I Accord caused an immense upswing in the securitization of assets.

Bessis (2007:32) emphasizes that finding the correct balance between risk-based capital and profitability is another important catalyst contributing to the upswing in the securitization of assets. An average proxy for the minimum required return of shareholders (their profit) is an accounting ratio: Return on Equity (ROE), of 25% before tax, or 15% after tax. Banks are able to achieve the minimum required ROE by using retained earnings only as a means to fund capital growth, but any capital growth above the minimum required ROE is not sustainable when using retained earnings alone (Bessis, 2007:33). Outside sources of capital would need to be used to supplement retained earnings in order to achieve the

sustainable growth of capital above the minimum required ROE (Bessis, 2007:33). Forcing banks to hold capital against its assets might lead banks to obtain outside sources of capital to fund capital growth above the minimum required ROE. This can be done by selling off the bank's assets or by reducing the risk exposure (for instance, granting less risky loans) of the bank (resulting in lower regulatory capital charges) (Bessis, 2007:33). Securitization plays a huge part in the selling of banks' assets and, therefore, also to obtain outside capital as well as escaping regulatory capital charges (Rose & Hudgins, 2005:277). Alexander (2009:88) states that many regarded this upswing in the securitization of assets as a good thing seeing that:

- It allowed for greater risk dispersion in the market. A greater dispersion of risk translates into a healthy and strong financial market; and
- Originators were hampered by Basel I since they could not make money on "wrongfully" labeled assets as the regulatory capital charges were too high. Markets started working more efficiently, as the simplistic Basel I regulations and resulting distortions were simply arbitraged away. The capital received from investors for the sale of assets, in the form of CDOs, could then be used to make more loans available and thus increase an originator's assets.

Alexander (2009:88) highlights a very important counter argument against the second argument mentioned above. He argues that the Basel I rules were there for a purpose, a prudential purpose designed to prevent a reckless expansion of credit (something that became very eminent during the boom of the mortgage bubble). If the aim of Basel I was to decrease the reckless expansion of credit, then the originators who made use of securitization in order to expand their own credit through regulatory arbitrage, should be held accountable for unethical as well as dangerous business conduct (Alexander, 2009:88). Alexander (2009:88) further states that regulatory arbitrage could have been justified if it were not for the following aspects:

- In order to avoid holding large amounts of regulatory capital for various assets, originators expanded their use of securitization to get rid of the unwanted assets on their balance sheets that were in effect costing them to lose money. The hyperactive use of securitization gave way to the reckless expansion of credit and unethical business conduct leading to a financial bubble;

- Originators created SPVs that bought the assets, transforming the assets into CDOs and offered liquidity lines (guarantees) to these vehicles that ended up as guarantees against defaulting assets; and
- In many cases originators actively financed buyers (for instance hedge funds) of CDOs.

As mentioned in Section 4.2, securitization was seen as a great instrument for dispersing risk in the market. The granting of liquidity lines to SPVs and the financing of buyers of CDOs, as mentioned above, created a scenario where any economic shock triggering large losses to assets may well force investors to draw on liquidity lines. Such a scenario can cause these assets to end up back on the balance sheet of originators. This will result in originators having no other choice but to honor their financial commitments.[33] If the originators cannot honour their commitments the burden would fall onto the taxpayer, as mentioned in Section 1.1.

The obvious flaws in Basel I had to be addressed with the result that regulators formulated a new accord called Basel II. The goal of Basel II is to keep pace with the increased sophistication of lenders' operations and risk management and to overcome some of the distortions caused by the inflexible Basel I requirements (Rose & Hudgins, 2005:502). Under Basel I lenders have been able to reduce required capital in ways that did not reflect lower real risk (also known as regulatory capital arbitrage) (Rose & Hudgins, 2005:502). The intention was that the Basel II Accord will align required minimum capital more closely with lenders' real risk profile (Bessis, 2007:42). Seeing that the Basel II Accord was an improvement on the Basel I Accord and that many aspects remained unchanged between the two Basel Accords, the following section will commence with a discussion on the Basel II Accord. It is important to note that the Basel II Accord was the Accord originators had to comply with during the formation of the mortgage bubble that led to the sub-prime crisis. Therefore, the following section discusses the Basel II Accord in order to establish its contribution to the formation of a mortgage bubble.

4.5 Basel II

According to Bessis (2007:40), Basel II focused on improving Basel I by enhancing credit risk measures and also extending the scope of capital requirements to operational risk.[34] The main difference between the two accords is that Basel I required lenders to calculate a

[33] As discussed in Section 4.2.
[34] Operational risk refers to the risk of direct or indirect losses resulting from inadequate or failed internal processes, systems and people or from external events (Rose & Hudgins 2005:503).

minimum level of capital based on a single risk weight for each of a limited number of asset classes, for instance mortgages, consumer lending, corporate loans, exposures to sovereigns (Rose & Hudgins, 2005:502). Basel II allows certain lenders to use their own risk measurement models to calculate required regulatory capital, whilst seeking to ensure a risk management culture at the heart of the organization up to the highest managerial level (Rose & Hudgins, 2005:502-503).

Harper (2007:2) states that the goal of Basel II is to better align the required regulatory capital with banks' actual risk exposure. The result is a vastly more complex accord than the original Basel I. Basel II has multiple approaches for assessing various types of risk as well as multiple approaches for securitization and for credit risk mitigation (for example collateral) (Bessis; 2007:41-42). Basel II is also considerably more elastic than Basel I, with some examples documented in Table 4.2. Even though Basel II was seen as much more complex compared to its predecessor certain aspects where left unchanged between the two accords. Various definitions, such as the definitions for capital from Basel I, Tier I and Tier II capital as well as the 8 percent coefficient have been carried over to Basel II (Bessis; 2007:41).

Table 4.2: The main differences between Basel I and Basel II

Basel II allows for more elasticity and risk sensitivity	
Basel I	**Basel II**
Focuses on a single risk measure.	More emphasis placed on a bank's own internal risk measurement models, supervisory review and market discipline.
Only one option proposed to banks.	Can choose between a variety options.
Broad brush structure (forfeits).	More credit risk sensitivity for better risk management.

Source: Bessis (2007:41).

According to Harper (2007:2-3), Basel II consists of three pillars, namely: minimum capital requirements for credit and operational risk (Pillar I), supervisory review (Pillar II) and market discipline (Pillar III). The main goal of Basel II still remains the same as Basel I and that is to maintain enough capital within the banking system to guard against the damage of financial shocks. However, according to Danielsson, Embrechts, Goodhart, Keating, Muennich,

Renault and Shin (2001:5), Butler (2009:57) and Dowd (2009:79) there is no need to look any further than Pillar I of Basel II to understand why Basel II was a recipe for disaster and how it contributed to the magnitude and extent of the sub-prime mortgage bubble.

4.5.1 Pillar I – Minimum Capital Requirements

The BIS (2001:6-32) defines the first pillar as follows: Basel II allows banks to choose between two broad approaches for calculating their capital requirements for credit risk, along with the inclusion of explicit capital charges for operational risk. The first approach will be to measure credit risk in a standardized manner, also known as the building block approach. The second approach, which is subject to the explicit approval of the bank's supervisor, would allow banks to use their internal ratings systems also known as the Internal Ratings Based (IRB) approach (Rose & Hudgins, 2005:502; BIS, 2001:6-32). The IRB approach consists of two approaches called the Foundation and Advanced approach (Bessis, 2007:42). The internal ratings contained under the IRB approach consists of assessments of the relative credit risks associated with borrowers and/or facilities, as assigned by banks (Bessis, 2007:42). Bessis (2007:42) emphasizes that it was not the desire of the BIS to produce a net decrease or a net increase in minimum regulatory capital via Basel II over that seen under Basel I. The following sections points out the flaws of Pillar I, starting with the standardized approach.

4.5.2 The standardized approach

Dowd (2009:76-79) highlights the flaws associated with the standardized approach:

- Only a limited number of risk categories exist to which assets are classed.
- Arbitrary risk weights is given to each category, which varies between 0 percent e.g. for OECD government debt and 100 percent e.g. for equities.
- The risk-weighted assets are the sum of the bank's assets multiplied with its relevant risk weight.

Dowd (2009:76-79) states that one fairly obvious problem with this approach is that the risk weights are merely pulled out of thin air and does not necessarily reflect market reality. Dowd (2009:76-79) argued that the underlying principle of a fixed risk weight assigned to each asset is a far greater problem. The reason being that elementary portfolio theory tells us that the risk contribution of any asset to a portfolio depends on the rest of the assets

contained in that specific portfolio. For instance, the same asset might add substantially more risk to one portfolio and yet subtract risk from another. The tendency to assign fixed "risk weights" to assets constitute to unsound banking practice and yet this method forms the very foundation on which the standardized approach is built (Dowd, 2009:76-79).

Dowd (2009:76-79) points out that during the mortgage bubble boom most of the leading financial institutions in the world found themselves in capital positions that were between one and two times their Basel II minimum regulatory capital requirements. Banks that made use of the standardized approach were allowed a maximum of 10 times leverage in equity or 50 times leverage to AAA bonds, both of which represent *"amazing"* and indeed *"unsustainable"* levels of risk (Dowd, 2009:76-79). Dowd (2009:76-79) states that the riskiness of their positions is of course confirmed by the fact that many of these financial institutions have defaulted on their commitments and had to be bailed out by government. The flaws associated with the capital adequacy regulatory systems, as highlighted in the discussion on the standardized approach, have made an unprecedented contribution to the creation and the ultimate crash of the sub-prime mortgage bubble (Dowd, 2009:76-79). This concludes the discussion on the standardized. The following section will highlight the flaws associated with the IRB approach.

4.5.3 The Internal Ratings Based (IRB) approach

Although Dowd (2009:76-79) is of the opinion that the IRB approach for calculating capital adequacy is better than the standardized approach, he also emphasizes that the IRB approach has its own limitations. Dowd (2009:76-79) outlines five flaws associated with the IRB approach:

- Dowd (2009:76-79) identifies the first problem as systemic endogenous risk. Systemic endogenous risk occurs when an external shock pushes value at risk (VaR)[35] numbers upwards, asset prices fall and traders approach their position limits. As they approach their limits they would be forced into short-selling their assets. The short-selling of assets exerts additional downward pressure on asset prices, which in turn triggers even further selling.[36] Butler (2009:57) acknowledges the problem associated with systemic endogenous risk by saying that banks found themselves having to sell assets in a falling

[35] "Value at Risk" refers to a loss that will not be exceeded at some specified confidence level (Hull, 2005:523). Value at Risk risk models quantifies the potential loss associated with a defined risk (Bessis, 2007:12).
[36] The law of supply and demand stipulates that an increase in the supply of an asset, with a decline in demand, will cause the price of the asset to decrease (Nielsen, 2007:1-2).

market to keep their margins up. The Basel II rules should have focused on liquidity rather than on capital since liquidity shortages was the immediate problem banks were faced with when the mortgage bubble crashed (Butler, 2009:57). In order for a bank to counter systemic endogenous risk heterogeneous trading and risk management strategies are of the essence. In contrast, the Basel II rules pressure banks to react to shocks in similar ways (Dowd, 2009:76-79);

- The second problem is known as "gaming" (Dowd, 2009:76-79). Traders have an incentive to "game" the risk management system. This implies that traders identify and exploit the weaknesses embedded within the system and in this case the system refers to the Basel II Accord (Dowd; 2009:76-79). A prime example would be a scenario where risks are underestimated by the highly quantitative, historical data-driven models used during the capital adequacy calculation process. This in turn can lead to a situation where the real risks being taken, by a bank, are likely to be greater than what the bank's internal risk measurement models suggests. Implying that the risk models would allow banks to keep less regulatory capital than what is actually required. Less regulatory capital would equate to more funds available to lend and, therefore, also an increase in profitability;

- The third problem is the VaR risk measure approach for measuring unexpected losses. Bessis (2007:12) explains that the goal of VaR models is to calculate a potential loss as a result of a defined risk. Dowd (2009:76-79) states that the main problem with the VaR is that it is blind to tail risk. VaR risk models only gives an indication of how much might be lost on the worst of the best 99 days out of 100, but does not give an indication as to what to expect on the one remaining day that matters the most (Dowd, 2009:76-79). In short, tail risk can be summarized as a portfolio risk.[37] Tail risk is a big concern since it is tail risk that ultimately causes the most distress in financial markets. Tail risk is usually under-estimated by normal statistical models used to calculate the probability of changes in the price of a financial instrument. Various banks felt that they should not be required to hold capital and liquidity to deal with tail risk events (Fisher; 2011:9). This implies that banks are leaving tail risk events in the hands of the tax payer to be the capital provider of last resort. Fisher (2011:9) states that this view taken by banks on tail risk leads directly to moral hazard and excessive risk-taking. Tail events seem to happen far more

[37] Portfolio risk results from the distributions of all individual and correlated asset returns (Bessis, 2007:361). Portfolio risk arises when the likelihood that an investment will move three standard deviations or more from the mean is greater than that indicated by a normal distribution (Bessis, 2007:342-343).

often than people assume (Fisher; 2011:9). Tail risk has obvious implications for financial stability and by acknowledging these risks from the start will lead to risks being re-structured or avoided all together so as to limit losses in the event of tail risks (Fisher, 2011:9);

- A further problem with the data-driven models used in VaR analysis, according to Dowd (2009:76-79), is that these models discourage management from taking a conceptual view of the risks banks face when entering certain positions. Various risks might build up and start a compound effect that may lead to a crisis situation. There is one obvious problem with statistical models that make use of historical data to evaluate an asset's VaR. This problem is that the nature of the historical behaviour of the assets is such that the various risks associated with the assets are not reflected in the statistical models that banks are encouraged to use by Basel II (Dowd, 2009:76-79). Dowd (2009:76-79) states that these models conceal the underlying risks, which will give management a false sense of security and encourage them to become less risk averse; and

- Dowd (2009:76-79) identifies pro-cyclicality as the fifth problem associated with the IRB approach. History indicates that risks vary pro-cyclically over the business cycle. The problem under Basel II's risk based capital regulation approach for assessing banks' capital requirements become evident as soon as the cycle approaches its peak. During this period financial markets appears to be extremely healthy and less risky, resulting in a decline in risk assessments. This implies that pro-cyclical capital charges will lead to over lending in booms and under lending in recessions (Danielsson *et al,* 2001:5; Gordy & Howells, 2004:1). Danielsson *et al.* (2001:5) and Dowd (2009:79) are, therefore, of the opinion that risk-based capital regulation under Basel II not only makes economic crises more likely but also makes them more severe as well.

In addition to Sections 4.5.2 and 4.5.3, Alexander (2009:89-90) emphasizes a further glaring problem associated with Pillar I of Basel II. Basel II made it compulsory for originators under the Standardized approach to make use of external credit ratings to decide on the risk-weighting of assets. Under the IRB approach of Basel II certain originators were allowed to make use of their own internal risk-based modeling, implying that originators were effectively becoming their own regulators. This process was sanctified by regulators under Basel II, who instated the ratings agencies as Nationally Recognized Securities Rating Organizations (NRSROs) and increasingly relied on them as the official arbiters of risk. According to Eavis (2007a:6), this was a crucial mistake since credit rating agencies fail to comprehend and

react quickly enough to questionable trends and new financial innovations. This implies that when new financial products are created, credit rating agencies know little about the quality of the product which is being rated which in turn creates a lot of doubt surrounding the ratings given to assets.[38]

This concludes the discussions on the flaws associated with Pillar I of Basel II. To summarize; capital adequacy regulation under Basel II has failed dismally to protect the institutions it was intended to help. If the collapse of the financial system during the Sub-prime crisis represents the success of the Basel regime, then it is difficult to imagine what failure might look like. If anything, capital adequacy regulation would seem to have been seriously counterproductive. It appears to have saddled financial institutions with a large and futile compliance burden, destabilised the world economy, hampered the development of best practice in risk management and undermined market competition. Its efficacy is further undermined by the scope it creates for gaming and regulatory arbitrage to circumvent its rules.

4.6 Conclusion

The focal point of this study is to identify and correct the mistakes made by the parties responsible for the sub-prime crisis. Chapter two explained the concepts bubbles (Section 2.2) and crashes (Section 2.3), the two phenomena that have created every major historical economic crisis, including the sub-prime crisis. Chapter three gave an important introduction on the dot-com crash (Section 3.2) and the September 11 terrorist attack on the World Trade Centre (Section 3.3). These two events were responsible for the implementation of an expansive monetary policy by the Federal Reserve Bank of America. One of the conclusions withdrawn from chapter three is that the implementation of an expansive monetary policy, by the Federal Reserve Bank of America, created a platform for a mortgage bubble to form. Chapter four explored three financial concepts, namely securitization (Section 4.2), mark-to-market accounting (Section 4.3) and the Basel Capital Rules (Sections 4.4 and 4.5) .

The two most important aspects to note in the securitization process is that securitization allowed banks to save on regulatory capital requirements and that it has allowed for more parties to be involved in the formation of the mortgage bubble. By selling these securitized

[38] A detailed discussion on the credit rating agencies will follow in Section 5.2.5.

assets to investors, originators obtained external capital to fund further loans, hence creating and inflating the mortgage bubble.

From the mark-to-market accounting standards approach of valuing securities, there are several aspects that should be noted. Firstly, originators make use of market values and market information in valuing their assets since these assets are traded OTC and not over an established stock exchange, such as the New York Stock Exchange (NYSE), where a price can be determined for these assets. An assessment of an originator's assets and liabilities using information about their market value would determine whether they had sufficient capital to satisfy regulatory liquidity requirements, as determined by the Basel II Accord. One prerequisite of valuing assets in this manner is a large and active OTC market, which implies that there should be a large amount of buyers and sellers. During times where the economy is in a bull market activity increases, the increase in activity is usually accompanied by an increase in the demand for securities in secondary markets. The increased demand would then result in an increase in the price of the securities. In contrast, during times of economic downturn market activity would diminish and the lower demand would result in price decreases. Mark-to-market accounting, therefore, fails to reflect the true value of an asset during volatile economic periods and during the boom phases contribute to the magnitude and growth of a bubble.

The Basel minimum regulatory capital requirements[39] contributed to the mortgage bubble boom in various ways. Some of the most important contributing aspects of the Basel II minimum regulatory capital requirements are summarized. The pro-cyclical nature of the Basel II minimum regulatory capital requirements implies that capital charges will lead to over lending in booms and under lending in recessions. Hence, risk-based capital regulation under Basel II not only makes economic crises more likely but also makes them more severe as well. Systemic endogenous risk is a second aspect associated with the Basel II minimum regulatory capital requirements. Systemic endogenous risk occurs when an external shock on the economy pushes VaR risk model numbers upwards. In most cases asset prices will fall and traders will approach their position limits. As traders approach their limits they would be forced into short-selling their assets. The short-selling of assets exerts additional downward pressure on asset prices, which in turn triggers even further selling. A third important aspect to take note of is that the credit rating agencies instated under the Basel II Accord to rate securities failed to comprehend and react quickly enough to questionable trends and new financial innovations. This implies that, credit rating agencies knew little

[39] Especially under Pillar I of Basel II, seeing that the Basel II Accord was in place during the period of the mortgage bubble boom.

about the quality of the assets contained in the securities of the various tranches of CDOs which they rated during the mortgage bubble boom.

The abovementioned processes along with the relevant events (as discussed in chapter three) will provide the necessary background needed to understand how the parties involved in the securitization process exploited the situation during a prolonged period of historically low interest rates to create a mortgage bubble, which ended in an economic crisis known as the sub-prime crisis. The following chapter will provide a discussion on all the relevant parties involved in the securitization process and how their actions formed and inflated a mortgage bubble. The crash of this mortgage bubble resulted in an economic crisis that came to be known as the sub-prime crisis. Future action to avoid the same mistakes made in the sub-prime crisis can only be taken once there is a clear understanding of what actions, taken by which parties, caused the creation of a mortgage bubble. It is, therefore, important to comprehend how the actions of various parties inflated the mortgage bubble in order to reach the objective of this study.

Chapter 5: Parties responsible for the mortgage bubble boom

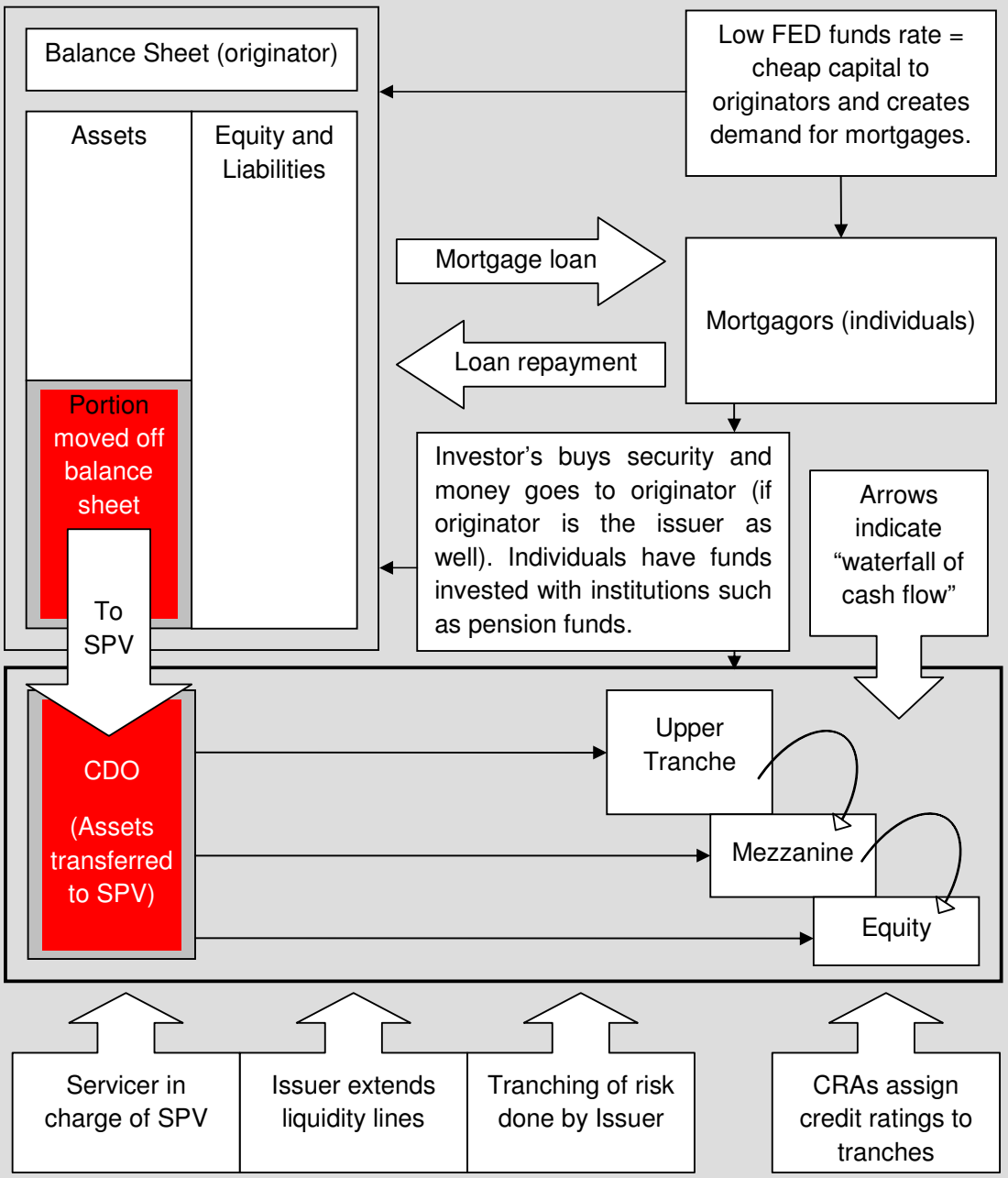
5.1 Introduction

The aim of this study is to identify and correct the mistakes made by the parties responsible for the sub-prime crisis. Chapter two explained the financial concepts bubbles and crashes, they are the two phenomena that have been creating every major historical economic crisis including the sub-prime crisis. Chapter three gave an important introduction on the dot-com crash and the September 11 terrorist attack on the World Trade Centre. These two events were responsible for the implementation of an expansive monetary policy by the Federal Reserve Bank of America. One of the conclusions withdrawn from chapter three is that the implementation of an expansive monetary policy, by the Federal Reserve Bank of America, created a platform for a mortgage bubble to form. Chapter four explored three financial concepts, namely securitization, mark-to-market accounting and the Basel Capital Rules. The three mentioned processes along with the relevant events will provide the necessary background needed to understand how the parties involved in the securitization process exploited the situation during a prolonged period of historically low interest rates to create a mortgage bubble. The crash of this mortgage bubble resulted in an economic crisis that came to be known as the sub-prime crisis. Chapter five explores the relevant parties responsible for the mortgage bubble boom. Before each individual party is discussed it is important to understand how the various parties are connected to one another.

As discussed in Section 4.2 all the responsible parties are connected to each other through the securitization process. The process of securitization has a circular flow and connects all the parties involved in the securitization process with one another. Figure 4.4[40] provides a graphical illustration of how the various parties involved in the securitization process are connected to one another. As discussed in Sections 4.2 and 4.6 the securitization process allows for more parties to be involved through the "originate and distribute" banking model. It is also through the securitization process that originators have been able to obtain additional capital to expand their lending activities in order to increase profitability and growth above the minimum required ROE.[41]

[40] Taken from Section 4.2.
[41] Discussed in Section 4.1.1.

Figure 4.4: The securitization process



Source: Compiled by author.

Chapter five contains an in-depth discussion surrounding several of the abovementioned links in the mortgage securitization process, as well as the actions taken by these parties. This chapter commences with a discussion on the mortgage originators in Section 5.2. This will be followed by discussions on the mortgagors (Section 5.3), the investors (Section 5.4) and the credit rating agencies (Section 5.5). The chapter is concluded in Section 5.6.

5.2 The mortgage originators (Lenders)

Mortgage originators[42] market and sell loans to borrowers, the interest rates and fees charged by originators for the loan determine their profit margins. Originators constantly compete with one another based on the interest rates, fees and service levels offered to borrowers (Nielsen, 2007:1). As discussed in Section 1.2, originators had access to cheap funding during the low interest rate period between 2001 and 2004. Originators were, therefore, seeking higher yields by taking on risk as the 1 percent return on investment on Treasury bills was seen as very low (Petroff, 2007:1). The low federal funds interest rate encouraged the major Wall Street firms to launch an aggressive move into the issuance of mortgage backed securities in order to chase higher yields and increase profitability (Dodd, 2007:16). Seeing that the majority of prime mortgagors have already been granted a mortgage during the low interest rate period, originators knew that they had to take on greater risk and sell mortgages to sub-prime borrowers if they were to capitalize any further on the housing boom. Originators were comfortable in increasing their sub-prime mortgage selling as they knew that Fannie Mae and Freddie Mac (and ultimately the taxpayers) would guarantee bad mortgages (Butler, 2009:55). This led originators to develop various methods to sell more sub-prime mortgages (Dodd, 2007:17). Before these methods are discussed, an explanation of what a sub-prime mortgage is and the mechanics behind such a mortgage are required.

Unlike prime lending, sub-prime lending is practised by a smaller number of large originators. According to Smith (2007a:1-2) and Nielsen (2007:1), sub-prime loans are mostly used to finance mortgages and these sub-prime mortgages are often associated with borrowers who have a tainted or limited credit history. Qualifying for a mortgage is based on a number of key factors, namely: an individual's income, and assets and credit rating. In most cases, sub-prime borrowers are borrowers who have question marks surrounding them in one or more of these areas, for instance a weak credit rating or inability to prove income earnings (Ashcraft & Schuermann, 2007:7; Smith, 2007a:1-2). These types of borrowers are labelled by originators as high risk borrowers who are unable to qualify for prime rate loans. A process known as risk-based pricing is used to calculate an individual's mortgage rates and terms (Smith, 2007a:1-2). The weaker an individual's credit score, the

[42] Reference made to originators in this section will predominantly be to United States of America's investment banks on Wall Street and GSEs, such as Fannie Mae and Freddie Mac. Originating investment banks on Wall Street are also referred to as private label security issuers. These large private label issuers include well known firms, such as Bear Stearns, Lehman Brothers, JP Morgan, Wells Fargo, Goldman Sachs and Bank of America as well as several other credit unions who are major lenders to high-risk sub-prime borrowers such as Countrywide, WAMU, and Indymac (Dodd, 2007:17).

more expensive his loan. This is the reason why sub-prime mortgages carry substantially higher interest rates than similar mortgages available in the prime mortgage market. In addition to having higher interest rates, sub-prime loans are also accompanied with higher fees (Smith, 2007a:1-2; Nielsen, 2007:1). Unlike prime rate loans, which are similar between lenders, sub-prime loans vary greatly. Originators ask higher rates on sub-prime mortgages to compensate for the increased risk they are exposed to when issuing these sub-prime mortgages (Nielsen, 2007:1). Most of these sub-prime mortgages came in the form of adjustable rate mortgages (Nielsen, 2007:1).

To summarize, as indicated in Section 1.2 the expansive monetary policy implemented by the Federal Reserve Bank caused the federal funds interest rate to come down to a mere 1 percent. The 1 percent return on investment on Treasury bills was seen as very low. Hence, the low federal funds interest rate encouraged the major Wall Street firms to launch an aggressive move into the issuance of mortgage backed securities in order to chase higher yields and increase profitability. Originators were comfortable in increasing their sub-prime mortgage selling as they knew that Fannie Mae and Freddie Mac (and ultimately the taxpayers) would guarantee bad mortgages, hence, enticing moral hazard amongst originating institutions. Various enticing adjustable rate mortgage products were used to attract sub-prime mortgagors. The focus on the originators role now shifts to adjustable rate mortgages and elaborate on how originators have taken advantage of the Alternative Mortgage Transaction Parity Act of 1982, to create extremely enticing mortgage products (Smith, 2007a:1-2). These mortgages came in the form of adjustable rate mortgages, which enabled many sub-prime borrowers to acquire a mortgage loan (Nielsen, 2007:1).

5.2.1 Adjustable rate mortgages

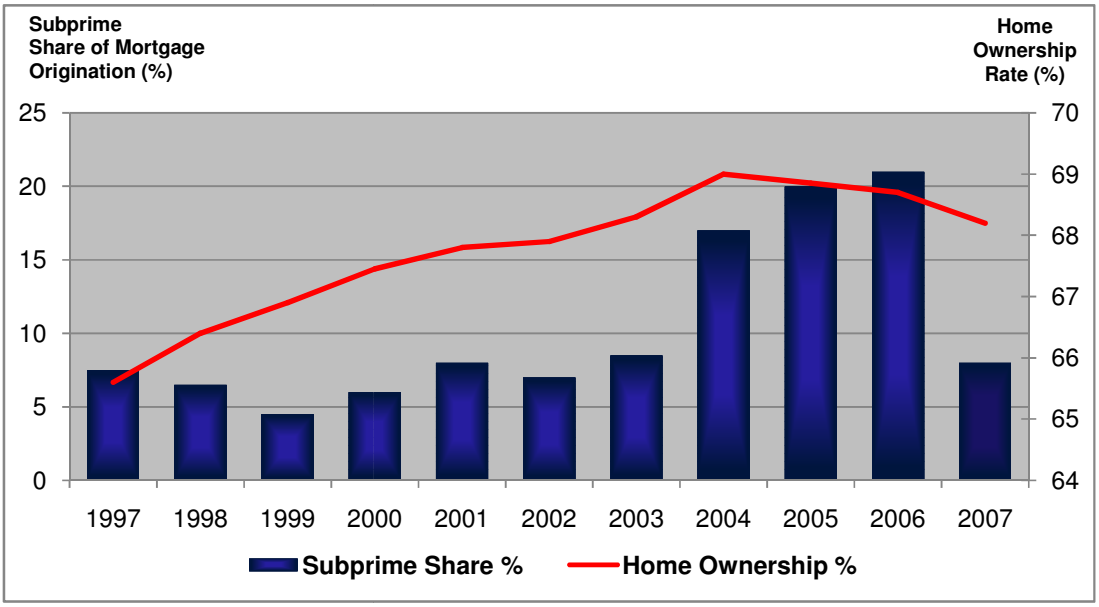
The Alternative Mortgage Transaction Parity Act of 1982 permitted originators to grant adjustable rate loans to mortgagors (Smith, 2007a:1-2). Adjustable rate mortgages were originally designed for wealthy investors who were seeking to pay as little interest as possible on a mortgage. This allowed them to have more cash available used to earn a rate of return that is higher than the interest on their mortgage (McWhinney, 2005:1). Adjustable rate mortgages also act as a short-term financing vehicle that can provide a borrower with enough time to repair his or her credit rating before they refinance the mortgage with more favourable terms (Nielsen, 2007:1). For individuals with a tainted credit history, sub-prime mortgages are a great way to purchase a home while at the same time rectifying or building their credit history. If they were able to rectify their creditworthiness, it will allow them to refinance the sub-prime mortgage converting it into a prime mortgage with lower interest

rates (Nielsen, 2007:1). Used correctly, adjustable rate mortgages can produce positive effects. However, an erosion of lending standards by originators (especially for sub-prime mortgages), in an attempt to sell more sub-prime mortgages and cash in on the housing boom, led originators to take on undue risk and to embark on excessive lending practices (Brunnermeier, 2008:8; Gordon, 2008:1-2). Borrowers were not innocent either as they took on excessive risk by making use of adjustable rate mortgage products in an attempt to obtain a house (Petroff, 2007:2).[43]

Mortgagors often did not realize that their mortgage was a sub-prime mortgage, because originators rarely referred to a mortgage as a sub-prime mortgage. From a marketing perspective, "sub-prime" is not an attractive term and originators tended to avoid using the term (Smith, 2007a:1). In an attempt to sell more sub-prime mortgages, various mortgage originators added prepayment penalties to the mortgage contract at the last minute without the mortgagors understanding its potential financial consequences (Nielsen, 2007:2). Another tactic to increase sub-prime mortgage sales was to grant loan-to-value mortgages of up to 125 percent to prospective mortgagors (Barnes, 2007:3). Originators also offered “piggyback” mortgages which are a combination of two mortgages that eliminates the need for a down payment, and NINJA loans (No Income, No Job or Assets) (Eavis, 2007a:4; Brunnermeier, 2008:8; Van Vuuren; 2009b:9). Basic requirements like proof of income and deposits were being discarded by mortgage originators (Smith, 2007a:2; Nagy & Szabó, 2008:35-36; Butler, 2009:53). “Liars’ loans” (Alt-A mortgages) were made to borrowers who have not completed all of the normal credit checks and lending documents (Fisher, 2008:36). Automated internet-based loan submissions and pre-approval systems were another method being used by originators to increase sub-prime mortgage sales (Ashcraft & Schuermann, 2007:18). New Century Financial who created the first automated internet-based loan submission and pre-approval system, called FastQual*,* was the second largest sub-prime originator between 2004 to 2006 (Ashcraft & Schuermann, 2007:18). In 2007, 40 percent of all sub-prime loans came from automated underwriting (Van Vuuren, 2009b:5). Figure 5.1 indicates how sub-prime lending in the United States of America increased, since 2003 until 2006, by more than double the rate indicated for previous years.

[43] The actions of the mortgagors are discussed in Section 5.3.

Figure 5.1: Sub-prime share of mortgage origination from 2004 to 2006



Source: Joint Centre for Housing Studies of Harvard University (2008:4).

Figure 5.1 shows a remarkable increase in sub-prime mortgage origination from 2003 to 2004. The trend was continued throughout 2005 and 2006, with the mortgage bubble crashing in 2007, resulting in a steep drop in sub-prime mortgage origination during 2007. The various adjustable rate mortgage products were originators' primary tool to increase sub-prime mortgage sales and can be directly linked to the increase in sub-prime mortgage origination, as depicted in Figure 5.1. Adjustable rate mortgages are significantly more complex than other more conventional mortgages. The mechanics of adjustable rate mortgages highlights just how dangerous it can be when interest rates are increased by the Federal Reserve Bank of America. The following explanations will shed some light on how these complex and risky mortgage products have contributed to the mortgage bubble boom that led to the sub-prime crisis.

McWhinney (2010:1-2) and Nielsen (2010b:2) indicated that adjustable rate mortgages have an adjustment frequency, which implies that the interest rate on an adjustable rate mortgage changes over time. The initial interest rate on an adjustable rate mortgage is usually set below the market rate of a comparable fixed rate loan. The low rate is guaranteed for a set period of time before it adjusts upward usually after one, two, three, five, seven or 10 years, depending on the terms of the mortgage. This initial interest rate is also known as a teaser rate and is used by lenders to entice borrowers to choose adjustable rate mortgages over

other traditional mortgages. The popularity of teaser rates increase dramatically during times when long-term interest rates move towards historical lows. With time these initial rates will tend to increase and surpass the market rate of fixed rate loans until it reaches the fully indexed rate (McWhinney, 2010:1-2 & Nielsen, 2010b:2).

The fully indexed rate is an important feature of adjustable rate mortgages as mentioned by McWhinney (2010:2) and Nielsen (2010b:2-3). The fully indexed rate is another aspect adding to the complexity of adjustable rate mortgages. The interest rate on adjustable rate mortgages consists of an index value plus an additional margin, which is known as the fully indexed interest rate. The various types of adjustable rate mortgages are each tied to their own index. These indices are constructed by using the interest rates of either a type of actively traded financial security, a type of bank deposit or a type of bank loan, for instance, the interest rate on Treasury bills, certificates of deposit, or the LIBOR rate (Nielsen, 2010b:2-3). The index value floats, with the margin remaining constant throughout the life of the mortgage. Nielsen (2007:2) states that sub-prime 2/28 and 3/27 adjustable rate mortgages carry a higher fixed period interest rate and a larger margin compared to prime fixed period adjustable rate mortgages. For example, if the current index value (LIBOR rate) is 6.72 percent and the margin is 5 percent, the fully indexed interest rate would then be 11.72 percent. If the index increased to 6.95 percent, the fully indexed interest rate would increase to 11.95 percent. Most mortgage indices are short-term indices and are highly correlated with one another. Securities, loans or deposits that have a term of one year or less are considered to be short-term. It is also important to note that most short-term interest rates, including those used to construct mortgage indices, are closely correlated with the Federal funds interest rate (Nielsen, 2010b:2-3). When these short-term interest rates rise, originators will increase their rates as well to reflect their increased cost of capital. This example illustrates that adjustable rate mortgages can be very risky in times of increasing interest rates and when used incorrectly, can produce adverse consequences.

To summarize, most sub-prime mortgages came in the form of adjustable rate mortgages. A diverse selection of adjustable rate mortgage products were made available to potential sub-prime mortgagors (Smith, 2007b:1). Hence, the conclusion can be withdrawn that originators used the diversification of their adjustable rate mortgage products as a method to increase sub-prime mortgage origination. The most popular types of adjustable rate mortgage products, granted by originators to sub-prime mortgagors, are discussed in the following section.

5.2.2 Adjustable rate mortgage products

As mentioned in Section 5.2.1, adjustable rate mortgages were originators' preferred product of choice to grant sub-prime mortgagors a sub-prime mortgage. Section 5.2.1 also indicated that adjustable rate mortgages are significantly more complex than other more conventional mortgages. Originators offered a wide variety of adjustable rate mortgages in an attempt to attract more possible mortgagors. Section 5.2.2 will elaborate on this discussion by examining four of the most prominent types of adjustable rate mortgages that originators offered to potential mortgagors. This section will commence with a discussion on option adjustable rate mortgages, followed by interest only adjustable rate mortgages, sub-prime 2/28 adjustable rate mortgages and sub-prime 3/27 adjustable rate mortgages.

- Option adjustable rate mortgage: According to Smith (2007b:1), the option adjustable rate mortgage is an extremely attractive option since the required payment is so low that it does not even cover the interest on the mortgage. These minimum payment options place borrowers in a position where they owe more on the house at the end of the month than they did at the beginning and is also referred to as negative amortization (Smith, 2007b:1). These minimum payments are extended for a limited time as most option adjustable rate mortgages recalculate after five years, or once the outstanding balance increases to 110 percent of the initial loan amount. After the recalculation, the fully amortized payment would be determined, which is the payment that would be required to pay off the home over the remaining life of the loan. The recalculated payment then becomes the minimum required payment and the negative amortization payment is terminated. It is important to note that this new payment can increase by as much as 100 percent, implying that the new payment can be double the initial payment (Smith, 2007b:1). These minimum payments were particularly used by prospective homebuyers to purchase homes in high priced locations where buyers could not otherwise afford to purchase a home. It was perceived that an increase in property value over the five year period would counter the recalculation result (Smith, 2007b:1).

- Interest only adjustable rate mortgage: Interest only adjustable rate mortgage payments are higher than minimum option adjustable rate mortgages, since it only covers the interest but do not reduce the capital or principal amount (Ashcraft & Schuermann, 2007:22-23). The borrower makes no progress toward owning the home, but does avoid negative amortization. Payment amounts remain fairly constant throughout the term of the mortgage, since it is only the interest that's being repaid. The interest only payments are also extended for a limited time implying that the borrower will eventually have to

start repaying the principal amount of the loan. Borrowers are left with a couple of options at the end of the interest only payment period. The interest only mortgage can be renewed or can be converted to more standard approaches, such as entering into a normal mortgage (where repayment on interest and principal will be taken into account) or the borrowers could simply return the keys, essentially liquidating the investment (Smith, 2007b:2).

- Sub-prime 2/28 adjustable rate mortgage: This is a type of adjustable rate mortgage frequently offered to sub-prime borrowers. A 2-year fixed interest rate period is offered after which the interest rate on the mortgage starts to float for the next 28 years based on an index (mostly the six month LIBOR index) plus a margin (Ashcraft & Schuermann, 2007:21-22; Nielsen 2007:1-2).

- Sub-prime 3/27 adjustable rate mortgage: The sub-prime 3/27 adjustable rate mortgage was designed with the same intent as the 2/28 adjustable rate mortgage, the only difference being that 3/27 mortgages have a 3-year fixed and a 27-year floating interest rate period compared to the 2 fixed and 28-year floating interest rate period of the 2/28 adjustable rate mortgage (Ashcraft & Schuermann, 2007:21-22; Nielsen 2007:1-2).

Before this section can be concluded two other parties that contributed to a lesser extent to the increased number of adjustable rate mortgage product sales will briefly be discussed. These two parties include the real estate appraisers and mortgage brokers. Eavis (2007a:2-3) states that real estate appraisers are responsible for establishing the market value of a property. Real estate appraisers buckled under pressure from originators to overvalue property in order for a mortgage to be viable. Originators would often tell real estate appraisers what the value of a property should be in order for the mortgage to be approved and in many cases real estate appraisers obliged with the given property value (Eavis, 2007a:3). The conclusion could be made that the real estate appraisers made a less severe contribution to the mortgage bubble boom.

The second party to be briefly discussed are the mortgage brokers. A mortgage broker, also known as third-party mortgage originator, is a person or company involved in the marketing of mortgages and the gathering of borrower information for a mortgage application (Eavis, 2007a:2; Nielsen, 2010b:1). Mortgage brokers do not make use of their own capital to originate mortgages. The information obtained by mortgage brokers regarding potential mortgagors gets passed onto the actual mortgage originators who then grants a mortgage loan to the mortgage applicants (Eavis, 2007a:2). As discussed in Section 1.2, originators

encouraged mortgage brokers to increase mortgage sales and mortgage brokers eagerly obliged as they earned fees in proportion to the volume of mortgages they wrote (Crotty, 2008:3). Mortgage brokers frequently come under scrutiny due to their lack of an ongoing and lasting responsibility for a mortgage. A mortgage broker has no responsibility for the performance of a mortgage once the broker has been compensated for brokering a mortgage, whereas the originator is bound for the duration of the mortgage to the borrower and is subject to some recourse should the mortgage default (Eavis, 2007a:2). Mortgage brokers' lack of liability for a mortgage encouraged brokers to sell loans to borrowers who could not afford them (Eavis, 2007a:2). Hence, they became one of the many contributing parties to the sub-prime crisis. This concludes the discussion on adjustable rate mortgage products and how several parties were involved in the marketing and selling process of sub-prime mortgages.

The following conclusions are drawn from the discussions on the four prominent adjustable rate mortgage products. It is quite evident that the abovementioned mortgage products made it extremely easy and inexpensive for mortgagors to acquire a mortgage during the initial period of obtaining the mortgage. Mortgage brokers and real estate appraisers contributed to a lesser extent to the increased number of adjustable rate mortgage product sales. The initial interest rate on an adjustable rate mortgage is usually set below the market rate of a comparable fixed rate loan. In addition, adjustable rate mortgages have an adjustment frequency, which implies that the interest rate on an adjustable rate mortgage changes over time. The low rate is guaranteed for a set period of time before it adjusts upward usually after one, two, three, five, seven or 10 years, depending on the terms of the mortgage.[44] If the Federal Reserve Bank of America increases the federal funds interest rate[45] at the same time that, for instance, an option adjustable rate mortgage adjusts from its initial low payment to its higher recalculated payment it will have a compound effect on mortgage payments. Many mortgagors will be forced to default on their mortgages as they will not be able to meet their financial obligations as a result of the policy interest rate increases. This was one of the most important aspects that created the sub-prime crisis, as discussed in Section 1.2.

This concludes the discussion on the various adjustable rate mortgage products. The discussion on the originators role in the mortgage bubble boom now shifts focus to the

[44] As indicated in Section 5.2.1.
[45] As mentioned in Section 1.2, inflationary pressures started to build due to the expansive monetary policy implemented by the Federal Reserve Bank of America. As a result monetary policy tightened in reaction to rising inflation which caused the federal funds interest rate to be adjusted upwards (Bordo, 2008:8-9).

process of securitization.[46] Originators obtained more funds to originate additional adjustable rate mortgage mortgages through the process of securitization, as explained in Section 5.2.3.

5.2.3 Mortgage origination and the securitization process

According to Ashcraft and Schuermann (2007:7) and Dodd (2007:17), the origination of mortgages and issuance of CDOs, until very recently, were dominated by loans to prime mortgagors. This process had to conform to underwriting standards set by the GSEs such as Fannie Mae and Freddie Mac, also known as agency asset classes. Non-agency asset classes that included sub-prime, Alt-A and jumbo asset classes were not deemed as conforming loans (Ashcraft & Schuermann, 2007:7). Sub-prime lenders are lenders who specialize in lending to borrowers with a tainted or limited credit history (in the United States of America such clients are typically low income or elderly individuals, or new immigrants). (Ashcraft & Schuermann, 2007:7; Nagy & Szabó, 2008:43). Alt-A asset classes involve loans to borrowers with relatively good credit standing, but undergo more aggressive underwriting than the jumbo classes. Jumbo asset classes, on the other hand, include loans to prime borrowers with an original principal balance larger than the conforming limits imposed on the agencies by Congress (Ashcraft & Schuermann, 2007:7). Seeing that the focal point of the study revolves around sub-prime mortgage origination the discussions to follow will focus more on origination in the sub-prime asset class.

In order to understand how the sub-prime asset class expanded emphasis is once again placed on the Federal Reserve Bank of America's expansive monetary policy implementation between 2001 and 2004. The expansive monetary policy created great demand for mortgages as a result of the low interest rates during that period. The expansive monetary policy also provided capital liquidity (cheap credit) to originators to be able to sell more mortgages. This was only one of the means used by originators to acquire capital to fund more mortgages.

It should be noted that an investment bank can be the originator of a pool of mortgages, which it can sell to another investment bank that will create an SPV and form a CDO from the pooled mortgages (referred to as the issuer).[47] The originator can also sell the pooled mortgages to one of the GSEs that usually hold them as a portfolio. The issuer is not

[46] Detailed discussions regarding the securitization process as well as its practical uses were held in Sections 4.2 and 4.2.1.
[47] As discussed in Section 4.2.

necessarily another party, as the originator can be the issuer of the SPV as well (Ashcraft & Schuermann, 2007:7).[48] To avoid confusion in the discussions to follow regarding the formation of the mortgage bubble, the issuer would also be referred to as being the originator and, therefore, a single entity.

In an attempt to further increase profits during the housing boom, originators turned to securitization to increase their selling of mortgages (Crotty, 2008:3). Since exchange traded derivatives are sold in a highly competitive market with low profit margins, originators had a strong incentive to make use of the securitization process to create products so complex that they could not be sold on exchanges (Crotty, 2008:25). Access to up-to-date prices is denied to investors in OTC markets (Das, 2006:126). In addition, complicated structures to price derivatives are used to further complicate the pricing process for investors (Das, 2006:126). Transparency is, therefore, very limited with structured products traded OTC. Crotty (2008:25) states that the lack of transparency lies at the heart of derivative profitability.

As much as 80 percent of derivatives are now sold OTC in non-transparent private deals (Crotty, 2008:25). This is a very large percentage, especially when considering that investors do not really know what they are buying. Dodd (2007:17) states that in a CDO, as much as 80 percent of the sub-prime debt can be resold to institutional investors as senior-tranche, investment-grade assets. The need for investment banks to create ever more complex derivative products is a key driver of financial bubbles (Sánta, 2007:31; Crotty, 2008:25).[49]

By using the process of securitization, originators also saved on regulatory capital requirements and were able to use funds received from selling securities in the market to fund more mortgages.[50] Tables 5.1 and 5.2 below indicate how originators increased their origination and issuance ratios to capitalize on the housing boom. The comparisons between 2001 and 2006 origination and issuance for agency as well as the non-agency asset classes clearly indicate that originators increased their mortgage sales particularly to sub-prime borrowers. It also illustrates how originators made use of the process of securitization to acquire more funds by issuing a larger portion of their already increased mortgage sales. Table 5.1 indicates that the agency sector has originated $1.433 trillion in conforming mortgage loans and issued $1.087 trillion in mortgage-backed securities secured by those mortgages during 2001. These numbers are far greater than the origination and issuance amounts for the non-agency sector during the same year. The non-agency sector has

[48] In addition, the originator can also act as the servicer as mentioned in section 4.2.
[49] As discussed in Section 1.1.
[50] See example in Section 4.2.1.

surpassed these figures in 2006, hence, indicating that the non-agency sector took on far greater risk to capitalize on the housing boom. Especially when taking into account the amount of sub-prime mortgage origination and issuance during 2006.

Table 5.1: Origination and issuance in the agency asset classes since 2001
(Billions of USD).

	Agency		
Year	Origination	Issuance	Ratio
2001	**$1,433.00**	**$1,087.60**	**76%**
2002	$1,898.00	$1,442.60	76%
2003	**$2,690.00**	**$2,130.90**	**79%**
2004	$1,345.00	$1,018.60	76%
2005	$1,180.00	$ 9 64.80	82%
2006	**$1,040.00**	**$ 9 04.60**	**87%**

Source: Ashcraft and Schuermann (2007:7).

Table 5.2 indicates how the non-agency sector exploited the opportunity to increase profit during the low interest rate period.[51] Table 5.2 further indicates that during 2001, in the non-agency sector, origination totalled $680 billion ($190 billion sub-prime + $60 billion Alt-A + $430 billion jumbo) and issuance reached $240 billion ($87.1 billion sub-prime + $11.4 billion Alt-A + $142.2 billion jumbo). Note that most of these were in the jumbo sector ($430 billion jumbo vs. $250 billion sub-prime & Alt-A). Origination in the sub-prime and Alt-A sectors during 2001 made up a mere 12 percent ($250 billion of $2.1 trillion) of total origination. The low federal funds interest rate through the end of 2003 resulted in a sharp increase in origination and issuance across all asset classes. Although the conforming markets reached its peak in 2003, non-agency markets surpassed activity in the conforming market as they continued rapid growth through 2005 and 2006. The CDO market (secured mainly with sub-prime debt) rapidly increased to more than $600 billion in issuance during 2006 alone, more than 10 times the amount issued just a decade earlier. Non-agency origination of $1.480 trillion ($600 billion sub-prime + $400 Alt-A + $480 billion jumbo) was 30 percent larger than agency origination of $1040 billion for 2006. Non-agency issuance increased from $240 billion in 2001 to $1.033 trillion during 2006, while agency issuance indicated a slight decrease from $1.087 trillion to $905 billion for the same time periods. Also note the large increases in the issuance to origination ratios for 2001 and 2006 of the sub-prime (46 to 75 percent) and Alt-A classes (a staggering 19 to 91 percent increase). These high issuance

[51] Interest rates fluctuated between 1 and 4 percent between 2002 and 2006 as indicated in Figure 6.3.

ratios during 2005 and 2006 for both sub-prime and Alt-A loans indicate that a large and increasing fraction of the originated mortgages contained in these classes were being sold to investors. Hence, very little of the sub-prime and Alt-A mortgages were retained on the balance sheets of the institutions who originated them.

Table 5.2: Origination and issuance in the non-agency asset classes since 2001
(Billions of USD).

	Sub-prime		
Year	Origination	Issuance	Ratio
2001	**$ 1 90.00**	**$87.10**	**46%**
2002	$ 2 31.00	$122.70	53%
2003	$ 3 35.00	$195.00	58%
2004	$ 5 40.00	$362.63	67%
2005	$ 6 25.00	$465.00	74%
2006	**$ 6 00.00**	**$448.60**	**75%**

	Alt-A		
Year	Origination	Issuance	Ratio
2001	**$60.00**	**$11.40**	**19%**
2002	$68.00	$53.50	79%
2003	$85.00	$74.10	87%
2004	$ 2 00.00	$158.60	79%
2005	$ 3 80.00	$332.30	87%
2006	**$ 4 00.00**	**$365.70**	**91%**

	Jumbo		
Year	Origination	Issuance	Ratio
2001	**$ 4 30.00**	**$142.20**	**33%**
2002	$ 5 76.00	$171.50	30%
2003	$ 6 55.00	$237.50	36%
2004	$ 5 15.00	$233.40	45%
2005	$ 5 70.00	$280.70	49%
2006	**$ 4 80.00**	**$219.00**	**46%**

Source: Ashcraft and Schuermann (2007:7).

The conclusions withdrawn from Table 5.2 are that mortgage originators in the non-agency asset class dramatically increased the origination and issuance of sub-prime and Alt-A mortgage classes between 2001 and 2006. Sub-prime and Alt-A mortgage classes are exposed to far more credit risk[52] than agency and jumbo mortgage classes. The ever increasing issuance ratios of sub-prime and Alt-A mortgage classes between 2001 and 2006

[52] Discussed in Sections 4.2.1 and 4.4. Also see footnote number 20.

meant that originators were offloading the credit risk onto those who invested in securities that contained sub-prime and Alt-A mortgages.[53] Not only did originators manage to transfer the credit risk they also managed to obtain funds to further expand sub-prime mortgage sales, as mentioned earlier in Section 5.2.3. Tables 5.3 and 5.4 lists the top 10 sub-prime originators and issuers for 2006.[54]

Table 5.3: Top sub-prime mortgage originators for 2006

(Billions of USD).

		2006	
Rank	Lender	Volume	Share (%)
1	HSBC	$52.80	8.80%
2	New Century Financial	$51.60	8.60%
3	Countrywide	$40.60	6.80%
4	CitiGroup	$38.00	6.30%
5	WMC Mortgage	$33.20	5.50%
6	Fremont	$32.30	5.40%
7	Ameriquest Mortgage	$29.50	4.90%
8	Option One	$28.80	4.80%
9	Wells Fargo	$27.90	4.60%
10	First Franklin	$27.70	4.60%
	Top 1-10	$362.40	60.30%
	Top 11-25	$180.80	30.20%
	Top 1-25 total	$543.20	90.50%
	Overall total	$600.00	100.00%

Source: Ashcraft and Schuermann (2007:9).

Table 5.3 indicates that in the United States of America 60.3 percent of total sub-prime mortgage loans were provided by only 10 originators. In Dollar terms the top 10 originators originated $362.4 billion worth of sub-prime mortgages out of an overall total of $600 billion. Worrisome question marks regarding how well these institutions were regulated appear when taking into account that the top 10 sub-prime originating institutions contributed so heavily to total sub-prime mortgage origination. Table 5.3 further indicates that the top 11-25 originators made a significant contribution of 30.2 percent of overall sub-prime mortgage

[53] See Sections 4.2.1 and 5.4.

[54] The list includes a mix of commercial banks and non-depository specialized mono-line lenders/credit unions such as Fremont and New Century Financial.

origination. Together the 25 originators originated 90.5 percent of overall sub-prime mortgages.

Table 5.4: Top ten sub-prime CDO issuers for 2006

(Billions of USD).

		2006	
Rank	Lender	Volume	Share (%)
1	Countrywide	$38.50	8.60%
2	New Century Financial	$33.90	7.60%
3	Option One	$31.30	7.00%
4	Fremont	$29.80	6.60%
5	Washington Mutual	$28.80	6.40%
6	First Franklin	$28.30	6.30%
7	Residential Funding Corp	$25.90	5.80%
8	Lehman Brothers	$24.40	5.40%
9	WMC Mortgage	$21.60	4.80%
10	Ameriquest	$21.40	4.80%
	Top 1-10	$283.90	63.30%
	Top 11-25	$143.70	32.00%
	Top 1-25 total	$427.60	95.30%
	Overall total	$448.60	100.00%

Source: Ashcraft and Schuermann (2007:9).

It should be noted that the list of issuers include those institutions that originate and issue mortgages by themselves, as well as investment banks that purchased mortgages from the originators and issued their own securities. Table 5.4 indicates that in the United States of America 63.3 percent of total sub-prime CDOs were provided by only 10 originating institutions. In Dollar terms, the top 10 CDO issuers issued $283.9 billion worth of sub-prime CDOs out of an overall total of $448.6 billion. The top 11-25 CDO issuers made a significant contribution of 32.0 percent to overall sub-prime CDO issuance. Together the top 25 CDO issuers issued a staggering 95.3 percent of overall sub-prime CDOs. When comparing Table 5.3 with table 5.4, several of the top 10 originating institutions are also found to be under the top 10 issuing institutions during the same year, which once again raise questions on how well these institutions were regulated.

Securitization allowed originators and issuers, as indicated by Tables 5.3 and 5.4, to issue CDOs containing sub-prime mortgage debt.[55] Securitization, therefore, enabled originators to transfer the risk associated with sub-prime mortgage debt to financial markets (Dodd, 2007:17). Barnes (2007:4-5) states that when the mortgage bubble burst in August 2007, investors in CDOs became extremely wary of investing in these securities. As a result, investors stopped trading and the CDO market and related credit derivatives markets essentially ceased to exist. Issuers of CDOs were no longer able to sell their inventory and stopped arranging new issues. With no buyers in the OTC market, sub-prime mortgage originators could not sell the loans they had provided. This exerted tremendous pressure on the liquidity needs of originators, as many of these originators were thinly capitalized, highly leveraged, unregulated finance companies with a significant amount of illiquid level three assets (Dodd, 2007:18-19).

According to Eavis (2007b:1-2), in the first half of 2007 level three assets were a big driver behind earnings at several major Wall Street banks.[56] Level three assets include leveraged buy-out loans, seriously problematic assets like sub-prime mortgages and CDOs. Level three assets are also called illiquid assets (Eavis, 2007b:1-2). Level two assets are theoretically more liquid than level three assets, but still does not get valued according to prices in active markets (Eavis, 2007b:1-2). Only level one assets are valued on a bank's balance sheet according to quoted prices in liquid markets. Level two assets were influenced negatively as interest rates and mortgage default rates started to increase in the third quarter of 2007. In many cases level two assets had to be moved down to level three as they became less liquid (Eavis, 2007b:1-2). The less liquid originators' assets became, the more originators struggled to meet their financial obligations.

As mentioned in the previous paragraph level three assets are illiquid assets. Future losses are most likely to originate from level three asset markdowns, which will in turn increase a banks liquidity risk exposure (as was seen during the sub-prime crisis). The comparison between equity[57] and liquidity risk[58] is of great importance since a decrease in the liquidity of assets will immediately have a negative impact on equity (Bessis, 2007:17). Banks need strong equity to grow and maintain high credit ratings (Eavis, 2007b:1-2). After the mortgage bubble burst in August 2007 Merrill Lynch's level three assets increased by 69 percent, realizing a $27 billion increase in level three assets. At $27 billion, Merrill Lynch's level three

[55] Sections 4.2 and 4.2.1 contained a detailed discussion on the process of securitization.
[56] Such as Bear Stearns, Lehman Brothers, JP Morgan, Wells Fargo, Goldman Sachs and CitiGroup.
[57] Equity refers to the net worth of a bank after liabilities are subtracted from assets (Bessis, 2007:17).
[58] Liquidity risk refers to the risk of not having sufficient cash and borrowing capacity to meet loan demand, customer withdrawals and other cash needs (Rose & Hudgins, 2005:162).

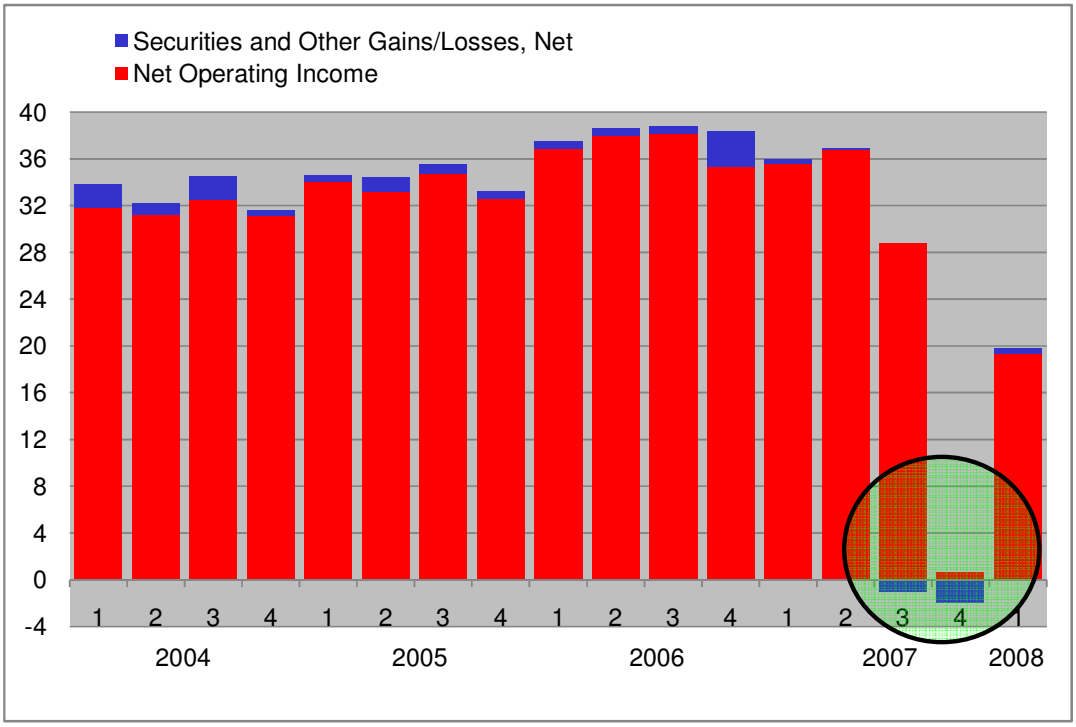
assets were equivalent to 70 percent of its equity. Goldman Sachs' level three assets increased by 1/3 in the third quarter of 2007 to $72 billion, which was the equivalent to 184 percent of equity. Morgan Stanley's $90 billion increase in level three assets was equivalent to 255 percent of equity (Eavis, 2007b:1-2). The increase in illiquid assets is a major concern for originating institutions. The reason being that it creates what is referred to as a liquidity gap (Rose & Hudgins, 2005:356; Bessis, 2007:139-140). For a bank, when its assets exceeds its liabilities there is a negative liquidity gap (Rose & Hudgins, 2005:356; Bessis, 2007:139-140). Originators would then find themselves locked in rather illiquid positions on the asset side and with short-term/liquid positions on the liabilities side (Bervas, 2008:129). The short-term securities on the liabilities side imply that investors are able to exit their investments easily, while the illiquid positions on the asset side imply that originators are unable to gain quick access to capital when required (Bervas, 2008:129; Rochet:47).[59] Hence, the increase in level three assets also increased originators' exposure to liquidity risk (Eavis, 2007b:1-2).

The situation was exacerbated when bankers to these originators withdrew their funding, due to their own liquidity problems. Originators were left unable to carry the inventory of mortgages they had made. As a result, originators stopped origination of new sub-prime mortgages, but continued with the origination of prime mortgages. Originators that provided guaranteed credit lines to SPVs, while also being the issuers of the commercial paper, had to honour those credit lines (Dodd, 2007:18-19). As a result originators had to transfer the sold mortgages back onto their balance sheets, which required originators to obtain additional funding for the SPVs and to take a capital charge against the loans to the SPVs (Dodd, 2007:18-19). The additional funding needed by originators added to financial markets' demand for credit at a time when credit (liquidity) was difficult to obtain. The liquidity shortages forced perfectly solvent banks to write down some of their assets to a large degree and some banks even had to declare bankruptcy (Myddelton, 2009:108).[60]

Figure 5.2 below indicates how the liquidity problems faced by originators since the third quarter of 2007 had a significant effect on the net operating income of various originators. Net operating income (including net securities and other gains) decreased from a high of $38.1 billion in the third quarter of 2006 to a mere $0.6 billion in the fourth quarter of 2007. Figure 5.2 also indicates that the third and fourth quarter of 2007 were the only two quarters where securities suffered losses.

[59] See Section 4.3.
[60] See Section 1.2 and 4.3.

Figure 5.2: Quarterly bank earnings in the United States of America from 2004 to 2008



Source: FDIC (2008:1).

To summarize; in an attempt to further increase profits during the housing boom, originators turned to securitization to increase mortgages sales. Since exchange traded derivatives are sold in a highly competitive market with low profit margins, banks had a strong incentive to make use of the securitization process to create products so complex that they could not be sold on exchanges. The recklessness of originators' lending and issuance activities posed numerous questions on how these institutions were being supervised and regulated both internally as well as externally. Access to up-to-date prices is denied to investors in OTC markets. In addition, complicated structures to price derivatives are used to further complicate the pricing process for investors. Transparency is, therefore, very limited with structured products traded OTC. Hence, it may be argued that investors did not understand the risk involved with the securities they were buying.

After the mortgage bubble burst in August 2007, originators found themselves locked in rather illiquid positions on the asset side and with short-term/liquid positions on the liabilities side. The short-term securities on the liabilities side imply that investors are able to exit their investments easily, while the illiquid positions on the asset side imply that originators are

unable to gain quick access to capital when required. The liquidity shortages forced perfectly solvent banks to write down some of their assets to a large degree and some banks even had to declare bankruptcy. The conclusion can, therefore, be made that originators played an integral role in the mortgage bubble boom that led to the sub-prime crisis. Just like the originators, the mortgagors were also accused of fraudulent behaviour, though to a lesser extent. Actions taken by mortgagors in an attempt to obtain a mortgage contributed to the magnitude of the bubble. The contribution by mortgagors to the creation of the crisis will be explored in the next section.

5.3 The Mortgagors (Borrowers)

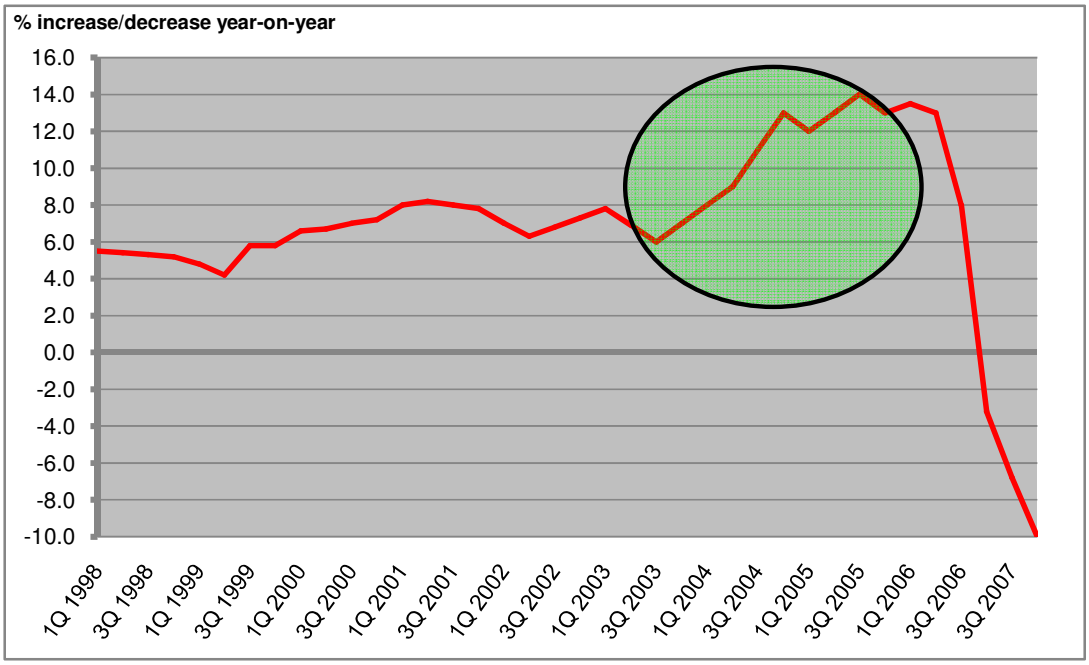
Barnes (2007:1-2) explained that as the lower interest rates worked their way into the economy, the real estate market became all the more attractive for home buyers and investors. This was quite evident at the beginning of 2002, as the number of homes sold and the prices they sold for increased dramatically. During this time period, the rate on a 30-year fixed-rate mortgage was at the lowest recorded levels seen in nearly 40 years, which resulted in a booming demand for housing and also created a unique opportunity for people to gain access to just about the cheapest source of equity available (Barnes, 2007:1-2). Bram (2003:4) also acknowledges the increased demand for real estate during this time period of extremely low interest rates. According to Butler (2009:56), other supply and demand factors that contributed to the increase in house prices included: speculative behaviour by individuals who were buying to let homes, the green belt[61] and other planning restrictions kept the supply of real estate low. Immigration from the new EU members further contributed to an increased demand for real estate (Butler, 2009:56).

Bram (2003:4) found that in the two years since the recession began, more housing units have been authorized in New York City than in any other two-year period since the early 1970s. He also mentions this to be *"a remarkable feat"* given that the terrorist attack occurred in the same time period. Bram (2003:4) also states that the prices of single-family homes in New York City and surrounding areas increased at a double-digit rate since the September 11 terrorist attack. This was mainly due to the low interest rates offered by the Federal Reserve Bank of America that increased the demand for real estate. Home ownership in the United States of America increased from 65 percent of households to 69

[61] The green belt refers to areas comprising mainly out of undeveloped, wild, or agricultural land that is surrounded by neighboring urban areas and any new development of land within this boundary is prohibited by law.

percent between 1995 and 2004, representing about 4.6 million new homeowners (Butler, 2009:54). The increased demand and declining supply of property exerted upward pressure on real estate prices, which also rose sharply from their stable position in the early 1990s (Butler, 2009:54). Figure 4.6 shows the rapid increase in United States of America's real estate prices between early 2000 until 2005.

Figure 5.3: Real estate price trends in the United States of America



Source: Webber (2011:1).

According to Petroff (2007:1-2), the hopes of these mortgagors lay in price appreciation of their property they bought or were about to buy. If their property were to appreciate it would have allowed them to refinance at lower rates and take the equity out of the property for use in other spending. The increased demand for property caused prices to increase dramatically. McWhinney (2005:1) states that average real estate prices in the United States of America increased to $283,800 in mid-2000, according to data released by the Federal Housing Finance Board (FHFB). It is widely believed in the United States of America that most prospective homeowners are able to afford a mortgage on a property that costs between 2 and 2.5 times their gross annual income (McWhinney, 2005:1). With this ratio in mind it can be established that a family looking to purchase the average home of $283,800 should be earning a gross annual income of between $113,520 and $141,900. In reality though, reports by the United States of America Census Bureau state that the average

household income for 2003 (the most recent year for which data is available) was only $43,318. These numbers make it very clear that a household earning the average gross annual income of $43,318 cannot afford to purchase the average home (McWhinney, 2005:1). It did not, however, stop the below-average household from obtaining the property. Petroff (2007:2) emphasises that many mortgagors were playing an extremely risky game by *"buying houses they could barely afford."*

An increasing number of mortgagors started to look at adjustable rate mortgages (discussed in Section 5.2.2) to overcome this obstacle of affordability. Some of the reasons for the popularity of adjustable rate mortgages, as indicated by McWhinney (2005:1), are:

- Adjustable rate mortgages enable borrowers to qualify for larger loans, implying that they can buy a big house with only a small payment.
- Adjustable rate mortgages allow borrowers to pay less interest on their loan in a falling interest rate environment.
- Adjustable rate mortgages provide initial interest rates that are lower than the rates available through fixed rate mortgages.

Unfortunately, these loans have been used in an abusive fashion by less affluent borrowers to acquire property they simply could not afford during the 2001 to 2004 low interest rate period. This phenomenon was very prominent in California where some of the United States of America's most expensive real estate is located, especially in the San Francisco Bay area. More than 50 percent of the property purchased since 2003 in this region were bought with interest only mortgages (McWhinney, 2005:1).[62] With home prices soaring due to an ever increasing demand, these mortgage loans became extremely popular during the extended period of low interest rates offered by the Federal Reserve Bank of America between 2001 and 2004. Many sub-prime borrowers, sometimes based on a lender's advice, assumed unreasonable amounts of property price appreciation over the short time period, which they intended to keep the 2/28 or 3/27 adjustable rate mortgage (Nielsen, 2007:1-2).[63] These borrowers counted on future property price appreciation to pay for the costs of refinancing their mortgages in future periods, as well as allowing them to obtain future mortgages with more favourable terms based on the increased equity in their property (Nielsen, 2007:1-2).

[62] Interest only mortgages have been discussed in Section 5.2.2.
[63] 2/28 and 3/27 adjustable rate mortgages have been discussed in Section 5.2.2.

McWhinney (2005:1-2) and Nielsen (2007:1-2) pointed out that most sub-prime borrowers intended to refinance their sub-prime adjustable rate mortgage before, or at the end of the fixed interest rate period. Even though the adjustment rates are fully disclosed prior to purchase, the most crucial mistake made by sub-prime mortgage borrowers was the failure to consider the future implications of these mortgages. For instance, they did not pay attention to how the fully indexed interest rate is calculated and by how much their monthly repayments would increase once the initial fixed interest rate period expired. It is important to note that there is usually a high probability that the fully indexed interest rate will be substantially higher than the initial fixed interest rate (Nielsen, 2007:1-2). This effect can be illustrated with the following example of a $150,000 interest-only loan (five-year adjustable rate mortgage) at 6 percent interest resulting in a monthly payment of $750 (($150,000*0.06)/12 = $750). After five years, the principal would need to be repaid. Even if the interest rate remains unchanged, the payment would now increase to $966.45 a month, since the term of the loan is now only 25 years. If the original 6 percent interest rate increased by only 1 percent, the monthly payment would increase to $1,060.17 (McWhinney, 2005:1-2).

In addition, mortgagors were ignorant of the fact that these mortgages had prepayment penalties that can make refinancing very difficult and costly. A prepayment penalty is a provision in the mortgage contract requiring the mortgagor to pay a certain percentage of the mortgage's remaining principal balance or a certain number of months' interest, if the mortgage is paid off before the end of a prepayment penalty period (Nielsen, 2007:1-2). Sub-prime 2/28 and 3/27 adjustable rate mortgages contain prepayment penalty periods that are longer than the fixed interest rate period of the adjustable rate mortgage. Interest rate cap structures limit the amount by which, and the rate at which, the fully indexed interest rate can increase each interest rate adjustment period and/or over the life of the mortgage (Nielsen, 2007:1-2). Some of these loans also come with balloon maturities[64], which require a large final payment. These were big mistakes as the index, margin, interest rate cap structure and prepayment penalty are all very important aspects of the agreement (Nielsen, 2007:1-2). McWhinney (2005:1-2) also mentions that many borrowers did not take into account other expenses associated with home ownership such as the cost of heat, water and electricity.

[64] A final mortgage payment made by a mortgagor that is considerably higher than prior payments.

Many borrowers were over optimistic about the rate of home price appreciation[65] as they took out these mortgage loans. As a result mortgagors overlooked the possibility of a monthly instalment increase, if future interest rates were to increase (McWhinney, 2005:1-2). The latter would stem the rate of home price appreciation and erode home equity. Even if mortgagors were planning on refinancing their mortgage before the interest rate would adjust, they failed to foresee possible future economic conditions that might make refinancing difficult. In this case their failure to foresee that the value of their property would depreciate and their equity would decline was a major mistake since this made them unable to refinance their mortgages at lower interest rates (McWhinney, 2005:1-2 & Nielsen, 2007:1-2). They were, therefore, forced to reset their mortgages at higher rates, which many could not afford. Many homeowners were simply forced to default on their mortgages (McWhinney, 2005:1-2 & Nielsen, 2007:1-2).

The vast number of foreclosures through 2006 and 2007 triggered the crash of the sub-prime mortgage bubble, since no one was making mortgage payments to the SPVs that contained the sub-prime mortgages (Bordo, 2008:8-9). Little to no funds paid to the SPVs meant that the investors in the various risk tranches did not receive payment (Bordo, 2008:8-9). As a result originators of these tranches had to honour their financial obligations to the SPVs as they guaranteed investors payment in the event of default.[66] More and more investors grew weary of the legitimacy of the ratings assigned to the various trances and withdrew from investing further in these securities (Dodd, 2007:19). This meant that originators were not getting capital from the sales of securitized mortgages and was forced to hold on to these "bad loans". With no money coming in and billions of Dollars spent to honour their liquidity lines extended to the SPVs created a scenario where the originators became illiquid and the sub-prime crisis was born (Myddelton, 2009:108).

To summarize; investors bought tranches of the pooled mortgages contained in the SPV and obtained the monthly income stream from mortgage repayments for a once-off fee to the originators of the pooled mortgages. These tranches, although illiquid, were eagerly bought by various investors (pension funds, hedge funds, mutual funds and international governments) in the secondary markets at their market-beating interest rates. These securities offered a higher return on investment than equally rated treasury bills. As a result investors invested large amounts into various tranches. The invested funds were used by

[65] It should also be noted that an increase in home equity, as a result of home price appreciation, played a very important role in a borrower's ability to refinance on more favourable terms at a future date.
[66] As discussed in Sections 4.2 and 5.2.3.

originators to increase their sub-prime mortgage origination. Therefore, securitization has allowed for a mortgage bubble boom as originators gained more funds to sell even more mortgages, only to eventually sell them back to investors, creating a "never ending" cycle. The investors are, therefore, directly linked to the originators and the mortgagors through the process of securitization.[67] The following section will explore in more detail the role of the investors in the securitization process.

5.4 The Investors

Brunnermeier (2008:6) states that asset backed securities enjoyed popularity among many fund managers (investors) who saw these securities as a creative way to enhance their portfolio returns and to build up a good track record. In a low-interest-rate environment many portfolio managers are *"searching for yield"* and securities offered investors exceptional returns on investment prior to the crash of the mortgage bubble (Brunnermeier, 2008:7; Demyanyk, & Van Hemert, 2008:26). According to Dodd (2007:17), major buyers of prime mortgage-backed CDOs were institutional investors. These investors were prohibited by law to invest in below-investment-grade securities. Only $685 billion of the $1.1 trillion sub-prime debt, which were securitized as CDOs, could have been sold to various high-yield-seeking investors. As mentioned in Section 4.2, originators were able to attract a larger variety of investors with different risk appetites by dividing CDOs into various risk classes or tranches. The guaranteed credit lines offered to various tranches[68] allowed these tranches to carry lower risk weights, making them a very attractive proposition to investors (Alexander, 2009:89). Alarmingly these tranches carried lower risk than the mortgage loans originators were offloading to sub-prime mortgagors.[69] The practice of constantly repackaging risky loans into less risky securities inflamed the mortgage bubble boom (Alexander, 2009:89). This enabled originators to transfer the risk associated with sub-prime mortgage debt to financial markets (Dodd, 2007:17).[70]

Dodd (2007:17) states that hedge funds, the proprietary trading desks of Wall Street firms, were chasing high-yield investments and found the high risk equity tranches very attractive. The highly leveraged high risk taking trading activities may well have contributed to the mortgage bubble boom (Dodd, 2007:17). This situation is exacerbated by the non-transparent nature of hedge funds as their assets, liabilities and trading activities are not

[67] As depicted in Figure 4.4.
[68] As discussed in Sections 4.2, 5.2.3 and 5.3.
[69] See footnote number 7.
[70] As discussed in Section 5.2.3.

disclosed publicly. Dodd (2007:17) also states that typical hedge fund leverage in the purchase of high-yield tranches was as high as 500 percent. This means that $100 million in capital would be added to $500 million in borrowed funds for a $600 million investment in equity or mezzanine tranches of a sub-prime CDO. If these subordinate tranches were 20 percent of the total CDO and the other 80 percent was sold as investment-grade senior debt to institutional investors, then the $100 million in hedge fund capital allowed originators and private label CDO issuers to move $3 billion through the sub-prime mortgage market (Dodd, 2007:17).[71]

When the mortgage bubble crashed, CDOs containing sub-prime mortgages became illiquid at the same time that highly leveraged investors such as hedge funds needed to adjust positions or close losing positions. Hedge funds were, therefore, locked into damaging positions at the very time they faced margin calls for collateral from their prime brokers (Dodd, 2007:18, Bervas, 2008:129).[72] The situation was exacerbated, because without trading there was no way to determine the value of the various risk tranches as there were no market prices to serve as benchmarks. After it came to light that the underlying assets were the investment-grade-rated tranches of sub-prime mortgages, hedge funds essentially ceased purchasing asset-backed commercial paper (Barnes, 2007:4-5). As a result the CDO market and related credit derivatives markets ceased to exist. High credit ratings assigned to the investment-grade-rated tranches by credit rating agencies were once enough to satisfy investors' concerns about credit risk, but the collapse in prices of the equity and mezzanine tranches forced investors to reassess the investment-grade risk segments (Dodd, 2007:18).

Hedge funds and high-yield investors also played a crucial role in the cross-border spread of the market crash. When the prices of the lower tranches plummeted and investors could not trade losing positions, investors had to sell other assets, such as emerging market equities that contained large unrealized gains, in order to meet margin calls or to offset losses (Dodd, 2007:19; Crotty, 2008:31). Equity markets declined worldwide along with market currency values. The OTC market's lack of transparency aggravated the problem since investors suddenly became risk averse (Dodd, 2007:19; Crotty, 2008:24-25). Investors had no way of telling who was exposed to and who was not exposed to the sub-prime risk. High yield tranches attracted many non-United States of America buyers. The seizing of the asset backed commercial paper market hit Canada, seeing that the guaranteed credit lines supporting the SPV's proved to be badly written and created legal uncertainties at a critical

[71] $2.4 billion as investment-grade securities and $600 million as high yield "junk".
[72] Hedge funds borrow against the value of their assets and when those values decline, hedge funds need fresh capital or sell off assets to repay the loan, called margin payments.

time (Dodd, 2007:19). The situation was not resolved until the Central bank publicly insisted that banks honour their commitments regardless of the legalities. Several German banks that invested in the United States of America's sub-prime market required regulatory intervention. In the United Kingdom depositors made a run on Northern Rock, one of the most prestigious banks in the United Kingdom, causing it to file for bankruptcy (Dodd, 2007:19). It could, therefore, be argued that the non-transparent, excessive risk taking trading activities of institutional investors (especially hedge funds), along with their highly leveraged nature, have made institutional investors a large contributor to the creation of the mortgage bubble.

In summary; rating agencies as well as institutional investors have all been struggling in recent years to keep up with the complexity of securities. Originators were able to attract a larger variety of investors with different risk appetites by dividing CDOs into various risk classes or tranches. Since exchange traded derivatives are sold in a highly competitive market with low profit margins, originators had a strong incentive to make use of the securitization process to create products so complex that they could not be sold on exchanges. Investors relied heavily on the ratings assigned to the various tranches by the Basel appointed credit rating agencies to guide their investment decisions. Investors were prohibited by law to invest in below-investment-grade securities. The overoptimistic ratings assigned to tranches by credit rating agencies (who were the only institutions allowed to rate these tranches) allowed investors to invest in various risk tranches. Since rating agencies were also struggling to comprehend the mechanics behind these securities, it created a scenario where the blind (rating agencies) were leading the blind (investors). The high ratings given by credit rating agencies to the various tranches were a big contributing factor to the magnitude of the mortgage bubble (Crotty, 2008:21-22). Section 5.5 elaborates on the credit rating agencies contribution to the mortgage bubble boom.

5.5 Credit rating agencies

Alexander (2009:89-90) states that before the implementation of the Basel II Accord credit rating agencies only passed judgment on the creditworthiness of governments, major banks, and large companies. After the implementation of the Basel II Accord credit rating agencies were allowed to pass judgment on a vast number of CDOs and their associated tranches. The purpose of the rating agencies was to safeguard the risk categorization models and to ensure that certain tranches met the requirements of the models (Alexander, 2009:89-90). It is, therefore, evident that credit rating agencies had a regulatory and supervisory responsibility over the securitization process done by originators. As mentioned in Section

4.5.1, the whole process was sanctified by regulators under Basel II, who instated the ratings agencies as Nationally Recognized Securities Rating Organizations (NRSROs) and increasingly relied on them as the official arbiters of risk. Under the Standardized approach of Basel II it was made compulsory for originators to make use of external credit ratings to decide on the risk-weighting of assets (Bessis, 2007:43). Under the IRB approach of Basel II certain originators were allowed to make use of their own internal risk-based modeling, but only if the individual national regulator approved the system, implying that originators were effectively becoming their own regulators (Rose & Hudgins, 2005:502).[73]

The business generated for rating agencies, as a result of the expansion in securitization, led to a situation where during the peak of the mortgage bubble over 80 percent of ratings agency fees came from structured credit work paid for by originators (Alexander, 2009:89). Credit rating agencies are paid by the issuer and not by investors for their opinion, which creates a potential conflict of interest (Ashcraft & Schuermann, 2007:15; Alexander, 2009:89). Since an investor is not able to assess the efficacy of rating agency models, they are susceptible to both honest and dishonest errors on the agencies' part. Dishonest errors could be driven by the dependence of rating agencies on fees paid by the issuer (the conflict of interest) (Ashcraft & Schuermann, 2007:15). Alexander (2009:89) emphasizes that *"the very obvious conflict of interest was corrupting"* the rating process. Van Vuuren (2009a) and Crotty (2008:22-23) are both of opinion that originators received preferential treatment in the rating process. Ratings were little more than *"a very sophisticated form of advertising"* (Alexander, 2009:89). If one credit rating agency gave a realistic assessment of the high risk associated with CDOs while others did not, that firm would see its profit and market share plummet (Crotty, 2008:22). Thus, it made sense for agencies to provide excessively optimistic ratings.

In addition, originators acquired the services of more than one credit rating agency. Hence, originators would use the highest ratings received and apply those ratings to their securities (Crotty, 2008:22). Issuers of CDOs worked very closely in conjunction with rating agencies to determine the "tranching attachment points". The common objective was to ensure that tranches were always sliced in such a way that they just made an AAA rating (Eavis, 2007a:6; Brunnermeier, 2008:6). This practice may well have allowed investment banks to gain too much influence over the rating process (Eavis, 2007a:6). The risk tranching process, along with the imprimatur of the credit ratings agencies, allowed investment banks to devise securitized products that enjoyed AAA grade ratings even though the underlying

[73] Originators' method of risk modeling had to be similar to those approved under Basel II.

securities were of far lower grade (McIlroy, 2008:285). The risks involved with these securities were severely under-priced (Crotty, 2008:22).

Eavis (2007a:6) emphasizes that credit rating agencies typically fail to react quickly enough to questionable trends and new innovations. This implies that when new financial products are created, rating agencies know little about the quality of the product which is being rated. According to Van Vuuren (2009a), it is important to note that the three rating agencies (namely Fitch, Standard & Poor's and Moody's) were the only institutions allowed to rate these securities and investors had to rely on their ratings to a great extent when making their investment decisions. Crotty (2008:22-23) and Alexander (2009:89) are both adamant that if these ratings had been done by government institutions or if agencies were paid by buyers rather than sellers of CDOs, these securities would not have grown so rapidly. This shortcoming of the system became very apparent when Standard & Poor's and Moody's suddenly downgraded nearly $6 billion of sub-prime CDO tranches. Many of these sub-prime mortgages backing the CDOs were less than a year old (Eavis, 2007a:6).

Brunnermeier (2008:6) also emphasized the role credit rating agencies played in outsmarting Basel II regulations (discussed in Section 4.5.1). Basel II imposed lower capital charges on assets with a high credit rating. For example, a bank rated A or lower could repackage its loans and buy some of them (or similar assets) back as AAA rated assets and thereby save on regulatory capital charges. It is even more important to note that the process of securitization allowed originators to raise capital at a lower AAA interest rate instead of the interest rate they would have had to pay based on the bank's own significantly lower rating (Brunnermeier, 2008:6).

Credit rating agencies and the originators who issue these securities cannot conduct due diligence on the tens of thousands of mortgages (Crotty, 2008:27). This forces them to rely on simulation models to assess the risk of CDOs and their tranches, but these models are unreliable and easily manipulated (Crotty, 2008:27; Van Vuuren, 2009a). Crotty (2008:27) refers to these models as *"black boxes"*, which means that data is fed in and millions of lines of computer code predict a rating. Black boxes make it difficult to identify the variables that drive the rating model. Black boxes say very little about the stability of such ratings and they allow the agencies to change their methodologies without letting anyone know they have done it. All that needs to be done is for the credit rating agencies to modify a few lines of code to acquire a better rating. The conclusion can, therefore, be made that black boxes leave everyone in the dark (Crotty, 2008:27).

In summary; under the Basel II Accord Fitch, Standard & Poor's and Moody's were the only institutions allowed to rate the various tranches of CDOs containing sub-prime mortgage debt. Investors had to rely on their ratings to a great extent when making their investment decisions. Credit rating agencies typically fail to react quickly enough to questionable trends and new innovations. Credit rating agencies are paid by the issuer and not by investors for their opinion, which creates a potential conflict of interest. In addition, originators received preferential treatment from credit rating agencies during the rating process. As a result the risks involved with these securities, containing sub-prime mortgage debt, were severely under-priced by the credit rating agencies. Hence, the conclusion can be made that the high ratings given by credit rating agencies to the various tranches was a big contributing factor to the magnitude of the mortgage bubble boom.

5.6 Conclusion

The cheap access originators had to credit during the low interest rate period between 2001 and 2004 encouraged originators to seek higher returns by taking on risk as the 1 percent return on investment they could earn on Treasury bills was seen as very low. Various loopholes left uncovered by the Basel II Accord were exploited by the originators in order to promote their own welfare and capitalize on the mortgage boom. Originators were comfortable in increasing their sub-prime mortgage sales as they knew that Fannie Mae and Freddie Mac (and ultimately the taxpayers) would guarantee their bad mortgages.

This led originators to increase their use of securitization in order to sell more sub-prime mortgages. Mortgage originators were able to attract a larger variety of investors with different risk appetites by dividing the CDOs into various risk classes or tranches, enabling originators to move more of the sub-prime mortgage debt through the market. Hedge funds have become important sources of capital to the credit market. Unfortunately Hedge Funds channelled their funds towards the higher yielding lower tranches of CDOs contaminated with sub-prime mortgage debt.

The tranching process, along with the imprimatur of the credit rating agencies, allowed investment banks to devise securitized products that enjoyed AAA grade ratings even though the underlying securities were of far lower grade. As much as 80 percent of sub-prime bundled securities became investment grade (“A” rated or higher), due to credit rating agencies, who earned lucrative fees for their work in rating the CDOs. Investors relied heavily on the ratings given by the credit rating agencies on securities in their investment decisions. This also had a tremendous impact on the creation of the mortgage bubble.

As mentioned in Sections 1.1 and 1.2, greed played an important part in the mortgage bubble boom by the parties discussed in this chapter. Butler (2009:57), however, emphasizes that where there has been greed and incompetence on behalf of the parties discussed in this chapter, it has only been able to thrive in the *"unreal boom world"* that the United States Government and the Federal Reserve Bank of America have created.

Various political, legislative and regulatory failures by the United States Government and the Federal Reserve Bank of America over the past century have been the actual cause of the sub-prime crisis (Butler, 2009:57). Chapter six will, therefore, explore the contributions made by the United States Government and the Federal Reserve Bank of America to the mortgage bubble boom that led to the sub-prime crisis.

Chapter 6: The United States of America's Government and the Federal Reserve Bank of America

6.1 Introduction

The aim of the study is to identify and correct the mistakes made by the parties responsible for the sub-prime crisis. In chapter two the financial concepts bubbles (Section 2.2) and crashes (Section 2.3) were explained, they are the two phenomena that have created every major historical economic crisis including the sub-prime crisis. Chapter three provided an important introduction on the dot-com crash (Section 3.2) and the September 11 terrorist attack on the World Trade Centre (Section 3.3). These two events were responsible for the implementation of an expansive monetary policy by the Federal Reserve Bank of America. One of the conclusions drawn from chapter three is that the implementation of an expansive monetary policy, by the Federal Reserve Bank of America, created a platform for a mortgage bubble boom. Chapter four explored three financial concepts, namely securitization (Section 4.2), mark-to-market accounting (Section 4.3) and the Basel II Capital Adequacy Ratios (Sections 4.4 and 4.5).

The three mentioned processes along with the relevant events provided the necessary background needed to understand how the parties involved in the securitization process exploited the prolonged period of historically low interest rates to create a mortgage bubble, as discussed throughout chapter five. The crash of this mortgage bubble resulted in an economic crisis that came to be known as the sub-prime crisis. As stated in Section 5.6, greed played an important part in the mortgage bubble boom by the parties discussed in chapter five. Butler (2009:57), however, emphasizes that the parties discussed in chapter five were only able to take the actions that they have done in order to inflate the mortgage bubble as a result of the *"unreal boom world"* that the United States of America's Government and the Federal Reserve Bank of America have created. Various political, legislative and regulatory failures by the United States Government and the Federal Reserve Bank of America over the past century have been the actual cause of the sub-prime crisis (Butler, 2009:57). Therefore, chapter six will explore the contributions made by the United States Government and the Federal Reserve Bank of America to the mortgage bubble boom, which led to the sub-prime crisis, in more detail.

Chapter six will commence with a discussion on the role that the United States of America's Government played in the mortgage bubble boom in Section 6.2. The United States of

America's Government has a comprehensive regulatory and supervisory role that stretches across the entirety of the securitization process, as well as all the parties involved in the process. Section 6.3 explore the contribution made by the Federal Reserve Bank of America to the mortgage bubble boom. As mentioned in Section 3.3 the Federal Reserve Bank of America's actions have been described as one of the largest contributing factors to the sub-prime crisis (Eavis, 2007a:7; Booth, 2009:35; Butler, 2009:51; Greenwood, 2009:37; Schwartz, 2009:49). Section 6.4 will provide a conclusion of chapter six.

6.2 The United States of America's Government

Smith (2007a:1-2) states that the United States of America's Government played an extremely influential role in the creation of the sub-prime crisis and that their contribution to the crisis can be traced back to the last great financial crisis, being the 1930s Great Depression. Also, Smith (2007a:1-2) emphasizes that since the Great Depression the creation and liberalization of various acts by United States of America's Government has set the onslaught of sub-prime mortgage lending in motion.

Butler (2009:51-52) states that the United States of America's Government developed the modern mortgage in 1934. Mortgages were intended to increase homeownership in the United States of America in the aftermath of the 1930s Great Depression. The availability of credit was tight, mortgage loans were hard to obtain, houses were not selling and the building industry was collapsing. Government's focus was to revive the market and boost lenders' confidence by creating a mortgage program that minimized the required down payment, thereby increasing the amount that potential homeowners could borrow (Butler, 2009:51-52). Before the creation of this mortgage program a 50 percent down payment was required to purchase a home. In the aftermath of the 1930s Great Depression various new agencies were created, namely Fannie Mae[74] and the Federal Housing Administration (FHA). Fannie Mae effectively insured mortgages as they were prepared to buy mortgages from originators and the FHA insured originators' mortgage risk against default (Rose & Hudgins, 2005:279; Dodd, 2007:16; Butler, 2009:52). By buying mortgages outright and holding them as a portfolio, Fannie Mae acquired the credit risk, market risk, and liquidity risk (Dodd, 2007:16).[75] Fannie Mae was also in a much better position than depository institutions to deal with market and liquidity risks, because it could borrow longer term. Fannie Mae was

[74] See footnote number 21.
[75] It is interesting to note that the concept of securitization has its origin within the residential mortgage market of the United States of America. Fannie Mae, Freddie Mac and the Government National Mortgage Association were the three institutions that began securitizing mortgage pools as discussed in Section 4.2 (Rose & Hudgins, 2005:279-280).

also better able to manage credit risk, because it held a mortgage portfolio that was diversified nationwide, something that could not be done by some of the largest banks due to regulatory limits on interstate banking (Dodd, 2007:16). Beenstock (2009:65) and Butler (2009:52), however, emphasize that these federal guarantees actually transferred risk from the originators (principally the Savings & Loan (S&L) institutions) to the United States of America taxpayer as it is the taxpayers' money that would ultimately have to cover any losses realized.[76] In addition to the creation of Fannie Mae, various other acts introduced by the United States of America's Government set the onslaught of sub-prime mortgage lending in motion. Some of the most relevant acts include the following:

- The Glass-Steagall Act of 1933: This act allowed the Federal Reserve Bank of America to set limits on the rates that banks could pay their depositors (known as Regulation Q). S&Ls were also restricted to long-term mortgage business. Hence, they were in a potentially risky position of being committed to financing 30-year mortgage loans while their depositors were able to move their deposits at short notice, creating a negative liquidity gap (Butler, 2009:52).[77] In the late 1960s and 1970s volatile and steep increases in interest rates meant the S&Ls did indeed face difficulties as depositors were able to take their funds out of these institutions and place them into higher-rate savings instruments elsewhere. Congress deregulated the Glass-Steagall Act, but it was done too late as most of the S&Ls were technically insolvent by the early 1980s. By 1995 the number of S&Ls had declined by 50% to only 1,645 institutions (Butler, 2009:52). Losses incurred were addressed by two other 1930s government creations, which include the Federal Deposit Insurance Corporation (FDIC) and the Federal Savings & Loan Insurance Corporation (FSLIC), at a cost of $150 billion to United States of America taxpayers (Butler, 2009:52). The Glass-Steagall Act was seen as a failure seeing that the mortgage market started to malfunction due to the long list of government intervention associated with this act (Kay, 2009:181). Some of the problems encountered with the Glass-Steagall Act included: restricted competition; regulation which prevented institutions from adapting to market conditions; bad business decisions and bad loans which were being underwritten by taxpayers (Butler, 2009:52).

- The Community Reinvestment Act of 1977: Gordon (2008:1-2), Smith (2007a:1-2) and Butler (2009:53) explain that the act, signed by President Jimmy Carter on 13 October 1977, outlawed the practice of "redlining" (the process of discriminating in selling or renting real estate in certain areas of a neighbourhood). Originators would simply refuse

[76] As discussed in Section 1.1.
[77] See Section 5.2.3 for a discussion on a negative liquidity gap.

mortgages to borrowers in poor residential areas, as they were perceived to be high risk mortgagors. After the introduction of the Community Reinvestment Act, originators were expected to conduct unbiased business across all of the geographical areas they served. In 1995 the United States of America's Government implemented further changes to the Community Reinvestment Act (Butler, 2009:53). Under the revised version, originators, in making their lending decisions, were forced to ignore most of the traditional criteria borrowers have to meet in order to be deemed creditworthy. Some of the criteria that were eliminated included: the verification of an applicant's income and an applicant's saving history (Butler, 2009:53-54). An applicant participating in a credit counselling programme had to be labelled as being credit worthy as this was seen as proof of an applicant's ability to manage their mortgage (Butler, 2009:53-54). It can, therefore, be argued that originators were forced by government, through the Community Reinvestment Act and the revised Community Reinvestment Act, to lend to people who they knew were high risk mortgagors. With creditworthiness no longer seen as a requirement for obtaining a mortgage, the number of sub-prime loans began to increase dramatically (Butler, 2009:53-54). Real estate mortgages have grown from 15% of their net wealth in 1949 to 41% in 2001 (Tirole, 2008:56). This was mainly as a result of various factors, such as financial innovation, increased risk taking through high loan-to-value ratios, teaser rates, a lack of refinancing penalties and changes in legislation favouring home ownership (Tirole, 2008:56).

- The Home Mortgage Disclosure Act (HMDA) of 1975: According to Butler (2009:53), the purpose of the HMDA of 1975 was to insure that originators complied with the Community Reinvestment Act. The HDMI impelled originators to provide detailed reports about whom they lent to. Together with the HMDA, the ACORN (Association of Community Organizations for Reform Now) monitoring group was also created (funded by taxpayers) to assist in monitoring originators' performance on the Community Reinvestment Act rules.

- The Deregulation and Monetary Control Act of 1980: Smith (2007a:1-2) states that this act made it possible for originators to charge higher interest rates to mortgagors with low credit scores[78] (These mortgagors were not seen as prime borrowers).

- The Alternative Mortgage Transaction Parity Act of 1982: According to Smith (2007a:1-2), this act permitted the use of adjustable rate mortgages and balloon payments.[79]

[78] Credit scores were discussed in Section 5.2.

- The Tax Reform Act of 1986: According to McWhinney (2011:1) and Smith (2007a:1-2), the Tax Reform Act of 1986 eliminated the interest deduction for consumer loans, but kept the mortgage interest deduction. This implies that individuals that obtained a home through a mortgage are able to gain an asset and reduce the amount of tax they are paying at the same time. Mortgage interest can only be deducted from United States of America's federal taxes. In addition, McWhinney (2011:2) states that a mortgagor that qualified for the deduction, based on the criteria outlined above, cannot make the deduction unless the mortgage is classified as secured debt. This implies that the home must serve as collateral for the debt. If the mortgage is classified as unsecured debt, the mortgage will not be deemed as a mortgage, but rather as a personal loan, and the interest cannot be deducted (McWhinney, 2011:2). Furthermore, McWhinney (2011:1-2) states that there are two types of debt that generate tax-deductible interest. The first being debt taken out in order to buy, build or improve a home. This type of debt is known as "acquisition debt". The second type is debt taken out for reasons other than to buy, build or improve a home. This type of debt is known as "equity debt", since it draws on the equity of a property. Between the two types of debt a mortgagor can take out $1.1 million in debt and deduct the full amount of mortgage interest, provided that all mortgages fit into one of the following three categories, as indicated by McWhinney (2011:1-2):

    - Pre-October 13, 1987, Debt: If a mortgagor took out a mortgage prior to this date, the mortgagor can deduct the full amount of all interest paid. Mortgages taken out prior to October 13, 1987, are referred to as "grandfathered debt".

    - Post-October 13, 1987, Debt: Interest on a mortgage taken out to buy, build or improve a home after October 13, 1987, may be fully deducted. This, however, may only be deducted if the total debt from all mortgages, including any grandfathered debt, amounts to $1 million or less for married couples and $500,000 or less for single persons or married couples filing separate returns.

    - Home Equity Debt Post-October 13, 1987: Mortgages taken out after October 13, 1987, for reasons other than to buy, build or improve a home must total $100,000 or less for married couples and $50,000 or less for single persons or married couples filing separate returns. The mortgages must also total less than the fair

[79] Adjustable rate mortgages and balloon payments were discussed in section 5.2.1 and 5.2.2.

market value of a house minus the value of all "grandfathered debt" and all post-October 13, 1987, mortgage debt.

The Tax Reform Act concludes the discussion on the various acts implemented by the United States of America's Government that set the onslaught of sub-prime mortgage lending in motion. To summarize; the above mentioned Acts have gradually weakened mortgage lending standards originators had to adhere to. The end result of these various acts created a mortgage bubble boom that led to the sub-prime crisis of 2007. Section 6.2.1 examines additional actions taken by government that have contributed to the mortgage bubble boom.

6.2.1 Actions taken by the United States of America's Government

Schwartz (2009:46) states that even more pressure from Congress was exercised in the form of new legislation, which was implemented in 1992. This legislation forced the GSEs, Fannie Mae and its younger twin Freddie Mac, to devote more effort to meeting low- and moderate-income home ownership goals. A total of 42 percent of Fannie Mae and Freddie Mac's mortgage financing had to be for borrowers with incomes below the median income in their area (Schwartz, 2009:46).[80] A required 12 percent of all mortgages purchased by Fannie Mae and Freddie Mac had to be "special affordable" loans.[81] The 42 percent target increased to 50 percent in 2000 and 52 percent in 2005. The 12 percent "special affordable" loans target increased to 20 percent in 2000 and 22 percent in 2005. The 2008 goal was to be 28 percent. These yearly goals were to be met by end of 2005 (Schwartz, 2009:46).

Furthermore, Fannie Mae and Freddie Mac also funded hundreds of billions of Dollars' worth in mortgages. Many of these mortgages were to sub-prime mortgagors and in the form of adjustable rate mortgages. These mortgages were granted to mortgagors who bought houses with less than 10 percent deposit (Schwartz, 2009:46). Fannie Mae and Freddie Mac were also important contributors to the demand for sub-prime securities as they purchased billions of sub-prime securities for their own portfolios to make profits and help satisfy the department of Housing and Urban Development's (HUD) affordable-housing goals (Schwartz, 2009:46). Butler (2009:54) states that Freddie Mac developed the process of securitizing "bad loan" packages and selling these "bad" debts to investors around the world. The securitization of mortgages expanded after 1995 while Fannie Mae and Freddie Mac profited immensely from this practise. In addition, Fannie Mae and Freddie Mac were merely

[80] This target was set by the department of Housing and Urban Development (HUD) in 1996.
[81] These are loans to mortgagors with incomes less than 60 percent of their area's median income.

passing most of the risk on to the taxpayers (Butler, 2009:54). As the mortgage bubble crashed the United States of America's Government had to step in to restore liquidity in financial markets. Taxpayers' funds were used to restore liquidity in financial markets (Butler, 2009:54-55; Kay, 2009:181). Hence, the conclusion can be made that government regulation and intervention induces moral hazard within the banking sector (Alexander, 2009:90; Beenstock, 2009:66).

This concludes the discussion on the contribution made by the United States of America's Government. In summary; the 1992 legislation that forced Fannie Mae and Freddie Mac to devote more effort to meeting low- and moderate-income home ownership goals has allowed for a boom within the mortgage market. In addition, the moral hazard created by United States of America's Government has allowed for originators to become less risk averse in their mortgage lending and securitization activities. As a result these actions contributed greatly to the mortgage bubble boom. As mentioned in section 6.1, the Federal Reserve Bank of America is the second party that have allowed the various parties discussed in chapter five to inflate the mortgage bubble to the point where a crash was inevitable. It is important to distinguish between the United States of America's Government and the Federal Reserve Bank of America as they are two separate bodies (Rose & Hudgins, 2005:58; Kiyosaki, 2009:23). The Federal Reserve Bank is an independent institution that produces the currency of an entire nation. The role of the central bank is to regulate interest rates and inflation (Rose & Hudgins, 2005:58; Kiyosaki, 2009:23). The expansive monetary policy implemented by the Federal Reserve Bank of America in the aftermath of the dot-com crisis and the September 11 terrorist attack on the World Trade Centre[82] has been described as one of the largest contributing factors to the sub-prime crisis (Eavis, 2007a:7; Booth, 2009:35; Butler, 2009:51; Greenwood, 2009:37; Schwartz, 2009:49). Section 6.3 will, therefore, explore the expansive monetary policy implemented by the Federal Reserve Bank of America.

6.3 The Federal Reserve Bank of America

According to Rose and Hudgins (2005:58) and Kiyosaki (2009:23), the Federal Reserve Bank of America is a private entity that regulates the money supply (inflation) and the federal funds interest rate of the United States of America, free from any form of government intervention. The Federal Reserve Bank of America implements monetary policy mainly

[82] The expansive monetary policy implemented by the Federal Reserve Bank of America in reaction to financial turbulence in the aftermath of the dot-com crisis and the September 11 terrorist attack on the World Trade Centre has been discussed in Section 1.2 and chapter three.

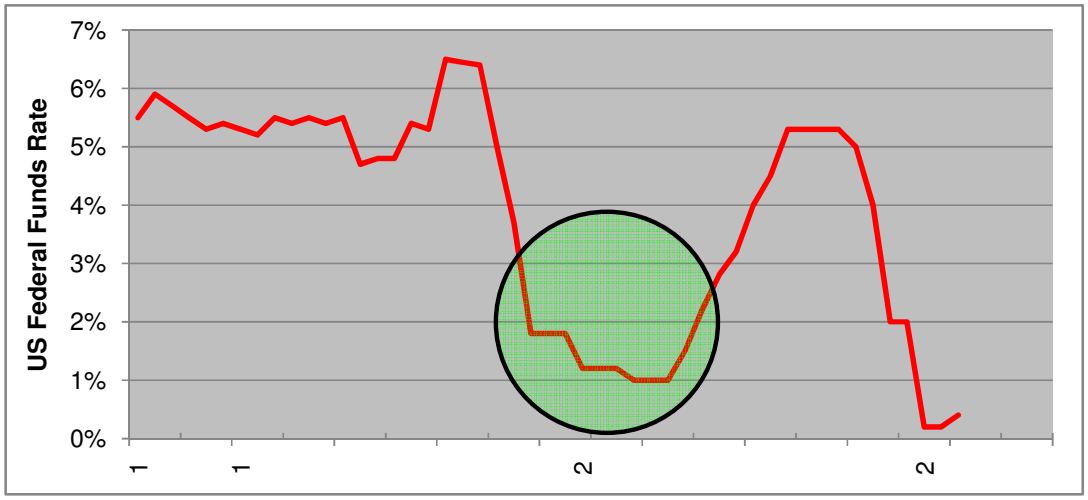
through setting a federal funds interest rate target and a primary credit rate (formerly known as the discount rate) (Tatom 2008:1). The federal funds interest rate is the rate at which depository institutions (banks) borrow or lend funds held in their deposit accounts at the Federal Reserve Bank of America (Tatom 2008:1). There are 12 districts into which the Federal Reserve System is divided into. Each of the 12 districts has its own Federal Reserve Bank of America (Rose & Hudgins, 2005:58). Seeing that the Federal Reserve Bank of America regulates inflation and interest rates, the assumption can be made that the Federal Reserve Bank of America, therefore, has a big regulatory and supervisory purpose to serve in order to maintain a sound and healthy economy. The Federal Reserve Bank of America also acts as a lender of last resort if banks are unable to honour their financial commitments. Bessis (2007:27-29), however, states that even though the Federal Reserve Bank of America acts as a lender of last resort, the burden in fact falls on the shoulders of the tax payers. This usually only happens if banks are in a position where they are unable to honour financial commitments. As depicted in Figure 4.4, the Federal Reserve Bank of America is linked to the originating institutions, seeing that the originators borrow funds from the Federal Reserve Bank of America and repays that loan at interest back to the Federal Reserve Bank of America. With the borrowed funds originators proceed to extend loans to, for instance, mortgagors and the mortgagors repays the originators at interest. Section 6.3.1 examines the effect the expansive monetary policy implemented by the Federal Reserve Bank of America has had on the mortgage bubble boom.

6.3.1 The Federal Reserve Bank of America's expansive monetary policy

The Federal Reserve Bank of America implemented an expansive monetary policy in the aftermath of the dot-com crisis and the September 11 terrorist attack on the World Trade Centre.[83] As a result the Federal Reserve Bank of America began cutting the federal funds interest rate dramatically during 2001 and by 2003 the federal funds interest rate decreased from 6.25 percent to a mere 1 percent (seen in Figure 6.1) (Barnes, 2007:1-2; Butler, 2009:55). Schwartz (2009:45), Fisher (2008:30), and Eavis (2007a:7) emphasize that the federal funds interest rate was too low for too long between 2001 and 2004. Hence, the reduction of interest rates provided capital liquidity between 2001 and 2004 (Petroff, 2007:1). The goal of a low federal funds interest rate was to expand the money supply and encourage borrowing, which it was argued, should then stimulate spending and investing. The strategy implemented by the Federal Reserve Bank of America proved to be successful and the United States of America's economy steadily began to strengthen in 2002 (Barnes, 2007:2).

[83] See footnote number 82.

Figure 6.1: Interest rates in the United States of America from 1995 to 2009



Source: Federal Reserve Bank of New York (2009).

It is also interesting to note that long-term interest rates have been on the decrease for the past 15 years and that this is a worldwide phenomenon (Eavis, 2007a:7). It is important to note the extremely low interest rates offered by the Federal Reserve Bank of America. The expansive monetary policy has been one of the main drivers behind the housing market boom. The cheap access originators had to credit during the low interest rate period between 2001 and 2004 encouraged originators to seek higher returns by taking on risk as the 1 percent return on investment they could earn on Treasury bills was seen as very low (Crotty, 2008:3). Originators were comfortable in increasing their sub-prime mortgage sales as they knew that Fannie Mae and Freddie Mac (and ultimately the taxpayers) would guarantee bad mortgages. This led originators to increase their use of securitization in order to sell more sub-prime mortgages.[84]

Eavis (2007a:7) states that the federal funds interest rate decisions, taken by the Federal Reserve Bank of America, indicate that Alan Greenspan chose to use the housing market as his main instrument to stimulate the economy after the September 11 terrorist attack on the World Trade Centre. By making use of monetary policy as a means to encourage an increase in home prices would be a highly unorthodox move for a central bank. Evidence suggests that Greenspan was overly keen to use housing for exactly that reason (Eavis, 2007a:7). In 2002 Alan Greenspan called mortgage markets a powerful stabilizing force, since they allowed people to extract equity from their homes. Later in 2004 Greenspan said

[84] As discussed in Sections 1.2 and 5.2.

that homeowners should consider using adjustable-rate mortgages to save on interest and prepayment costs. In 2005, when a record $625 billion in sub-prime mortgages were created, Greenspan gave a speech that praised the creation of new loan products, including sub-prime home loans (Eavis, 2007a:7). The Federal Reserve Bank of America was slow in tightening monetary policy, delaying doing so until June 2004. The Federal Reserve Bank of America increased the federal funds interest rate by 25 basis points on a monthly basis from June 2004 until August 2006 (Schwartz, 2009:45). Unfortunately, the low interest rates resulted in excessive borrowing and lending practices that in itself created a mortgage bubble with continuing increases in real estate prices (Butler, 2009:55; Eavis, 2007a:7).

To summarize; the expansive monetary policy was implemented by the Federal Reserve Bank of America between 2001 and 2004 in fear of deflation and a global savings binge. This was as a result of the earlier financial turbulence in the aftermath of the dot-com crisis and the September 11 terrorist attack on the World Trade Centre. The lengthy period of extremely low interest rates resulted in inevitable inflationary pressures. The mortgage bubble boom and, therefore, also the sub-prime crisis was induced by the tightening of the federal funds interest rate in reaction to escalating inflationary pressures. Hence, the conclusion can be made that the expansive monetary policy implemented by the Federal Reserve Bank of America was one of the biggest contributing factors to the sub-prime crisis.

In addition, Sections 1.1 and 1.2 emphasises that all economic crises over the past century, including the sub-prime crisis, all have one glaring characteristic in common. This being that they have all been the result of financial market booms that occurred in environments of low inflation, rising real GDP growth and low policy real interest rates (Bordo & Wheelock, 2007:115). As booms progress, inflationary pressures build up and central banks inevitably tighten policy rates, thus contributing to the ensuing crash (Bordo & Wheelock, 2007:115).

As discussed in Section 6.3, the Federal Reserve Bank of America is a private entity that regulates inflation (the money supply) by adjusting the federal funds interest rate. The Federal Reserve Bank of America, therefore, regulates both factors that played a role in the creation of every major economic crisis experienced in the United States of America over the past century. Hence, Section 6.3.2 will explore how the Federal Reserve Bank of America have been fostering conditions for financial market booms through the implementation of expansive monetary policy that leads to inflationary pressures.

6.3.2 The correlation between inflation and historic economic crises

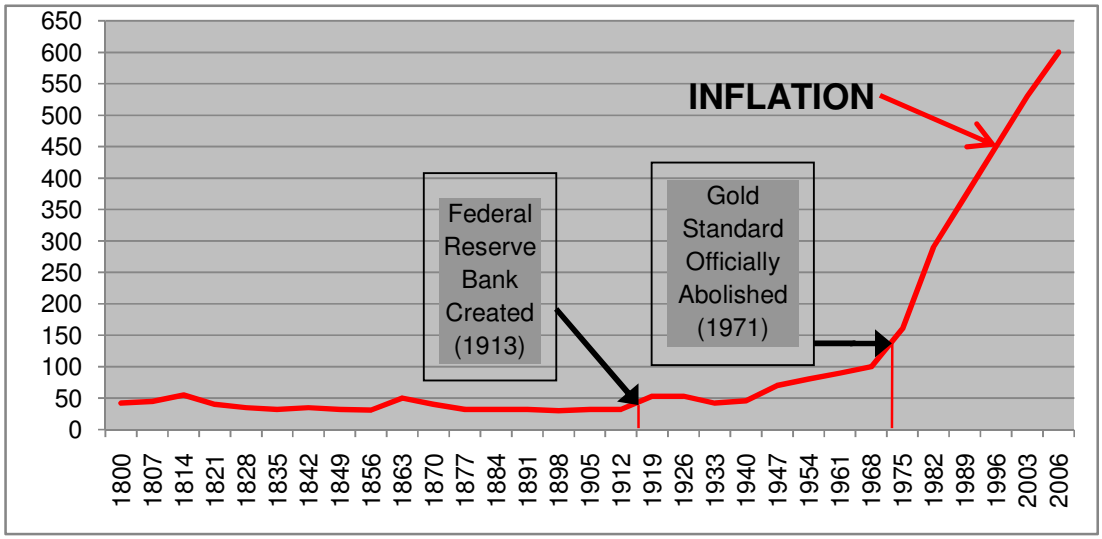
As discussed in Sections 1.1 and 6.3.1, economic crises of all types over the centuries followed a similar pattern. This being that they have all been the result of financial market booms that occurred in environments of low inflation, rising real GDP growth and low policy real interest rates (Bordo & Wheelock, 2007:115). As these booms progresses, inflationary pressure builds up and central banks inevitably tighten their policy rates contributing to the ensuing crash (Bordo & Wheelock, 2007:115). The question can, therefore, be posed that if economic crises all follow the same pattern, why is it that the same mistakes are being made over and over again? Secondly, why does central banks, who have the responsibility to regulate inflation by means of policy interest rates, allow these booms to progress to a point where it is bound to result in a recession once they start addressing the situation by increasing interest rates? In light of the abovementioned questions the following discussion will focus mainly on the Federal Reserve Bank of America. The Federal Reserve Bank of America is responsible for the printing of the Dollar currency and controls inflation by means of managing the supply of money to the economy and by using interest rates to curb inflationary pressures (Rose & Hudgins, 2005:58; Kiyosaki, 2009:23). In this section particular attention would be paid on how inflation is controlled by the Federal Reserve Bank of America.

The only thing giving the Dollar value, or any other currency for that matter, is how much of that currency is in circulation in the economy. A currency will be diluted with every new bill printed and circulated throughout an economy (Griffin, 2003:12-15; Rose & Hudgins, 2005:57-59). As more money is printed and loaned, more interest is earned in the process. By weakening the currency in this way gives rise to the phenomenon called inflation, which is the appearance of rising prices (Griffin, 2003:12-15). Griffin (2003:12-15) emphasises the word "appearance" since the reality is that prices are not increasing at all, but it is rather the value of the Dollar that is falling. It is important to note that before the removal of the Gold Standard[85] a one Dollar bill was backed by gold, where on the bill itself it stated that the Dollar bill was “redeemable in gold”. After the Gold Standard was completely abolished by President Richard Nixon in 1971, a one Dollar bill stated that it is “legal tender”, which means it is basically worthless paper, backed by nothing (Kiyosaki, 2009:220; Wood, 2010:1-3). If the Dollar was backed by gold, or anything tangible that could not just be created out of thin air, then prices would have remained stable over a long period of time,

[85] Under the Gold Standard Act the Dollar reflected the price of gold and could be converted into gold. After the removal of the Gold Standard the Dollar was unpegged from the gold price and could no longer be converted into gold (Kiyosaki, 2009:220).

which implies that inflation would remain rather constant (Griffin, 2003:12-15; Kiyosaki, 2009:220). Figure 6.2 indicates how inflation remained constant under the Gold Standard and how inflation boomed after the elimination of the Gold Standard.

Figure 6.2: Inflation trend in the United States of America from 1800 to 2006



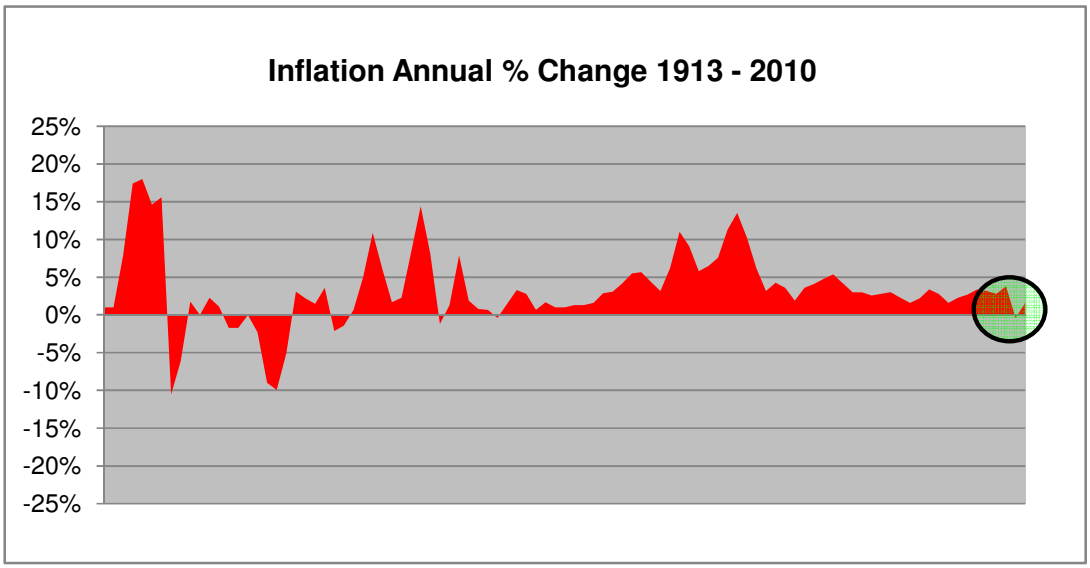
Source: United States of America's department of labour: bureau of labour statistics (2011).

Kiyosaki (2009:220) refers to the elimination of the Gold Standard as one of the *"biggest financial events in world history."* After the removal of the Gold Standard the Dollar no longer had to reflect the gold price. After the removal of the Gold Standard there was no limit on the amount of Dollar bills that could be printed, which previously had to reflect the gold reserves held by the United States of America. This freedom to print money at will is the main reason for an ever growing inflation rate (Kiyosaki, 2009:220). Money is not created until the instant it is borrowed. It is only due to the act of borrowing that new money comes into existence (Griffin, 2003:12-15). This new money gets loaned to banks who in turn lend it to the public. The borrowers of the money then have to pay the banks interest on the loaned amount and the banks repay the Federal Reserve Bank of America interest back on their loaned amount (Griffin, 2003:12-15). This money was created out of nothing and yet the banks are collecting interest on it, which implies that they are in essence collecting interest on nothing (Salerno, 1982:1; Griffin, 2003:12-15).

Salerno (1982:1) and Griffin (2003:12-15) question the morality behind this concept of being able to collect interest on nothing. As a result of this expansion and contraction of credit

money, in order to regulate inflation, the economy moves like a saw tooth. The economy gradually follows a bull market trend for an extended period of time that seems as if the growth will continue forever. This is, however, not the case as the growth inevitably declines and does so very rapidly when the economy begins to contract. The decline in growth will persist until the economy turns and start with the next long bull market climb (Griffin, 2003:12-15). This "saw tooth" trend is depicted in Figure 6.3. The highlighted area, as seen in Figure 6.3, indicates the decreasing inflation rate in the aftermath of the mortgage bubble crash as a result of the tightening of the federal funds interest rate. The tightening of the federal funds interest rate was necessitated by escalating inflationary pressures during the mortgage bubble boom.

Figure 6.3: United States of America's inflation rate during the period 1913 to 2010



Source: United States of America's department of labour: bureau of labour statistics (2011).

As the economy enters a bear market and interest rates start to increase to curb inflation most people start to struggle to repay their debt and lose their assets in the process. Griffin (2003:12-15) states that banks lend credit money to the public that was printed out of thin air. Not only do the public have to pay interest on these loans, but they also stand a chance to lose their assets that they had to pledge as collateral, should they be unable to repay their debt. This is exactly what happened during the sub-prime crisis as it followed the classic historical pattern associated with all other previous economic crises.

To summarize; financial market booms occurred in low inflation and low policy real interest rate environments. The crash in financial markets have been the result of increases in policy rates by central banks as a result of building inflationary pressures during boom periods, as depicted in figure 5.2. The “saw tooth” pattern associated with the global economy is, therefore, a creation of central banks as they are in control of regulating inflation and interest rates. Central banks around the world have seen it all and although all the warning signs were present during the sub-prime mortgage boom, the Federal Reserve Banks’ tightening of their loose monetary policy resulted in the inevitable crash of the mortgage bubble. Once again, the sub-prime crisis follows the same pattern as all economic crises over the last century. Central banks have, therefore, been involved in the creation of every major economic crisis in history through the implementation of monetary policy. Seeing that there are no other similarities between the various economic crises that occurred over the past century the conclusion can be made that central banks have been fostering conditions for financial market booms through the implementation of an expansive monetary policy. This raises some alarming questions as to the effectiveness of the Federal Reserve Bank of America, since it was created in 1913. It makes little sense to address the mistakes made by the various parties involved in the formation of the sub-prime mortgage bubble if central banks are left to continue creating conditions that may ignite financial market booms. It is, therefore, recommended that further research be conducted to determine the reasons why the Federal Reserve Bank of America has been so influential in creating all of the major economic crises experienced over the past century. Section 6.4 will provide a conclusion on chapter six. Thereafter chapter seven will present policy recommendations and a summary for the study.

6.4 Conclusion

Various acts and legislation imposed by the United States of America’s Government over the past century have gradually created a platform for a boom in the mortgage market (discussed in Section 6.2). Furthermore, legislation imposed in 1992 forcing Fannie Mae and Freddie Mac to devote more effort to meeting low- and moderate-income home ownership goals has allowed for a boom within the mortgage market (discussed in Section 6.2.1). The moral hazard created by United States of America’s Government has allowed for originators to become less risk averse in their mortgage lending and securitization activities. As a result these actions contributed greatly to the mortgage bubble boom. The sub-prime crisis stem predominantly from the United States of America’s Government and the Federal Reserve Bank of America’s intervention and /or lack thereof.

The Federal Reserve Bank of America was the second entity discussed in chapter six (Section 6.3). The Federal Reserve Bank of America is an independent institution that produces the currency of the entire nation. The role of a central bank is to regulate interest rates and inflation. The expansive monetary policy implemented by the Federal Reserve Bank of America in the aftermath of the dot-com crisis (Section 3.2) and the September 11 terrorist attack on the World Trade Centre (Section 3.3) resulted in inevitable inflationary pressures. The mortgage bubble crash and, therefore, also the sub-prime crisis was induced by the tightening of the federal funds interest rate in reaction to the escalating inflationary pressures during the mortgage bubble boom. Hence, the expansive monetary policy implemented by the Federal Reserve Bank of America between 2001 and 2004 can be described as one of the largest contributing factors to the sub-prime crisis.

This concludes the discussion on the contributions made by the United States of America's Government and the Federal Reserve Bank of America to the mortgage bubble boom that led to the sub-prime crisis. Chapter seven will present policy recommendations and a summary for the study.

Chapter 7: Recommendations and Summary

7.1 Introduction

The primary objective of the study is to assess the mistakes made by the various parties responsible for the creation of a mortgage bubble in order to make policy recommendations to prevent a recurrence of the events that led to the sub-prime crisis. The secondary objectives are as follows:

- Determining the relevant role-players and processes responsible for the sub-prime crisis (chapters four, five and six);
- Determining how the actions of the relevant role-players inflated the mortgage bubble (chapters five and six); and
- Determining the correlation between historic banking crises and the sub-prime crisis (Section 6.3.2).

The secondary objectives have been reached throughout the study. Section 7.1 will firstly provide a brief summary of what has been discussed in the study thus far. Thereafter policy recommendations and a summary for the study will be provided in Sections 7.2 and 7.3, respectively. The study commenced with a discussion on historic economic crises as well as an introduction on the sub-prime crisis in chapter one. This was followed by an explanation of the financial concepts of bubbles and crashes. These two concepts have created every major historical economic crisis, including the sub-prime crisis.

Chapter three gave an important introduction on the dot-com crash and the September 11 terrorist attack on the World Trade Centre. These two events were responsible for the implementation of an expansive monetary policy by the Federal Reserve Bank of America. One of the conclusions withdrawn from chapter three is that the implementation of an expansive monetary policy, by the Federal Reserve Bank of America, created a platform for a mortgage bubble to form.

Chapter four explored three financial concepts, namely securitization, mark-to-market accounting and the Basel II Capital Adequacy Ratios. The three mentioned processes along with the relevant events provided the necessary background needed to understand how the parties involved in the securitization process exploited the situation during a prolonged period of historically low interest rates to create a mortgage bubble. The crash of this

mortgage bubble resulted in an economic crisis that came to be known as the sub-prime crisis.

Chapter five explored the roles played by the originators, mortgagors, investors and credit rating agencies in the mortgage bubble boom. However, the parties discussed in chapter five were only able to take the actions that they have taken to inflate the mortgage bubble as a result of conditions created by the United States of America's Government and the Federal Reserve Bank of America.

Chapter six explored the contributions made by the United States Government and the Federal Reserve Bank of America to the mortgage bubble boom. Various political, legislative and regulatory failures by the United States Government and the Federal Reserve Bank of America over the past century have been one of the largest contributing factors to the sub-prime crisis. The conclusion withdrawn from chapter six was that the Federal Reserve Bank of America's actions has most likely been the largest contributing factor to the sub-prime crisis.

The aim of this study is to identify the causalities of the sub-prime crisis as well as to provide policy recommendations on how to avoid a recurrence of such banking crisis in the future. Thus far the most relevant parties responsible for the sub-prime crisis and their actions have been discussed. Section 7.2 will now provide policy recommendations on how to avoid a recurrence of such banking crisis in the future. Thereafter, Section 7.3 will provide a comprehensive summary on the study.

7.2 Recommendations

As mentioned in Section 7.1, in order to reach the objective of the study, Section 7.2 will now provide policy recommendations aiming to address and resolve the most significant problems with regards to the processes and relevant role players involved in creating the sub-prime crisis. The three relevant processes that have played a critical role in the mortgage bubble boom, as discussed in chapter four, are:

- Securitization (Section 4.2);
- Mark-to-market accounting (Section 4.3); and
- The Basel II Accord of the Basel Bank for International Settlements (Section 4.5).

The relevant role-players during the sub-prime mortgage origination process that have contributed to a mortgage bubble boom, as discussed in chapter five, are:

- The mortgage originators (Section 5.2);
- The mortgagors (Section 5.3);
- The investors (Section 5.4); and
- Credit rating agencies (Section 5.5).

The contributions made by the two authority figures to the mortgage bubble boom, as discussed in chapter six, are:

- The United States of America's Government (Section 6.2); and
- The Federal Reserve Bank of America (Section 6.3).

7.2.1 Securitization

As mentioned in Section 4.2.1, the securitization of assets has many eminent virtues and as such is not inherently a hazardous financial innovation. The problem is not with securitization itself, but rather with the quality of the assets being securitized. Securitization can be beneficial to financial stability through the diversification of risk. It can also be the cause of widespread contagion of toxic securities if the risks involved with the securitized assets have been under-priced, as was the case with the sub-prime crisis. It is essential for stability in financial markets that the risks involved with the assets about to be securitized are calculated and priced accurately.

Hence, the recommendation would be to address the parties who are involved with the securitization of assets in order to insure that securitization is not misused, as was seen with the sub-prime crisis. The two most relevant parties involved during the securitization process are the originators and the credit rating agencies. Recommendations on how to avoid a future recurrence of their mistakes will be discussed in Sections 7.2.4 and 7.2.7, respectively. Mark-to-market accounting, which is used to price securities is another problem area that impinges on the safe usages of securitization. It is, therefore, important to address the problems identified with mark-to-market accounting experienced during the mortgage bubble boom. Section 7.2.2 will provide recommendations as to how these problems can be rectified.

7.2.2 Mark-to-market accounting

As with securitization, mark-to-market accounting can still be used effectively to price securities. Once again emphasis is placed on the non-transparent and complex nature of CDOs that have contained sub-prime mortgage loans. Investors relied heavily on the ratings assigned by credit rating agencies to the various tranches of CDOs.[86] As mentioned in Section 5.5, credit rating agencies could not come to grips with the complexity of the structured products and as a result the risks involved were under-priced. The high ratings assigned to the various tranches of CDOs were met with positive market sentiment reflecting little relation to reality.

The importance of banks' assets being valued more in line with the actual value of the assets being securitized cannot be stressed enough. Financial markets do not function normally if an accurate price cannot be assigned to the assets, which a potential investor adds in his portfolio. Since mark-to-market accounting makes use of market sentiment to value its assets it is of the utmost importance that the risk exposures associated with the assets, being securitized are accurately calculated.[87] This can be achieved through the standardization of securitised products. Market sentiment will reflect more realistic pricing of securities if the risks involved with the securitized assets are calculated correctly.

7.2.3 Basel Bank for International Settlements

In order to cushion the pro-cyclical[88] nature of the Basel II capital requirements[89] during a market downturn, regulatory capital discounts given to AAA rated borrowers should be reduced. This reduction will allow for smaller and more modest increases in the bank's capital requirements during credit rating downgrades.

The minimum 8 percent[90] regulatory capital requirement under Basel II should be increased. The increase will act as a capital buffer and will better protect banks from any immediate danger of crossing the minimum regulatory capital threshold in the event of a sudden market downturn.

[86] See Sections 5.4 and 5.5.
[87] See Section 4.3.
[88] See Section 4.3 and 4.5.3.
[89] Regulatory capital requirements have been discussed in Sections 4.2.1 and 4.5.1.
[90] See Sections 4.2.1 and 4.4.

Basel II does not address interest rate risk at all, interest rate risk played a crucial part in creating the sub-prime crisis. Once escalating inflationary pressures had to be addressed the Federal Reserve Bank of America did so by increasing the federal funds interest rate by 25 basis points on a monthly basis from June 2004 until August 2006. The majority of sub-prime mortgagors were forced to default on their monthly payments as they were unable to afford their adjustable rate mortgage payments. The equity that was gained as a result of the sustained house prices increases during the housing boom were eroded once the interest rate increases caused a decline in house prices and later the collapse of the entire United States housing market. Hence, it would be crucial to address interest rate risk with the new Basel III accord.

A possible solution to the VaR[91] problem, of being blind to tail risk, would be to replace the VaR risk measure with a better measure of risk. The Expected Shortfall risk measure is a better alternative since it is not blind to tail risk, as it calculates the loss that can be expected on that important one bad day out of 100, which the VaR risk measure does not (see Dowd, 2009).

Instead of focusing on making each individual bank address risk more sensibly regulation should in fact focus more on containing the systemic risks[92] within banks where the actions of each individual bank impinges on one another. The method of assigning risk weights to assets in order to calculate capital adequacy should be substituted by a method that uses the rates of growth of the assets as a means to calculate capital adequacy. As growth rates increase during a bull run capital and liquidity would be needed to hold against the bank's assets. Similarly during a bear market were economic activity and growth rates decrease banks would need to hold less capital and liquidity against assets. This method has the opposite effect regarding regulatory capital requirements under the risk weighted method.[93]

This proposed method would cause significant increases in the amount of capital banks would need to hold for keeping assets on their own books during asset price boom periods. The problem with this is that it can greatly reinforce the modern day tendency towards bank disintermediation during upturns and re-intermediation during downturns. Hence the implementation of this proposal, while originating institutions are still allowed to make use of the originate and distribute banking model, might not be such a good idea. However, if it

[91] See Section 4.5.3.
[92] See Section 4.4 and 4.5.3.
[93] See Section 4.5.3.

were to be implemented along with the traditional originate to hold banking model it may well proof to be successful.[94]

7.2.4 The mortgage originators

Modern banking has changed considerably from its original role as a store of value and facilitator of exchange. Loan origination should move back to the traditional "originate to hold" banking model where the protection of deposits was the most important goal of originating institutions. This will eliminate a considerable amount of risk taking by originating institutions. By not allowing originators to be able to securitize assets, and since no bank will want to keep a large amount of sub-prime assets on their books, it will force banks to act more risk averse when it comes to loan origination.

The eagerness by regulators[95] to regulate originating institutions and to ever perfect and refine that regulation has, in fact, had the exact opposite effect of what it was intended to accomplish. Regulation has led to a massively false sense of reassurance with devastating consequences. By eliminating actions that allow for moral hazard within originating institutions (such as bailouts to banks during bank failures) will lead to banks becoming more risk averse and that the need for regulation might even fade away as a result of this. In order to rectify this situation the greed factor needs to be removed from the equation. The removal of moral hazard, by allowing banks to take responsibility for their own actions, might well have caused originators to rethink the extent of their sub-prime lending activities.[96] As a result less toxic assets would have been contained in CDOs and the crisis, most likely, would have been avoided.

The transparency of risk[97] in relation to the structured financial products in which a bank is dealing is imperative if banking regulation is to work. Originating institutions must be able to accurately measure their risk exposures and these calculations must be disclosed to regulators who should be able to verify the information. One of the easiest ways to accomplish transparency of structured products is through the standardization of securitised

[94] The "originate and distribute" (sub-prime model) and "originate to hold" (traditional model) banking models have been discussed in Section 4.2.
[95] With specific reference to the Basel II Accord (Section 4.5), credit rating agencies (Section 5.5) and the United States of America's Government (Section 6.2 and 6.2.1).
[96] The roles played by moral hazard and greed in creating the sub-prime crisis have been discussed in Sections 1.1, 1.2, 5.2 and 6.2.1.
[97] The non-transparent nature of securitized assets being sold to investors has been discussed in Sections 5.2.3, 5.4 and 5.5.

products. If structured products cannot be standardized banks should be prohibited from dealing in products with an unascertainable or doubtful risk profile.

7.2.5 The Mortgagors

The actions of the mortgagors, as discussed in Section 5.3, can only be contributed to one facet of human nature called greed. Mortgagors were eager to take advantage of the low interest rates and mortgage products that originators had to offer, seeing that originators made it extremely easy to acquire a mortgage, especially for sub-prime mortgagors. The assumption was that financial gains could be realized based on the historical trend of continues appreciation in house prices. The crux of the matter is that mortgage originators should ultimately not have been allowed to grant sub-prime loans and, therefore, the onus should not fall on the mortgagors but rather on the parties who made borrowing appear riskless and allowed sub-prime mortgages to be granted to the public. Hence, the actions taken by the originators as well as various policies implemented by the Unites States of America's Government and the Federal Reserve Bank of America would have to be addressed in order to keep the greed factor of the general public at bay.[98]

7.2.6 The Investors

The unregulated, non-transparent, high risk taking and highly leveraged nature of hedge funds needs to be addressed in order to minimize risk associated with secondary markets.[99] The practice of highly leveraged investing along with the fact that hedge funds are left unregulated with regards to capital requirements led to excessive risk taking practices by hedge funds. Their appetite for high-risk tranches containing toxic sub-prime mortgage debt was a futile mistake considering their highly leveraged and thinly capitalized positions. In order for hedge funds to limit risk taking and to provide a buffer between losses and bankruptcy, risk taking needs to be in proportion to invested capital. Government intervention would be required to reduce the highly leveraged nature of their operations. It is also pivotal to set reporting requirements for hedge funds, as well as OTC markets, in order to eradicate their non-transparent nature.

[98] See Sections 7.2.4, 7.2.8 and 7.2.9 to view the recommendations made for these three parties.
[99] Section 5.4 discussed the trading activities of hedge funds.

7.2.7 Credit rating agencies

In order to remove the potential conflict of interest between originators and rating agencies, ratings should rather be done by government institutions. Another possibility is for rating agencies to be remunerated by government and not by originators, as this will allow for unbiased ratings. Instead of making use of just one rating agencies opinion, two or more rating agencies should be used in the rating process in order to obtain an average rating to be assigned to a CDO. This will allow for greater risk assessment accuracy.

Emphasis has been placed on rating agencies' lack of ability to accurately rate the risks involved with the CDOs containing sub-prime mortgages.[100] This is a crucial mistake seeing that investors rely so heavily on these ratings to make an informed choice as to what to buy. Rating agencies would need to fully comprehend the risks involved with the tranches they are rating, as well as to be able to ascertain whether or not the bank's internal risk models for calculating risk is reliable. To rectify the problem originators would need to improve on transparency and the accuracy of their risk assessments. One of the most effective ways to overcome this obstacle is through the standardization of securitised products. The standardization of securitised products will simplify the rating process, as it will be easier to determine the risks involved with CDOs containing similar assets.

7.2.8 The United States of America's Government

Government intervention is needed to prevent short sales of banks' assets during times of economic downturns.[101] Fire sales on a large scale may well cause the price of the banks' assets to decrease and as a result reduce the availability of liquidity to the corporate sector during bad times. The orderly sales of assets, regulated by government, will prevent steep drops in asset prices and, therefore, also liquidity shortages. Another method that government can apply to avoid short sales is to offer short-term loans to banks facing liquidity shortages as a result of a decline in investor confidence over the quality of assets contained in tranches of CDOs. By providing liquidity government can buy time for the holders of these assets in which they can convince potential investors in the assets in question of their quality.

[100] See Section 5.5.
[101] Short sales have been discussed in Section 4.5.3.

7.2.9 The Federal Reserve Bank of America

There are no real recommendations to be made on the role played by the Federal Reserve Bank of America in the creation of the mortgage bubble, only more questions to be posed as to why they allowed interest rates to be too low for too long. The Federal Reserve Bank of America, who is responsible for setting interest rates and therefore heavily influences the amount of lending that takes place in the economy, is the one role-player that ultimately had the power to put a stop to the excesses.

The argument made by Alan Greenspan, that the global economy would have been engulfed in a recession if a central bank attempted to terminate the housing price boom, can be described as fallacious. Greenspan could not explain why the Federal Reserve Bank of America could not have implemented a less expansive monetary policy that would not have made mortgage lending and borrowing appear riskless. The mortgage bubble boom could well have been avoided had the Federal Reserve Bank of America implemented a less expansive monetary policy.

7.3 Summary

Throughout chapter five emphasis has been placed on greed and how this weakness of human emotion was the driving force behind the sub-prime mortgage bubble boom. Mortgage originators, mortgagors, investors and credit rating agencies were all driven by greed in an attempt to realize financial gains during the mortgage bubble boom. The greed factor is highlighted best by the origination of sub-prime mortgages to mortgagors that had no job, no income and even no assets.[102] This is extremely high risk lending practice and can only be contributed to the greed factor. Although greed played such an immense role in the formation of the sub-prime mortgage bubble, it is imperative to note that the parties discussed in chapter five have only been able to flourish in the unreal boom world that the United States of America's Government, regulators and the Federal Reserve Bank of America created.[103]

A very important aspect this study aims to highlight is that the sub-prime crisis was no different to any other economic crises experienced over the centuries. Although very different from one another in terms of the various innovations that created profitable investment opportunities, they all share one glaring characteristic. This being that they have

[102] See Section 5.2.1.
[103] As discussed in chapter six.

all been the result of financial market booms that occurred in environments of low inflation, rising real GDP growth and low policy real interest rates.[104] They also share the same fate seeing that as these booms progress, inflationary pressures builds up and central banks inevitably tighten policy interest rates resulting in the inevitable crash.[105]

The conclusion withdrawn from this dissertation is that the sub-prime crisis was a mortgage bubble boom, and a crash, created predominantly by the expansive monetary policy implemented by the Federal Reserve Bank of America. The expansive monetary policy was implemented in reaction to financial turbulence in the aftermath of the dot-com crisis and the September 11 terrorist attack on the World Trade Centre.[106] The sub-prime crisis is, however, the latest crisis in a long line of economic crises, all of which developed during prolonged periods of expansive monetary policy. Seeing that there are no other similarities between the various economic crises that have occurred during the past century, the conclusion can be made that central banks have been fostering conditions for financial market booms through the implementation of an expansive monetary policy. There might not be a recurrence of the exact events that have led to the sub-prime crisis, but since all major economic crises over the past centuries follow the same pattern, only accompanied with different forms of innovation, the likelihood of history repeating itself is not farfetched. Central banks have, therefore, been involved in the creation of every major economic crises in history through the implementation of monetary policy. It is, therefore, vital to the stability of financial markets and the global economy that more care should be taken when implementing an expansive monetary policy. The expansion and contraction of the money supply through the use of interest rates by central banks, especially the larger economies, has to be done as carefully and systematically as possible. It is, therefore, recommended that further research be conducted to determine the reasons why the Federal Reserve Bank of America has been so influential in creating all of the major economic crises experienced over the past century.

[104] See Sections 1.1 and 1.2.
[105] See Sections 1.1, 1.2 and 6.3.1.
[106] See Sections 1.2, 6.3.1 as well as chapter three.

List of references

ALEXANDER, J. 2009. Regulatory arbitrage and over-regulation. (*In* BOOTH, P., *ed.* Verdict on the Crash: Causes and Policy Implications. London: Institute of Economic Affairs. p. 81-94.)

ASHCRAFT, A.B. & SCHUERMANN, T. 2007. Understanding the securitization of subprime mortgage credit. (Wharton Financial Institutions Center working paper, no. 07-43; FRB of New York staff report, no. 318.) [Web:] http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1071189#. Date of access: 7 Apr. 2009.

BARNES, R. 2007. The Fuel That Fed the Sub-prime Meltdown. [Web:] http://www.investopedia.com/articles/07/subprime-overview.asp#axzz1jWbDpKuC. Date of access: 8 May 2009.

BEATTIE, A. 2010. Market Crashes: The Dotcom Crash. [Web:] http://www.investopedia.com/features/crashes/crashes8.asp#axzz1kS0a8km2. Date of access: 18 Oct. 2010.

BEENSTOCK, M. 2009. Market foundations for the new financial architecture. (*In* BOOTH, P., *ed.* Verdict on the Crash: Causes and Policy Implications. London: Institute of Economic Affairs. p. 59-71.)

BERVAS, A. 2008. Financial innovation and the liquidity frontier. *Banque de France Financial Stability Review - Special issue on liquidity,* (11):123-131, Feb.

BESSIS, J. 2007. Risk Management in Banking. 2nd ed. London: Wiley. 792 p.

BASEL BANK OF INTERNATIONAL SETTLEMENTS (BIS). 2001. The New Basel Capital Accord. Basel Committee on Banking Supervision. Basel, Switzerland. 139 p. Jan.

BOOTH, P. 2009. Introduction. (*In* BOOTH, P., *ed.* Verdict on the Crash: Causes and Policy Implications. London: Institute of Economic Affairs. p. 27-35.)

BORDO, M.D. 2008. An Historical Perspective on the Crisis of 2007-2008. (*In* the Central Bank of Chile Twelfth Annual Conference on Financial Stability, Monetary Policy and Central Banking held in Santiago, Chile on 6 and 7 November 2008. Chile. 23 p.)

BORDO, M.D. & WHEELOCK, D. 2007. Stock market booms and monetary policy in the twentieth century. *Federal Reserve Bank of St. Louis Review*, 89(2):91-122, Mar/Apr.

BRAM, J. 2003. New York City's Economy before and after September 11. Federal Reserve Bank of New York *Current Issues in Economics and Finance*, 9(2):1-7, Feb. [Web:] http://www.newyorkfed.org/research/current_issues/ci9-2.html. Date of access: 12 Jun. 2009.

BRUNNERMEIER, M.K. 2008. Deciphering the 2007-08 Liquidity and Credit Crunch. *Journal of Economic Perspectives (forthcoming),* 37p, May.

BUTLER, E. 2009. The financial crisis: blame governments, not bankers. (*In* BOOTH, P., *ed.* Verdict on the Crash: Causes and Policy Implications. London: Institute of Economic Affairs. p. 51-58.)

CHAPMAN, R.J. 2011. Simple Tools and Techniques for Enterprise Risk Management. 2nd ed. London: Wiley. 637 p.

CAPRIO, G & KLINGEBIEL, D. 1996a. Bank Insolvency: Bad Luck, Bad Policy, or Bad Banking? *Annual World Bank Conference on Development Economics.* 29p.

CAPRIO, G & KLINGEBIEL, D. 1996b. Bank Insolvencies: Cross Country Experience. *The World Bank:* Policy Research Department Finance and Private Sector Development Division. Policy working research paper no, 1620. 52 p. Jul.

CAPRIO, G & KLINGEBIEL, D. 2003. Episodes of Systemic and Borderline Financial Crises. [Web:] http://siteresources.worldbank.org/INTRES/Resources/469232-1107449512766/648083-1108140788422/23456_Table_on_systemic_and_non-systemic_banking_crises_January_21_2003.pdf. Date of access: 27 Apr. 2009.

CROCKETT, A. 2008. Market liquidity and financial stability. *Banque de France Financial Stability Review - Special issue on liquidity,* (11):13-17, Feb.

CROTTY, J. 2008. Structural Causes of the Global Financial Crisis: A Critical Assessment of the 'New Financial Architecture'. University of Massachusetts Amherst Campus Working Paper, 2008-14. 61 p.

DANIELSSON, J., EMBRECHTS, P., GOODHART, C., KEATING, C., MUENNICH, F., RENAULT, O. & SHIN, H.S. 2001. An academic response to Basel II. *Economic and Social Research Council*. Special Paper no. 130. 17 p. May. [Web:] ftp://ftp.math.ethz.ch/hg/users/embrecht/Basel2.pdf. Date of access: 21 Oct. 2011.

DAS, S. 2006. Traders Guns and Money: Knowns and Unknowns in the Dazzling World of Derivatives. Harlow: Prentice Hall. 339 p.

DEMIIRGÜÇ-KUNT, A., DETRAGIACHE, E. & GUPTA, P. 2006. Inside the crisis: An empirical analysis of banking systems in distress. *Journal of International Money and Finance*, 25(5):702-718, Apr.

DEMYANYK, Y. & VAN HEMERT, O. 2008. Understanding the Subprime Mortgage Crisis. [Web:] http://ssrn.com/abstract=1020396. Date of access: 7 Apr. 2009.

DODD, R. 2007. Subprime: Tentacles of a Crisis. *Finance & Development: 15-19,* Dec.

DOWD, K. 2009. The failure of capital adequacy regulation. (*In* BOOTH, P., *ed.* Verdict on the Crash: Causes and Policy Implications. London: Institute of Economic Affairs. p. 73-80.)

EAVIS, P. 2007a. Subprime: Let the finger-pointing begin! [Web:] http://money.cnn.com/galleries/2007/fortune/0709/gallery.subprime_blame.fortune/index.html. Date of access: 18 Oct. 2009**.**

EAVIS, P. 2007b. Wall Street playing with more funny money. [Web:] http://money.cnn.com/2007/11/12/magazines/fortune/eavis_level3.fortune/index.htm. Date of access: 18 Oct. 2009.

EWERHART, C. & VALLA, N. 2008. Financial market liquidity and the lender of last resort. *Banque de France Financial Stability Review - Special issue on liquidity,* (11):133-148, Feb.

FDIC. 2008. *Quarterly Banking Profile, First Quarter 2008,* 2(2):21 p. [Web:] http://www2.fdic.gov/qbp/2008mar/qbp.pdf. Date of access: 12 Jun. 2009.

FEDERAL RESERVE BANK OF NEW YORK. 2009. Historical Changes of the Target Federal Funds and Discount Rates. [Web:] http://www.newyorkfed.org/markets/statistics/dlyrates/fedrate.html. Date of access: 18 Oct. 2009.

FISHER, I. 1933. The debt deflation theory of great depressions. *Econometrica,* 1:337-357, Oct.

FISHER, P. 2011. Tail risks and contract design from a financial stability perspective. (*In* BIS central bankers' speeches. Speech by Mr Paul Fisher, Executive Director for Markets of the Bank of England held at Clare College, Cambridge on 1 September. Cambridge. 11p.)

FISHER, P.R. 2008. What happened to risk dispersion? *Banque de France Financial Stability Review - Special issue on liquidity,* (11):29-37, Feb.

GOODHART, C.A.E. 2008. The Regulatory Response to the Financial Crisis. *Monetary Policy and International Finance.* CESifo working paper no. 2257. 19 p. Mar.

GORDON, R. 2008. Did Liberals Cause the Sub-Prime Crisis? [Web:] http://prospect.org/article/did-liberals-cause-sub-prime-crisis. Date of access: 25 May. 2009.

GORDY, M.B. & HOWELLS, B. 2004. Pro-cyclicality in Basel II: Can We Treat the Disease Without Killing the Patient? [Web:] http://www.bis.org/bcbs/events/rtf04gordy_howells.pdf. Date of access: 8 May 2009.

GREENWOOD, J.K. 2009. The successes and failures of UK monetary policy, 2000-08 (*In* BOOTH, P., *ed.* Verdict on the Crash: Causes and Policy Implications. London: Institute of Economic Affairs. p. 37-43.)

GRIFFIN, E. 2003. The Creature from Jekyll Island. *JAGCorps Critical Thinkers Resources.* [Web:] http://www.billionDollarbailout.com/The-Creature-from-Jekyll-Island-by-Edward-Griffin.pdf. Date of access: 19 Oct. 2010.

HARPER, D. 2007. Basel II Accord To Guard Against Financial Shocks. [Web:] http://www.investopedia.com/articles/07/basel2.asp#axzz1kGEcR9TT. Date of access: 21 Mar. 2009.

HONOHAN, P. & KLINGEBIEL, D. 2000. Controlling the fiscal costs of banking crises. *The World Bank.* 33p. May.

HULL, J.C. 2005. Fundamentals of Futures and Options Markets. 5th ed. N.J.: Pearson Prentice Hall. 550 p.

JOINT CENTRE FOR HOUSING STUDIES OF HARVARD UNIVERSITY. 2008. The State of the Nation's Housing. [Web:] http://thehousingroundtable.org/doc/JointHarvardHousingStudy2008.pdf. Date of access: 4 Mar. 2009.

KAY, J. 2009. The future of financial services regulation. (*In* BOOTH, P., *ed.* Verdict on the Crash: Causes and Policy Implications. London: Institute of Economic Affairs. p. 117-182.)

KIYOSAKI, R.T. 2009. Rich Dad's Conspiracy of the Rich: The 8 New Rules of Money. New York, NY.: Business Plus. 260 p.

LINDGREEN, C.J., GILLIAN, G., & SAAL, M.I. 1996. Bank Soundness and Macroeconomic Policy. Washington, DC.: International Monetary Fund. 215 p.

LLEWELLYN, D.T. 2009. The global financial crisis: incentive structures and implications for regulation. (*In* BOOTH, P., *ed.* Verdict on the Crash: Causes and Policy Implications. London: Institute of Economic Affairs. p. 183-196.)

McILROY, D.H. 2008. Regulating risk: A measured response to the banking crisis. *Journal of Banking Regulation,* 9(4):284-292, Aug.

McWHINNEY, J.E. 2005. ARMed And Dangerous. [Web:] http://www.investopedia.com/articles/pf/05/ARMed.asp#axzz1kGEcR9TT. Date of access: 7 Apr. 2009.

McWHINNEY, J.E. 2010. The Home-Equity Loan: What It Is and How It Works. [Web:] http://www.investopedia.com/articles/pf/05/041305.asp#axzz1kS0a8km2. Date of access: 4 Nov. 2010.

McWHINNEY, J.E. 2011. Tax Deductions on Mortgage Interest. [Web:] http://www.investopedia.com/articles/pf/06/MortIntTaxDeduct.asp#axzz1kS0a8km2. Date of access: 21 Dec. 2011.

MYDDELTON, D.R. 2009. Accounting aspects of the financial crisis. (*In* BOOTH, P., *ed.* Verdict on the Crash: Causes and Policy Implications. London: Institute of Economic Affairs. p. 101-108.)

NAGY, M. & SZABÓ, V.E. 2008. The Sub-prime Crisis and its Impact on the Hungarian Banking Sector. *Magyar Nemzeti Bank Bulletin.* 35-43, Apr.

NIELSEN, B. 2007. Subprime Is Often Subpar. [Web:] http://www.investopedia.com/articles/pf/07/subprime.asp#axzz1kGEcR9TT. Date of access: 7 Apr. 2009.

NIELSEN, B. 2010a. Why Housing Market Bubbles Pop. [Web:] http://www.investopedia.com/articles/07/housing_bubble.asp#axzz1kGEcR9TT. Date of access: 24 Aug. 2010.

NIELSEN, B. 2010b. How Interest Rates Affect The Housing Market. [Web:] http://www.investopedia.com/articles/pf/07/mortgage_rate.asp#axzz1kGEcR9TT. Date of access: 24 Aug. 2010.

OVIEDO, M.P. & SIKDAR, S. 2008. Optimal Banking Sector Recapitalization. Iowa State University: Department of Economics Working Papers Series. Working Paper no. 08002. 25 p. Jan.

PERISTIANI, S. 2003. Evaluating the Riskiness of Initial Public Offerings: 1980-2000. *Federal Reserve Bank of New York Staff Reports,* no. 167. May. [Web:] http://papers.ssrn.com/sol3/papers.cfm?abstract_id=470261. Date of access: 16 Feb. 2009.

PETROFF, E. 2007. Who Is To Blame For The Subprime Crisis. [Web:] http://www.investopedia.com/articles/07/subprime-blame.asp#axzz1kGEcR9TT. Date of access: 8 Feb. 2009.

PRAET, P. & HERZBERG, V. 2008. Market liquidity and banking liquidity: linkages, vulnerabilities and the role of disclosure. *Banque de France Financial Stability Review - Special issue on liquidity,* (11):95-109, Feb.

REINHART, C.M. 2008. Reflections on the International Dimensions and Policy Lessons of the US Subprime Crisis. [Web:] http://www.voxeu.org/index.php?q=node/988. Date of access: 15 Apr. 2009.

ROCHET, J. 2008. Liquidity regulation and the lender of last resort. *Banque de France Financial Stability Review - Special issue on liquidity,* (11):45-52, Feb.

ROMER, C.D. 1993. The Nation in Depression. *Journal of Economic Perspectives*, 7(2):19-39.

ROSE, P.S., & HUDGINS, S.C. 2005. Bank Management & Financial Services. 6th ed. New York, NY.: McGraw-Hill. 782 p.

SALERNO, J. T. 1982. The Gold Standard: An Analysis of Some Recent Proposals. Cato Policy Analysis No. 16. [Web:] http://www.cato.org/pubs/pas/pa016.html. Date of access: 25 Nov. 2011.

SÁNTA, L. 2007. The role of central banks in crisis management – how do financial crisis simulation exercises help? *Magyar Nemzeti Bank Bulletin.* 31-38, Nov.

SCHWARTZ, A.J. 2009. Origins of the financial market crisis of 2008. (*In* BOOTH, P., *ed.* Verdict on the Crash: Causes and Policy Implications. London: Institute of Economic Affairs. p. 45-50.)

SMITH, L. 2007a. Subprime Lending: Helping Hand Or Underhanded? [Web:] http://www.investopedia.com/articles/basics/07/subprime_basics.asp#axzz1kGEcR9TT. Date of access: 15 Apr. 2009.

SMITH, L. 2007b. Option ARMs: American Dream Or Mortgage Nightmare? [Web:] http://www.investopedia.com/articles/pf/07/optionarms.asp#axzz1kGEcR9TT. Date of access: 15 Apr. 2009.

TATOM, J.A. 2008. The Federal Reserve in Crisis. *Networks Financial institute at Indiana State University,* 7 p. Mar.

TIROLE, J. 2008. Liquidity shortages: theoretical underpinnings. *Banque de France Financial Stability Review - Special issue on liquidity,* (11):53-63, Feb.

U.S. DEPARTMENT OF LABOR: BUREAU OF LABOR STATISTICS. WASHINGTON, D.C. 2011. [Web:] ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt. Date of access: 12 Jan. 2012.

VAN VUUREN, G.W. 2009a. Interview with author. Potchefstroom. (Material in author's possession.)

VAN VUUREN, G.W. 2009b. The Credit Crunch: How did we get into this mess, who's to blame and when will it end? (Lecture given as part of the course in Bank Risk Management to Honours students at the NWU on 11 August 2009.) Potchefstroom. 30 p. (Unpublished.)

WEBBER, A. 2011. SF Case-Shiller Home Price Index Increases Again. [Web:] http://www.dailyrosetta.com/sf-case-shiller-home-price-index-increases-again/31749.html. Date of access: 23 Oct. 2011.

WOOD, C. 2010. The Conspiracy that is the Federal Reserve. [Web:] http://www.personalliberty.com/conservative-politics/liberty/the-conspiracy-that-is-the-federal-reserve/. Date of access: 18 Oct. 2010.

WRAY, R.L. 2008. What's a Central Bank to do? Policy response to the current crisis. *The Levy Economics Institute of Bard College. Policy Note.* 8 p.

YANN, L.L. 2005. From boom to bust and back again. [Web:] http://www.zdnet.co.uk/news/it-strategy/2005/11/29/from-boom-to-bust-and-back-again-39238833/2/. Date of access: 12 Oct. 2009.

Abbreviations

ACORN:	Association of Community Organizations for Reform Now
BIS:	Basel Bank of International Settlements
CDO:	Collateralized Debt Obligations
CDS:	Credit Default Swap
CRA:	Credit Rating Agency
Fannie Mae:	See FNMA
FDIC:	Federal Deposit Insurance Corporation
FED:	Federal Reserve Bank of America
FHA:	Federal Housing Administration
FHFB:	Federal Housing Finance Board
FHLMC:	Federal Home Loan Mortgage Corporation
FNMA:	Federal National Mortgage Association
Freddie Mac:	See FHLMC
FSLIC:	Federal Savings & Loan Insurance Corporation
GSE:	Government Sponsored Enterprise
HMDA:	Home Mortgage Disclosure Act
IMF:	International Monetary Fund
IPO:	Initial Public Offering
IRB:	Internal Ratings Based
MBS:	Mortgage Backed Security
NINJA:	No Income, No Job or Assets
NRSRO:	Nationally Recognized Securities Rating Organization
NYSE:	New York Stock Exchange
OTC:	Over the Counter
S&L:	Savings and Loan Institution
SEC:	Securities and Exchange Commission
SPV:	Special Purpose Vehicle
VAR:	Value at Risk