THE SOUTH AFRICAN OVER-THE-COUNTER CREDIT DERIVATIVES MARKET: 2005 TO 2015

by

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Declaration

I, Storme Kennedy-Palmer, declare that "The South African over-the-counter credit derivatives market: 2005 to 2015" is my own work, and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

Signed: .....

Date: .....

Abstract

Credit derivatives played a large role in intensifying losses during the subprime lending crisis, which began in 2007 in the US and spiralled into a financial crisis in 2008. One of the major reasons for this descent into financial crisis was the uncertainty about the exposure of some systemically important financial institutions through their derivative positions, specifically credit derivative instruments such as credit default swaps (CDSs).

Using data obtained from the SARB, the study found that prior to the crisis, the size of the South African OTC credit derivatives market was increasing steadily. However, the 2008 financial crisis temporarily stunted this growth, and the size of the market declined. Since 2010, the growth of the market has once again been on an upward trajectory. The study examines recent international and local regulations relating to OTC derivatives and makes policy recommendations for South Africa.

Abbreviations

AIG	American International Group
ABCP	Asset-backed commercial paper
ABS	Asset-backed securities
AIGFP	American International Group Financial Products
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements
BoE	Bank of England
CB	Capital conservation buffer
CCB	Countercyclical buffer
CCP	Central counterparty
CDO	Collateralised debt obligation
CDO²	Collateralised debt obligation squared
CDS	Credit default swap
CFTC	Commodity Futures Trading Commission (US regulatory supervisor)
CLN	Credit-linked note
CLO	Collateralised loan obligation
CMBS	Commercial mortgage-backed securities
CPI	Consumer price index
CPSS	Committee on Payment and Settlement Systems
CVA	Credit valuation risk
DCO	Derivatives clearing organisation (Dodd-Frank terminology for a central counterparty)
DIS	Deposit insurance scheme
D-SIB	Domestic systemically important banks
DTCC	The Depository Trust and Clearing Corporation (US Depository)
EC	European Commission
ECB	European Central Bank
EMIR	European Market Infrastructure Regulation
ESMA	European Securities and Markets Authority (EU regulatory supervisor)
EU	European Union
FAIS	South African Financial Advisory and Intermediary Services Act
Fed	Federal Reserve Bank
FMA	The South African Financial Markets Act
FMI	Financial market infrastructures
FOMC	Federal Open-Market Committee
FSA	Financial Services Authority (UK regulatory regulator)
FSB	Financial Services Board
FSCF	Financial Sector Contingency Forum
G20	The Group of Twenty
GAAP	Generally Accepted Accounting Principles

GDP	Gross domestic product
GNFV	Gross negative fair value
GPFV	Gross positive fair value
GSE	Government-sponsored enterprise
G-SIFI	Globally systemically important institutions
ICR	Individual capital requirement
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
IMM	Inside market midpoint
IOSCO	International Organisation of Securities Commission
ISDA	International Swaps and Derivatives Association
JSE	Johannesburg Stock Exchange
LCR	Liquidity coverage ratio
LIBOR	London Interbank Offered Rate
MAGD	Macroeconomic Assessment Group on Derivatives
MBA	Mortgage Bankers Association
MBS	Mortgage-backed securities
MoU	Memorandum of understanding
MSP	Major market participants (definition from Dodd-Frank)
NCCE	Net current credit exposure
NSFR	Net stable funding ratio
ODP	OTC derivatives provider (definition from FMA)
OTC	Over-the-counter
OTS	Office of Thrift Supervisors (US regulatory supervisor)
QE	Quantitative easing
RMBS	Residential mortgage-backed securities
RWA	Risk-weighted assets
SA	South Africa
Safcom	South African Clearing Company (CCP for exchange-traded derivatives)
Safex	South African Futures Exchange
SARB	South African Reserve Bank
SEC	Securities and Exchanges Commission (US regulatory supervisor)
SIFIs	Systemically important financial institutions
SIV	Structured investment vehicle
SPE	Special purpose entity
SPV	Special purpose vehicle
Strate	South Africa's Central Securities Depository (CSD)
TARP	Troubled Asset Relief Program
TR	Trade repository
TRS	Total return swap
UK	United Kingdom
US(A)	United States of America
VaR	Value at risk

ZAR	South African rand

The international organisation *Financial Stability Board* has not been abbreviated to FSB to avoid confusion with the South African Financial Services Board which has been abbreviated to FSB. Thus everywhere in this document FSB refers to the Financial Services Board and the Financial Stability Board is not abbreviated.

Table of contents

List of figures

List of tables

List of equations

Chapter 1: Overview

1.1 Introduction

As of February 2013, the Financial Stability Board found that the "currently available information on the size and structure of the South African OTC derivatives market is limited" (Financial Stability Board, 2013). While there has been much examination of the credit derivatives markets in the US and Europe, a preliminary literature review was unable to find a detailed study of the South African commercial banking over-the-counter (OTC) credit derivatives market before, during and after the subprime financial crisis.

There are two distinct ways in which derivative markets are organised, the exchange-traded market and the OTC market. In South Africa, the Johannesburg Stock Exchange (JSE) operates the licensed exchange-traded derivatives market. The JSE trades a large number of derivatives, but does not offer credit derivative products. Even the JSE's *Can Do Exotic Options* (in which the contracts details are agreed upon by two counterparties, making it an extremely customisable product) are currently only written with equity as the underlying product (Johannesburg Stock Exchange Ltd, 2014). At June 2010, the SARB's data shows unexpired contracts at month-end of R25 trillion South African rand of OTC derivatives and R0.8 trillion for exchange-traded derivatives. That is a ratio of roughly 31:1. This indicates that the OTC market is much larger than the exchange-traded market for derivatives in South Africa, which is consistent with international developments in the markets for these instruments.

Participants in the OTC derivatives market in South Africa mainly consist of commercial banks and institutional investors such as asset managers and hedge funds. Prior to the crisis, OTC markets were subject to almost no direct regulation, starkly contrasted against the highly regulated exchange-traded markets. This indicates why OTC markets are often associated with higher risk and less transparent instruments than those traded through a licenced exchange. During the period under study, commercial banks were the only market participants who were required to report the notional volumes of outstanding derivatives. This is in terms of the functional regulation on banks supervised by the South African Reserve Bank (SARB) and thus banks also report their exchange-traded derivatives holdings. Prior to 1 January 2008, the banks were required to submit the DI430 form monthly to the SARB. With the implementation of Basel II, the banks have been required to submit the BA350 form monthly from 1 January 2008 to present. The DI430 form has largely the same layout as the BA350 thus making it possible to compare the data from these forms.

The vast majority of derivatives contracts initiated in the South African OTC market are interest rate derivatives, followed by foreign exchange derivatives, then credit derivatives, and finally, equity and commodity derivatives. The most common credit derivatives are credit default swaps (CDSs) and total return swaps (TRSs). Synthetic collateralised debt obligations (CDOs) and credit-linked notes (CLNs) are also examples of credit derivatives, and these instruments are discussed in sections 2.2.5 and 2.2.6. TRSs transfer the cash flows from the underlying reference entity (such as a loan or a bond) in return for interest payments, thereby hedging interest rate receipts for one party while the other accepts the risk of variable returns. CDSs transfer the risk of a credit event involving the underlying reference entity, such as bankruptcy, default or a ratings downgrade from the protection buyer to the protection seller, thus providing a method for hedging credit risk. However, CDS protection buyers do not

necessarily have to have an interest in the underlying reference entity, and CDSs can therefore be used for purely speculative purposes.

Alan Greenspan, Chairman of the Fed from 1987 to 2006, believed that CDSs would strengthen the stability of the financial industry, and in a 2004 speech, he stated the following Greenspan (2004):

> *The new instruments of risk dispersion have enabled the largest and most sophisticated banks in their credit-granting role to divest themselves of much credit risk by passing it to institutions with far less leverage… These increasingly complex financial instruments have contributed, especially over the recent stressful period* [Stock market bubble]*, to the development of a far more flexible, efficient, and hence resilient financial system than existed just a quarter-century ago*.

Using CDSs for hedging purposes affords banks the ability to offload risk on to those parties who want to hold it, thereby reducing the concentration of risk in the financial system. However, CDSs are not the first financial instrument to give banks this opportunity. In the 1980s, the development of loan sales allowed banks to originate loans and then sell them so that they could deleverage when necessary or free up capital to originate more loans, which had the effect of giving individual banks the flexibility in managing their credit risk exposures that had not been previously available. One disadvantage is that selling a loan of a valued customer could lead to reputational damage for the bank and often the administration surrounding loan sales is complicated. In the 1990s, securitisation provided another credit-risk management strategy for banks (Hirtle, 2009: 125-150). Securitisation and its role in the financial crisis will be discussed in section 2.2.2.

A survey prepared by the International Swaps and Derivatives Association (ISDA) showed that the market size for CDSs globally more than doubled in size each year from a notional value of US $3.7 trillion in 2003 to $62.2 trillion at the end of 2007. However, by the end of 2008, the notional amount outstanding had fallen to $38.6 trillion (International Swaps and Derivatives Association, 2010). The credit derivatives market worldwide is relatively small compared to the market for other OTC derivatives, but according to Karras (2009), there was rapid growth in global credit derivative transactions before 2009, and this would only increase in the future owing to defaults and debt restructuring, which create a real need for these hedging products (Karras, 2009: 193-213). CDSs will be discussed in chapter 2, and in detail in section 2.2.6.

1.2 Rationale for the research

Credit derivatives were intricately involved in the financial crisis, through two main channels. Firstly, defaults on poor quality loans triggered embedded CDSs, and secondly, there were mark-to-market losses. “Mark-to-market” is an accounting practice whereby assets are valued at their current market value on the balance sheet. This is in contrast to historical cost accounting where an assets original purchase price is recorded in the financial statements. Mark-to-market accounting is a concept of fair-value accounting, which seeks to prevent businesses from overvaluing their assets in an attempt to protect investors. Thus a drop in the market value of an asset would result in a mark-to-market loss through leverage even if the loss is not realised by selling the asset. Mark-to-market losses on OTC derivatives were triggered when concerns about counterparty credit risk exposure grew after some financial institutions suffered large losses on mortgaged-backed securities (MBSs) and CDOs. These

losses reduced asset value resulting in higher leverage for financial institutions, and it was this increased leverage that created further concerns over counterparty risk and almost led to the meltdown of the financial system through systemic risk. In fact, the Basel Committee on Banking Supervision (BCBS) noted that approximately two thirds of counterparty credit risk losses were due to mark-to-market losses and only one third due to actual defaults (Bank for International Settlements, 2013).

CDSs resulted in direct losses through defaults, indirect losses through mark-to-market losses and a decline in aggregate demand through the wealth channel effect. In addition to the financial losses, these complicated financial instruments also played a role in increasing systemic risk in the financial system. Alan Greenspan's prediction that CDSs would decrease systemic risk in the financial system was based on the premise that credit risk would be transferred away from institutions that did not have the risk appetite to institutions that were prepared to hold the risk. However, Nijskens & Wagner found that credit risk transfer activities such as CDSs and securitisation led to many individual banks seeming less risky due to lower volatility however, these activities resulted in higher levels of systemic risk in the financial system contrary to Alan Greenspan's prediction (Nijskens & Wagner, 2011: 1391 – 1398). Possible reasons for this finding include banks' use of CDSs to sell protection (i.e. buy risk), discussed in section 2.2.6; CDS holdings resulting in a higher level of counterparty risk even in the case of a balanced book, discussed in section 2.2.10; the originate-to-distribute model discussed in section 2.2.2; as well as the use of CDSs to create synthetic portfolios discussed 2.2.6.5.

The role of CDSs in the crisis led the G20 to issue the following directive at the 2009 Pittsburgh Summit to improve the safety of the OTC derivatives market:

> *All standardised OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012 at the latest. OTC derivative contracts should be reported to trade repositories. Non-centrally cleared contracts should be subject to higher capital requirements. We ask the FSB and its members to assess regularly implementation and whether it is sufficient to improve transparency in the derivatives markets, mitigate systemic risk, and protect against market abuse* (G20, 2009).

Since the G20's directive, there have been large developments in the regulation and supervision of OTC markets in its largest centres, the EU (including the largest centre for OTC derivatives, the UK) and USA. South Africa has followed suit and developed regulations specifically designed to fall in line with existing regulations to avoid regulatory arbitrage. Since banks make up some of the largest OTC credit derivatives market participants throughout the world, Basel III has many indirect influences on this market.

The South African derivatives market has increased in size significantly since January 2005, with month-end unexpired contracts of R144 billion for exchange-traded contracts and R7 200 billion for OTC contracts excluding credit derivatives. These figures increased to R624 billion for exchange-traded contracts and R35 800 billion for OTC contracts excluding credit derivatives at the end of January 2015.

Looking at credit derivatives, in January 2005, the amount of outstanding credit derivatives with the banks as protection buyers was R17.8 billion and R14.7 billion with the banks as protection sellers. By January 2015, the amount of outstanding credit derivatives with the banks as protection buyers had risen to R87 billion and R97 billion with the banks as protection sellers (note that the figures quoted are in nominal values; in chapter 4 the data has

been adjusted for inflation). The market has thus grown considerably over the stated period. This study further conducts an examination of the variances in the size of the credit derivatives market as an absolute value and relative to the total of all other OTC derivatives over the period January 2005 to January 2015.

A preliminary investigation indicates that South Africa has suffered minor derivative disasters in the past and that the use of credit derivatives such as CDSs has risen significantly since the 2008 financial crisis, justifying further examination of this market. From an academic perspective it is also evident that there is limited research available, especially as far as South African journals are concerned, indicating a further need for this type of study.

1.3 Research question

The credit derivatives market worldwide has grown significantly over the period of analysis, making it an increasingly important role player in South Africa's financial markets. Research on its exact size and composition is thus vital, especially following the 2008 financial crisis and the lessons learnt about the potential dangers of these instruments.

1.3.1 Problem statement:

The intention of this research is to analyse and evaluate the size and composition of the South African OTC credit derivatives market from January 2005 to January 2015 and to review the progress of implementation of proposed new regulations locally and abroad and make policy implementation recommendations for the local market.

1.3.1.1 Sub-problem 1:

Analyse and evaluate the size and composition of the South African OTC credit derivatives market from January 2005 to January 2015.

1.3.1.2 Sub-problem 2:

Review the progress of implementation of proposed new regulations in the US, UK, EU and South Africa.

1.3.1.3 Sub-problem 3:

Make policy implementation recommendations for the local market.

1.4 Chapter layout

The layout of the chapters is as follows:

Chapter 2 provides a review of literature and key word analysis.

Chapter 3 describes the methodology employed during the empirical analysis.

Chapter 4 discusses the results obtained from the study.

Chapter 5 presents the concluding remarks and policy recommendations.

Chapter 2: Literature review

2.1 Introduction

This chapter summarises the available literature on the financial crisis of 2007–2008, giving an outline of the events which led to the crisis and the role that credit derivatives played in exacerbating the crisis. Ben Bernanke, former Chairman of the Federal Reserve, is quoted in a document filed with the US Court of Federal Claims on 22 August 2014 as saying: "September and October of 2008 was the worst financial crisis in global history, including the Great Depression". The subprime crisis which began in the US in 2007 escalated and spread through the global economy, leading to a global financial crisis followed by a global economic recession which some, including the former IMF MD Dominique Strauss-Kahn, have dubbed the "Great Recession". The crisis hit after a period known as the Great Moderation which was a golden age of financial stability and reduced severity in business cycles. The Great Moderation was thought to be caused by structural changes and improved macroeconomic policies in advanced economies, and many thought it would be permanent. According to Paul Krugman, Professor of Economics and International Affairs at Princeton University, the crisis has taught us that the international financial system is fragile and can have devastating consequences for the world's real economy (Krugman, 2015). The severity of the 2007–2008 crisis was largely due to the complicated nature of newly structured financial instruments combined with the interconnectedness of global financial systems.

The direct losses on subprime loans were estimated to be at around US $250 billion by October 2007. This is a large number, but the contagion effect meant that this initial loss snowballed, leading to much higher losses in the stock market and worldwide GDP. From

July 2007 to November 2008, the estimated worldwide decline in GDP was $4 700 billion and the decline in world stock market capitalisation was about $26 400 billion dollars, which is around 100 times the initial loss on subprime loans (Blanchard, 2009). These losses were so high because the subprime loan asset-price bubble led to a financial crisis.

Olivier Blanchard, chief economist at the International Monetary Fund (IMF) and Professor of Economics at MIT, admits that many, including himself, believed that the US economy would fare better than most economies if housing prices fell as a result of the diversification of risk that both securitisation and derivatives provide. He has since acknowledged that the opacity of these innovative instruments (both securitised and credit derivatives) combined with the fact that they were widely held by a large number of financial institutions were two factors that he did not consider before the crisis (Blanchard, 2009). According to Stulz (2009), one of the major reasons for this snowball effect was the uncertainty about the exposure of some systemically important financial institutions through their derivative positions, primarily through their credit-default swap (CDS) holdings (Stulz, 2009: 58-70). Innovative new financial products such as CDSs, mortgage-backed securities (MBS), collateralised debt obligations (CDOs) and collateralised debt obligations squared (CDO^2) were at the heart of the crisis. They can be broadly classified as credit derivatives, such as CDSs and synthetic CDOs), and securitised products, such as MBSs and balance sheet CDOs. In theory, both classes of financial products should strengthen the stability of the financial industry through diversification of credit risk, whereby the risk is spread among many investors not just the loan originator.

Losses in the financial sector led to much larger losses in the real economy. Average worldwide growth between 2000 and 2007 was 4.2%, which had, however, dropped to 2.7%

in 2008 and -0.4% in 2009. Although the direct impact of the financial crisis was primarily on the US, UK and EU, emerging economies soon began to suffer indirectly from it through two main mechanisms: firstly, through a decline in portfolio investment; and secondly, through a decline in exports. For South Africa, the average growth rate between 2000 and 2007 was 4.3%, but this declined to 3.8% in 2008 and down to -1.5% in 2009 (Blanchard, Johnson, Akoto, Alsemgeest, Bhoola, Biyase, Dikgang, et al, 2014). The South African stock market fell by 36.0% between May and December 2008, leading to the loss of almost one million jobs (Financial Stability Board, 2013). Although South Africa did not experience a local financial crisis stemming from the global financial crisis, according to the Financial Stability Board, it was one of the worst affected emerging economies.

Throughout this chapter, the role of these complicated financial instruments in the global financial crisis will be examined with specific focus on credit default swaps (CDSs). A CDS is a type of credit derivative that is used to transfer risk from a party who does not wish to hold the risk to a party who is willing to accept it. This credit derivative caused great uncertainty during the crisis as a small default could trigger large payments by issuers of CDSs, and these issuers included large systemically important banks like Lehman Brothers and large systemically important insurance firms like American International Group (AIG). According to Sipko (2011: 33–38), the gross notional outstanding volume of CDSs reached $62 173 trillion by the end of 2007, which is equivalent to global GDP.

The rest of chapter 2 is set out as follows: Section 2.2 summarises the events that led to the crisis, as well as the role played by credit derivatives, specifically CDSs, in exacerbating the global financial crisis. Section 2.3 looks at the available literature of the OTC credit derivative market in South Africa. Section 2.4 examines the financial market regulation

relating to OTC derivatives prior to the crisis and in response to the crisis in South Africa, the US and Europe.

2.2 Global financial crisis

2.2.1 Background

After the 9/11 terrorist attacks on the US, the Federal Reserve Bank (Fed) feared that the already fragile, post-dotcom stock market bubble economy would be plunged into a recession, so under the leadership of Chairman Alan Greenspan, the Fed kept interest rates low. On 17 September 2001, the Fed lowered interest rates from the already low 3.5% to 3.0%, down from 6.5% at the beginning of January 2001 (*The Economist*, 2007). The Federal Open-Market Committee (FOMC) continued to cut the target federal funds rate at each meeting through to the end of the 2001 (Board of Governors of the Federal Reserve System, 27 February 2002). By 2003, the federal funds rate reached a low of 1%, which was the lowest rate since 1958 and it remained at that level for a year. Thereafter, the Fed gradually increased the federal funds rate until it reached 5.25% by June 2006. The period of extremely low interest rates encouraged households to take up large amounts of mortgage debt, both through home buying and refinancing existing mortgages. In October 2001, the Mortgage Bankers Association's (MBA's) refinancing index reached the highest level since its inception in January 1980 (Board of Governors of the Federal Reserve System, 27 February 2002). This increase in household borrowing had already outstripped the growth of disposable personal income in 2001, which meant that despite the lower interest rate, the household debt-service burden at the end of 2001 was already near the peak recorded at the end of 1986, according to the report submitted to the US congress by the Fed in February

2002. At this stage, however, Greenspan was not concerned about the housing market, stating in 2002 that the lower interest rate would sustain the demand for new construction as well as mortgage markets which have been a "powerful stabilising force over the past two years of economic distress by facilitating the extraction of some of the equity that homeowners have built over the years" (Saxton, Reed, & Greenspan, 13 November 2002). Greenspan later admitted that he had only become aware of the housing bubble during late 2005 and 2006 (Felsenthal, 2007).

According to John Taylor, Professor of Economics at Stanford University, the Fed kept rates too low for too long. The Taylor rule is a rules-based approach to monetary policy whereby "the nominal federal funds rate is adjusted in response to both the gap between real and trend gross domestic product and the gap between the inflation rate and policymakers' target" (Kohn, 2012: 173-182). The Taylor rule therefore stipulates that interest rates should increase in times of high inflation or when employment is above full employment levels, and vice versa. Figure 1 was presented to the 2007 annual central bankers' symposium in Jackson Hole, Wyoming by Taylor (*The Economist*, 2007). It shows the actual federal funds rate between 2000 and 2007 compared with a hypothetical interest rate following the Taylor rule. Taylor says that the Fed has deviated from the Taylor rule before, but this was the greatest deviation over the last few decades (*The Economist*, 2007). Taylor's argument criticises the Fed for creating an artificially low interest rate environment in which the housing bubble was allowed to grow. However, according to Blanchard (2009), there was no pressure on inflation and the equilibrium world interest rates were low – hence there was no reason for Greenspan to increase the federal funds rate.

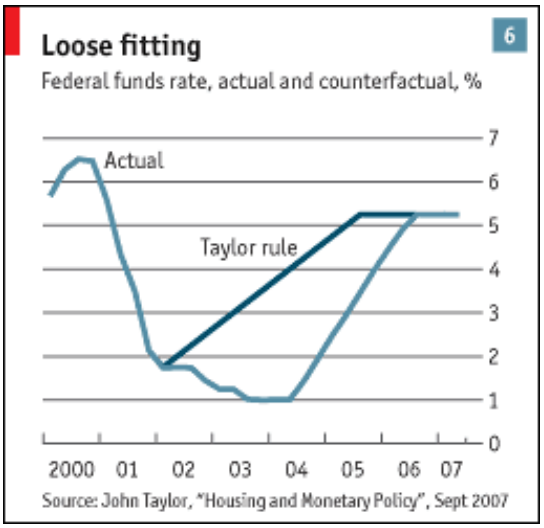

Figure 1: The Taylor rule
Source: Chart published in *The Economist*, on October 18, 2007 using data from John Taylor's paper "Housing and Monetary Policy" September 2007. See: http://www.economist.com/node/9972453

Donald Kohn, former Vice Chairman of the Federal Reserve System, identified various limitations to following a simple rules-based approach to monetary policy, such as the Taylor rule. Firstly, there are many measures of inflation (e.g. the GDP deflator, CPI, core CPI, etc.) and the Taylor rule requires a single measure. However, there can be significant short-run deviations between the various measures. Secondly, it is not easy to determine the level of potential output or the equilibrium real interest rate as both are inferred from other information and both could fluctuate with changes in other factors. Thirdly, the Taylor rule relies on lagged or current values of a small set of variables while "policy is best made looking forward … especially in periods of rapid or unusual change" (Kohn, 2012: 173-182). According to Kohn (2012), before meetings of the Federal Open-Market Committee (FOMC), policymakers receive several versions of the Taylor rule to consult, but that it is not viewed in isolation, and that "central banks monitor a wide range of indicators in conducting monetary policy".

In an opinion piece for the New York Times in 2015, entitled "Bad Tayloring", Paul Krugman states that Republicans in the US are pushing for government to force the Fed to follow the Taylor rule and that this would be a very bad idea. Krugman highlights the fact that the Taylor rule was devised during the period of "Great Moderation", and that Taylor misjudged the risks and volatility in the economy of which the financial crisis is evidence (Krugman, 2015). The period of Great Moderation lasted from the mid-1980s until the beginning of the crisis. This period was characterised by a softening of the volatility of business cycle fluctuations and it was in these benign economic conditions that Taylor first proposed following a systematic monetary policy that is free from fiscal concerns – in other words, abandoning discretionary monetary policy in favour of the Taylor rule.

Robert Schiller, professor of Economics at Yale University, along with Karl Case, created an index of housing prices dating back to 1890. The index is now known as the Standard & Poor's Case–Shiller home price index. This index showed a large spike in US housing prices beginning in the early 2000s. Schiller predicted a US housing price bubble as early as 2003, and in the second edition of his book entitled *Irrational exuberance*, published in 2005, he fortified his prediction of a housing bubble. Table 1 shows the index of home prices used in the second edition of Schiller's book. The index is updated monthly and reflects prices from 1890 to the present. In 2013, Schiller won the Nobel Prize in Economics for his work predicting both the housing bubble and the stock market bubble. It is worth noting that US housing prices reached a low in 2012, but have recovered significantly since then and are again on another steep upward trajectory.

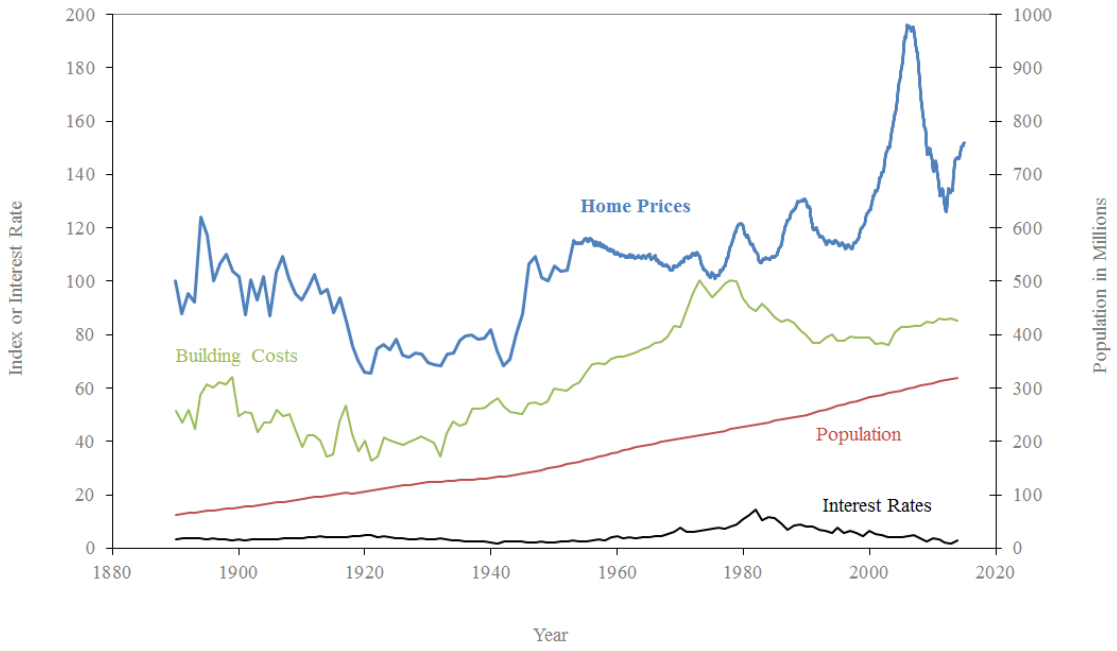

Figure 2: Case-Schiller Housing Index

Sourced from http://www.econ.yale.edu/~shiller/data.htm (accessed on 28 February 2015)

However, according to Frederic Mishkin, a member of the Board of Governors of the Federal Reserve System from 2006 to 2008, the Fed would have had an almost impossible task of deflating the housing market asset-price bubble (*The Economist*, 2007). He argues that in order for a central bank to prevent an asset-price bubble from bursting, three conditions would need to be met. Firstly, the central bank would need to identify the bubble before it bursts; secondly, monetary policy would need to be incapable of dealing with the consequences of the burst bubble; and thirdly, the central bank would need to know what monetary policy would deflate the bubble. Mishkin maintains that all three conditions would in all probably not be met. Firstly, if the central bank were aware of a bubble, then so would the market be aware and it would burst before action could be taken. Secondly, Mishkin asserts that central banks are capable of dealing with the consequences of an asset-price bubble burst and that the Japanese experience after the asset-price bubble of the 1990s was

unique because the Japanese central bank made many mistakes before and after the bubble burst. Thirdly, it seems improbable that central banks would know exactly what monetary policy would be effective in deflating the bubble. Mishkin believes that it is better for a central bank to act swiftly after the bubble bursts (*The Economist*, 2007).

Hyman Minsky, late Professor of Economics at Washington University, developed a model to interpret financial crises in the US, Great Britain and other market economies. The model identifies various steps leading to a crisis (Kindleberger & Aliber, 2005: 21). Firstly there would be some kind of macroeconomic shock which might make some assets more desirable than others; secondly, this desirable asset would be in high demand; and thirdly, a credit supply expansion would allow people to increase the demand for this asset. As demand grows, the asset price continues to rise which in turn leads more people to take out loans to jump on the bandwagon. Lastly, there would be some kind of incident which would spark "revulsion" towards the asset, resulting in widespread panic selling which would drive the price of the asset down. Minsky highlighted the pro-cyclical nature of credit, namely that the extension of credit increases in boom times and decreases during economic slowdowns, exacerbating the cycle. Minsky's model is consistent with the subprime crisis: housing prices were on the rise and low interest rates combined with lax underwriting policy made it easier for subprime lenders to obtain mortgage loans. Many mortgage loans were converted into MBSs which were easily tradable and held by many financial institutions. The revulsion event (catalyst) could be said to be when Lehman Brothers, a major bank that was heavily involved in the creation and selling of MBSs through its subprime lender BNC Mortgages, filed for bankruptcy on 15 September 2008. Although the crisis followed the basics of Minsky's model, the model does not explain why the crisis was so much more severe than any since the Great Depression and why it had such far-reaching effects. Section 2.2.4 looks

at the structure of complicated financial instruments involved in the crisis and the contagion effect they potentially had. First, sections 2.2.2 and 2.2.3 will examine securitisation and subprime lending, respectively.

2.2.2 Securitisation

Securitisation is the practice of pooling various types of contractual debt together and selling them in the form of bonds to investors. This is an off-balance-sheet activity, meaning it is not a conventional banking activity. In the years leading up to the crisis, the market for mortgage lenders was highly competitive and this was in part due to the 1999 Gramm-Leach-Bliley Act which effectively repealed certain provisions of the Glass-Steagall Act. The Glass-Steagall Act refers to four provisions in the US Banking Act of 1933 which separate commercial and investment banking. The Glass-Steagall Act was enacted in the aftermath of the Great Depression as a way of preventing excessive risk taking and conflicts of interest in the financial industry. Commercial banks were prevented from dealing in non-governmental securities for customers; investing in non-investment grade securities for themselves, underwriting or dealing in most securities. Lastly, these banks were prevented from affiliating with any company primarily engaged in such activities. Conversely, investment banks or securities firms were prevented from taking deposits (Barth, Brumbaugh, & Wilcox, 2000: 191-204). Joseph E. Stiglitz, Economics Professor at Columbia University, and recipient of the Nobel Prize in Economics, warned of the dangers if these activities are not kept separate before the enactment of Gramm-Leach-Bliley. A commercial bank's primary business is to manage other people's money and to lend conservatively, whereas an investment bank's primary business is to organise the sale of bonds and equity with the goal of achieving the highest profit possible for its clients. Stiglitz (2010: 321–339) believes that the bigger risk

culture of investment banking won out over the conservative culture of commercial banks when Glass-Steagall was repealed. In contrast, there are some, like former US President Bill Clinton, who argue that the enactment of Gramm-Leach-Bliley helped mitigate losses in the financial crisis because commercial banks were allowed to acquire investment banks and that loopholes in Glass-Steagall had been taken advantage of since 1960 – hence it was largely irrelevant. In addition, regulators had allowed banks to enter into limited securities and insurance activities with few problems being attributed to these practices before the repeal. However Gramm-Leach-Bliley permitted financial institutions to form holding companies which could own banks and other financial subsidiaries. Subsidiaries were allowed to engage in activities that the banks themselves were prevented from directly entering into (Barth *et al.*, 2000: 191-204). Thus banks were able to expand into non-conventional banking activities such as securitisation by acting through subsidiaries of bank-holding companies as well as separate entities such as special purpose vehicles (SPVs). SPVs gained infamy in 2001 when it was revealed that Enron created an SPV in order to move losses off its own balance sheet and on to that of the SPV to avoid accounting for those losses. The SPV's investors received Enron shares as compensation for their losses but the scheme soon fell apart. Generally, this kind of accounting treatment was easier to achieve under the US GAAP (Generally accepted accounting principles) system compared to the IFRS (International financial reporting standards) system. However, 2010 updates to US accounting rules relating to SPVs would make this kind of accounting treatment harder to achieve for certain transactions (Bank for International Settlements, 2009).

The role that SPVs, also known as special purpose entities (SPEs), played in the recent crisis was as vehicles for the disaggregation of the risks of an underlying pool of exposures (Bank for International Settlements, 2009). This, in and of itself, is not a bad thing, but subprime

lending, asymmetric information problems combined with opaque financial instruments contributed to the failure of many of these entities. Many banks created SPVs to buy mortgage loans originated by the sponsor bank and who would repackage this debt and sell it to investors through the process of securitisation. Securitised assets are also called structured finance products. This debt could take the form of asset-backed commercial papers (ABCPs), mortgage-backed securities (MBSs), structured investment vehicles (SIVs), collateralised loan obligations (CLOs), collateralised debt obligations (CDOs) and collateralised debt obligations squared (CDO²s). For the purposes of this study, MBS, CDOs and CDO²s will be discussed in further detail in a later section (No distinction is made between commercial mortgage-backed securities [CMBSs] and residential mortgage-backed securities [RMBSs]). An SPV can take the form of any legal entity and is usually kept separate from its sponsor or parent company for regulatory, accounting and bankruptcy purposes. Through this process of securitisation, banks therefore no longer had to hold all the mortgage loans they had originated on their balance sheets for the full term of the loan, usually 20 years. This created an asymmetric information problem since the originators were no longer concerned about the risk of default since the loans would not be held on their balance sheets for long. Banks would conduct less credit due diligence on assets bound for SPVs than they would for assets destined to be held on the banks' balance sheet. This is a kind of moral hazard since the originator of the loan knows that other investors will bear the risk of default. This situation encouraged loan originators to issue loans to people who did not meet traditional lending criteria, and these would become known as subprime loans. This business plan is known as the originate-to-distribute business model. Loan originators were also able to earn fees when selling loans to SPVs and additional fees could be earned by the originator for management and administration services for the SPV (Bank for International Settlements, 2009).

The use of off-balance-sheet entities like SPVs was inadvertently encouraged by Basel I because these detached entities required less capital than assets held on banks' own books. The 1988 Basel I accord was a step forward in banking supervision since it provided a set of internationally recognised minimum capital holdings on banks' balance sheets. The Basel Committee on Banking Supervision provides a framework for prudential supervision of banks. The Committee also provides a forum for cooperation on banking supervision and members come from all over the world, including South Africa (Bank for International Settlements, 2014). However, the Basel Committee does not have the authority to impose acceptance of its framework on countries – instead, it is up to central banks and governments whether or not to implement the accord. This causes an inconsistency in the timeframe of application, and in some cases, in the manner of application. For instance, European banks generally had less ability to move assets off balance sheet into an SPV, but because European risk-based capital requirements are not as closely tied to accounting, there was less incentive to move assets off balance sheet. Conversely in the USA, US institutions can easily move assets off balance sheet to SPVs and they have the incentive to do so because Basel I required US banks to hold more capital for certain exposures than in Europe (Bank for International Settlements, 2009). These kinds of practices are known as regulatory arbitrage, and as early as 1999, the Basel committee began formulating what would become known as Basel II. Basel II includes more risk-sensitive approaches for measuring capital requirements for positions that an originator purchases from an SPV to which the originator transferred assets. However, because very few banks had adopted it prior to the crisis, its provisions were untested.

According to a report issued by the Bank of International Settlements in 2009, the use of SPVs was not inherently problematic, but rather it was the poor risk management and a

misunderstanding of the associated risks and possible structural behaviours of SPVs that contributed to failure of their usage during the crisis. Ultimately, SPVs had been used successfully for years before the crisis so it is unclear whether the poor credit quality of the underlying assets sold to SPVs could be attributed to the SPVs' structural behaviour (Bank for International Settlements, 2009).

SPVs allowed banks to move assets and liabilities off their balance sheets; backed by less capital than if they were kept on the banks' balance sheet. In essence, this created a "shadow banking system" with lower capital requirements than traditional banking institutions, which geared up the whole financial system (Blanchard *et al.*, 2014). This increase in leverage due to reduced capital holdings would prove to accelerate the crisis. For example, in 2006, Citigroup had off-balance-sheet assets to the value of $2.1 trillion, but the value of assets on its own balance sheet was only $1.8 trillion (Blanchard, 2009). Prior to the crisis, many banks committed themselves to helping SPVs pay out investors if necessary, but the severity of the crisis was not foreseen and the severe devaluation of assets held by some SPVs led to their bankruptcy. By mid-2008, write-downs and returns of some of Citigroup's off-balance-sheet assets had decreased the value down to less than one half of the value of assets held on its own balance sheet. In many cases, these assets and liabilities were moved on to the balance sheet of the sponsor bank, which created a huge strain on the financial industry.

According to Juraj Sipko, Associate Professor at Pan-European University, the abolishment of the Glass-Steagall Act contributed directly to the phenomenal growth in the derivatives market seen in the first decade of the 21st century. Using data from the Bank of International Settlements (BIS), Sipko (2011) estimated that at the end of 2000 the gross notional amount outstanding of OTC derivatives would be approximately $95 trillion, which would increase to

$675 trillion at the end of 2008, which was more than seven times the 2000 figure. Credit default swaps were in their infancy when Glass-Steagall was repealed, but reached a gross notional outstanding volume $62.173 trillion by the end of 2007, the same volume as the worlds' combined GDP (Sipko, 2011: 33-38).

2.2.3 Subprime lending

The Fed refers to a subprime borrower as an individual who has a low credit score, a history of delinquency, foreclosure or bankruptcy and a debt service to income ratio of ≥ 50% among other characteristics (Sengupta & Emmons, 2007). These borrowers would not qualify for a standard mortgage because they do not meet one or many of the traditional lending criteria such as no collateral, no job or a poor credit history. Lending to borrowers who did not meet traditional lending criteria became known as subprime lending. Examples of subprime loans offered include the "NINJA" loan and "Liar" loan. NINJA loan is an acronym for a loan granted to a borrower with no income, no job and no assets. Liar loans did not require borrowers to provide proof of their stated income. In addition to lax lending criteria, some lenders would give borrowers a low teaser interest rate for the first few periods and thereafter the higher interest rate would apply (Connerty, 2010: 83). Subprime borrowers are thus distinguished from prime borrowers, and as a result usually have to pay a higher cost for credit, that is, a higher interest rate.

In the early 2000s, the lowest interest rates in decades contributed to the creation of an intensely competitive market for US mortgage lenders. Seeking higher revenue and market share, more mortgage lenders began relaxing underwriting standards and originating riskier mortgages to less creditworthy borrowers. Subprime lenders included investment banks and

government-sponsored enterprises (GSEs) such as Freddie Mae. The Federal National Mortgage Association (FNMA), commonly known as Fannie Mae, was founded in 1938 during the Great Depression as part of the New Deal, and has been a publicly listed company since 1968. It does not lend directly to consumers but rather buys loans made by banks on the secondary market. Freddie Mac, another GSE, was created in 1970 and, like Fannie Mae, it buys mortgages on the secondary market and repackages them as mortgage-backed securities (MBSs) which it sells to investors. According to an article in the *New York Times* published on 30 September 1999, Fannie Mae had been under increasing pressure from Bill Clinton's administration to expand mortgage loans to low- and moderate-income people, and it was also under pressure from shareholders to increase profits. Fannie Mae started easing its credit requirements on loans that it purchased from banks and other lenders in order to create MBSs (Holmes, 1999).

Minsky identified three types of finance, namely hedge, speculative and Ponzi. Hedge finance means that the borrower's income is sufficient to pay both the interest rate payments and capital repayments on a loan. In speculative finance, the borrower can pay the interest rate payments, but not the capital repayment. Lastly, Ponzi finance means that the borrower's income does not cover the interest payments or the capital repayments, and it is necessary to rely on selling assets or securing more loans to make these payments. According to Minsky, during an economic recession, some borrowers are pushed into a lower group, either into the speculative finance or even the Ponzi finance group (Kindleberger & Aliber, 2005: 21). Many subprime borrowers were in the speculative finance group during the boom times, since they needed the value of their properties to continue to appreciate. The appreciation of their property value allowed them to repay their loans with newly found home equity. As the economy slowed, many borrowers were pushed into the Ponzi finance group and could not

make their repayments, forcing them to default on their loans. In addition, as housing prices fell, many mortgages exceeded the value of the house, in which case, the mortgage is said to be underwater, leading to default or foreclosure.

At the time, many thought that subprime loans were giving people, who would not normally be able to own their own homes, a piece of the "American Dream". However, it was unlikely for housing prices to rise indefinitely at the rates necessary to allow subprime borrowers to use equity to make the repayments. Lending money to people who have to rely on the value of the underlying asset to increase in order to make their repayments is tantamount to predatory lending. While US lenders were jumping over one another to lend money to subprime borrowers, in South Africa, the National Credit Act of 2005 protected consumers from this kind of predatory lending by financial institutions. The Fed was aware of this problem early on, and in the February 2002 report, it was noted that "the economic slowdown and the rise in unemployment significantly eroded the quality of loans to subprime borrowers, and delinquency rates for both mortgages and consumer credit in that segment of the market moved sharply higher" (Board of Governors of the Federal Reserve System, 2002).

2.2.4 Complex financial instruments

The first MBS was created by Bank of America in 1977. A financial institution administers an MBS by collecting the mortgage cash payments from multiple mortgage lenders and grouping them into pools from which specific securities draw payments from various tranches grouped according to risk and earnings potential. These tranches are given different ratings by credit rating agencies according to their value, risk and liquidity. According to the credit rating system, AAA rated assets are the most valuable, least risky and easiest to sell

(most liquid) assets. As one goes down a step in the tranche, the assets are lower rated because they are more risky owing to the fact that they will only be paid out as long as the tranche above it has been fully paid (Benmelech & Dlugosz, 2010: 161-207). One can think of this in terms of a sequence of water buckets, one held above the other. The highest rated tranche would be represented by the first bucket and the payment streams as the water. Only once the first bucket is completely full, will the water overflow into the second bucket, and so on, until the water finally reaches the last bucket. If there are no defaults, then the lowest rated tranche will receive its full payment, but defaults will dry up payments in the lowest tranche first. The lower rated bonds have a higher risk of default than the higher rated bonds, but they are compensated for this with a higher interest rate – hence they have the potential for higher earnings as long as defaults are at a minimum. The higher rated tranches are called senior tranches, while the lower rated ones are called junior tranches.

Financial institutions did not stop at securitising subprime mortgages into MBSs. CDOs were first created in the 1990s, and consist of various types of debt pooled together. This debt may include credit card debt, vehicle loans and mortgage loans, which serve as collateral for the CDO. A special purpose vehicle (SPV) would pool MBSs together into tranches with varying risk and return potentials which it would sell to investors. Following the US housing market boom, frequently the lower rated tranches of MBSs were pooled together into a CDO. Senior tranches of CDOs would often receive high ratings despite being backed by the most risky MBSs. CDOs are re-securitised securities, because unlike MBSs, which are backed by actual mortgage loans, CDOs are backed by MBSs (Benmelech & Dlugosz, 2010: 161-207). If the CDO is backed by other structured credit securities (e.g. MBSs), it is called a structured finance CDO, and if it is backed solely by other CDOs, it is called a collateralised debt obligation squared (CDO^2).

Financial institutions used CDOs to obtain investor funds for subprime mortgages generating large fees for themselves. The system would continue to work as long as defaults were kept to a minimum. As long as property prices in the US were increasing, most subprime borrowers were able to make their repayments, but when the housing bubble burst in the second half of 2007, the default rate soared. The house is the collateral on a mortgage agreement – if the borrower defaults, then the house is sold to repay the lender. However, if the value of the mortgage is more than the resale value of the house (this situation is referred to as the mortgage being underwater), then the lender will lose money on the default. Owing to the reduced mortgage payments received, the lower tranches stopped receiving their incomes, which caused panic selling of these instruments. This led to the supply far exceeding the demand for these securities which further eroded their value, and created a vicious downward spiral.

Credit rating agencies gave many MBS, CDO and CDO² tranches a high rating despite the fact that they comprised high risk assets. This could have been either an error on their part because of the opacity of these instruments or perhaps the result of the perverse incentive structure of the rating agencies. Agencies such as Moody's and Standard and Poor's are paid by the security issuers for whose securities they rate, resulting in a serious conflict of interest. A study conducted by staff of the Federal Reserve Bank of New York in 2010 found that rating agencies provide useful information, but there was a progressive decline in standards leading up to the crisis, between the beginning of 2005 and mid-2007, when the MBS market was at its pre-crisis peak (Ashcraft, Goldsmith-Pinkham, & Vickery, 2010). During 2007 and 2008, rating agencies radically downgraded securitised asset tranches in successive rounds. Moody's alone downgraded 36 346 tranches during this period, nearly one third of these were

previously rated AAA (Benmelech & Dlugosz, 2010: 161-207). Another contributor to the inaccurate risk assessments could be the use of credit default swaps packaged with CDO tranches. The characteristics of CDSs that allow them to change risk assessments is discussed in section 2.2.6, while the role of rating agencies is discussed further under section 2.2.7.

2.2.5 Credit derivatives

In a paper presented to the Federal Reserve Bank of Atlanta in May 2007, David Mengle, then head of research at the International Swaps and Derivatives Association, defined a derivative as a bilateral agreement whereby risk is shifted from one party to another and its value is derived from the value of an underlying instrument. A broad range of derivatives exist, and they can be classified as interest rate, exchange rate, commodity and credit derivatives. A credit derivative is an agreement to shift credit risk from one party to another; with its value derived from the credit performance of one or more reference entities. Reference entities could be corporations, sovereign entities (in other words, a country) or debt obligations. "[T]he vast majority of credit derivatives take the form of the credit default swaps , which is a contractual agreement to transfer the default risk of one or more reference entities from one party to another" (Mengle, 2007).

CDSs gained infamy during the crisis for several reasons. The following is a brief summary of the key issues that will be discussed in detail in section 2.2.6. Firstly, CDSs can reference an entity that neither party to the CDS owns, therefore allowing speculators to make large bets on the performance of the reference entity, which in many cases exceeds the value of the market for the reference entity (see subsection 2.2.6.3). Secondly, SPVs can secure even higher credit ratings for their CDO tranches by packaging CDSs with some of the tranches

(see subsection 2.2.6.4). Thirdly, they can be used to create a "synthetic CDO" which is a credit derivative itself, not a structured finance product like a CDO (see subsection 2.2.6.5). Since CDSs were traded OTC, the amount of CDSs held and the counterparty risk of large financial institutions through their CDS holdings were uncertain, further fuelling mistrust between financial institutions (see subsection 2.2.6.6). Lastly, there is a brief discussion of other types of credit derivatives (see subsection 2.2.6.8).

2.2.6 Credit default swaps

The section on CDSs has been broken down into subsections. The first subsection deals with the definition of this instrument and the most common types used. The second provides a practical example of how a single-name CDS functions. The third subsection contrasts the two primary uses of CDSs, namely hedging and speculation. The fourth subsection examines how CDSs can be used to secure higher credit risk ratings for other financial products. The fifth looks at how the characteristics of CDSs allow them to create other credit derivatives. The sixth looks at how these instruments exacerbate counterparty risk in times of uncertainty. Lastly, the seventh subsection examines real-life examples of index CDSs created using MBSs.

2.2.6.1 Definition and types of CDS

According to the ISDA, a credit default swap is a contractual agreement whereby one party buys protection from the default risk of a reference entity and the other party sells the protection in exchange for a periodic fee received from the protection buyer for the term of the CDS. If there is a credit event (i.e. the reference entity defaults or declares bankruptcy), the protection buyer is entitled to protection on a specified face value (which is referred to as

the notional amount) of reference entity debt (International Swaps and Derivatives Association, 2014).

There are numerous types of CDSs. The three main types are single-name CDSs, basket CDSs and index CDSs. A single-name CDS refers to a single reference entity, that is, a corporation, sovereign entity or debt. When there are two or more reference entities, it is called a basket CDS. Because a basket CDS does not only refer to a single reference entity, it needs to be stipulated after how many entities experience a credit event, the CDS will be triggered. There are first-to-default CDSs, where if any one of the entities has a credit event, it will trigger the CDS. The contract can stipulate any number of entities that must have a negative event, right up to an all-to-default CDS, where all of the entities must default before the CDS is triggered. And lastly, an index CDS references as many as 125 entities and each entity has an equal share of the notional amount (Mengle, 2007). It is important to distinguish between a single-name CDS and a basket or index CDS.

2.2.6.2 Practical example of the pricing and life cycle of a single-name CDS

The price of the CDS is known as the spread or premium and it represents the annual interest rate paid by the protection buyer to the protection seller. It is calculated as an annual percentage of the nominal amount represented as basis points and is usually paid quarterly. When pricing a CDS, the likelihood of default, the recovery rate in the event of default as well as market sentiment are taken into account. The higher the spread (interest rate), the more risky the reference entity is assumed to be. The parties to the contract do not need to own the reference entity or obtain the reference entity's (or reference entity's owner's) permission to enter into a CDS because the reference entity is not a party to the contract

(Mengle, 2007). This means that parties to a CDS are able to speculate on the performance of the reference entity without being exposed to the reference entity. Therefore a CDS can be bought for the following two reasons: firstly, to hedge against possible losses, that is, the protection buyer owns the reference entity and wants to be protected from loss should the reference entity suffer a credit event; and secondly, a CDS can be bought to speculate on the creditworthiness of the reference entity.

A credit event is well defined by a bilateral agreement of the parties prior to the inception of the CDS. In the case of a single-name CDS on a corporate bond, a credit event may refer to the default on coupon payments on a bond; a restructuring of the bond that is detrimental to creditors; bankruptcy of the bond issuer; repudiation of the contract; a moratorium on payments; or even a decline in the bond's credit rating. A credit event triggers the CDS, which means the protection seller needs to pay the protection buyer the pre-agreed-upon cash payment known as the "default payment". This is usually the principal amount plus expected interest/coupon payments known as the nominal value, while the protection buyer must deliver the actual bond to the protection seller or the current cash value of the referenced bond.

To illustrate how a CDS functions, see the following example of a single-name CDS on a corporate bond: Say, for example, that Company Z issues a bond worth R100 000. If the premium on a CDS written using Company Z's bond as the reference entity is 200 basis points (0.2%), then the protection buyer would need to pay the protection seller R2 000 per annum for the duration of the CDS's lifespan. As long as there is no credit event before the CDS reaches maturity, then the protection seller will keep the premiums and not have to pay anything to the protection buyer.

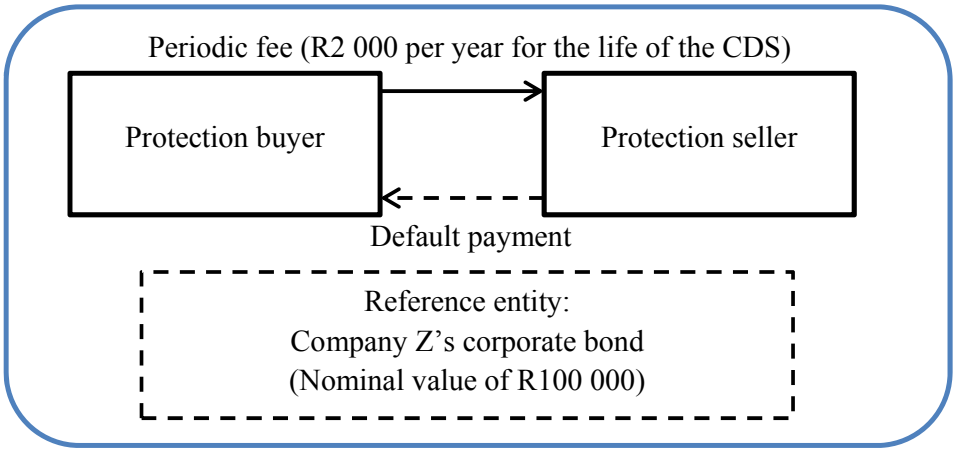

Figure 3: Example of a single-name CDS on a corporate bond
Source: Compiled by researcher (2015)

What happens when a credit event takes place? If the protection buyer owns the underlying reference entity, then it is a simple procedure to settle with the protection seller. This procedure is known as "physical settlement", whereby the protection buyer gives the protection seller the physical bond in exchange for payment, which equals the nominal value of the CDS. Alternatively, the protection buyer can keep the bond and the protection seller will pay out the nominal amount minus the par value of the bond.

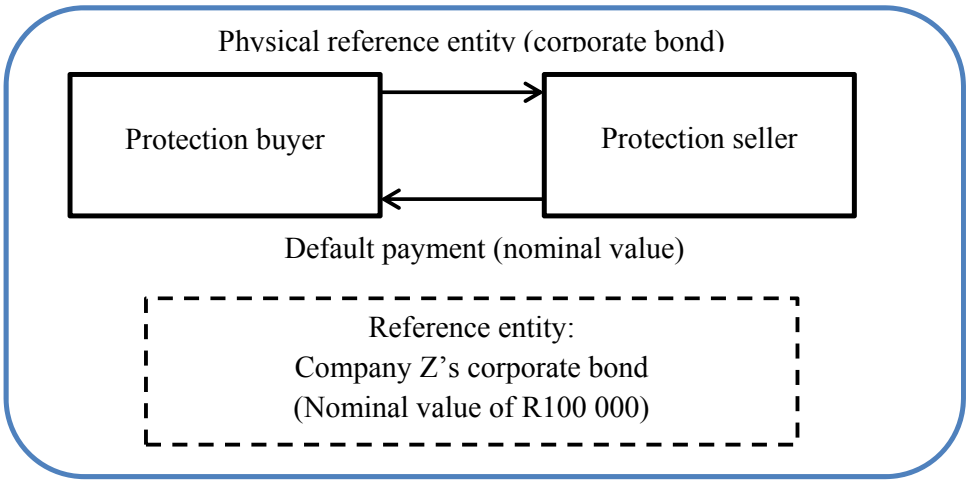

Figure 4: After a credit event: physical settlement of a single-name CDS
Source: Compiled by researcher (2015)

However, with the increased use of CDSs for speculative purposes, if there is a credit event, only a few of the CDS buyers would actually hold the underlying bonds. If the physical payment method was used in the case where many of the CDS buyers did not hold the underlying bond, the bonds would have to be recycled in order to settle all the CDSs. This would artificially raise the price of the bonds after the credit event, which would artificially push the expected recovery rate higher and increase the volatility of the defaulted bonds. These problems gave rise to the ISDA establishing a global protocol for cash settlement via the auction process in 2005. According to the protocol, CDS buyers and sellers must submit an adherence letter to the ISDA for every credit event, that is, parties had to opt in to the auction process. This only applies to single-name CDSs. The cash settlement auction process is overseen by a dealer broker such as ICE (Creditex) which conducts a dealer poll where dealers place orders for the debt of the reference entity to establish the inside market midpoint (IMM). The IMM is the market value of the bond represented as a percentage of the notional amount which is called the recovery rate. Protection buyers who do not own the reference entity are paid the notional amount minus the recovery rate (Mengle, 2007).

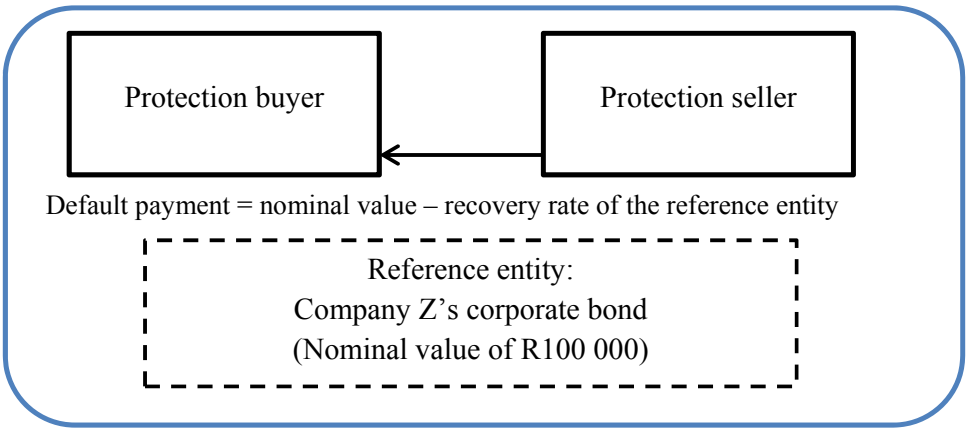

Figure 5: Cash settlement auction of a single-name CDS
Source: Compiled by researcher (2015)

The largest test for the cash settlement auction since its inception came with the bankruptcy of Lehman Brothers. At the auction on 10 October 2008, the recovery rate was set at 8.625 %. That meant that protection sellers had to pay out 91.375% of the nominal value of CDSs against debt, with Lehman Brothers as the reference entity. This was a huge win for speculators who had bet against Lehman Brothers. The estimated notional amount of CDSs bought on Lehman Brothers debt is estimated between $72 billion to $400 billion which is an astronomical number, but after multilateral netting, only $5.2 billion changed hands at the cash settlement (Stulz, 2010: 73-92). The vast difference between the notional amount outstanding on the CDSs and the final settlement amount is due to multilateral netting which is discussed in section 2.2.6.6.

2.2.6.3 Hedging versus speculative use of CDSs

Since CDSs transfer risk, they are essentially insurance contracts. However, they differ from insurance contracts in two important respects. Firstly, the buyer of a CDS does not need to own the underlying reference entity debt to take out a CDS against the default of the reference entity or any another kind of stipulated credit event. Secondly, the seller of the CDS need not be a regulated financial entity and is not required to maintain reserves to cover the protection sold. The first distinction gives rise to the incentive to speculate on debt using CDSs. Since the buyer of a CDS need not own the reference entity's debt, many CDSs can be taken out against a single credit obligation. The second distinction means that the CDS seller might not have the necessary capital to meet its obligations, as in the case of AIG, which will be discussed in section 2.2.10.

Hedging can increase stability in the financial system because risk is held by those parties who are prepared to accept it. Hedging is often used by businesses for the purpose of risk management and through this transfer of risk to those who have an appetite for it, derivatives increase social welfare. CDS dealers often buy protection to hedge against protection they have sold, therefore balancing their risk exposure. The second reason is to speculate. A speculator who thinks there will be a credit event can buy a CDS against the reference entity without holding the reference entity, and make a profit if a credit event does happen. Likewise, if the speculator believes that the reference entity is creditworthy, he or she can sell a CDS and earn premiums as long as a credit event does not take place. In essence, speculators are placing bets about the probability the reference entity will default or experience any kind of stipulated credit event. They can take long and short positions in the reference entity without having to own it, essentially creating a synthetic portfolio of bonds and allowing them to create highly leveraged positions. When the buyer of the CDS does not own the underlying reference entity, it is referred to as a naked swap. Naked swaps violate the insurance industry principle, "requirement of insurable interest". This principle can be explained as follows: one is allowed to take out home insurance on one's own home because one has an interest in it, but one is not allowed to take out home insurance on one's neighbour's house (Vasudev, 2014: 56-74).

Hence, to continue with the example of a single-name CDS on a corporate bond, the investor who buys the bond issued by Company Z can also buy a CDS against the possibility that Company Z's bond suffers a credit event, thus hedging their risk. Any other party can also buy a CDS against a credit event on Company Z's bond. Assume that in total, CDS sellers sell ten CDSs against Company Z's bond. If company Z does default and there is a 0%

recovery rate, the CDS protection sellers will be required to pay R1 000 000 to the CDS protection buyers.

2.2.6.4 How CDSs can be used to acquire higher credit ratings on financial assets

Many institutions are prevented from holding financial assets below a certain credit rating, but CDSs offer a way around this. Say, for example, Institution X would like to buy a corporate bond from Company Y. Company Y has a BB rating, but Institution X is restricted by law or by shareholders from buying assets with less than an A rating. Institution X can secure a CDS against Company Y's bond from CDS writer U which has a credit rating of AA. Owing to the fact that the CDS provides default insurance on Company Y's bond, Company Y's credit rating is no longer important because Institution X will be paid out if Company Y does default. The important credit rating therefore becomes that of CDS writer U, which has a rating of AA. So in that way the CDS issuer gives its credit rating to the underlying bond superficially. In the same respect, banks used CDSs in order to reduce the amount of capital they had to hold. This is because under Basel I, capital requirements were based on risk weightings – hence the higher credit rating given by a CDS seller would give the asset a higher credit rating requiring less capital and allowing banks to increase their leverage.

2.2.6.5 How CDSs can be used to create other credit derivatives

CDOs are managed by SPVs and one can distinguish between two different types used before the crisis: firstly, there are balance-sheet CDOs where the loan originator has moved all the reference debt to the SPV, who then repackages this debt into tranches and sells this debt to investors. CDSs bought by the SPV against these CDOs were essentially hedging instruments

since the SPV owned the underlying debt, as long as the total notional amount of the CDSs did not exceed the total value of the underlying debt.

Secondly, there are synthetic CDOs which are credit derivatives because the SPV does not own all the underlying debt – it simply references it. A synthetic CDO is not backed by a pool of assets like other CDOs, but consists instead of CDSs which simulate a portfolio of assets. The synthetic CDO thus relies on the default of the reference entities in order to generate an income. A synthetic CDO is a credit derivative, not a securitised asset. An example of a synthetic CDO is J.P. Morgan's "BISTRO". The SPV had capital of $700 million against the notional value of $10 billion for the reference portfolio. The SPV then bought CDSs against the full value of the reference portfolio. Following a default, revenue from CDS pay-outs would first be paid to the SPV up to $700 million and thereafter would be paid to the loan originator. This created a large moral hazard since both the loan originator and the SPV benefited from the defaults of the CDOs' reference debt. In fact, since the SPV was paying for the CDSs, if the underlying reference debt had not defaulted, it would have made a loss. The systemic risk increases when there are multiple synthetic CDOs against a single reference portfolio, and when there are multiple CDSs per portfolio (Vasudev, 2014: 56-74). According to Vasudev (2014), 85% of CDOs issued in 2006 were synthetic – that is, approximately $471 billion out of $550 billion.

2.2.6.6 Opacity of CDS holdings and counterparty risk

Prior to the crisis, CDSs were traded exclusively OTC, that is, they did not go through a formal exchange. This meant that deals were concluded between two parties which made them highly customisable. The size of the market is difficult to measure because to determine

the gross outstanding notional amount of CDSs, dealers need to provide information about their holdings since it was not mandatory to use a central repository. In the US, the Depository Trust and Clearing Corporation (DTCC) keeps a record of the gross notional amount of outstanding CDSs involving large dealers, but it does not cover the whole market and data on CDS positions during the crisis only became available in late 2008 (Stulz, 2010: 73-92). The gross outstanding notional amount of CDSs overstates the market for two reasons. Firstly, many dealers will hedge against protection sold. For example, Company A goes to buy a CDS from Bank 1. If Bank 1 does not want to hold the risk, then it can go to Bank 2 to buy a matching CDS. Bank 2 can then decide whether to hold the risk or to buy protection from Bank 3, and so on. Hence after multilateral netting the actual amount of risk in the market, it is lower than the total notional amount. The second reason is that the OTC market consists of a few large dealers, and aggregating their notional outstanding amounts on CDSs leads to double counting since they often deal with each other in the US and UK.

Multilateral netting is a process whereby the transactions of more than two parties are off-set instead of being settled individually. For example, say that Bank A bought R100 000 worth of protection from Bank B who in turn bought R100 000 of protection from Bank C in order to balance its books. If the CDS were triggered and multilateral netting were not in place then Bank B would need to pay Bank A and Bank C would need to pay Bank B . However since Bank B has a balanced book, ie a net position of zero, then if multilateral netting were in place Bank C would pay Bank A directly. Even though Banks A and C did not transact with each other directly, in this instance they were the net protection buyers and sellers respectively and so money would change hands between them only. The CDS market is characterised by many large dealers, which explains why the final settlement after the Lehman Brothers default was much lower than the notional amount of the CDSs taken on

Lehman Brothers debt. However, even dealers who hold a net position of zero (like Bank C in the above example) can contribute to systemic risk through counterparty risk; this effect is discussed further in section 2.2.10.

In practice, CDS contracts are regularly traded prior to their maturity. This secondary market allows the value of CDSs to fluctuate, thus reflecting the market's view on the creditworthiness of the reference entity. When trading CDSs prior to the crisis, there was no requirement to inform the counterparty to a CDS that their counterparty had changed. This caused further confusion in the marketplace when large CDS counterparties like Lehman Brothers declared bankruptcy or defaulted.

2.2.6.7 Index CDSs in practice

In the early 2000s, it became popular to use ABSs as the reference entities for index CDSs. Common examples of ABSs used as reference entities for CDSs are MBSs and CDOs. However, index CDSs became highly complicated to keep track of owing to the high number of reference entities, so financial information and services companies such as Markit began providing an independent source of daily credit derivative pricing. Markit's ABX indices are backed by RMBSs and CMBS. According to Markit, its ABX index references a basket of 20 subprime MBSs, while its PRIMEX index references a basket of prime MBSs. When looking at RMBSs, one has the option of an agency index like MBX-IOS-PO or non-agency RMBS indices such as ABX, PRIMEX and iBoxx. Agency refers to RMBSs where the underlying mortgages were issued by government-sponsored entities such as Freddie Mac or Fannie Mae. Non-agency refers to private non-governmental issuers such as a SPV (Markit Ltd, 2014). In 2006, the ABX indices on subprime mortgage securitisations were introduced, but these indices fell sharply in 2007 (Stulz, 2010: 73-92).

The popularity of CDSs grew prior to the crisis. According to Blanchard (2009), issuers were happy to accept low premiums prior to the crisis because they assumed that the probability of having to pay out was nearly negligible. However, that turned out to be a gross misjudgement of the risks. There has been a strong regulatory response to credit derivatives and OTC derivatives since the crisis. These responses will be examined in section 2.4.

2.2.6.8 Other types of credit derivatives

Another type of credit derivative is the total return swap (TRS). In the case of a TRS, both credit risk and market risk for a reference entity are shifted from the protection buyer to the protection seller. The protection buyer makes payments to the protection seller equivalent to the total return of the reference entity (coupon payments plus capital gains or losses), while the protection seller makes payments to the protection buyer equivalent to agreed-upon fixed or floating interest rate payments.

CDSs and TRSs are the two basic forms which credit derivatives take, but their properties can create credit derivatives out of other investment products. For example, a synthetic CDO is a credit derivative because it references securitised assets, whereas a balance sheet CDO is not a credit derivative because the securitised assets are owned by the SPV.

In a similar way, a CDS or TRS can be linked to an investment product such as a bond or stocks to create a credit-linked note (CLN). A CLN is similar to a CDS except for one important distinction – a CLN is always funded (hardly any CDSs are funded in practice). The CLN issuer is the protection buyer and the CLN investor is the protection seller. Investors buy securities from the CLN issuer usually through an SPV, and in exchange they

receive fixed or floating coupon payments for the life of the security and at maturity, and as long as there has not been a credit event, they receive par value. If the reference entity experiences a credit event, the CLN issuer will pay the investors only the recovery rate. The SPV enters into a CDS selling protection against the default of the reference entity. A CLN therefore has an embedded CDS. See figure 6 below for an illustration of a CLN where the reference entity is a single-name corporate bond. The reference entity could also be a basket or index. Thus, unlike CDSs, the protection buyer using a CLN is not exposed to counterparty risk, whereas the protection seller is exposed to the risk of default of the underlying reference entity as well as counterparty risk to the CLN issuer. Hence a CLN investor receives a periodic fee on the underlying reference entity (roughly equivalent to the fee protection sellers would receive on the embedded CDS) plus a funding premium from the SPV (Kothari, 2009: 107-112). A CLN thus offers the issuer a hedge against credit risk without the associated counterparty risk of a CDS, and it offers investors a higher yield than they would receive on an equivalent CDS.

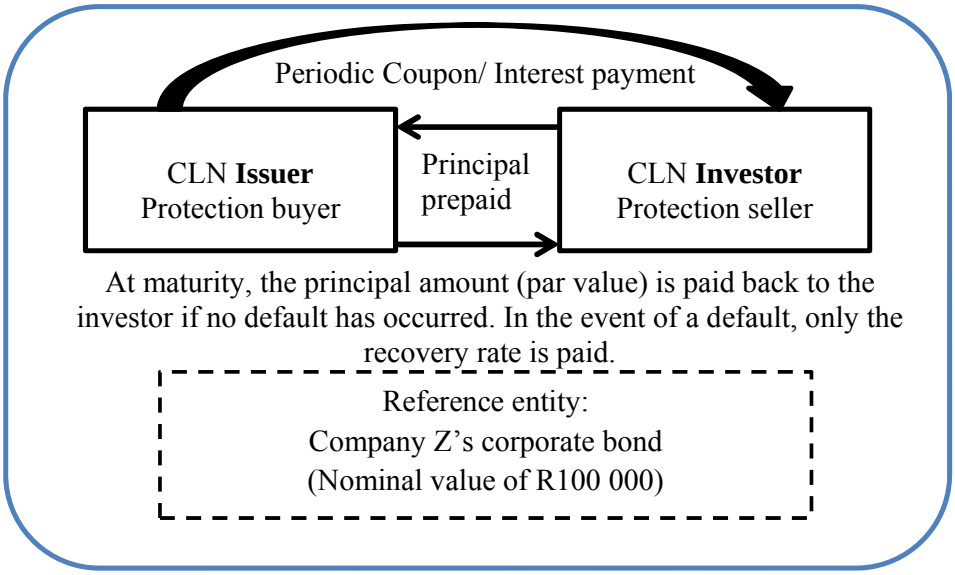

Figure 6: Example of a CLN on a single-name corporate bond
Source: Compiled by the author, 2015

2.2.7 Rating agencies

Moody's, one of the largest rating agencies, defines the role of ratings in the financial market as follows: "a rating simply helps investors determine the relative likelihood that they might lose money on a given fixed income investment. More technically, it is an opinion on the future ability, legal obligation and willingness of a bond issuer or other obligor to make full and timely payments on principal and interest due investors" (Pinto, 2006: 341-356). Investors have imperfect knowledge and generally have less information about the creditworthiness of investments than rating agencies – hence an asymmetric information problem exists. In addition, a moral hazard exists as rating agencies are paid by the issuers whose securities they rate. In fact, Moody's profits more than doubled between 2002 and 2006 (*The Economist*, 2007). Moral hazard exists when "one party to a transaction has both the incentive and the ability to shift the cost of its behaviour onto the other party" (Mohr, 2015). Thus, because rating agencies are paid by the issuers and not by the users of their information, they have the incentive to issue higher credit ratings. The reason for this moral hazard is that rating agencies provide information which is non-rival and non-excludable. This means that it costs the same amount to provide the information for one person as it does for the whole market. Hence, the information does not have a market price, and because access to the information cannot be restricted, it suffers from the free-rider problem. Thus, if rating agencies are not paid by the issuers of securities then they will not be paid at all, which means they will not render the service. It is worth noting that one US rating agency recognised by the Securities and Exchanges Commission (SEC), Egan-Jones rating agency (EJR), follows a "subscriber-pay" model. This model has received a lot of opposition from other rating agencies who argue that since smaller investors are unable to afford the information, a group of large investors could band together to create moral hazard problems.

In essence, the service provided by rating agencies is a public good. But would it not be better for rating agencies to be operated as public companies rather than private? The next two paragraphs look at some of the arguments for and against the nationalisation of rating agencies.

An argument for nationalisation is centred on the key role that rating agencies play in the regulation of the financial industry. Some financial institutions such as pension funds and commercial banks are not allowed to hold sub investment grade assets. The reason is that these institutions must be curtailed from making risky investments since their failure would be disastrous for the economy and society. Pension funds render a vital service for society – they receive savings from people in order to make long-term investments for pay-out at retirement. People do not invest in pension funds in order to speculate; they invest so that they can retire – hence the need for pension funds to be risk-averse institutions. By contrast, large commercial banks have systemic risk, meaning that if they fail they could cause widespread panic in the financial system. Hence when rating agencies make mistakes, there are huge implications for the financial system. Ultimately, rating agencies do not have perfect information so people should not rely on them 100% when making investment decisions. However, the complexity inherent in these financial instruments means that most retail and even institutional investors simply do not have the ability to properly understand the risks (*The Economist*, 2007).

The argument against the nationalisation of rating agencies is threefold. Firstly, there are many arguments that public institutions are less innovative than private institutions. Secondly, there is no guarantee that the information provided would be better because agencies have argued that it is not their job to measure market risk or liquidity risk and that

they only measure credit risk (*The Economist*, 2007). Credit risk refers to the chances of default on a debt instrument that is held to maturity; market risk refers to whether the price of the asset will fluctuate until it reaches maturity; and lastly, liquidity risk refers to how easy it is to trade the asset. The importance of market risk and liquidity risk is discussed in section 2.2.7. Thirdly, if the information comes from a government-sponsored entity, it may be perceived as a public guarantee and when information proves wrong, investors might demand bailouts.

2.2.8 Liquidity

Liquidity refers to the ease with which an asset can be converted into cash, and since cash is easily tradable, liquidity also refers to the ease with which cash can be traded. The business model of banks is such that they generally issue long-term assets and hold short-term liabilities. Banks therefore usually hold more short-term liabilities then short-term assets on their balance sheets while having more medium- to long-term assets then medium- to long-term liabilities. This is known as a maturity mismatch. During the normal course of business, liquidity will flow into a bank in the form of deposits and out of the bank when depositors withdraw their deposits. At the end of the day, one bank might have excess liquidity and another might have a shortage of liquidity. A bank with a shortage of liquidity needs to borrow to make sure it has enough liquidity so that it can meet its short-term obligations. Conversely, a bank with a liquidity surplus has more liquidity than it needs, so it would prefer for those extra funds to be earning interest rather than sitting idle. The interbank market fulfils the needs of both surplus units and deficit units in the banking sector. Money market instruments are considered to be highly liquid since they have a maturity of less than one year, and because they are easily tradable, their marketability makes them cash equivalents.

Most banks borrow and lend money in the interbank market for a period of less than a week and most of those are overnight-only transactions. The local interbank market is a source of short-term finance for banks, and for longer-term finance banks could look overseas.

Unlike in other industries, where the bankruptcy of a competitor may be welcome news, in the banking industry, a bank failure sets off tremors in the industry because banks are heavily connected. The primary reasons for the failure of one bank being disruptive to the whole financial system is twofold. The first has to do with the public's perception of the strength of the banking sector because a run on a healthy bank could shut it down on account of the asset maturity mismatch . The second relates to with counterparty risk. Unlike during the banking crisis that led to the Great Depression, a run on a bank is highly unlikely to mean queues of depositors lining up to withdraw their deposits in the US. This is because most deposits are federally insured and banks can use the interbank market to obtain liquidity (not relying solely on depositors). South African banks do not have deposit insurance. However, in its financial system stability assessment of South Africa, the IMF recommended that South African introduce a deposit insurance scheme (DIS) to reduce systemic liquidity risk (International Monetary Fund, 2014). Counterparty risk stems from the interconnectedness of financial institutions. When two parties enter into a contract, each party is exposed to the risk that its counterparty will not live up to the contractual obligations. When counterparty risk increases, banks' incentive to trade with one another diminishes. Even when the interbank interest rate increases in order to offset the increase in counterparty risk, it does not guarantee that surplus units will lend to deficit units because those banks that are most desperate for liquidity will pay the higher rate, while safer borrowers are less desperate for liquidity and could look elsewhere for funding. Hence during times of high uncertainty, safe borrowers might be pushed out of the market by high interest rates, leaving only unsafe borrowers in the

market. This serves as an incentive for surplus units to hang on to their additional liquidity and in an extreme situation the whole interbank market could seize up if surplus units are completely unwilling to lend to deficit units (*The Economist*, 2007).

If banks are unable to meet their liquidity requirements by borrowing, they are forced to sell assets. When many institutions are suffering from liquidity shortages due to a macroeconomic event, such as large-scale defaults on loans, there will be fewer investors willing to buy assets. The high supply of assets and low demand result in a fall in the prices of these assets. If investors are uncertain about the fundamental value of these assets, this could force banks to sell assets at prices below the expected present value of the payments on the asset, which is known as "fire sale prices" (Blanchard, 2009). As banks sell more assets, the price drops and the value of similar assets on their balance sheet or on the balance sheets of other banks will fall when using mark-to-market accounting. This cycle continues as the value of assets held by banks decreases, and they might have to sell assets or reduce their lending to maintain their capital ratios, further feeding into the fall in asset prices. Selling assets to maintain liquidity and capital ratios amplifies initial losses due to the macroeconomic event, but in the case of the financial crisis, these two amplification mechanisms were extremely strong because of the opacity of complicated financial assets (Blanchard, 2009). The true value of these complicated assets created doubt about the solvency of banks and further discouraged private lending.

2.2.9 Burst bubble

Trouble began brewing in the fourth quarter of 2005 when growth in US house prices started to slow. By the end of 2006, US housing price indexes started declining (Blanchard, 2009).

According to the Case-Schiller house price index, the first quarter of 2007 showed the first nationwide decline in year-over-year house prices after 1991. Defaults and foreclosures on subprime mortgages began increasing as the equity barrier disappeared for many subprime lenders. In most cases, when a home owner defaults on his or her mortgage the property is repossessed and sold in order to pay back the loan. However, in many cases, subprime mortgages were underwater – in other words, the value of the loan on a mortgage was higher than the market price of the house owing to the large fall in property prices. These losses created defaults on MBSs, and by extension, on some CDOs and CDO²s. Subprime lenders began reporting slower growth as a result of defaults. In early 2007, several subprime lenders such as Ownit Mortgage Solutions Inc. and Mortgage Lenders Network USA Inc., began filing for bankruptcy. On April 2, New Century Financial, the USA's largest independent subprime lender filed for chapter 11 bankruptcy, and when filing for bankruptcy, it stated that its lenders could demand $8.4 billion in loan repayments which it could not repay. Worryingly, the list of investors included major financial institutions such as Bank of America, Citigroup, Barclays Banks and UBS (CNN, 2007). Heavy losses through defaults mounted as house prices continued to fall. A vicious cycle had begun, as subprime mortgage lenders suffered a higher default rate by the end of 2005, less mortgage loans were being created, and this tightening of credit then caused a decline in the demand for houses, and housing prices continued to fall further. As predicted by Minsky's model, credit has a procyclical nature, and during boom times, heavily indebted borrowers might increase their indebtedness in order to purchase assets for short-term capital gains. However, as soon as the market price of these assets begins to fall, these borrowers are overleveraged and are forced to sell assets quickly in order to meet their debt repayments (Kindleberger & Aliber, 2005: 21). By mid-August 2006, the US Home Construction Index was down over 40% year on year.

The widespread holding of MBSs on the balance sheets of financial institutions worldwide started to become clearer. In August 2007, it was revealed that France's BNP Paribas and Bank of China had large holdings of MBSs. It was discovered that even some government-backed regional German banks *(Landesbanken*) had surprisingly large exposures to US-originated MBSs (O. Blanchard, 2009). Large US investment banks like Merrill Lynch, Lehman Brothers and Bear Stearns, who were heavily involved in MBSs and CDOs, began suffering huge losses. On 22 August 2007, Lehman Brothers closed its subprime lender, BNC mortgages. In November 2007, Merrill Lynch announced it would write down $8.4 billion in losses associated with the national housing crisis. As of October 2007, the expected loss from US subprime loan defaults was approximately $250 billion (Blanchard, 2009). Investors in SPVs that securitise MBSs were exposed to large losses, but whether it was for contractual reasons or reputational risk, many sponsor banks took the assets and liabilities of their SPVs on to their own balance sheets. The subprime loans they originated were starting to come back to haunt them. Citigroup and HSBC consolidated assets worth $94 billion that had been sitting off their balance sheets (*The Economist*, 2008). According to Blanchard *et al*., by October 2008, all SPVs involved with MBSs were either bankrupt or their assets and liabilities had already been returned to the sponsor banks' balance sheets (Blanchard *et al.*, 2014). Basel II specified that a bank is only allowed to exclude assets from its balance sheet (therefore reducing capital requirements) if it does not maintain any exposures in the SPV or make any implicit guarantees. However, very few banks had actually implemented Basel II prior to the crisis (Bank for International Settlements, 2009).

Fears over growing subprime defaults led to a mistrust of MBSs and CDOs. Rating agencies responded by downgrading these securities. The market for these financial instruments seized

and fears over the extent to which many financial institutions held these assets worsened counterparty risk and interbank liquidity began to dry up. In the UK, Northern Rock, a British bank heavily involved in issuing mortgage loans and securitising them for sale, used short-term funding for 65% of its mortgages, which made it highly susceptible to a liquidity shortage (*The Economist*, 2007). On 14 September 2007, Northern Rock was unable to meet its liquidity needs in the interbank market and was forced to approach the Bank of England for liquidity, which it received. However, this created panic among depositors and led to a traditional run on the bank because the UK did not have the same kind of deposit insurance as the US (*The Economist*, 2008). On the 22 February 2008, Northern Rock was nationalised after attempts at a private buy-out were unsuccessful. In March 2008, after a bailout from the Fed, JP Morgan Chase bought Bear Stearns with the assistance of the Fed. According to *The Economist* (2008), the reason Bear Stearns was bailed out had more to do with its central role in markets for CDSs and interest-rate swaps than the size of its balance sheet.

The TED Spread is the difference in interest rates (price spread) between three-month contracts for US Treasury Bills and three-month contracts for Eurodollars (represented by the London Interbank Offered Rate, also known as LIBOR) having identical expiration months. It indicates the level of perceived counterparty risk in the banking system because Treasury Bills are considered risk free, while the LIBOR rate reflects the credit risk of lending to commercial banks (Blanchard *et al.*, 2014). Figure 7, provides the TED Spread from 31 December 2005 to 27 January 2015, which indicates that the rate is usually well below 1%, but it fluctuated significantly between late 2007 and early 2009. Figure 7 highlights this period of significant volatility in TED Spreads.

Figure 7: TED Spread: long-term view (31 December 2005–27 January 2015)
Source: Federal Reserve Bank of St. Louis (2015a)

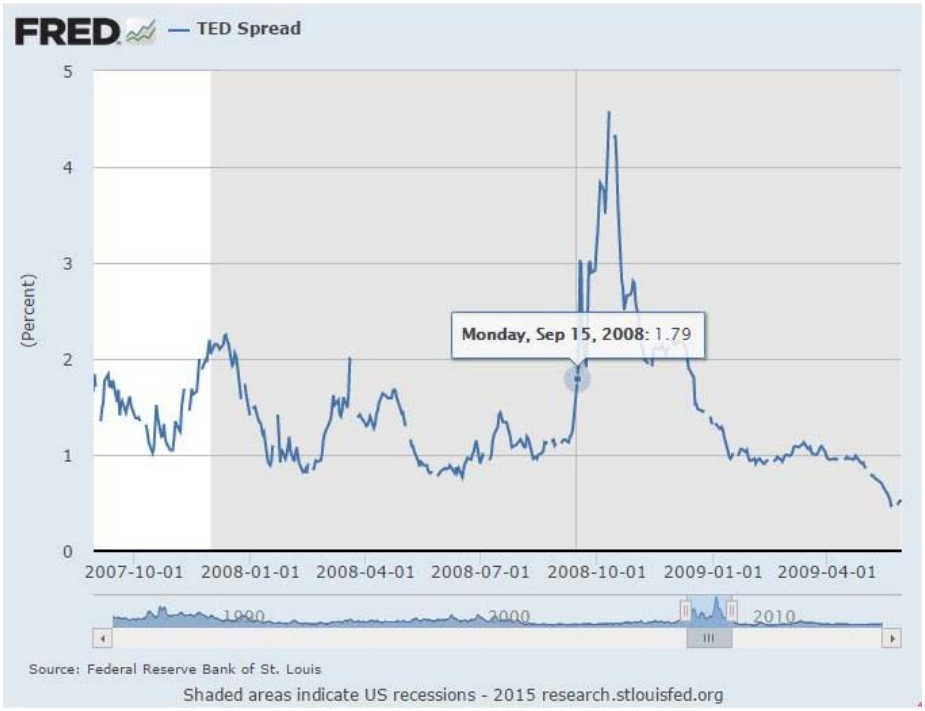

Figure 8: TED Spread: Lehman Brothers announces its bankruptcy on 15 September 2008 (29August 2007–28 May 2009)
Source: Federal Reserve Bank of St. Louis (2015b)

The TED Spread ballooned in early August 2007 when news about subprime mortgage defaults started reaching the market. The interbank market was seizing up and central banks

were required to provide liquidity. The Fed was quick to act, supplying liquidity to banks, but the Bank of England took a strong stance that it would not help irresponsible banks. Mervyn King, the Bank of England's Governor, quickly changed his stance after mounting public pressure. On 15 September 2008, Lehman Brothers announced its bankruptcy (see figure 8 – 15 September is indicated). The closure of Lehman Brothers caused a large-scale panic in the financial sector because of the interconnectedness of financial institutions and the opacity of the new financial instruments. Lehman Brothers had more than $600 billion in assets of which it was unclear how much was owed to other banks, making all banks nervous to lend to each other because they did not know who was insolvent (Blanchard *et al.*, 2014). After the news broke, the TED Spread ballooned, reaching its highest recorded rate of 458 basis points on 10 October 2008 (see figure 9). After Lehman's bankruptcy, the interbank market had all but frozen up and the Fed reacted by making even more liquidity available to the market. However, at the same time, a different problem had arisen – the market for MBSs, CDOs and CDO²s collapsed because no-one wished to hold these toxic assets anymore.

Value at risk (VaR) is a measure of market risk developed by JP Morgan in the 1980s and was used by Basel II to determine capital requirements (*The Economist*, 2008). More specifically, VaR "describes the loss that can occur over a given period, at a given confidence level, due to exposure to market risk" (Basak & Shapiro, 2001: 371-405) . VaR uses data forthe previous few years to calculate the maximum possible losses a bank can expect to sustain and the amount of capital that must be held against these possible losses. This created a heavy reliance on quantitative risk analysis in the financial sector. However, using past data to predict losses means that during the good times VaR will predict lower possible losses, which is counter-intuitive since a crisis usually follows a period of expansion. A second problem is that during troubled times, VaR will encourage deleveraging which will create

further volatility. In this way, VaR is procyclical. As banks tried to move these assets off their balance sheets they needed to sell them at low or "fire sale" prices. In contrast, keeping these assets was difficult as well because of fair-value accounting, also known as mark-to-market accounting. Fair-value accounting meant that the market value of assets was reflected on a bank's balance sheet (*The Economist*, 2008). In addition, asset selling triggered by VaR measures increased procyclically. Lower market values forced banks to make write-downs, which increased their leveraged positions and forced many to sell assets to meet capital requirements. Banks can either sell assets or reduce lending to deleverage (*The Economist*, 2008). As these assets became more undesirable they were sold at lower prices, which decreased their market value. The paradox of leverage means that a decline in the market value of assets on a bank's balance sheet requires the bank to sell assets to deleverage. These two effects fed into one another creating a panic selling situation. The Fed reacted to the "fire sale" situation by starting its Quantitative Easing I (QEI) programme in November 2008 (Blanchard *et al.*, 2014).

Figure 9: TED Spread: to date, highest recorded rate on 10 October 2008 (29 August 2007– 28 May 2009)
Source: Federal Reserve Bank of St. Louis (2015c)

Quantitative easing (QE) refers to actions taken by the central bank to increase the money supply when decreasing the interest rate is no longer an option. It achieves this through open-market operations such as buying Treasury Bills or longer-term government bonds. By contrast, credit easing refers to actions taken by the central bank to affect the price or interest rate on a specific asset, for example MBSs. Under the QEI programme, the Fed bought MBSs in order to stop the rapid decline in the market value of these assets that was creating turmoil in the financial industry after fire sales and write-downs. It was thus technically a credit-easing programme, not a quantitative-easing programme as the name suggests (Blanchard *et al.*, 2014). In August 2010, the Fed launched Quantitative Easing II (QEII) in which it bought long-term government bonds in order to increase the money supply. Prior to the crisis, the Fed's balance sheet had been approximately $700 billion, but as of early 2014 it had expanded to over $4 trillion. Gill Marcus, former governor of the SARB, predicts that the Fed will not sell these assets back to the market – it would rather will keep them to maturity, in other words let them run off (Turok, 2014: 11-12, 15, 16, 17, 18).

The Troubled Asset Relief Program (TARP) was an initiative by the US Treasury to buy MBSs and other assets which the market had seized in order to stop fire sales of these assets after the Lehman Brothers' bankruptcy. Initially $700 billion was earmarked for this program, but the Dodd-Frank Act later reduced this amount to $475 billion. Capital-adequacy rules are designed to protect a bank from insolvency but the more immediate concern was liquidity risk as the large interbank market had seized up. On 9 October 2007, Mr King of the Bank of England stated that "regulation worldwide has paid insufficient attention to liquidity, focusing instead on capital" (*The Economist*, 2007).

The Fed acts as lender of last resort for commercial banks and as such they are more heavily regulated by the Fed than investment banks and other financial institutions. However, owinge to systemic risks, the Fed offered emergency funding to investment banks for the first time since the Great Depression (*The Economist*, 2008). In the wake of the crisis, the remaining two largest investment banks, Goldman Sachs and Morgan Stanley, changed their charters to become commercial banks. During the financial crisis, another source of systemic risk was identified, that is, credit derivatives, specifically CDSs.

2.2.10 The role of AIG and CDSs in the financial crisis

A division of AIG called AIG Financial Products (AIGFP) became heavily involved in the selling of CDSs in the early 2000s. AIGFP sold CDSs on MBSs as well as on senior tranches (AAA rated tranches) of CDOs. Since AIG did not hedge against the protection it sold, the buck stopped with AIG. However, even dealers who hold a net position of zero or a "balanced book" can cause systemic risk because the failure of one dealer will mean that its counterparties will need to replace their CDSs while the market may be less liquid as a result of the default. As of June 30 2008, AIG's net notional amount of outstanding CDSs was $411 billion on AAA rated CDO tranches, with $55.1 billion written on subprime collateral (Stulz, 2010: 73-92).

AIG included collateral agreements in many of its CDS contracts. The use of collateral reduces counterparty risk and usually the amount of collateral required changes as the value of the contract changes, again referring to mark-to-market. If the chance of default by a dealer increases or the recovery rate decreases as perceived by the market, the required collateral will increase (Stulz, 2010: 73-92). This practice also affected banks because as

stated by the Bank of America in its 2005 10-K; "Earnings volatility increases due to accounting asymmetry as we mark-to-market the CDS" (Minton, Stulz, & Williamson, 2009: 1-31).

Prior to March 2005, AIG had a AAA credit rating, but the departure of its longstanding CEO coupled with accounting irregularities resulted in a downgrade to AA+. More accounting irregularities combined with the credit ratings downgrades of MBSs as well as the bankruptcy of Lehman Brothers resulted in further downgrades of AIG. As a result of its credit downgrades, AIG was forced to post larger amounts of collateral to its counterparties. At the same time CDSs were being triggered by credit events. In addition, AIG had borrowed to invest in MBSs whose value had plummeted. These factors compounded and created a huge liquidity shortage for AIG. Its systemic importance led to the US government bailing out AIG with $85 billion on 16 September 2008. In November 2008, AIG had agreed to post $39.9 billion in collateral (International Swaps and Derivatives Association, 2009). In total, through the initial bailout, subsequent assistance and through TARP, the US government gave AIG more than $180 billion (Blanchard *et al.*, 2014).

2.2.11 Basel III: revised global banking regulation

In September 2009, the G20 met at the Pittsburgh Summit, and released the following communiqué:

> *We meet in the midst of a critical transition from crisis to recovery to turn the page on an era of irresponsibility and to adopt a set of policies, regulations and reforms to meet the needs of the 21st century global economy* (G20, 2009).

The G20 is a forum for a group of 20 major economies represented by their heads of government and central bank governors. G20 members include the US, UK, EU, Japan and South Africa.

The Basel Committee developed Basel III to address the weaknesses in Basel II, which was initially published in 2004 and was largely untested because of differing degrees of implementation prior to the crisis. Only a few European banks had adopted the rules before the crisis struck (*The Economist*, 2007). The focus of Basel II was on credit and operational risk. Basel III, however, focuses on a much wider spectrum of issues: expanding on capital requirements from Basel I and introducing liquidity and risk management. Basel III was endorsed by the G20 at its November 2010 summit in Seoul, and is in the process of being implemented worldwide. The first phase came into effect on 1 January 2013 and is scheduled to be fully implemented in all G20 countries by 2019, although there is pressure on banks to be fully compliant before then. The G20 also called for improvements in the classification and measurement requirements for financial assets to which the International Accounting Standards Board has responded with a new accounting standard, IFRS to replace IAS 39.

Basel III makes changes in capital adequacy (The Basel Committee on Banking Supervision, December 2010). Banks have to hold a certain minimum capital ratio, which is calculated by dividing the bank's capital by its risk-weighted assets (RWA). The new capital requirements are more restrictive because of two updates. Firstly, capital has a stricter definition under Basel III. Tier 3 capital, which was the riskiest capital a bank could hold, has been eliminated and there are more restrictive qualifications for tier 2 capital. The largest proportion of tier 1 capital must be common equity tier 1 capital (CET1 capital) which is defined as common shares and retained earnings. Banks must hold 6% tier 1 capital of which at least 4.5% must

be CET1 capital, the additional tier 1 capital must be a going concern. This is up from the previous requirement of 4% total tier 1 capital with at least 2% CET1. Banks must also keep a "capital conservation buffer" of 2.5% CET1 capital. The minimum capital requirement remains unchanged at 8%, but the quality of capital has been significantly increased, and adding the capital conservation buffer means the capital requirement is 10.5%. Basel III also introduces a "countercyclical buffer" of between 0% and 2.5%. The idea being that during times of high credit growth, banks will build their countercyclical buffer so that in times of credit decline they have a capital buffer to counter the pro-cyclical nature of credit expansion. In addition, global systemically important financial institutions (G-SIFIs), or institutions whose failure might lead to another financial crisis, are required to hold an additional buffer of between 1% and 2.5% CET1 capital depending on the banks systemic importance as calculated using the Basel Committee's methodology.

Secondly, the risk weights for assets have also been updated. These are as follows:

- higher risk weights for securitised and resecuritised assets
- higher capital requirements for derivatives that do not go through a central counterparty (CCP)
- trade exposures to a qualifying CCP, which receive a 2% risk weight
- additional margining required for illiquid derivative exposures
- higher capital requirements for trading book positions (to avoid regulatory arbitrage between trading and banking books)
- higher capital requirements for resecuritisations for both trading and banking books
- Higher risk weights for counterparty risk stemming from dealings with other financial institutions

See equation 1 for an illustration of the changes to capital treatment under Basel III.

$$\text{Required capital ratio} = \frac{Capital\ (only\ tier\ 1\ and\ 2)}{RWA\ (increases\ in\ risk\ weights\ for\ certain\ assets)}$$

Equation 1: Capital ratio under Basel III

Other important elements of Basel III include the following:

- Less reliance on external credit rating agencies due to increased internal reporting to avoid a repeat of the increased losses as a result of credit rating agency downgrades of assets and institutions during the crisis. Banks with a large exposure to a given portfolio of assets should develop internal ratings for that portfolio instead of relying on external ratings for their capital requirements. This is dependent on supervisors having the capacity to evaluate banks' internal assessment processes in order to determine that they are a reasonable reflection of the risks undertaken.
- Default fund exposures to a qualifying CCP are capitalised according to a risk-based method.
- Two new liquidity ratios were introduced because it was illiquidity not insolvency that threatened the financial system during the recent crisis.
    - Liquidity coverage ratio (LCR): Addresses short-term liquidity. Banks must have sufficient high-quality liquid assets to withstand a 30-day stressed funding scenario specified by supervisors.
    - Net stable funding ratio (NSFR): Addresses longer-term liquidity. Banks are required to maintain a sound financing structure over a one-year stressed funding scenario specified by supervisors. It incentivises banks to use stable sources of funding.
- A leverage ratio was introduced:
    - The leverage ratio must be $\geq 3\%$. That is, banks' total assets, including off-balance-sheet assets, cannot be more than 33 times their tier 1 capital.
- There is a new stressed VaR requirement for banks using VaR models in the trading book.
- A capital charge for potential mark-to-market losses on expected counterparty risk was introduced, that is, credit valuation risk (CVA).
- An additional capital charge was introduced to cover the risk of mark-to-market losses on the expected counterparty risk to OTC derivatives transactions not centrally cleared.

In South Africa, the SARB oversees the implementation of Basel III. It has already adopted the LCR and intends to implement the NSFR despite a limited supply of government bonds and an illiquid corporate debt market. In response to Basel III, the SARB has committed to assisting banks in meeting their liquidity needs (International Monetary Fund, 2015a). According to Directive 5/2013 issued by the SARB, the end of the phase-in period for capital changes is 1 January 2016. The SARB introduced an additional capital charge for domestic

systemically important banks (D-SIB) because of the small number of large banks that are highly connected, even though none of them qualify as globally systemically important financial institutions (G-SIFIs).

South African banks will need to hold

- a minimum of 8% capital, of which 6% must be tier 1 capital and 4.5% must be CET1 capital
- plus, between 0% and 2.5% for predefined domestic systemically important banks (D-SIB)
- plus, a capital conservation buffer (CB) of between 0% and 2.5%
- plus, a countercyclical buffer (CCB) range of between 0% and 2.5%
- plus, a pillar 2A capital requirement at 0.5% of RWA for all banks. Pillar 2A capital is held for factors relating to systemic risk. Once the phase-in period for D-SIB is complete, pillar 2A plus the D-SIB requirement will not exceed 2% for CET1, 2.5% for tier 1 capital and 3.5% of total RWA.
- plus, a bank-specific individual capital requirement (ICR), also known as pillar 2B

The South African minima will equal 10.5% + ICR + CCB + min (3.5% or [P2A + D-SIB]), which gives a total capital minimum requirement of 14% (South African Reserve Bank, 2013). South African banks are therefore subject to capital requirements that are higher than those specified by Basel III.

The Basel Committee conducted a comprehensive quantitative impact study for Basel III, in which 263 banks from 23 committee member jurisdictions participated, and these banks were split into two groups. Group 1 consisted of 94 banks that have tier 1 capital in excess of €3 billion and who are internationally active; the remaining banks were placed in group 2. The study estimated that for group 1 banks to meet the 7% CET1 level (the 4.5% minimum plus the 2.5% capital conservation buffer), there would be a total shortfall of €577 billion. The sum of profits after tax for the year 2009 prior to distributions was €209 billion for group 1 banks. In addition, the RWA would increase by 23% for group 1 (Bank for International

Settlements, 2010). The study assumed that there would be no changes in banks' behaviour as a result of Basel III so the impact could be larger. Basel III could lead to significant reductions in credit extension which will affect global growth negatively.

Basel I and II were both implemented differently across nations which led to financial regulatory arbitrage. At the Risk and Return conference (13 March 2014) Daniel Mminele, Deputy Governor of the SARB, indicated that

> *concerns are being raised around issues such as inconsistency in the domestic implementation of the new regulatory standards and their applicability to all countries, and possible "unintended consequences", which include the impact of the reforms which need to be balanced against the need for financial stability* (Mminele, 2014).

2.2.12 Conclusion

There are many factors that came together to cause and intensify the crisis. These include the low interest rate environment, subprime lending, falling property prices, complicated and opaque new securities, inaccurate risk ratings, credit default swap instruments, shadow banking, counterparty risk, an overleveraged financial system, interbank liquidity shortages and widespread panic selling of assets. Financial instruments such as CDSs did not cause the financial crisis, but their complexity and opacity accelerated and intensified the panic, which worsened the financial contagion effect and systemic risk to the financial system.

In the wake of the financial crisis, regulators all over the world have been examining the failures in regulation before and during the crisis and developing regulatory responses. Basel

III was the Basel Committee's response to the weaknesses identified in banking regulation prior to the crisis. This protocol has been adopted by the G20, of which South Africa is a member. Banks make up the largest OTC credit derivative market makers worldwide, and for this reason Basel III indirectly addresses some aspects of the OTC credit derivatives market. However, governments have responded with legislation to regulate local OTC derivatives markets that were previously largely unregulated.

Regulatory responses to OTC derivatives include setting up central counterparties (CCPs), trade repositories (TRs), minimum capital and margining requirements. A detailed discussion of these regulatory responses combined with a discussion of key regulation addressing OTC derivatives markets is given in section 2.4. Regulations discussed are the USA's Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, the European Market Infrastructure Regulation (EMIR) and the recently enacted South African Financial Markets Act (FMA). Financial regulation will need to continue evolving in order to keep pace with the innovative financial world but without stifling innovation.

2.3 The South African experience

2.3.1 Securitisation

Since securitisation played a key role in the financial crisis, the department of bank supervision at the SARB instructed all banks that were involved in securitisation activities in either a primary or secondary role to furnish it with a report on the various risks facing those banks in April 2008. In November 2008, the final report was submitted to the SARB by an internationally based auditing firm that conducted the research. According to the report,

securitisation in South Africa was not as complicated as in the US and European countries and the assets housed in South African securitisation schemes tended to have a high level of transparency. The top-tier South African banks sourced only 4% on average of their total funding from securitisation, which was significantly less than those international banks that struggled during the liquidity crisis (Bank Supervision Department of the South African Reserve Bank, 2008). In addition, the assets securitised were subjected to the same credit approval processes that banks applied to their own credit exposure. This is possibly because of to the constraining influence of the National Credit Act 34 of 2005. Hence asset securitisation was not a source of risk for South Africa before the crisis.

Furthermore, strong exchange controls prevented South African banks from investing heavily in US and European securities (The OTC Derivatives Working Group, 2012). Although the global financial crisis did not have a direct impact on the South African financial system, it was the primary cause of the economic recession beginning in the fourth quarter of 2008 and lasting for three consecutive quarters (Financial Stability Board, 2013). Because US and European banks needed to deleverage, they began cutting their foreign exposure to emerging economies like South Africa (Blanchard, 2009). Then in the aftermath, weary investors began withdrawing investments from developing countries in favour of safer investments such as US treasury bonds. In addition to the outward flow of financial investment, lower global GDP reduced the demand for South African exports combined with a decline in the prices of major export commodities, which further harmed the domestic economy.

2.3.2 The total OTC derivatives market

While derivatives were not a direct contagion for South Africa during the crisis, the country has had its share of derivative disasters over the years. By international standards, the South African OTC derivatives market is well developed and did not encounter systemic difficulties from the financial crisis or from other international and local crises. The total OTC market is large in relation to the size of the country's economy: in June 2012 the gross notional outstanding value of the South African OTC derivatives market was approximately R27 trillion which is 7.5% of GDP (International Monetary Fund, 2015b). The market is also large compared with those of other emerging markets (see figure 10). South Africa has the only derivatives market in sub-Saharan Africa (Adelegan, 2009). The major market participants consist of "the big four" South African Banks and international banks operating domestically. Other market participants include corporates and financial institutions such as pension funds, insurance funds and asset managers. According to Price Waterhouse Coopers, in 2012, 63% of the total notional outstanding value of all OTC derivative transactions in South Africa was interbank, while 35% involved other financial institutions and only 2% involved a corporate counterparty. There are a small number of large banks in South Africa that are significantly interconnected, thereby providing a source of systemic risk. Prior to the crisis, the OTC derivatives market was largely unregulated. The only market participants that were subject to regulation were financial institutions, that is, banks and financial advisors, on account of their institutional nature not their activities. Derivatives were not explicitly regulated under the Financial Advisory and Intermediary Services Act (FAIS) of 2002 or the Banks Act of 1990. The Securities Services Act of 2004 did not provide for active regulation and monitoring of the OTC derivatives market. The latter Acthas been replaced by the Financial Markets Act of 2012, which will be discussed in section 2.4.5. The JSE requires that its members report their

OTC derivatives positions in order to determine each member's market risk exposure per instrument (National Treasury, 2014). The majority of transactions rely on bilateral execution and there is an uneven use of collateral for transactions (The OTC Derivatives Working Group, 2012).

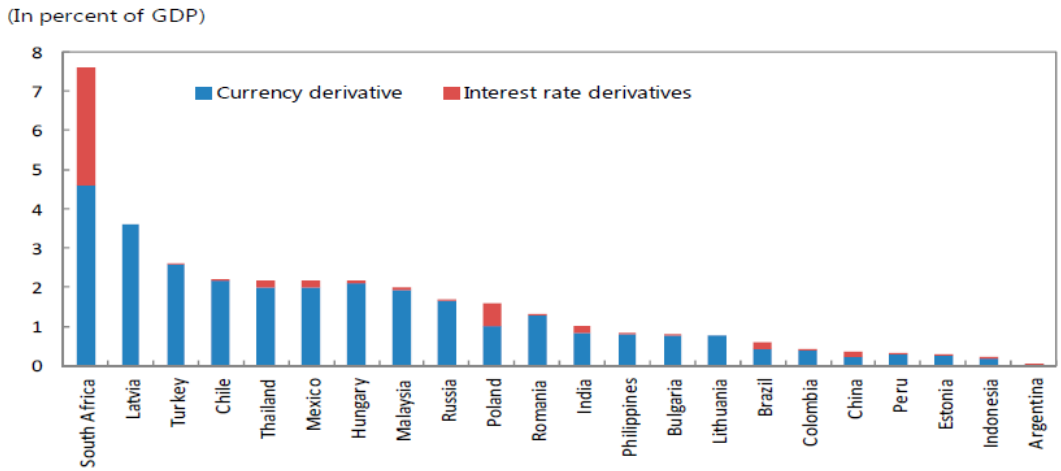

Figure 10: OTC derivatives averages daily Turnover in 2013, as a percentage of GDP
Source: International Monetary Fund (2015b)

The gaps in regulation meant that some OTC derivatives dealers were not subject to regulation or assessment of their market conduct. One such entity was Dealstream Securities (Pty) Ltd, which was not a licensed financial services provider. Dealstream was heavily involved in the OTC derivatives market mainly in "contracts for difference" which are a type of forward contract. In early September 2008, the FSB announced that it was investigating several complaints against Dealstream and that investors should be cautious of the company. Dealstream was accused of misappropriating its clients' funds and by early October had filed for bankruptcy (National Treasury, 2014).

It is not only the largely unregulated OTC derivatives market that has seen derivative disasters. Even the highly regulated exchange-traded derivatives market has seen crises in the past. A brief historical overview of exchange-traded derivatives shows that in the late 1980s, the South African Futures Exchange (Safex) and the South African Clearing Company (Safcom) were established to handle exchange-traded derivative instruments. Safex initially traded only futures contracts but options were introduced in 1992 and in 1995 agricultural commodity futures were added (Adelegan, 2009). The JSE bought Safex in 2001 and formed two divisions: Safex financial derivatives; and Safex agricultural derivatives (Swart, B. & Venter, A., 2006: 114). According to Swart and Venter (2006: 114) "… [t]hese developments have created an international[ly] accepted trading environment in South Africa and brought the country in line with global financial trends …".

In 2003, the Joint Municipal Pension Fund lost R1.9 billion on speculative maize future contracts. Swart and Venter (2006: 114) note that "(i)t would be unfair to blame derivatives as such for the disaster" and that human factors such as lack of knowledge and transparency as well as greed, fraud or simple error likely also played a role. They make the important point that "knowledge of financial processes and their modelling in particular is essential". According to Allan Thomson, the head of derivatives trading at the JSE, "Lehman Brothers held very large single stock futures on Safex", but when Lehman Brothers went under these contracts were simply transferred to another JSE member (Johannesburg Stock Exhange Ltd, 2008). Investors did not lose their positions with the bankruptcy because the JSE was their counterparty, not Lehman Brothers. This is the benefit of a central counterparty in reducing counterparty risk.

2.3.3 The credit derivatives market

The composition of market participants in the OTC credit derivatives market deviates significantly from that of the total OTC derivatives discussed in section 2.3.2. According to a South African credit derivatives trader, the local credit derivatives market is extremely one directional. In general, South African banks sell protection to foreign banks and in return buy protection from local market participants such as asset managers and insurance firms. In the vast majority of cases, South African banks act as dealers in the credit derivatives market, engaging in limited hedging activities and even less often engaging in speculative activities. As a result, South African banks rarely deal with each other as counterparties, simply acting as dealers passing risk from the international market to local market participants. The main market makers are Standard Bank, Absa and RMB (a division of FirstRand bank). The majority of CDSs in the South African market are single name with a few basket CDSs. No CDS indices are issued in the South African market, but South African sovereign debt and a few large South African corporations are referenced in foreign CDS indices.

2.3.4 Regulatory response

The aftermath of the crisis has raised questions about the suitability of financial regulation and supervision worldwide. In South Africa, the Financial Markets Act will directly affect the domestic OTC derivatives market. This Act will be discussed in detail in section 2.4.4. The South African regulation relating to the OTC derivatives market is compared with the US and European legislation in section 2.4.5. In addition, there have been significant changes in the roles and responsibilities of regulators of the financial sector in South Africa. These will be discussed in the paragraph that follows.

In direct reaction to the financial crisis, the Minister of Finance gave the SARB a financial stability mandate in 2010. The SARB responded by separating the Financial Stability Department from the Bank Supervision Department of the SARB (International Monetary Fund, 2015a). According to Gill Marcus, former Governor of the SARB, since the crisis, most central banks have been given a financial stability mandate. The SARB implemented the new structure in April 2014 whereby there are three deputy governors under the governor, each with a different responsibility area. These areas are risk management and compliance, financial conglomerates supervision and financial stability (Turok, 2014: 11-12, 15, 16, 17, 18). However, the developments did not stop there, and the Financial Sector Regulation Bill has detailed large changes in the South African financial regulatory framework. Traditionally, the regulatory framework was in line with the institutional approach. Prior to the crisis, the two main regulatory authorities were the SARB, which regulates and monitors banks, and the Financial Services Board (FSB), which regulates and monitors non-bank financial institutions. The National Credit Regulator serves as a watchdog for consumer protection. After a joint assessment of the South African financial system conducted by the International Monetary Fund and the World Bank in 2008, it was found that although South Africa has a modern and effective financial regulatory framework, it needs to strengthen both prudential and market conduct supervisory and regulatory powers. The South African government responded by issuing a proposal in 2011 to reform the financial system. The main focus of this reform is a shift to the twin peaks system following global moves towards this model after the crisis. The twin peaks approach is regarded by the National Treasury as the least disruptive to the financial industry while providing the optimal means of ensuring that transparency, market integrity and consumer protection receive sufficient priority. Regulatory functions are split between two regulators. In South Africa, the SARB is responsible for prudential regulation and supervision, while the FSB is responsible for the conduct of

business. The FSB has become the "market conduct authority", while a single statutory entity in the SARB called the "prudential authority" supervises prudential regulation (International Monetary Fund, 2015a). The newly established Financial Stability Oversight Committee comprising the SARB, FSB and National Treasury is responsible for macro-prudential oversight of the financial system with a focus on the financial system's stability. The newly formed Council of Financial Regulators comprising representatives from the regulators, market participants and other stakeholders ensures financial regulation coordination. (Department of National Treasury, South Africa, February 2011).

2.4 Regulation relating to OTC derivatives

2.4.1 Legal enforceability

The history of OTC derivatives contracts has been plagued by questions of their legality. Traditionally, OTC derivatives were considered to be bets and could only be legally enforced if it was proven that at least one of the counterparties held a legitimate claim on the underlying reference entity. This was a common law rule used in both the US and the UK called the "rule against difference contracts", and it essentially prevented OTC derivatives from being used for speculative purposes and restricted them to use as hedging instruments only. In 1936, the Commodity Exchange Act made OTC derivative contracts illegal and unenforceable. However, in 1986 in the UK, authorities eliminated the rule against difference contracts which helped to establish the UK's OTC derivatives market which is now the largest centre in the world (The OTC Derivatives Working Group, 2012). In the US, the Futures Trading Practices Act of 1992 permitted certain swaps to be traded OTC, and in 2000, the Commodity Futures Modernisation Act gave full legal recognition to OTC

derivatives and allowed CDSs to be used for speculative purposes. The Act also allowed for self-regulation of the market.

There have been a multitude of lawsuits initiated by both professional and non-professional end-users after suffering large losses due to OTC derivatives contracts. Complainants have cited market manipulation, improper conduct by the counterparty and inadequate disclosure of risks. A popular example is *Procter and Gamble Co versus Bankers Trust Co and BT Securities Corporation (1996)* where Procter claimed that Bankers Trust had superior knowledge and fiduciary obligations to Procter. The court ruled in favour of Bankers Trust (Schwartz & Smith, 1997). A more recent case is that of *Cassa di Risparmio della Repubblica di San Marino v Barclays Bank Ltd (2011),* where Barclays stood accused of misrepresentation and fraud. Cassa di Risparmio della Repubblica di San Marino (CRSM) had bought a series of CDO²s with a total value of €230 million which were structured and sold by Barclays. The CDO²s had a AAA rating from rating agencies but CRSM claimed that Barclays knew that they were more risky than the credit rating suggested because Barclays' internal financial modelling indicated a higher credit risk. The court found in favour of Barclays. Most of these lawsuits stem from the opacity and complexity of these instruments. The International Swaps and Derivatives Association (ISDA) has made significant strides towards standardisation of contracts and its "master agreement" is the industry standard with its general terms and conditions which reduce the opacity of these contracts while still allowing customisability.

2.4.2 Market self-regulation in response to the crisis

After the financial crisis, in its pursuit to further standardise CDS contracts, the ISDA designed the "ISDA Credit Derivatives Determinations Committees and Auction Settlement CDS protocol", which is also known as the Big Bang Protocol. According to the ISDA, the Big Bang CDS Protocol was successfully adhered to by over 2 000 parties by 7 April 2009 (International Swaps and Derivatives Association, 2009). The Big Bang Protocol and the subsequent Small Bang Protocol are industry self-regulatory protocols. The protocols established standard contract conventions. The first major change resulting from these protocols is that prior to 2009 there was no upfront fee payable by the protection buyer, which allowed speculators to take a position in a large synthetic portfolio of reference entities without much initial capital outlay. The Big Bang Protocol requires that the annual CDS premium is fixed at either 100 or 500 basis points and that an upfront fee is paid, with the upfront payment differing according to the perceived credit risk of the underlying bond issuer (collateral provided). Secondly, investors now need to opt out of the auction process (such as the auction held for Lehman Brothers) whereas before they needed to opt in.

2.4.3 Regulatory structures during the crisis

Prior to the crisis, the OTC derivatives market was largely unregulated with regulatory supervision of some market participants and not others. In the US, financial supervision was conducted by the Fed in conjunction with a number of other regulatory authorities such as the Office of Thrift Supervision (OTS), the Comptroller of the Currency, the Federal Deposit Insurance Corporation, the Securities and Exchange Commission (SEC), the Commodity Futures Trading Commission (CFTC) as well as many other state regulators (*The Economist*, 2007). In Britain, all financial supervision is conducted by the Financial Services Authority

(FSA), which is wholly separated from the Bank of England (BoE). In the Euro zone, the European Central Bank (ECB) provides liquidity to the market but supervision is carried out by national authorities. In South Africa, since 1971, the South African Reserve Bank has been responsible for the regulation and supervision of banks in the country, while the Financial Services Board (FSB) has been responsible for the regulation and supervision of all non-banking financial institutions.

In the case of the US, the SEC and CFTC shared oversight and supervisory authority of derivative market participants. Too many regulatory authorities created a number of loopholes which were exploited by financial institutions (*The Economist*, 2007). In Europe, the European Commission's (EC's) 2004 Markets in Financial Instruments Directive (MiFID) created common rules for the trading of derivatives, but contained loopholes that exempted qualified counterparties from some of their obligations. The Committee of European Securities Regulators (CESR) was created as an independent committee to improve coordination among European securities regulators. In South Africa, the 2002 FAIS Act provided standards for the conduct of professional market participants, particularly when dealing with retail customers. The focus is on consumers receiving fair treatment as well as the full disclosure of relevant information, but it does not specifically address conduct with respect to OTC derivatives (The OTC Derivatives Working Group, 2012). Under the South African Securities Act of 2004, the FSB was given some power over OTC derivatives in so far as it could prohibit a person from selling these instruments. It could impose conditions for such a business and it could prescribe conditions in terms of which specified types of unlisted securities could be sold. However, the FSB did not use these powers at any time because the largest market participants are banks that are regulated by the SARB (The OTC Derivatives

Working Group, 2012). This is because South Africa was largely following an institutional approach to regulation.

The failure to supervise and regulate OTC derivatives markets has been addressed internationally by industry leaders such as the ISDA, and international organisations such as the International Organisation of Securities Commissions (IOSCO), the G20, the International Monetary Fund and the World Bank have all weighed in on reforms to the OTC derivatives markets and were considered by policy makers (with varying weights) with regard to regulatory reform. The focus will be on three pieces of regulation – from the US, the EU and South Africa, respectively. In the US, the Dodd-Frank Wall Street Reform and Consumer Protection Act was signed into law by President Barack Obama on 21 July 2010. The Act contains specific instructions for the OTC derivatives market in the USA to increase stability. In the EU, the EMIR became enforceable on 16 August 2012. In South Africa, the Financial Markets Act of 2012 came into effect in June 2013. The UK is a member state of the European Union (EU) and so it is bound by the EU regulation, but it is worth noting that the UK is the largest centre for OTC derivatives and that the FSA would prefer more liberal policies in respect of central clearing and central trading (The OTC Derivatives Working Group, 2012).

2.4.4 Comparison of Dodd-Frank and EMIR legislation

Both Dodd-Frank and the EMIR make provision for increased regulatory and supervisory authority over OTC derivatives markets. In the USA, the SEC and CFTC are still the two main regulatory bodies in this industry but they have been given more power, and a "Financial Stability Oversight Council" has been created to resolve disputes between the two

bodies. In Europe, the CESR was replaced by the newly established European Securities and Markets Authority (ESMA). Both Acts also require professional dealers to register themselves.

Dodd-Frank refers to "swap dealers" and "major market participants" (MSPs), which are systemically important institutions that must be registered with the CFTC. MSPs are now subject to additional requirements such as record keeping and capital requirements (only imposed on non-bank dealers). An organisation can be an MSP for one type of derivative, but not necessarily for all its derivative holdings and derivatives held for hedging are not included. The ESMA identifies non-financial counterparties and financial counterparties. It gives partial exemption for non-financial counterparties from reporting and clearing obligations provided that their activities fall below defined thresholds. The thresholds are defined by the European Commission and are different for each type of derivative, taking into account systemic risks. It is important to note that once a non-financial counterparty exceeds the threshold for one type of derivative, it is subject to the same regulatory requirements as financial institutions for all of its derivative holdings, not only the types that are above the thresholds. Derivatives used for hedging are excluded from the threshold calculation. Dealers are market makers, while end-users use derivatives to hedge their own risk.

A trade repository (TR) is valuable for reducing systemic risks because it aggregates and stores important data on transactions which can be accessed by authorities for macro-prudential supervision as well as during a financial crisis to assess counterparty risk, thereby reducing the opacity of these complicated instruments. Dodd-Frank requires central reporting of all transactions to a TR. The onus is on the dealer to report the transaction but if neither of the counterparties is a dealer then they must decide which of them is responsible for reporting the transaction. The TR or "swap data depository" as it is referred to in the US Act, could be

a private institution or one operated by the CFTC. The European legislation also prescribes a number of standards for trade repositories; and according to the EMIR, non-financial counterparties are exempt from the central reporting responsibility provided that their activities fall below the thresholds.

Central clearing reduces counterparty credit risk because the central clearing counterparty (CCP) acts as a counterparty to each transaction – "a buyer to every seller" – and allows for multi-lateral netting. Central clearing reduces systemic risk by bringing an opaque dealer market into the light where regulators can impose rules and also net transactions. However, central clearing is not always desirable for certain derivatives. The reason is twofold. Firstly, from the end-user's perspective central clearing requires a level of standardisation and if a high level of customisability is desired, then the forced central clearing of all derivative contracts circumvents the use of these more exotic derivatives which is not desirable from a social cost perspective since many corporates use derivatives to hedge their risk. Secondly, the CCP itself may be unable to "risk-manage some derivatives", and forcing it to might lead to systemic risk (The OTC Derivatives Working Group, 2012). For those derivatives that are not subject to central clearing, mandatory margin requirements or collateral have been imposed. According to Dodd-Frank, end-users are not exempt from margin requirements. Dodd-Frank requires that derivatives meeting certain criteria determined by the CFTC must be centrally cleared, taking into account systemic risk mitigation and the effect on competition among other things. The Act identifies a "derivatives clearing organisation" (DCO) as a systemically important entity and identifies governance and conduct of business rules for these institutions. According to Dodd-Frank, end-users can be exempt from central clearing provided they are not MSPs and/or financial institutions, and they can demonstrate how they meet their financial obligations associated with entering non-cleared swaps and that

they use swaps to hedge commercial risk. There is a grandfathering exemption, which means that existing contracts are not subject to these new restrictions but all new contracts will be. The EMIR refers to central counterparties (CCPs) to execute central clearing functions. CCPs reduce systemic risk because there are strict rules to deal with a default of one member. According to the EMIR, after the default of a member in order to settle with its counterparties, the CCP will use, firstly the defaulting members' margins, then the defaulting members' contribution to the default fund, then the rest of the contributions to the default fund, and only after that, will the CCP's own funds be used. The European regulation specifies that all standardised derivatives must be cleared and it states two approaches for determining whether a derivative must be centrally cleared. The first approach is called the "bottom-up" approach where the CCPs identify which derivatives should be centrally cleared according to criteria determined by the ESMA. The second approach is "top down" in the sense that the ESMA and the European Systemic Risk Board can prescribe which derivatives must be centrally cleared. Dodd-Frank prevents banks from holding non-centrally cleared CDSs and CDSs against ABSs on their own balance sheet, but there is a grandfathering exemption. They are required to "push out" these derivatives on to separately capitalised subsidiaries from 2013. The European legislation makes no such rule.

The G20 requested central trading of standardised derivatives contracts where possible. Since then there has been much debate about the benefits and detractors of implementing mandatory central trading. Proponents argue that central trading is the natural extension of central clearing, that it will increase pre-trade price transparency and that it will further bolster the safety of the market. Detractors argue that centralised trading requires a high level of standardisation and that greater standardisation is not desired by market participants. According to a study of market participants conducted by the IMF, only 17% believe that

current pre-trade price transparency is inadequate and that the derivative products which would gain the most from higher pre-trade price transparency are the more exotic derivatives which would not benefit from standardisation (The OTC Derivatives Working Group, 2012). Dodd-Frank specifies certain types of derivative contracts that must be centrally traded, specifically all standardised derivatives. It also introduces a new kind of trading platform called a "swaps execution facility", where bid and offer spreads are posted by multiple dealers. EU regulation is still in the consultation phase regarding centralised trading.

Basel III's lower risk weighting attached to derivatives which are centrally cleared provides an incentive for financial institutions to centrally clear derivatives that are not required to be centrally cleared by legislation. Standard contract conventions like the ones featured in the ISDA's Big Bang and Small Bang Protocols are helpful to central clearinghouses to manage the impact should any large members default.

Section 939(a) of the Dodd-Frank Act requires all federal agencies to remove the requirement to rely on credit ratings from their regulations and replace them with appropriate alternatives. Although Basel III encourages banks to use internal risk models where possible rather than rely solely on credit rating agencies, it does not completely eliminate reliance on these agencies.

The major difference between the US and European regulation with respect to derivatives is Dodd-Franks "Volcker Rule". The Volcker Rule prevents banks from trading in derivatives for themselves, that is, banking book trades. However, there are exceptions, such as risk mitigation. The Volcker Rule could favour the European market at the expense of the US derivatives market and displace profits from US banks to European banks. Regulatory

arbitrage could move more business to European markets at the expense of US markets. But the more liberal European regulation could lead to greater financial market instability in Europe.

2.4.5 The South African FMA

The Financial Markets Act (FMA) of 2012 repeals the Securities Services act of 2004 and its purpose is to align South Africa with regulations in other G20 countries to prevent regulatory arbitrage. The Act focuses on OTC derivatives market regulation and supervision and strengthening existing measures against insider trading and market abuse. South African regulators decided to implement the FMA's regulation relating to the OTC derivatives market in three phases as opposed to adopting a Big Bang approach in an effort to avoid major disruptions to the market. This cautious approach is largely due to a lack of a detailed understanding of the functioning of the local OTC derivatives market by South African authorities (Financial Stability Board, 2013). Before each phase is implemented, there will be a period of consultation where all role players will be able to give their input on any aspect of the regulatory framework (National Treasury, 2014). The consultation process for the first phase opened on 4 July 2014 and closed on 3 September 2014. Phase 1 consists of the implementation of central reporting for OTC derivative transactions and a code of conduct for market participants and the registration of market participants. Phase 2 concerns risk management, specifically the margin and capital requirements for non-centrally cleared derivatives, where appropriate. Phase 3 concerns the standardisation of derivatives for central clearing and where appropriate, central trading. Authorities do not view central trading as an immediate concern (Financial Stability Board, 2013).

OTC derivatives providers will need to register with the Financial Services Board of South Africa (FSB). The Act refers to them as ODPs "OTC derivatives providers", and they will be subject to a code of conduct established under the FMA. An ODP is defined as a person/entity for which OTC derivatives form a regular feature in the course of its business and for its own account, which originates OTC derivatives or is a market maker. There is no threshold because regulators wish to monitor all primary OTC market participants, essentially all professional market participants (Financial Stability Board, 2013).

The reporting of all OTC derivative transactions to a TR will be mandatory in South Africa. ODPs will bear the responsibility of reporting all transactions to a TR. At this stage it is envisioned that end-users (say, corporates) will not bear responsibility to report their transactions to a TR since at this stage it is assumed that these end-users transact with ODPs. TRs will be subject to reporting obligations and will need to be licensed, but the Act does not prescribe the TR's structure and/or ownership at this stage (National Treasury, 2014). As of early 2015, a South African TR had not been established, but the Act does allow for the use of a foreign TR. As an example, TriOptima is a well-established Swedish TR that collects data from the G-14 banks regarding outstanding OTC interest rate derivatives and provides weekly reports that are accessible to the public (National Treasury, 2014). There are two issues with using a foreign TR. Firstly, it would not be under the jurisdiction of the South African government so South African authorities would need to sign a memorandum of understanding (MoU) with the foreign TR to ensure that South African authorities can access all the data they require for supervision. Secondly, multiple (foreign and local) TRs would mean that the data needs to be aggregated for the local economy, which could lead to a delay in the accessibility of the data which could have large consequences in the event of a crisis. The second issue could be resolved by relying only on a foreign TR, but the MoU would have

to ensure that South African authorities do not face any legal or operational impediments to obtaining the data they need, especially under stressed circumstances (International Monetary Fund, 2015b).

Central clearing of standardised contracts is not mandated by the Act. Authorities are initially going to rely on incentives to encourage ODPs to centrally clear OTC derivative transactions. Since the main market makers are banks, Basel III's lower risk weighting attached to derivatives that clear through a CCP, as well as exemption from CVA will provide a large incentive. Margin requirements for non-centrally cleared OTC derivative transactions will follow the BCBS-IOSCO framework. It seems authorities will only commit to enforcing mandatory central clearing if the margining and capital requirements do not incentivise a large enough migration to central clearing. A South African CCP for OTC derivatives has not yet been licensed. The JSE's Safcom is the CCP for exchange-traded derivatives and the JSE has taken steps to enable Safcom's compliance with the principles for Financial Market Infrastructures (FMIs) set by the Committee on Payment and Settlement Systems (CPSS) and the International Organisation of Securities Commissions. In September 2013, Safcom made an application to the European Securities and Market Authority (ESMA) for recognition. Safcom has not yet expressed an intention to apply for recognition under the Dodd-Frank Act. There are various criticisms against licensing Safcom as a local OTC derivatives CCP. Firstly, Safcom is wholly owned by the JSE, and the ESMA has suggested that the connectedness of an exchange and a CCP could be a source of additional risk. Secondly, Safcom relies heavily on four of its ten existing members for liquidity, which makes it extremely vulnerable should one of the big four banks fail. The Act allows for offshore CCPs recognised by the FSB to provide services to South African entities. South African banks trade extensively with foreign banks, according to Nhlanhla Nene, current Minister of

Finance, and around 60% of South African interbank derivatives are traded with foreign banks. Counterparties under the EMIR's jurisdiction are subject to mandatory clearing of standardised derivatives transactions. Hence in January 2013, the first OTC derivative transaction involving a South African bank (Absa) and a foreign counterparty was cleared by LCH.Clearnet, a CCP based in the UK (Financial Stability Board, 2013).

South African authorities can decide not to license a local CCP, and recognise foreign CCPs or not, and whether to rely only on a local CCP. Since most of the interbank derivatives transactions in South Africa are conducted with foreign banks, the use of foreign CCPs seems a natural choice, but the use of foreign CCPs would require South African entities to post collateral to offshore accounts. Current exchange controls limit South African entities from investing more than 25% of their liabilities offshore, and collateral requirements to foreign CCPs mean this limit may need to be reconsidered. The same supervision and access to data concerns that apply to a foreign TR also apply to a foreign CCP, but even more so because CCPs are more systemically important. It would be far harder for South African authorities to assist a foreign CCP in trouble than a local CCP and the failure of a foreign CCP would have large direct and indirect consequences for South Africa. However, a global CCP would also have more clearing members and therefore less reliance on the small number of large South African banks. Owing to economies of scale, a global CCP reduces costs for clearing members and allows for more netting, which is desirable. Conversely, forcing foreign banks to use a South African CCP would increase their costs and possibly reduce their participation in the market, resulting in a smaller market and less liquidity in the market.

There are pros and cons to both the local only or foreign only approaches, but they are unsuitable for South Africa. The FMA envisioned that both local and foreign CCPs would be

able to operate in the market but there are also downsides to this mixed approach, such as reduced netting opportunities for banks that participate in multiple CCPs. Lastly, a hybrid model could be considered, where a local CCP becomes a clearing member of a global CCP. This would optimise netting while still having the benefits of having both a local and global CCP in the market. However, it intensifies the direct exposure if a global CCP fails.

Safcom is an excellent candidate for a local CCP if authorities decide not to rely solely on a foreign CCP. Safcom's "risk waterfall" is consistent with the ESMA's framework for dealing with the default of a clearing member. According to the risk waterfall, if a clearing member defaults, the losses from the default are funded in the following order: firstly, by the defaulting clearing member's initial margin; secondly, by the defaulting member's contribution to the default fund; thirdly, by the JSE's contribution to the default fund; and fourthly, by non-defaulting members' contribution to the default fund. Presently, Safcom has ten clearing members, but it relies heavily on its four largest members for most of its liquidity. It has therefore been suggested that it should also have access to liquidity from the SARB because CCPs are systemically important institutions themselves.

Central trading of derivative transactions is not seen as an immediate concern and is not covered by the FMA. Further regulation would be needed should authorities find that central trading of standardised derivative transactions is desirable.

OTC derivatives are classed according to a taxonomy in the Act. The following are classified as credit derivatives:

- credit default swap (single name, index, index tranche or basket)
- credit default swaption

- credit default option
- total return swap

Under the new twin peaks model, the SARB and FSB will share supervisory responsibility for the OTC derivatives market. The FSB will be responsible for market conduct, while the SARB will be responsible for regulating capital and risk requirements, although the SARB's power over this market has not yet been finalised. Until the twin peaks model is fully implemented, the FSB will have sole regulatory responsibility for the OTC derivatives market (Financial Stability Board, 2013)

2.4.6 BCBS-IOSCO framework for margining

The purpose of margining is to reduce systemic risk for non-centrally cleared derivatives while providing an incentive to use central clearing counterparties. Capital requirements specified in Basel III have the same objectives, that is, to reduce risk and incentivise the use of CCPs. However, it is worth noting that capital requirements against non-centrally cleared derivatives help the survivor to absorb losses in the event of a counterparty's default whereas margining is kept by the survivor in the event of a default to help cushion the blow. After the enactments of Dodd-Frank and the EMIR legislation, the G20 identified the need for a global standard for margining requirements for non-centrally cleared OTC derivatives to avoid regulatory arbitrage. At the November 2011 G20 conference in Cannes, the G20 leaders requested that the Basel Committee on Banking Supervision (BCBS) and the International Organisation for Securities Commissions (IOSCO) develop standards on margining for non-centrally cleared OTC derivatives for consultation. In July 2012, the initial proposal was released for comment, and the consultation period closed on 28 September 2012. A revised

proposal was released in February 2013 for public comment. The BCBS and IOSCO conducted a quantitative impact study in order to estimate the impact of the proposed margin requirements, and this study informed the final framework. The study found that margining was being conducted on a case-by-case basis, and varied considerably between respondents and jurisdictions. The survey's respondents made up approximately 75% of the global non-centrally cleared derivatives market and between them they held margining equal to approximately €100 billion. That is only 0.03% of the gross notional exposure. After implementing the margining requirements, these respondents would need to hold €558 billion for the same gross notional exposure. Timelines for a phased implementation have been released with the objective that implementation is harmonised across countries (as with Basel III's implementation) to avoid regulatory arbitrage, and over an appropriate period to minimise transition costs. The first phase begins in December 2015 (BCBS-IOSCO, 2015).

The framework stipulates that all major market participants (ODPs, MSPs, financial institutions and systemically important non-financial institutions) will be required to exchange initial and variation margins as appropriate for the counterparty risk per transaction for non-centrally cleared derivatives. The initial margin is posted when the transaction is entered into, while the variation margin changes as the perceived risk changes. The variation margin limits the build-up of systemic risk during the life of the contract. When calculating the initial margin, a "standardised initial margin schedule" is used. For credit derivatives with a life span of zero to two years, 2% of the notional exposure is required as a margin. For two to five years, it is 5% and for five years plus it is 10%. This is compared to interest rate derivatives which have an initial margin requirement of 1% for a zero to two-year contract, 2% for two to five years and 4% for over five years. When calculating the variation margin, the full amount necessary to fully collateralise the mark-to-market exposure of non-centrally cleared derivatives must be exchanged with sufficient frequency (say, daily). Assets used as

collateral for margining must be highly liquid and not be susceptible to market risk, for example, high quality government debt, cash, high quality corporate bonds and gold (BCBS-IOSCO, 2015).

2.4.7 Comparison of South African legislature with European and US legislature

The implementation of the FMA has been a slow process characterised by many opportunities for public comment. The main reason for this is the concern that local authorities have about the potentially adverse side effects of the regulation that could reduce the market size, reduce market liquidity and stifle innovation. There is also a need to better understand European Union and US regulation and the cross-border impact of these reforms. As such, it is not surprising that the US and EU are further along in the implementation of their OTC derivatives market regulation than South Africa. A summary of the progress to date of implementation in these three jurisdictions is provided in chapter 5.

	Dodd-Frank	EMIR	FMA
Market supervision	SEC and CFTC with the Financial Stability Oversight Council established to resolve disputes.	ESMA	Twin peaks: SARB and FSB
Professional market participants	Act refers to "major market participants" (MSPs). Identified by market involvement above	Act refers to financial counterparties. Non-financial counterparties receive partial exemption provided	Act refers to "OTC derivatives providers" (ODPs). No thresholds in place. All professional

	stated thresholds. Hedging positions not counted towards threshold. Required to register with the CFTC and adhere to new prudential requirements. Possible to be an MSP for one class of derivatives but not another.	they are below stated thresholds. Hedging positions not counted towards threshold. Professional market participants required to register and subject to new prudential requirements. Once a non-financial counterparty exceeds one threshold, it is subject to the same regulatory requirements for all classes of derivatives.	market participants must register as ODPs. Non-professional end-users are exempt. Must register with the FSB.
Trade repository	Onus is on the MSP to report transactions to a TR. If both parties are end-users, they must decide who is responsible for reporting the transaction.	All financial counterparties must report their transactions to a TR. Non-financial counterparties are exempt from the reporting requirement provided they fall beneath all the thresholds.	Onus is on ODPs to report all transactions. End-users are exempt.
Central clearing	Act refers to a derivatives clearing organisation (DCO). CFTC decides	Act refers to a central clearing counterparty (CCP). All standardised	Central clearing is not mandated at this stage. Authorities are relying on

	which derivatives must be centrally cleared. End-users can be exempt from central clearing provided they are not MSPs and they use the derivatives for hedging purposes. Banks are prevented from holding non-centrally cleared CDSs and CDSs against ABSs on their own balance sheet, and must be "pushed out" to separately capitalised subsidiaries.	derivatives to be centrally cleared. "Top-down" and "bottom-up" approaches used to determine which derivatives must be centrally cleared. Banks not prevented from holding non-centrally cleared CDSs on their balance sheets.	incentives (Basel III) to encourage central clearing.
Margin requirements for non-centrally cleared derivatives	Non MSP end-users not exempt from margin requirements. However, will follow the BCBS-IOSCO framework.	Follows the BCBS-IOSCO framework.	Follows the BCBS-IOSCO framework.
Central trading	Central trading of all standardised derivatives. Introduces a new type of trading platform called a "swaps execution facility" where bid and offer spreads are posted by	Consultations are in progress. Legislation has not been finalised	Not required at this stage. New legislation will be needed if it does become a requirement.

	dealers.		
Additional	"Volcker Rule" prevents banks from trading in derivatives for their own account, that is, for the banking book.	No such provision.	No such provision.

Table 1: Comparison of Dodd-Frank, EMIR and FMA
Source: Compiled by researcher (2015)

From the above comparison it can be see that the South African regulation was created to complement the European regulation. Hence the same differences between the European and US regulation exist between South African and US regulation. The major differences are the Volcker Rule, forced centralised trading of standardised derivatives, reporting obligations for end-users and the margin requirements for end-users. On the whole, the South African and European legislation is more accommodating of market participants. Interestingly, one of the provisions where Dodd-Frank is stricter on end-users than the European and South African is the margin requirements, but the Basel Committee on Banking Supervision and the International Organisation of Securities Commissions (BCBS-IOSC) issued guidelines with regard to margining, which are being considered by national governments. The BCBS-IOSC imposes margining requirements on "covered entities" which are financial institutions and the implementation of the guidelines would likely supersede Dodd-Frank's initial position.

Chapter 3: Methodology

3.1 Introduction

This chapter details the research methodology used in extracting data from the BA350 and DI430 forms for the study. In analysing the data, the study will look at market size, market activity, and market risk in the South African credit derivatives market.

3.2 Data source

The SARB mandates that all commercial banks complete and submit the BA350 form monthly. The content of the individual forms completed is confidential and not available for public review, but the SARB publishes the accumulated data for the South African banking sector, which is available to the public. According to Government notice R.1029 Banks Act (/1990): Regulations relating to banks (South African Reserve Bank, 2012), the purpose of the return is to determine the following, *inter alia*:

a) The relevant notational amounts underlying all contracts in derivative instruments entered into during the reporting month, that is, the turnover in respect of transactions in derivative instruments entered into during the reporting month;
b) The relevant notational amounts underlying all contracts in derivative instruments that had not yet terminated at month-end, that is, the notional amounts underlying all unexpired derivative contracts;
c) The relevant fair value amounts underlying all contracts in derivative instruments that had not yet terminated at month-end, that is, the fair value amount underlying all unexpired derivative contracts.

The form distinguishes between transactions entered into in respect of credit derivative instruments and transactions entered into in respect of derivative instruments other than credit

derivative instruments. Instruments other than credit derivatives include foreign exchange, interest rate, equity and commodity instruments.

Prior to 1 January 2008, banks would complete and submit the "DI" series of forms to the SARB. However, with the implementation of Basel II, banks were required to complete and submit the "BA" series of forms to the SARB. The DI430 form is equivalent to the BA 350 form and can be used to calculate notional amounts outstanding as well as turnover for exchange-traded and OTC derivative instruments prior to 1 January 2008. Gross positive fair value (GPFV) and gross negative fair value (GNFV) can be calculated for exchange-traded and OTC derivative instruments not including credit derivatives. However, it is not possible to calculate gross positive fair value and gross negative fair value for credit derivatives using the DI 430 form. It was thus not possible to collect this data for January 2005, 2006 and 2007. An example of a BA350 form is provided in appendix B.

3.3 Definitions of key terms and concepts

3.3.1 Trading versus banking

The BA 350 form distinguishes between derivative instruments that are used for trading purposes versus banking purposes. Each bank has its own written policy approved by the board of directors which specifies the criteria for determining which derivative instruments are classified as part of the bank's trading activities and which are classified as part of the bank's banking activities (South African Reserve Bank, 2012). This distinction is primarily based on the subjective intention of the individual bank. Assets, which the bank intends to keep until maturity, are listed in the banking book, while those assets the bank intends to

trade are listed under the trading book. Assets in the trading book are typically measured according to current market prices, while assets in the banking book are measured on an amortised cost basis with income accrued over time, having deducted any provisions for credit impairment. Thus, the market value of a bank's assets may differ from the recorded value in the bank's accounts. When market value is lower than the recorded value, then the bank's true capital position and ability to absorb losses will be overstated (Farag, Harland, & Nixon, 2013: 206). Since trading book assets are supposed to be highly liquid and easy to trade, they have lower capital requirements than banking book assets. This, among other reasons, as discussed in detail in the literature review, allowed banks to overleverage themselves prior to and during the crisis. A Basel study based on a sample of large banks found substantial differences in how much capital lenders thought was needed to guard against possible losses on trading book assets. In order to address this deficit in regulation, the Basel Committee has proposed two alternative definitions for the boundary between banking and trading books that do not depend on the banks' subjective intention to trade or putting up barriers to make switching between books more difficult (The Basel Committee, 2013). In addition, Basel III imposes higher capital requirements for trading book positions to avoid regulatory arbitrage between trading and banking books.

3.3.2 Turnover data

Turnover reflects the notional gross amounts underlying all transactions entered into during the reporting month where the reporting bank acted as a principal (South African Reserve Bank, 2012). The amounts are measured in terms of notional amounts and are reflected as absolute amounts. Turnover provides a measure of market activity (Bank for International Settlements, 2007).

3.3.3 Notional amounts

Notional amounts are defined as the nominal amounts underlying the respective derivative contracts – in other words, the contracted base values on which payments and receivables are calculated (South African Reserve Bank, 2012). Notional amounts outstanding provide useful information on the structure of the OTC derivatives market as well as being a rough estimate for the potential transfer of price risk in derivatives markets. They are also comparable to measures of market size in related underlying cash markets and shed useful light on the relative size and growth of cash and derivatives markets. However, notional amounts should not be interpreted as a measure of the riskiness of these positions (Bank for International Settlements, 2007).

3.3.4 Fair value

A single comprehensive measure of risk does not exist. However, the BIS uses the concept "market value", whereas the SARB uses the concept "fair value". Market value is the cost of replacing all open contracts at the prevailing market prices. Conversely, fair value is regarded by the SARB as a broader term than market value since the market value of an instrument usually refers to the price obtainable in an active market.

Gross negative fair value refers to the fair values of contracts where the reporting bank owes money to its counterparties, without taking into account netting. This represents the maximum losses the bank's counterparties would incur if the bank defaults and there is no netting of contracts, and no bank collateral was held by the counterparties. The figures for negative value are reported as absolute amounts. Conversely, gross positive fair value reflects

the values of contracts where the reporting bank is owed money by its counterparties, without taking into account netting (South African Reserve Bank, 2012).

South African banks and the SARB follow the International Financial Reporting Standards (IFRS) accounting standard. South Africa implemented IFRS in 2005, and since then, the JSE has required listed companies to use IFRS. In addition, Regulation 3 of the Financial Reporting Standards prescribes that all returns required to be completed by banks (i.e. the BA series) must be prepared in accordance with IFRS (International Monetary Fund, 2015a). According to the IFRS, GNFV and GPFV of derivative contracts must be published on their balance sheets as a liability and asset respectively (International Swaps and Derivatives Association, 2012).

3.3.5 Outstanding balances

The outstanding balance at the beginning of the reporting month as well as outstanding balance at the end of the reporting month are recorded in the BA 350 form. These amounts reflect the remaining contractual maturity of all relevant contracts in notional gross amounts that had not yet terminated at the beginning or at the end of the reporting month (South African Reserve Bank, 2012).

3.4 Data analysis

In this study, the analysis of the data was conducted according to three indicators, namely market size, market activity and market risk. A detailed discussion of each will follow in sections 3.4.1 to 3.4.3.

3.4.1 Market size

As explained earlier, notional amounts outstanding at the end of the month are comparable to measures of market size in related underlying cash markets and can be used as a proxy for relative size and growth of cash and derivatives markets (Bank for International Settlements, 2007).

In this study, the notional amounts outstanding at the end of the month for January 2005 to January 2015 for credit derivatives where the reporting bank is the protection buyer and for credit derivatives where the reporting bank is a protection seller were recorded, in addition to calculating the percentage change between periods. Notional amounts outstanding for credit derivative where protection was bought and sold were added (therefore not netted) to attain the total notional amount outstanding for the credit derivatives market for each period. This is the method used to calculate the total notional amount outstanding for credit derivatives used by the BIS, the ISDA and the OCC.

The percentage change in the total notional amount outstanding at month end of credit derivatives was calculated. In addition, the total notional amount outstanding at month end of credit derivatives was compared with the total notional amount outstanding at month end of OTC derivative instruments other than credit derivative instruments, thereby expressing the size of the credit derivatives market as a percentage of the OTC derivatives market for instruments other than credit derivatives in South Africa for each period.

3.4.2 Market activity

Turnover is a measure of market activity. The turnover of credit derivatives reflects the amount of protection acquired during the reporting month, in the case where the reporting bank is a protection buyer; and the amount of protection sold during the reporting month, in the case where the reporting bank is a protection seller. These two amounts were then added together to calculate total turnover for credit derivatives in the reporting month. Protection that matured during the reporting month was not included in the calculation of turnover because this amount does not indicate market activity during the reporting month. Instead, it is the result of contracts entered into in a previous month which are simply expiring in the reporting month.

The percentage change in the total turnover of credit derivatives was calculated as well as the turnover of the credit derivatives market as a percentage of the turnover for OTC derivative instruments other than credit derivative instruments.

3.4.3 Market risk

As discussed in section 3.3.4, South African banks report the GNFV (liability) and GPFV (asset) of their derivative contracts on their balance sheets. However, banks under the authority of the US GAAP accounting standards, publish the net current credit exposure (NCCE) of derivative contracts on their balance sheets (either as an asset or a liability). The ISDA favours the use of the NCCE over the GNFV and GPFV because it believes NCCE provides a better reflection of an entity's exposure to credit and liquidity risk since it takes into account bilateral netting agreements (International Swaps and Derivatives Association, 2012).

GNFV represents the maximum loss the default of the reporting bank would inflict on its counterparties, while GPFV represents the maximum losses a bank could incur if all its counterparties default. However, because NCCE takes into account bilateral netting, it is the net amount owed to banks if all contracts were immediately liquidated. Here, NCCE was calculated by subtracting netting benefits from GPFV. Therefore for a portfolio of contracts with a single counterparty where the bank has a legally enforceable bilateral netting agreement, the NCCE is equal to GPFV – GNFV. However, there are instances in which a bank contracts with a counterparty where the legal enforceability of bilateral netting agreements may be uncertain. In those instances, NCCE is not simply reflected by GPFV – GNFV. A primary example would be where the counterparty is based in a foreign country where the legal enforceability of bilateral netting contracts has either not been tested or there is legal precedence where after the bankruptcy of a local entity, bilateral netting contracts was not enforced. A second example would be where standardised documentation, such as the ISDA's master agreement, is not used for whatever reason.

NCCE therefore represents the sum of GPFV for counterparties without legally certain bilateral netting arrangements and the bilaterally netted current credit exposure for counterparties with legal certainty regarding the enforceability (International Swaps and Derivatives Association, 2012).

$$GPFV - Netting\ benefits = NCCE$$

Equation 2: Calculation of NCCE

In the USA, the OCC publishes a quarterly report on bank trading and derivatives activities based on information provided by all insured US commercial banks, savings associations and trust companies (Office of the Comptroller of the Currency (OCC), 2014). US banks report financial reports using the US GAAP accounting standards. In a 2011 report, the OCC confirmed that NCCE is the primary metric it uses to evaluate credit risk in bank derivative activities. According to the same report published by the OCC, the netting benefit as a percentage of GPFV was 50.6% in the first quarter of 1998, but improvements in the ISDA's master agreement and other industry initiatives have contributed to the increase in this percentage over the years. It reported the netting benefit was 88.2% in the second quarter of 2014 (Office of the Comptroller of the Currency (OCC), 2014). Since NCCE does not take into account collateral held against contracts, according to the OCC, a more risk-sensitive measure of credit risk would be to consider collateral held against contracts (Office of the Comptroller of the Currency (OCC), 2011).

NCCE is not calculated in South Africa. A simple calculation of GPFV – GNFV would give a rough approximation for the NCCE in South Africa. However, without an understanding of netting benefits, the true NCCE could not be calculated.

Therefore the GNFV and GPFV as well as the NCCE were calculated for credit derivatives and all other OTC derivatives.

3.5 Calculations

A detailed description of the methodology for extracting data from the BA350 and DI430 forms is provided in this section. The data were analysed on a year-on-year basis using January as the reference month, and the GDP deflator was used to adjust for inflation. The GDP deflator is defined as the ratio of the nominal estimates of GDP to the real estimates of GDP (Stats SA, 2012). An example of a BA350 form is attached under appendix B of this dissertation.

3.5.1 Methodology for extracting data from the BA350 form (January 2008 onwards)[1]

This methodology is as follows:

- Total notional amount outstanding at the end of the month for credit derivatives contracts where the reporting bank is a protection buyer:
  Sum of columns 9 and 10 of line 112.

- Total notional amount outstanding at the end of the month for credit derivatives contracts where the reporting bank is a protection seller:
  Sum of columns 9 and 10 of line 116.

- Total notional amount outstanding at the end of the month for OTC derivative contracts other than credit derivative contracts:
  Sum of columns 11 and 12 of line 56.

- Turnover of credit derivative contracts where the reporting bank is a protection buyer:
  Sum of columns 3 and 4 of line 112.

- Turnover of credit derivative contracts where the reporting bank is a protection seller:
  Sum of columns 3 and 4 of line 116.

- Turnover of OTC derivative contracts other than credit derivative contracts:

[1] The researcher greatly appreciates the assistance of a SARB market analyst in taking the time to discuss and confirm the correctness of these calculations.

Sum of columns 11 and 12 of line 13.

- Gross positive fair value (GPFV) of credit derivative contracts outstanding at month end where the reporting bank was a protection buyer:
  Sum of columns 11 and 13 of line 112.

- Gross negative fair value (GNFV) of credit derivative contracts outstanding at month end where the reporting bank was a protection buyer:
  Sum of columns 12 and 14 of line 112.

- Net current credit exposure (NCCE) of credit derivative contracts outstanding at month end where the reporting bank was a protection buyer:
  Sum of columns 11 and 13 minus the sum of columns 12 and 14 in line 112.

- Gross positive fair value (GPFV) of credit derivative contracts outstanding at month end where the reporting bank was a protection seller:
  Sum of columns 11 and 13 of line 116.

- Gross negative fair value (GNFV) of credit derivative contracts outstanding at month end where the reporting bank was a protection seller:
  Sum of columns 12 and 14 of line 116.

- Net current credit exposure (NCCE) of credit derivative contracts outstanding at month end where the reporting bank was a protection buyer:
  Sum of columns 11 and 13 minus the sum of columns 12 and 14 in line 116.

- Gross positive fair value (GPFV) of OTC derivative contracts other than credit derivatives outstanding at month end:
  Sum of columns 11 and 12 in line 107.[2]

- Gross negative fair value (GNFV) of OTC derivative contracts other than credit derivatives outstanding at month end:
  Sum of columns 11 and 12 in line 108.[2]

- Net current credit exposure (NCCE) of OTC derivative contracts other than credit derivatives outstanding at month end:
  Sum of columns 11 and 12 in line 107 minus the sum of columns 11 and 12 in line 108.[2]

[2] GPFV and GNFV amounts recorded in both the BA 350 and DI 430 forms for OTC derivatives contracts other than credit derivatives also include values for exchange-traded contracts. Given the data, it is not possible to separate GPFV and GNFV for OTC and exchange-traded contracts.

3.5.2 Methodology for extracting data from the DI430 form (prior to January 2008)

This methodology is as follows:

- Total notional amount outstanding at the end of the month for credit derivatives contracts where the reporting bank is a protection buyer:
  Sum of columns 9 and 10 of line 71.

- Total notional amount outstanding at the end of the month for credit derivatives contracts where the reporting bank is a protection seller:
  Sum of columns 9 and 10 of line 75.

- Total notional amount outstanding at the end of the month for OTC derivative contracts other than credit derivative contracts:
  Sum of columns 13 and 14 of line 40.

- Turnover of credit derivative contracts where the reporting bank is a protection buyer:
  Sum of columns 3 and 4 of line 71.

- Turnover of credit derivative contracts where the reporting bank is a protection seller:
  Sum of columns 3 and 4 of line 75.

- Turnover of OTC derivative contracts other than credit derivative contracts:
  Sum of columns 13 and 14 of line 20.

- Gross positive fair value (GPFV) of credit derivative contracts outstanding at month end where the reporting bank was a protection buyer:
  Not possible to calculate given the data provided.[3]

- Gross negative fair value (GNFV) of credit derivative contracts outstanding at month end where the reporting bank was a protection buyer:
  Not possible to calculate given the data provided. [3]

- Net current credit exposure (NCCE) of credit derivative contracts outstanding at month end where the reporting bank was a protection buyer:
  Not possible to calculate given the data provided. [3]

[3]For the years 2005, 2006 and 2007, the DI 430 forms were used as the data source. It is not possible to calculate GPFV or GNFV for credit derivatives using the DI 430 forms.

- Gross positive fair value (GPFV) of credit derivative contracts outstanding at month end where the reporting bank was a protection seller:
  Not possible to calculate given the data provided.[3]

- Gross negative fair value (GNFV) of credit derivative contracts outstanding at month end where the reporting bank was a protection seller:
  Not possible to calculate given the data provided.[3]

- Net current credit exposure (NCCE) of credit derivative contracts outstanding at month end where the reporting bank was a protection buyer:
  Not possible to calculate given the data provided. [4]

- Gross positive fair value (GPFV) of OTC derivative contracts other than credit derivatives outstanding at month end:
  Sum of columns 13 and 14in line 63.[5]

- Gross negative fair value (GNFV) of OTC derivative contracts other than credit derivatives outstanding at month end:
  Sum of columns 13 and 14 in line 64.[5]

- Net current credit exposure (NCCE) of OTC derivative contracts other than credit derivatives outstanding at month end:
  Sum of columns 13 and 14 in line 63 minus the sum of columns 13 and 14 in line 64.[4]

3.6 Conclusion

The data were analysed and tabulated separately according to the three research indicators, namely market size, market activity and market risk. The data tables are available under appendix C of this dissertation. The analysis of the data follows in chapter 4.

[4] For the years 2005, 2006 and 2007, the DI 430 forms were used as the data source. Owing to the fact that it is not possible to calculate GPFV or GNFV for credit derivatives using the DI 430 forms, it is not possible to calculate NCCE.
[5] GPFV and GNFV amounts recorded in both the BA 350 and DI 430 forms for OTC derivatives contracts other than credit derivatives also include values for exchange-traded contracts. Given the data, it is not possible to separate GPFV and GNFV for OTC and exchange-traded contracts.

Chapter 4: Results of the study

4.1 Introduction

This chapter analyses the available data on the size, activity and risk of the South African OTC credit derivatives market. These indicators are discussed separately in sections 4.2 to 4.4. The data is analysed on an annual (year-on-year) basis using January as the reference month.

The GDP deflator was used to adjust for inflation and all amounts are therefore reported in constant (real) prices, with 2005 as the base year[6]. The GDP deflator is defined as the ratio of the nominal estimates of GDP to the real estimates of GDP (Stats SA, 2012). As data for the same month (January) of each year is analysed, seasonal fluctuations are not a concern.

Market size is represented by the notional amount outstanding at the end of the month and market risk is represented by the fair value amount at the end of the month. Hence both market size and risk are stock variables. However, market activity is represented by the notional amount outstanding of new contracts entered into during the month, and it is therefore a flow variable. A stock variable is a value measured at a particular point in time, in this case the last day of the month, while a flow variable is measured over the course of a period, in this case, over the course of a month.

[6]Note that the aggregate tables in appendix C are expressed in nominal prices, while the data presented in tables throughout the rest of the chapter is expressed in real prices.

4.2 Market size

Notional amounts outstanding at the end of the month are comparable to measures of market size in related underlying cash markets and shed useful light on the relative size and growth of cash and derivatives markets (Bank for International Settlements, 2007). The sections that follow examine the size of the market for credit derivatives for protection bought and sold as well as the size of the total credit derivatives market compared to the rest of the OTC derivatives market.

4.2.1 Notional amount outstanding credit derivatives: protection buyer versus seller

CREDIT DERIVATIVES: WHERE THE REPORTING BANK IS A PROTECTION BUYER			
Period	**Notional amount at the end of the reporting month**	**Year-on-year change**	**Y/Y % change**
Jan-05	R 17 879 831 000.00		
Jan-06	R 12 302 022 003.60	R -5 577 808 996.40	-31.2%
Jan-07	R 18 566 922 889.85	R 6 264 900 886.25	50.9%
Jan-08	R 26 996 857 308.29	R 8 429 934 418.44	45.4%
Jan-09	R 36 375 520 728.98	R 9 378 663 420.70	34.7%
Jan-10	R 33 896 630 065.41	R -2 478 890 663.57	-6.8%
Jan-11	R 13 926 293 139.93	R -19 970 336 925.48	-58.9%
Jan-12	R 24 169 419 669.29	R 10 243 126 529.36	73.6%
Jan-13	R 40 034 846 254.40	R 15 865 426 585.11	65.6%
Jan-14	R 44 992 995 624.00	R 4 958 149 369.59	12.4%
Jan-15	R45 693 383 246.07	R 700 387 622.08	1.6%

Table 2: Notional amounts outstanding for credit derivatives where the reporting bank is a protection buyer
Source: Compiled by researcher (2015)

CREDIT DERIVATIVES: WHERE THE REPORTING BANK IS A PROTECTION SELLER			
Period	**Notional amount at the end of the reporting month**	**Year-on-year change**	**Y/Y % change**
Jan-05	R 14 719 937 000.00		
Jan-06	R 10 109 816 198.56	R -4 610 120 801.44	-31%
Jan-07	R 14 164 289 436.66	R 4 054 473 238.10	40%
Jan-08	R 18 872 000 450.33	R 4 707 711 013.68	33%
Jan-09	R 28 989 270 793.91	R 10 117 270 343.58	54%
Jan-10	R 22 928 819 868.07	R -6 060 450 925.84	-21%
Jan-11	R 46 563 504 970.74	R 23 634 685 102.67	103%
Jan-12	R 42 687 543 862.93	R -3 875 961 107.81	-8%
Jan-13	R 48 498 792 293.29	R 5 811 248 430.36	14%
Jan-14	R 52 095 133 772.78	R 3 596 341 479.49	7%
Jan-15	R 50 815 373 298.43	R -1 279 760 474.35	-2%

Table 3: Notional amounts outstanding for credit derivatives where the reporting bank is a protection seller
Source: Compiled by researcher (2015)

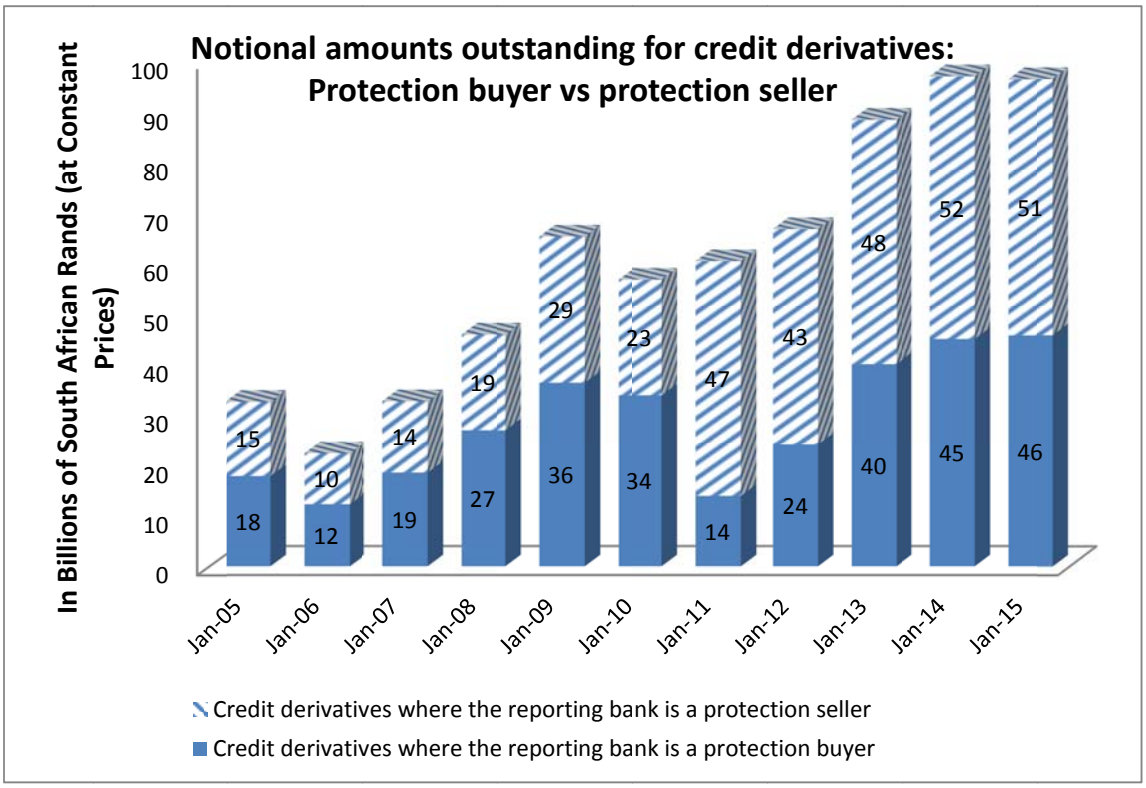

Figure 11: Notional amounts outstanding for credit derivatives: protection buyer versus protection seller
Source: Compiled by researcher (2015)

The notional amounts outstanding presented in this analysis could be overstated for a variety of reasons (discussed below) but all these factors are partly, if not largely, offset. One can thus state that the notional amounts outstanding provided in this analysis provide a relevant and useful estimation of market size.

The first factor is the absence of a central clearing counterparty. Without a central clearing counterparty, the outstanding notional amounts are overstated due to a lack of netting. Protection sold by the reporting bank to third parties cannot be netted against the reporting bank's protection bought from third parties. In the South African market this is not a significant factor, because risk is generally transferred from foreign banks to local nonbank market participants with local banks acting as the intermediary. The effectiveness of a central clearing counterparty in netting contracts and thus reducing counterparty risk decreases the smaller the proportion of interdealer trade in the total market. In South Africa, the size of the interdealer market is negligible.

The second factor that could lead to overstated notional amounts is agreements where counterparties are also reporting banks as opposed to another financial institution or non-financial customers who are counted twice. This is known as "double-counting". This is not a significant factor because in the South African credit derivative market, reporting banks rarely transact with each other.

The third factor leading to the possible overstating of the notional amount outstanding is the difficultly in unwinding CDSs. Instead of cancelling or unwinding a CDS, the party would normally buy a corresponding CDS to offset the initial CDS. However, after the ISDA's Big Bang protocol in 2009, scheduled termination dates of CDSs must always match a quarterly

roll date. These quarterly roll dates are always 20 March, 20 June, 20 September and 20 December. At these dates, dealers are able to "collapse" their books, that is, netting protection bought and sold for each of their counterparties. This bilateral netting does not have a large effect on notional amounts outstanding in the South African market because risk transfer is largely one directional. In addition, since the crisis, technology companies have been offering "portfolio compression" services whereby redundant CDSs are eliminated. An example is triReduce from TriOptima, originally a Swedish company with offices all over the world. According to the company, by 2009, redundant CDSs with a notional outstanding amount of $60.2 trillion were eliminated (The OTC Derivatives Working Group, 2012). However, portfolio compression such as triReduce has not yet been applied to the credit derivatives market in South Africa. As is the case with bilateral netting made possible by standardised termination dates, the effect of portfolio compression would arguably be minimal because of the largely one-directional transfer of risk that characterises the South African credit derivatives market.

According to the Financial Sector Assessment Programme conducted by the World Bank and the IMF, "there is no accurate information on the size of the South African OTC derivatives market" (National Treasury, 2014). The analysis of the size of the market is incomplete because only data pertaining to banks is captured in the BA350 form. However, in the credit derivative market, banks act as market makers so the vast majority of transactions involve a South African bank as a counterparty.

January 2005 to January 2006 recorded a sudden drop in the notional amounts outstanding for credit derivatives (see figure 11). January 2006 to January 2009 saw a prolonged period of growth in the market. On 21 February 2007, the Minister of Finance announced exchange

control reforms that removed several barriers to growth in the market for derivatives in all asset classes (Adelegan, 2009). This is a possible factor for the growth seen between January 2007 and January 2008. According to a South African credit derivative trader, after Lehman Brothers filed for bankruptcy on 15 September 2008, market activity was muted from that time until January 2009. Therefore the growth seen from January 2008 to January 2009 would have mostly been from February 2008 until mid-September 2008. The market size then dropped from January 2009 to January 2010. This could have been the result of lower market confidence after the crisis. However, it is also possible that after the Big Bang protocol was adhered to in April 2009, dealers "collapsing" their books would have reduced the notional amount outstanding. Since South African banks largely transfer risk from international banks to local market participants, the impact of dealers collapsing their books would not be that high because there is limited interdealer activity. One can therefore deduce that the fall in notional values was largely due to the financial crisis. Market size was on an upward trend from January 2011 until January 2015.

4.2.2 Notional amounts outstanding for credit derivatives by instrument

CREDIT DERIVATIVES PER INSTRUMENT: WHERE THE REPORTING BANK IS A PROTECTION BUYER			
Period	**Credit default swaps**	**Total return swaps**	**Other**
Jan-05	R 12 162 835 000.00	R 241 646 000.00	R 5 475 350 000.00
Jan-06	R 8 395 332 682.49	R 526 700 022.53	R 3 379 989 298.59
Jan-07	R 7 820 289 401.91	R 497 376 969.44	R 10 249 256 518.49
Jan-08	R 8 731 709 984.56	R 402 143 109.88	R 17 863 003 409.68
Jan-09	R 5 928 100 443.00	R 530 129 189.76	R 29 917 291 096.22
Jan-10	R 5 250 085 816.50	R 72 742 061.11	R 28 573 802 187.80
Jan-11	R 5 497 520 166.15	R 408 727 921.41	R 8 020 045 052.38
Jan-12	R 14 797 726 295.32	R -	R 9 371 693 373.97
Jan-13	R 24 130 611 331.60	R 294 418 993.56	R 15 609 815 929.25
Jan-14	R 28 815 667 202.13	R 160 185 564.73	R 16 017 142 857.14
Jan-15	R 22 679 504 712.04	R 433 584 293.19	R 22 580 294 240.84

Table 4: Notional amounts outstanding for credit derivatives by instrument where the reporting bank is a protection buyer
Source: Compiled by researcher (2015)

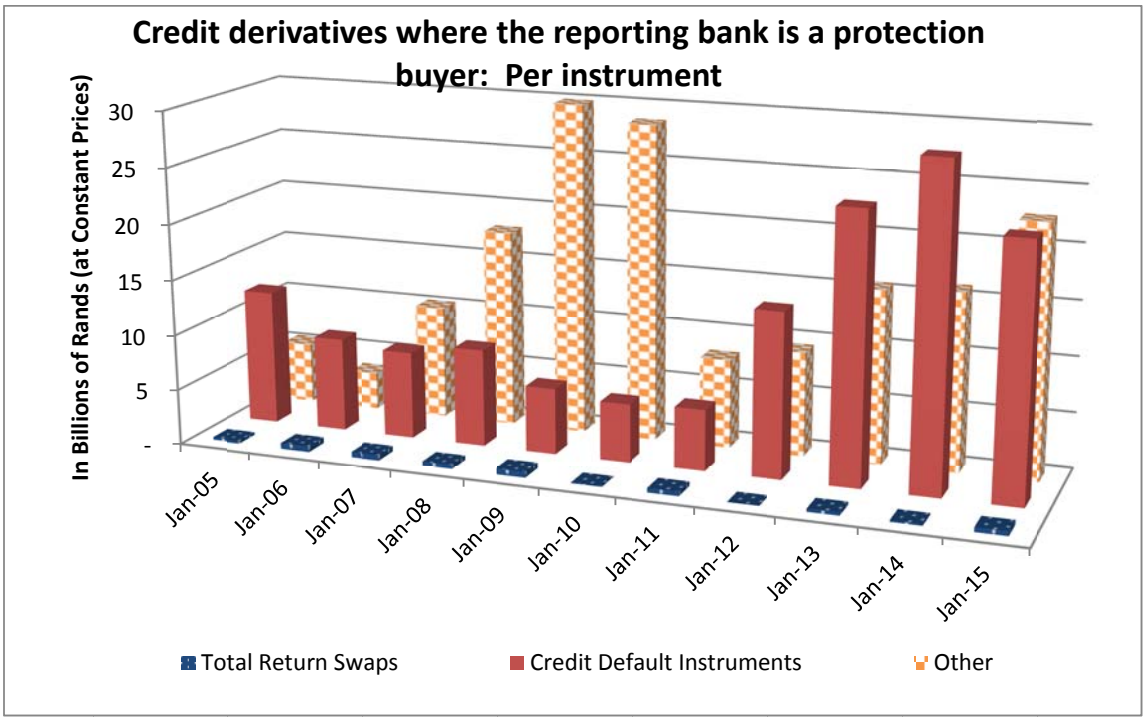

Figure 12: Notional amounts outstanding for credit derivatives per instrument where the reporting bank is a protection buyer
Source: Compiled by researcher (2015)

If one examines the development of the size of CDS market where the reporting bank is a protection buyer represented in figure 12, the observed results can be separated into five distinct periods. The first period includes only January 2005, for which the notional amount outstanding was over R10 billion. The second period sees a drop in notional amounts outstanding beginning in January 2006 and continuing until January 2008, where notional amounts remained at around R8 billion. The third period sees a further drop in notional amounts outstanding, starting in January 2009 until January 2011 where they remained just above R5 billion. This third period could be in reaction to the global financial crisis, resulting in a drop in desirability of these instruments. The fourth period sees a rapid increase in the growth rate of notional amounts outstanding for CDSs, starting in January 2012 and continuing until January 2014. The market reaches an all-time high of R28.8 billion in January 2014. The fifth period consisting only of January 2015 sees a decline in the notional amount outstanding to R22.7 billion.

The TRS market size has recorded insignificant amounts when compared with the whole credit derivatives market over the observed period, and will therefore not be discussed in further detail.

The development of the size of "other" credit derivative instruments over the observed period has fluctuated greatly. The following instruments are classified as credit derivatives in terms of the FMA Act: CDSs (both single name, index and tranche), credit default swaptions (also known as credit default options) and TRSs. However, credit linked notes (CLNs) are sometimes classified as credit derivatives because they are used to buy protection, while simultaneously selling protection using an embedded CDS (see section 2.2.6.8). CLNs are similar to CDSs, but they differ in one crucial respect, namely they are funded. The CLN

issuer is the protection buyer and the CLN investor is the protection seller. According to a South African credit derivatives trader, there is a healthy market for CLNs in South Africa. South African banks issue and sell CLNs to other local market participants to offset the protection they have sold to foreign banks. The observed period can be separated into three distinct periods. The first period consists of January 2005 and January 2006, which saw a decline in the notional amounts outstanding of other credit derivatives. The second period starts in January 2007 and ends in January 2010. It is characterised by a large growth in the market size of other credit derivatives, reaching a high of R29.9 billion in January 2009. The size of the market dropped drastically between January 2010 and January 2011, falling by nearly 70% to R8 billion from R28.6 billion. The third period then sees another period of continuous growth in the market size, from January 2011 to January 2015. According to a credit derivative trader, reporting errors could be responsible for the vast fluctuation in "other" credit derivatives where some banks report CLNs as credit derivatives for protection bought and others do not.

CREDIT DERIVATIVES PER INSTRUMENT: WHERE THE REPORTING BANK IS A PROTECTION SELLER			
Period	**Credit default swaps**	**Total return swaps**	**Other**
Jan-05	R 12 811 627 000.00	R 179 250 000.00	R1729060000.00
Jan-06	R 8 499 605 737.46	R 57 339 854.31	R 1 552 870 606.79
Jan-07	R 11 256 084 214.91	R 63 100 387.37	R 2 845 104 834.37
Jan-08	R 14 245 687 242.67	R60 500 032.17	R 4 565 813 175.50
Jan-09	R 23 202 607 540.65	R 3 560 643 500.07	R 2 226 019 753.20
Jan-10	R 18 111 653 122.14	R 3 092 588 073.92	R 1 724 578 672.02
Jan-11	R 43 713 343 836.87	R 2 239 383 068.90	R 610 778 064.96
Jan-12	R 38 291 825 757.43	R 3 217 413 037.65	R 1 178 305 067.84
Jan-13	R 45 635 364 431.83	R 1 343 260 160.40	R 1 520 167 701.06
Jan-14	R 50 497 584 335.01	R 689 746 856.48	R 907 803 135.21
Jan-15	R 44 660 125 130.89	R 1 303 874 345.55	R 4 851 373 821.99

Table 5: Notional amounts outstanding for credit derivatives where the reporting bank is a protection seller
Source: Compiled by researcher (2015)

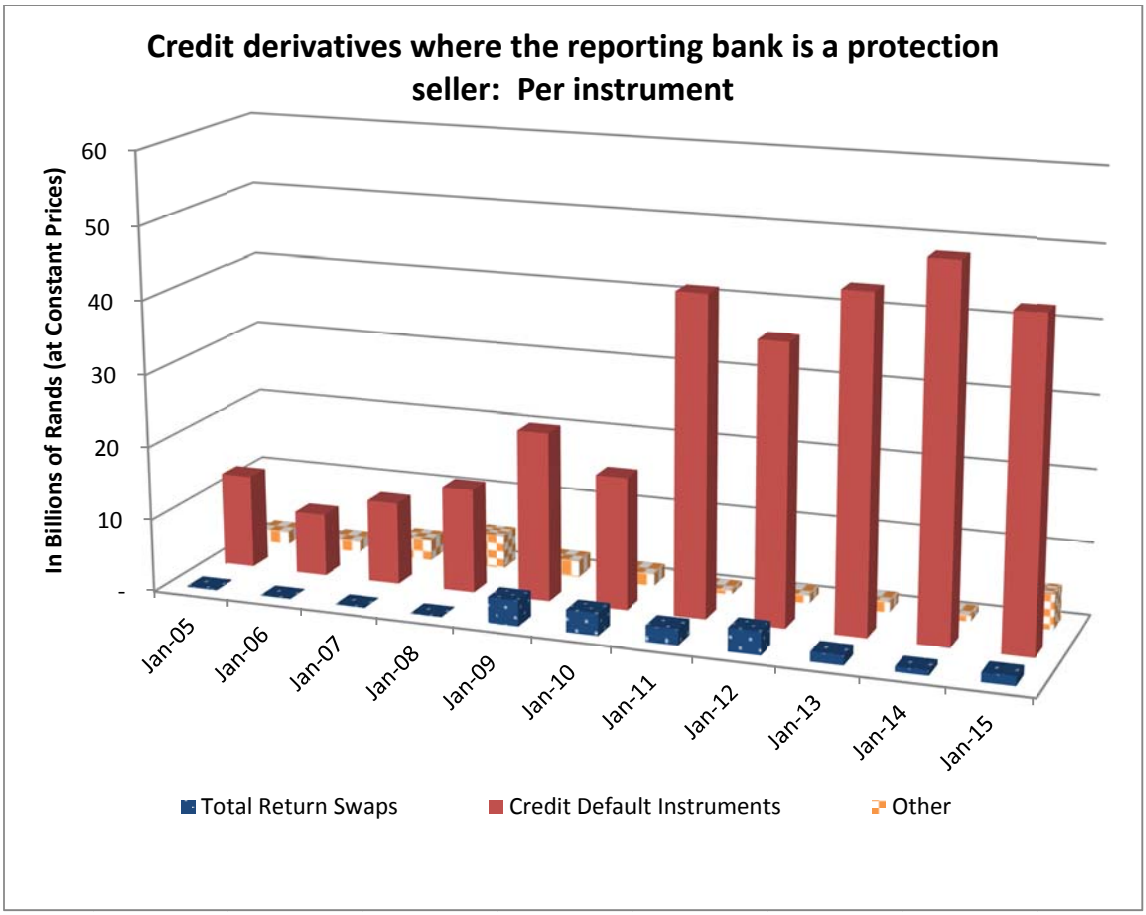

Figure 13: Notional amounts outstanding for credit derivatives per instrument where the reporting bank is a protection seller

Source: Compiled by researcher (2015)

The size of the market for credit derivatives for all instruments differs significantly where the bank is a protection seller compared to a protection buyer. South African banks primarily sell protection to foreign banks, with CDSs by far the instrument of choice (see figure 13).

For CDSs, the market size followed a generally increasing trend for the observable period. However, there were a few instances of annual declines in market size observed. The first of these declines was 33% from R12.8 billion, in January 2005, to R8.5 billion, in January 2006. From January 2006 to January 2009, the notional amounts outstanding continuously

increased until January 2010. The increase in the notional amount outstanding in January 2009 compared to January 2008 is likely due to activity between February 2008 and mid-September 2008 (as observed previously). The drop from January 2009 to January 2010 is likely due to the influence of the crisis and to a much lesser extent, the Big Bang protocol as discussed in section 4.2.1. January 2011 saw a huge increase of 141% in notional amounts outstanding compared to January 2010. There was a small decline in January 2012 compared to January 2011, followed by another period of sustained growth cumulating in an all-time high of R50 billion in January 2014. From January 2014 to January 2015 there was a drop to R44.7 billion.

As with credit derivatives where the reporting bank was a protection buyer, the notional amounts outstanding of TRSs where the reporting bank was a protection seller is exceedingly small compared to the total credit derivatives market. It saw a period of large growth between January 2009 and January 2012, but has since declined and in comparison to CDSs and other credit derivatives, it remains relatively small.

In sharp contrast to the notional amounts outstanding of other credit derivatives where the reporting bank is a protection buyer, the size of the market for other credit derivatives where the reporting bank is a protection seller is exceedingly small. According to a South African credit derivative trader, the reason for this is that South African banks sell protection to foreign banks primarily through CDSs and buy protection from local market participants either in the form of CDSs or CLNs. CLNs are sometimes classified as “other” credit derivatives. The notional amount outstanding in January 2005 was R1.7 billion, spiking to R4.6 billion in January 2008. This was followed by a period of decline lasting from January 2008 to January 2011, where it experienced overall growth until reaching a high of R4.9

billion in January 2015. Unlike the market size of other credit derivatives, where the reporting bank is a protection buyer, the market for other credit derivatives where the reporting bank is a protection seller has been dwarfed by the CDS market where the reporting bank is a protection seller since January 2008.

4.2.3 Notional amounts outstanding total credit derivatives versus all other OTC derivatives

TOTAL OF ALL OTHER OTC DERIVATIVES				
Period	**Notional amount at the end of the reporting month**		**Year-on-year change**	**Y/Y % change**
Jan-05	R	7 236 998 542 000.00		
Jan-06	R	7 128 385 785 896.67	R -108 612 756 103.34	-2%
Jan-07	R	7 657 805 948 720.62	R 529 420 162 823.96	7%
Jan-08	R	12 530 150 927 206.60	R 4 872 344 978 486.02	64%
Jan-09	R	19 147 193 296 379.60	R 6 617 042 369 172.93	53%
Jan-10	R	15 702 614 892 091.80	R -3 444 578 404 287.78	-18%
Jan-11	R	19 414 087 734 295.10	R 3 711 472 842 203.36	24%
Jan-12	R	19 268 864 416 023.10	R -145 223 318 272.01	-1%
Jan-13	R	15 463 538 170 244.80	R -3 805 326 245 778.29	-20%
Jan-14	R	19 293 811 575 915.40	R 3 830 273 405 670.52	25%
Jan-15	R	18 720 248 723 036.60	R -573 562 852 878.71	-3%

Table 6: Notional amounts outstanding for total credit derivatives (protection bought and sold) versus all other OTC derivatives

Source: Compiled by researcher (2015)

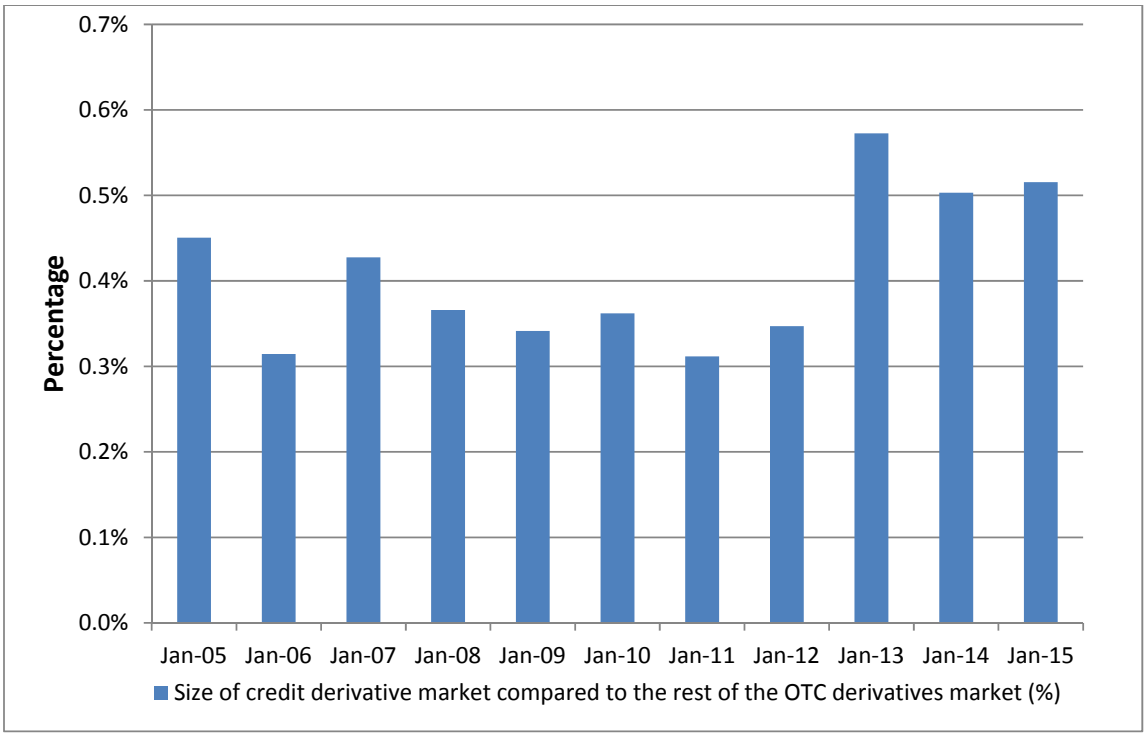

Figure 14: Size of the total credit derivatives market compared to the rest of the OTC derivatives market
Source: Compiled by researcher (2015)

The size of the credit derivatives market as a percentage of the size of the rest of the OTC derivatives market in South Africa remained between 0.3% and 0.4% from January 2006 to January 2012, with only January 2005 and January 2007 breaching the 0.4% mark. However, from January 2013 to January 2015, the size of the credit derivatives market was over 0.5% of the rest of the OTC market. The credit derivatives market did grow by 30% from January 2012 to January 2013, which partly explains this jump. Another possible contributor could be the use of portfolio compression for interest rate swaps. On 6 October 2014, TriOptima announced that after its first triReduce compression cycle for cleared South African rand, interest rate swaps had been completed and that $284.3 billion in notional amounts outstanding had been eliminated for LCH.Clearnet's SwapClear members. This decline in notional amounts outstanding for interest rate swaps could artificially raise the size of the credit derivatives market as a percentage of the size of the rest of the OTC derivative market.

4.3 Market activity

Turnover is a measure of market activity. The sections below will look at the protection acquired and sold during the reporting month as well as turnover of total credit derivatives compared to turnover for all other OTC derivatives during the reporting month.

4.3.1 Protection acquired during the reporting month versus protection sold during the reporting month

CREDIT DERIVATIVES: WHERE THE REPORTING BANK IS A PROTECTION BUYER			
Period	**Protection acquired during the reporting month**	**Year–on-year change**	**Y/Y % change**
Jan-05	R 2 497 223 000.00		
Jan-06	R 368 095 711.93	R -2 129 127 288.07	-578.4%
Jan-07	R 644 793 892.33	R 276 698 180.41	42.9%
Jan-08	R 2 356 356 954.45	R 1 711 563 062.12	72.6%
Jan-09	R 1 582 316 362.80	R -774 040 591.65	-48.9%
Jan-10	R 1 776 188 506.79	R 193 872 143.99	10.9%
Jan-11	R 1 167 578 564.96	R -608 609 941.83	-52.1%
Jan-12	R 2 387 626 135.14	R 1 220 047 570.17	51.1%
Jan-13	R 2 930 705 545.68	R 543 079 410.54	18.5%
Jan-14	R 1 312 036 780.59	R -1 618 668 765.09	-123.4%
Jan-15	R 167 048 167.54	R -1 144 988 613.05	-685.4%

Table 7: Protection acquired by the reporting bank during the month
Source: Compiled by researcher (2015)

CREDIT DERIVATIVES: WHERE THE REPORTING BANK IS A PROTECTION SELLER			
Period	**Protection sold during the reporting month**	**Year-on-year change**	**Y/Y % change**
Jan-05	R 2 913 748 000.00		
Jan-06	R 304 175 428.06	R -2 609 572 571.94	-857.9%
Jan-07	R 461 854 882.14	R 157 679 454.08	34.1%
Jan-08	R 789 175 083.63	R 327 320 201.50	41.5%
Jan-09	R 445 789 274.50	R -343 385 809.13	-77.0%
Jan-10	R 332 511 011.39	R -113 278 263.11	-34.1%
Jan-11	R 1 112 309 324.93	R 779 798 313.54	70.1%
Jan-12	R 920 690 837.24	R -191 618 487.69	-20.8%
Jan-13	R 4 063 646 320.35	R 3 142 955 483.11	77.3%
Jan-14	R 2 730 491 331.08	R -1 333 154 989.27	-48.8%
Jan-15	R 620 772 251.31	R -2 109 719 079.77	-339.9%

Table 8: Protection sold by the reporting bank during the month
Source: Compiled by researcher (2015)

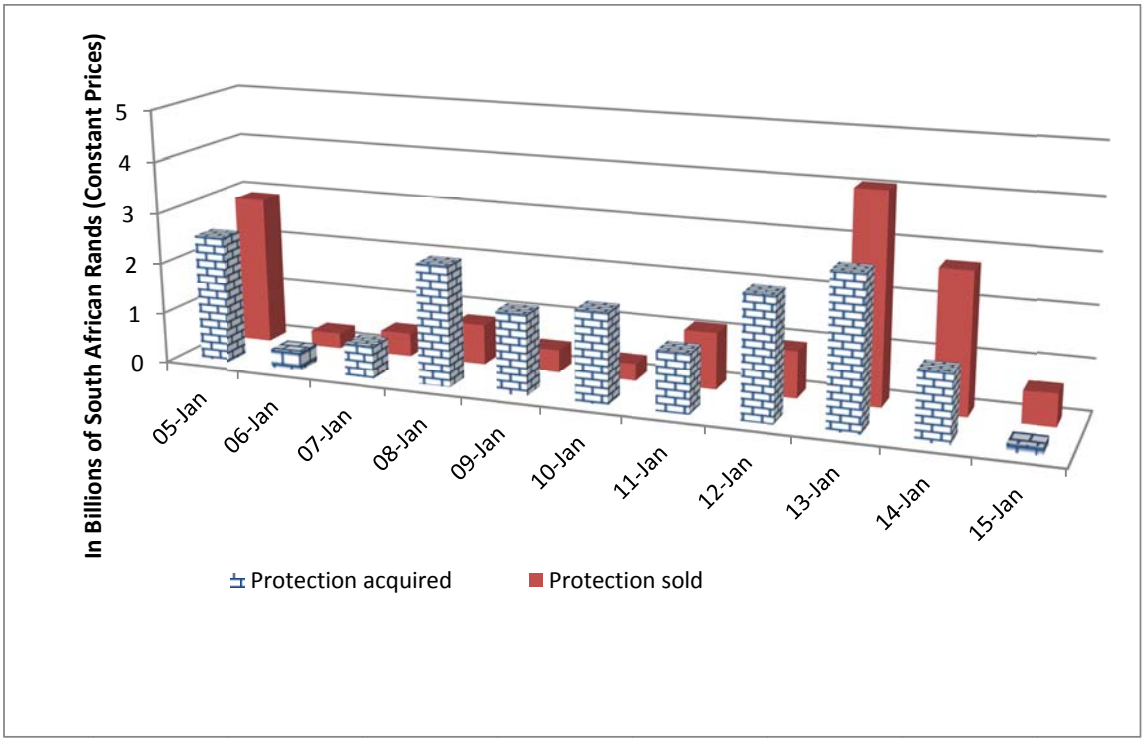

Figure 15: Protection acquired versus protection sold in the reporting month
Source: Compiled by researcher (2015)

There are large fluctuations in both the amount of protection acquired and the amount of protection sold during the reporting month. There was a huge amount of activity for both protection acquired and sold in January 2005. Activity then dropped steeply for both for January 2006 and January 2007. Over R2 billion's worth of protection was acquired in January 2008 and remained above R1 billion during January 2009, 2010 and 2011. While protection sold dropped in January 2009 compared to January 2008, it reached a low in January 2009 of R0.3 billion. Protection sold then rose in January 2011 and 2012 until it reached a peak of R4.1 billion in January 2013. In January 2012 protection acquired amounted to over R2 billion and in January 2013 it peeked at R2.9 billion. It then declined drastically to R0.17 billion in January 2015. Protection sold also dropped off drastically in January 2015 compared to January 2014.

Without information on all the months in the year, it is difficult to draw conclusions about a month in isolation when looking at market activity.

4.3.2 Turnover of total credit derivatives versus all other OTC derivatives

TOTAL OF ALL OTHER OTC DERIVATIVES			
Period	**Turnover**	**Year-on-year Change**	**Y/Y % change**
Jan-05	R 1 876 480 952 000.00		
Jan-06	R 2 102 243 676 779.81	R 225 762 724 779.81	10.7%
Jan-07	R 2 536 244 234 544.10	R 434 000 557 764.28	17.1%
Jan-08	R 4 314 261 887 223.37	R 1 778 017 652 679.27	41.2%
Jan-09	R 3 844 920 084 889.77	R -469 341 802 333.60	-12.2%
Jan-10	R 3 173 893 153 980.30	R -671 026 930 909.47	-21.1%
Jan-11	R 5 563 662 233 478.08	R 2 389 769 079 497.78	43.0%
Jan-12	R 4 367 859 598 112.73	R -1 195 802 635 365.36	-27.4%
Jan-13	R 3 816 376 851 601.05	R -551 482 746 511.68	-14.5%
Jan-14	R 6 132 199 715 836.70	R 2 315 822 864 235.65	37.8%
Jan-15	R 5 545 877 556 544.50	R -586 322 159 292.20	-10.6%

Table 9: Turnover of all other OTC derivatives
Source: Compiled by researcher (2015)

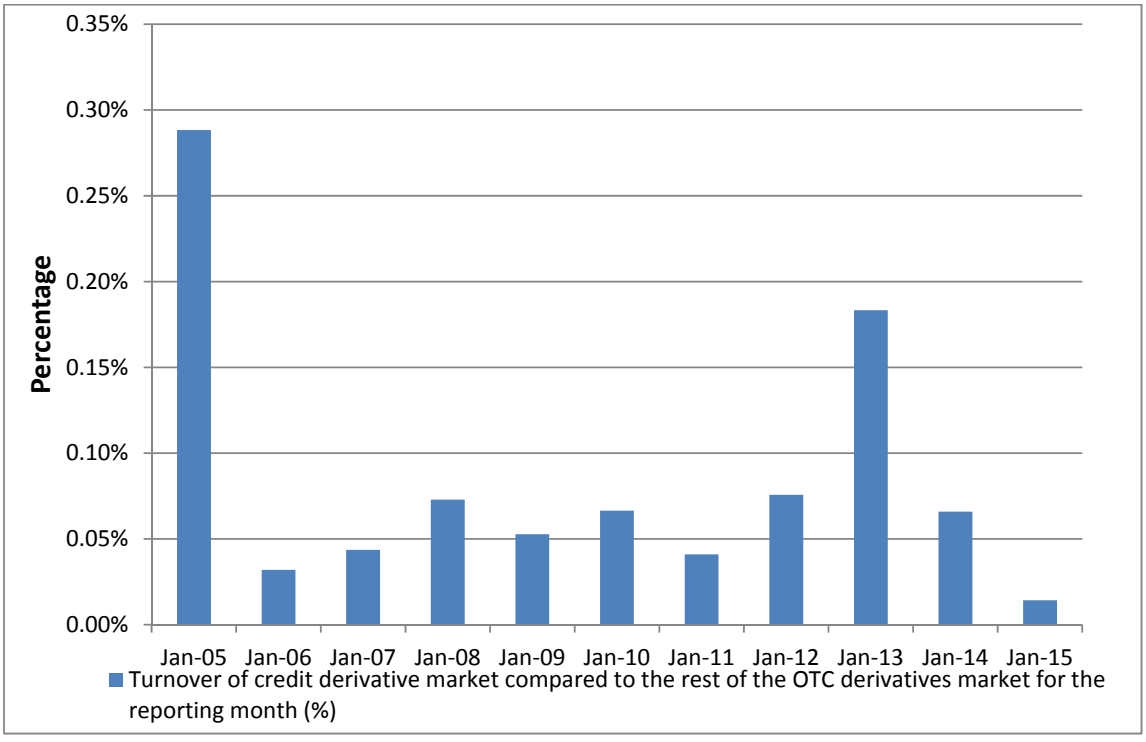

Figure 16: Turnover of total credit derivatives expressed as a percentage of the rest of the OTC derivatives market
Source: Compiled by researcher (2015)

In January 2005, market activity for credit derivatives reached a high of 0.29% of market activity for all other OTC derivatives. Market activity as a percentage of market activity for all other OTC derivative contracts then remained fairly constant at around the 0.05% mark. It spiked in January 2013 to just under 0.2%, and then reached a low of 0.14% in January 2015. Without information on all the months in the year, it is difficult to draw a conclusion about a month in isolation when looking at market activity.

4.4 Market risk

Even though there is no single complete measure of market risk, the concept of fair value is used by the SARB to identify potential losses. "The measurement of fair values maximises the use of relevant and reliable inputs and [is] consistently applied for risk management and reporting purposes" (International Monetary Fund, 2015a). In the subsections that follow, GPFV and GNFV for protection bought and sold are compared against each other and expressed as a percentage of the rest of the OTC derivatives market plus exchange-traded derivatives because they could not be separated. It is unfortunate that the GPFV and GNFV for OTC derivatives excluding credit derivatives could not be separated from the GPFV and GNFV of exchange-traded derivatives. However, the notional amounts outstanding of exchange-traded derivatives are a fraction of the notionals for OTC derivatives. In June 2010, the notional amount outstanding of exchange-traded derivatives was R800 billion, while for the same period, the notionals for OTC derivatives were R25 000 billion. Hence, the inclusion of GPFV and GNFV of exchange-traded derivatives in the GPFV and GNFV of OTC derivatives excluding credit derivatives is negligible. The analysis then compares the NCCE for protection bought and protection sold and is also expressed as a percentage of the rest of the OTC derivatives market plus exchange-traded derivatives.

4.4.1 Gross positive fair value and gross negative fair value

CREDIT DERIVATIVES WHERE THE REPORTING BANK IS A PROTECTION BUYER GROSS POSITIVE FAIR VALUE			
Period	**Amount**	**Year-on-year change**	**Y/Y % change**
Jan-05	N/A	N/A	N/A
Jan-06	N/A	N/A	N/A
Jan-07	N/A	N/A	N/A
Jan-08	R 3 750 194 608.85		
Jan-09	R 8 768 541 068.39	R 5 018 346 459.54	57.2%
Jan-10	R 8 368 003 198.30	R -400 537 870.09	-4.8%
Jan-11	R 5 154 600 615.89	R -3 213 402 582.41	-62.3%
Jan-12	R 3 905 113 965.71	R -1 249 486 650.18	-32.0%
Jan-13	R 4 292 704 886.18	R 387 590 920.47	9.0%
Jan-14	R 1 205 238 464.52	R -3 087 466 421.66	-256.2%
Jan-15	R 2 628 153 926.70	R 1 422 915 462.18	54.1%

Table 10: GPFV of credit derivatives where the reporting bank is a protection buyer
Source: Compiled by researcher (2015)

CREDIT DERIVATIVES WHERE THE REPORTING BANK IS A PROTECTION BUYER GROSS NEGATIVE FAIR VALUE			
Period	**Amount**	**Year-on-year change**	**Y/Y % change**
Jan-05	N/A	N/A	N/A
Jan-06	N/A	N/A	N/A
Jan-07	N/A	N/A	N/A
Jan-08	R 413 256 722.85		
Jan-09	R 4 181 284 922.42	R 3 768 028 199.57	90.1%
Jan-10	R 3 307 438 119.07	R -873 846 803.35	-26.4%
Jan-11	R 804 820 994.93	R -2 502 617 124.14	-311.0%
Jan-12	R 707 955 473.28	R -96 865 521.65	-13.7%
Jan-13	R 2 701 741 193.93	R 1 993 785 720.64	73.8%
Jan-14	R 7 158 740 375.56	R 4 456 999 181.63	62.3%
Jan-15	R 8 292 847 643.98	R 1 134 107 268.42	13.7%

Table 11: GNFV of credit derivatives where the reporting bank is a protection buyer
Source: Compiled by researcher (2015)

CREDIT DERIVATIVES WHERE THE REPORTING BANK IS A PROTECTION SELLER GROSS POSITIVE FAIR VALUE			
Period	**Amount**	**Year-on-year Change**	**Y/Y % change**
05-Jan	N/A	N/A	N/A
06-Jan	N/A	N/A	N/A
07-Jan	N/A	N/A	N/A
08-Jan	R 1 910 022 355.89		
09-Jan	R 2 067 574 185.79	R 157 551 829.90	7.62%
10-Jan	R 1 161 009 670.73	R -906 564 515.07	-78.08%
11-Jan	R 1 963 744 555.63	R 802 734 884.90	40.88%
12-Jan	R 1 783 672 706.19	R -180 071 849.43	-10.10%
13-Jan	R 3 666 711 222.07	R 1 883 038 515.88	51.35%
14-Jan	R 2 337 531 158.26	R -1 329 180 063.82	-56.86%
15-Jan	R 2 407 234 554.97	R 69 703 396.72	2.90%

Table 12: GPFV of credit derivatives where the reporting bank is a protection seller
Source: Compiled by researcher (2015)

CREDIT DERIVATIVES WHERE THE REPORTING BANK IS A PROTECTION SELLER GROSS NEGATIVE FAIR VALUE			
Period	**Amount**	**Year-on-year change**	**Y/Y % change**
05-Jan	N/A	N/A	N/A
06-Jan	N/A	N/A	N/A
07-Jan	N/A	N/A	N/A
08-Jan	R 344 989 224.14		
09-Jan	R 2 812 657 034.94	R 2 467 667 810.80	87.73%
10-Jan	R 1 585 667 610.99	R -1 226 989 423.95	-77.38%
11-Jan	R 2 060 075 260.91	R 474 407 649.91	23.03%
12-Jan	R 2 951 184 532.82	R 891 109 271.92	30.19%
13-Jan	R 2 012 649 417.64	R-938 535 115.19	-46.63%
14-Jan	R 2 016 103 694.68	R 3 454 277.04	0.17%
15-Jan	R 4 277 791 099.48	R2 261 687 404.80	52.87%

Table 13: GNFV of credit derivatives where the reporting bank is a protection seller
Source: Compiled by researcher (2015)

The data from tables 10 to 13 are then aggregated to obtain GPFV for protection bought and sold (table 14) as well as GNFV for protection bought and sold (table 15).

TOTAL CREDIT DERIVATIVES GROSS POSITIVE FAIR VALUE			
Period	**Amount**	**Year–on-year change**	**Y/Y % change**
05-Jan	N/A	N/A	N/A
06-Jan	N/A	N/A	N/A
07-Jan	N/A	N/A	N/A
08-Jan	R 5 660 216 964.75		
09-Jan	R 10 836 115 254.19	R 5 175 898 289.44	47.77%
10-Jan	R 9 529 012 869.03	R -1 307 102 385.16	-13.72%
11-Jan	R 7 118 345 171.52	R -2 410 667 697.51	-33.87%
12-Jan	R 5 688 786 671.90	R -1 429 558 499.62	-25.13%
13-Jan	R 7 959 416 108.25	R 2 270 629 436.35	28.53%
14-Jan	R 3 542 769 622.78	R -4 416 646 485.47	-124.67%
15-Jan	R 5 035 388 481.68	R 1 492 618 858.90	29.64%

Table 14: GPFV for total credit derivatives
Source: Compiled by researcher (2015)

TOTAL CREDIT DERIVATIVES GROSS NEGATIVE FAIR VALUE			
Period	**Amount**	**Year–on-year Change**	**Y/Y % change**
05-Jan	N/A	N/A	N/A
06-Jan	N/A	N/A	N/A
07-Jan	N/A	N/A	N/A
08-Jan	R 758 245 946.99		
09-Jan	R 6 993 941 957.36	R 6 235 696 010.37	89.16%
10-Jan	R 4 893 105 730.06	R -2 100 836 227.30	-42.93%
11-Jan	R 2 864 896 255.84	R -2 028 209 474.23	-70.80%
12-Jan	R 3 659 140 006.11	R 794 243 750.27	21.71%
13-Jan	R 4 714 390 611.57	R 1 055 250 605.46	22.38%
14-Jan	R 9 174 844 070.24	R 4 460 453 458.67	48.62%
15-Jan	R 12 570 638 743.46	R 3 395 794 673.22	27.01%

Table 15: GNFV for total credit derivatives
Source: Compiled by researcher (2015)

TOTAL OF ALL OTHER DERIVATIVES (OTC AND EXCHANGE TRADED) GROSS POSITIVE FAIR VALUE			
Period	**Amount**	**Year-on-year**	**Y/Y % change**
Jan-05	R 199 375 210 000.00		
Jan-06	R 160 435 579 378.19	R -38 939 630 621.81	-24.3%
Jan-07	R 118 120 098 320.22	R -42 315 481 057.97	-35.8%
Jan-08	R 155 121 026 601.90	R -18 046 942 894.51	-11.6%
Jan-09	R 354 626 312 860.36	R 199 505 286 258.45	56.3%
Jan-10	R 187 595 061 932.63	R -167 031 250 927.73	-89.0%
Jan-11	R 142 140 998 964.84	R -45 454 062 967.79	-32.0%
Jan-12	R 178 674 703 165.61	R 36 533 704 200.77	20.4%
Jan-13	R 151 297 003 992.32	R -27 377 699 173.29	-18.1%
Jan-14	R 184 242 088 849.50	R 32 945 084 857.18	17.9%
Jan-15	R 187 201 693 717.28	R 2 959 604 867.78	1.6%

Table 16: GPFV for total of all other derivatives (OTC and exchange traded)
Source: Compiled by researcher (2015)

TOTAL OF ALL OTHER DERIVATIVES (OTC AND EXCHANGE TRADED) GROSS NEGATIVE FAIR VALUE			
Period	**Amount**	**Year-on--year**	**Y/Y % change**
05-Jan	R 203 114 616 000.00		
06-Jan	R 157 697 346 237.61	R -45 417 269 762.39	-28.80%
07-Jan	R 121 484 756 891.97	R -36 212 589 345.64	-29.81%
08-Jan	R 146 834 706 317.55	R -29 581 136 092.16	-20.15%
09-Jan	R 344 283 485 823.26	R 197 448 779 505.71	57.35%
10-Jan	R 180 915 213 989.81	R -163 368 271 833.45	-90.30%
11-Jan	R 134 815 639 424.74	R -46 099 574 565.08	-34.19%
12-Jan	R 160 598 296 591.31	R 25 782 657 166.58	16.05%
13-Jan	R 126 265 088 973.42	R -34 333 207 617.89	-27.19%
14-Jan	R 160 229 468 232.43	R 33 964 379 259.01	21.20%
15-Jan	R 169 465 704 712.04	R 9 236 236 479.62	5.45%

Table 17: GNFV for all other derivatives (OTC and exchange traded)
Source: Compiled by researcher (2015)

4.4.1.1 Credit derivatives: GPFV – protection buyer versus protection seller

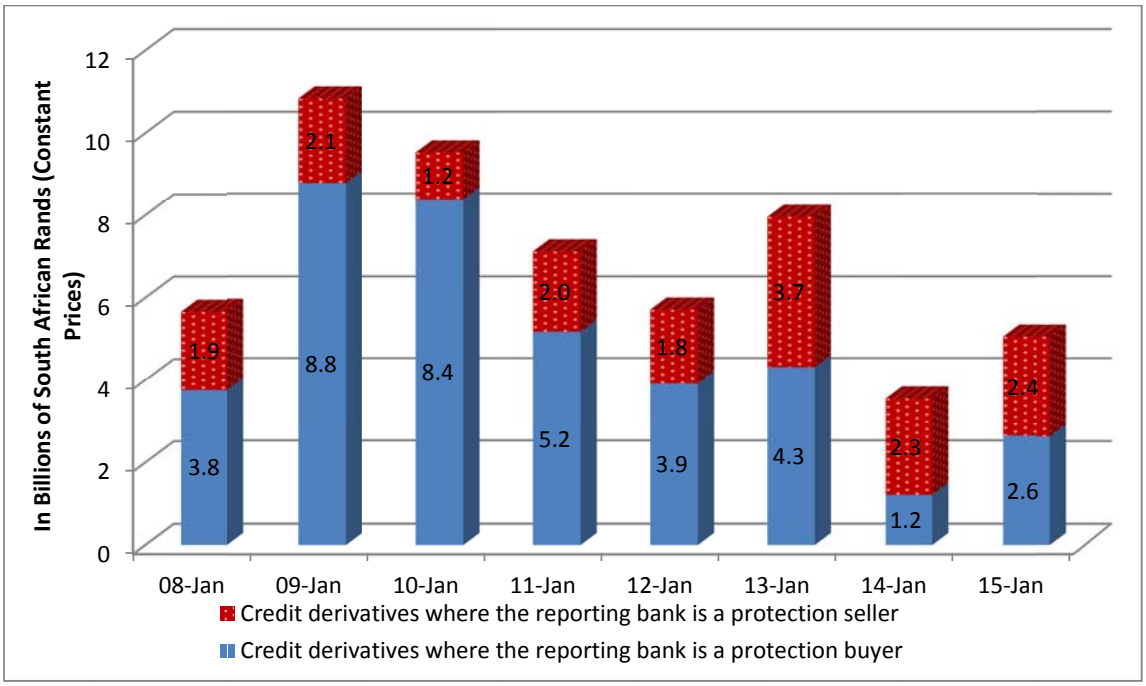

Figure 17: GPFV of protection bought versus protection sold
Source: Compiled by researcher (2015)

Overall, the GPFV of credit derivatives where the reporting bank was a protection buyer exceeded GPFV of credit derivatives where the reporting bank was a protection seller. The only exception was January 2014 where GPFV was R2.3 billion for protection sold and R1.2 billion for protection bought.

As at January 2009 and January 2010, the GPFV of protection bought, dwarfed the GPFV of protection sold. It is during this same period that there was a massive spike in "other" credit derivatives where the reporting bank is a protection buyer. It was postulated that this increase was due to an increase in CLNs issued by South African banks and bought by local non-bank local market participants such as asset managers and insurance firms.

4.4.1.2 Credit derivatives: GNFV – protection buyer versus protection seller

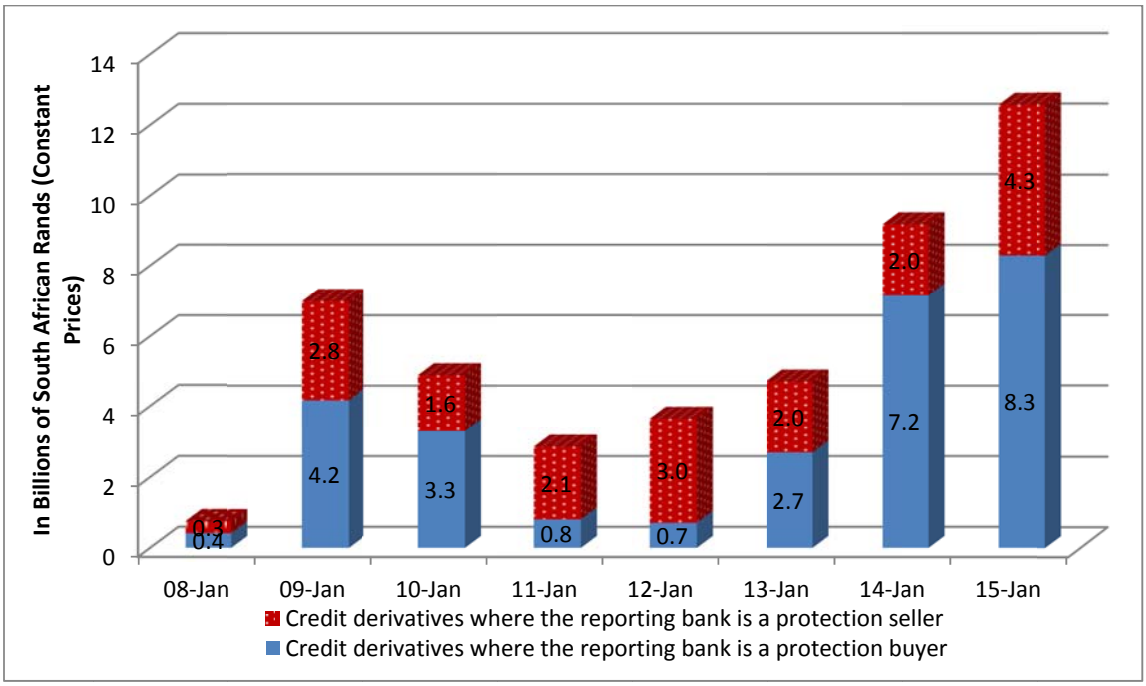

Figure 18: GNFV of credit derivatives: protection buyer and protection seller
Source: Compiled by researcher (2015)

Regarding figure 18, there was a large variation between the GNFV of credit derivatives where the reporting bank was a protection buyer and a protection seller. GNFV was extremely low in January 2008 for both protection bought and sold. It then rose sharply tenfold to R7 billion by January 2009. GNFV then declined until January 2010 and further in January 2011. From January 2011, GNFV increased steadily until it reached a peak in January 2015 of R12.6 billion.

The years ending January 2014 and January 2015 both saw enormous GNFV where the reporting bank was a protection buyer. This means that if the reporting bank defaulted or filed for bankruptcy, the counterparty risk to local non-bank market participants such as asset

managers and insurance firms (excluding bilateral netting and collateral) has increased significantly in the preceding two years.

4.4.1.3 GPFV of credit derivatives as a percentage of the sum of GPFV for all other derivatives (OTC and exchange traded)

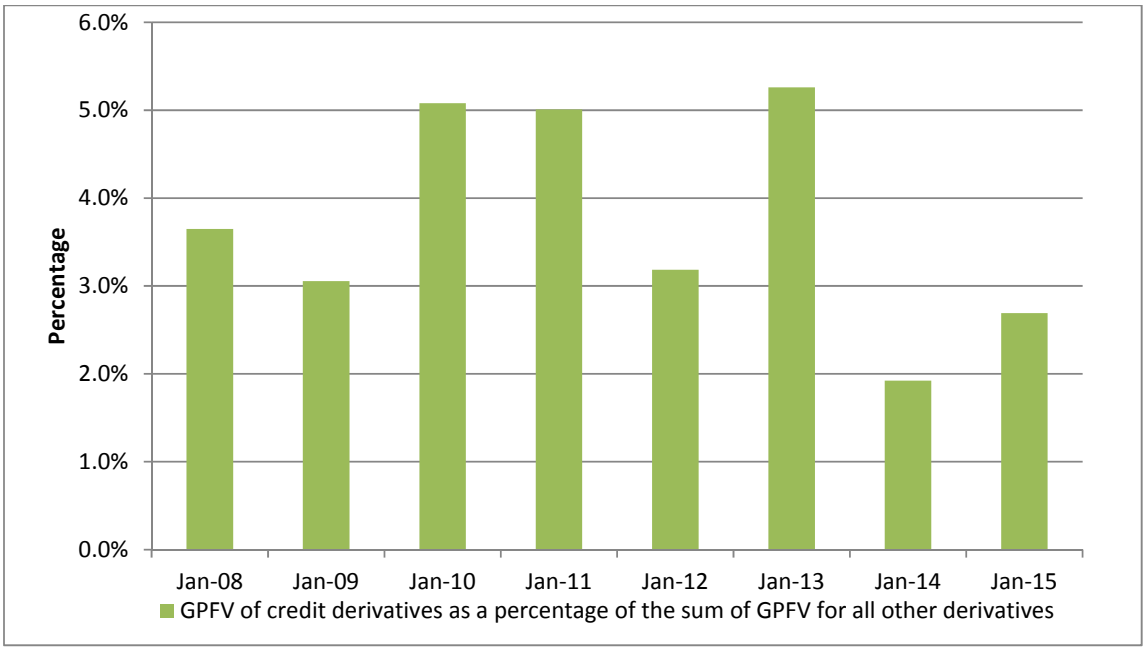

Figure 19: GPFV of credit derivatives expressed as a percentage of GPFV for all other derivatives (OTC and exchange traded)
Source: Compiled by researcher (2015)

The GPFV/GNFV for all other OTC derivatives could not be separated from the GPFV/ GNFV for exchange-traded derivatives. The above therefore reflects the GPFV of credit derivatives as a percentage of the GPFV for all other OTC derivatives plus the GPFV of exchange-traded derivatives.

Regarding figure 19, the GPFV of credit derivatives as a percentage of GPFV for all other OTC derivatives plus the GPFV of exchange-traded derivatives was extremely erratic over the observed period, fluctuating between 3% and 5% between January 2008 and January

2013. In January 2014, it reached a low of less than 2% and increased to just under 3% in January 2015.

4.4.1.4 GNFV of credit derivatives as a percentage of the sum of GNFV for all other derivatives (OTC and exchange traded)

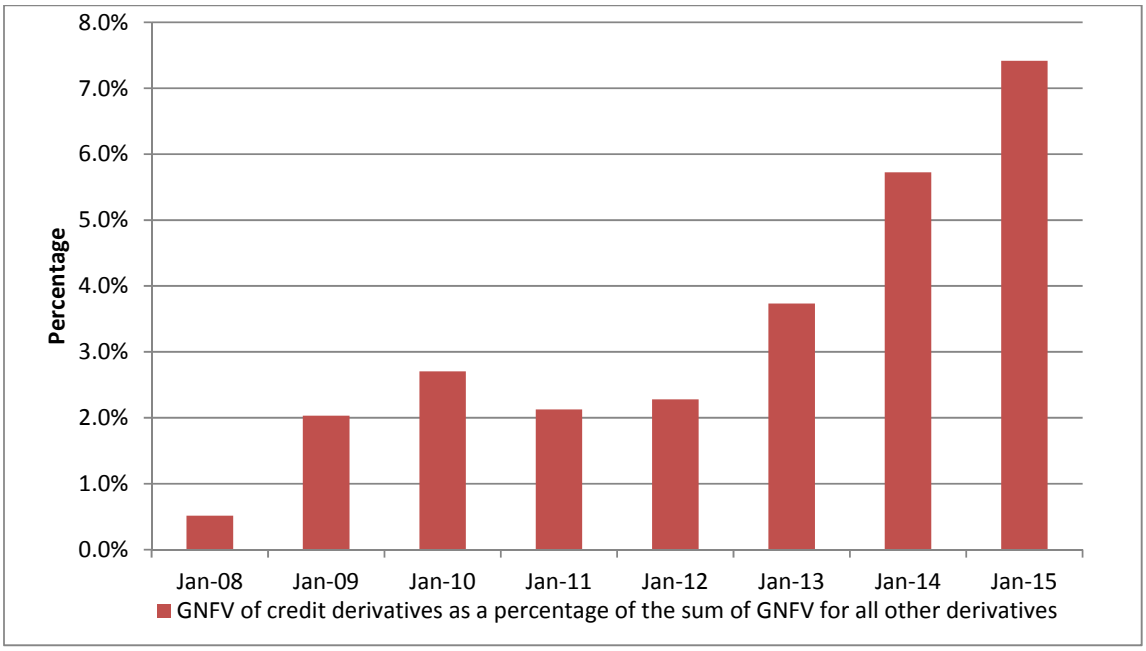

Figure 20: GNFV of credit derivatives expressed as a percentage of GNFV for all other derivatives (OTC and exchange traded)
Source: Compiled by researcher (2015)

The above thus reflects the GNFV of credit derivatives as a percentage of the GNFV for all other OTC derivatives plus the GNFV of exchange-traded derivatives. With reference to figure 20, the GNFV of credit derivatives as a percentage of GNFV for all other OTC derivatives plus the GNFV of exchange-traded derivatives saw strong growth over the observed period, from a low of below 1% in January 2005 to a high of over 7% in January 2015. This is in sharp contrast to the erratic movements observed in figure 19.

4.4.2 Net current credit exposure

CREDIT DERIVATIVES WHERE THE REPORTING BANK IS A PROTECTION BUYER NET CURRENT CREDIT EXPOSURE			
Period	**Amount**	**Year–on-year change**	**Y/Y % change**
05-Jan	N/A	N/A	N/A
06-Jan	N/A	N/A	N/A
07-Jan	N/A	N/A	N/A
08-Jan	R 3 336 937 886.00		
09-Jan	R 4 587 256 145.97	R 1 250 318 259.97	27.26%
10-Jan	R 5 060 565 079.23	R 473 308 933.26	9.35%
11-Jan	R 4 349 779 620.96	R -710 785 458.27	-16.34%
12-Jan	R 3 197 158 492.42	R -1 152 621 128.54	-36.05%
13-Jan	R 1 590 963 692.25	R -1 606 194 800.17	-100.96%
14-Jan	R -5 953 501 911.04	R -7 544 465 603.29	126.72%
15-Jan	R -5 664 693 717.28	R 288 808 193.76	-5.10%

Table 18: NCCE for credit derivatives where the reporting bank is a protection buyer
Source: Compiled by researcher (2015)

4.4.2.1 NCCE where the reporting bank is a protection buyer

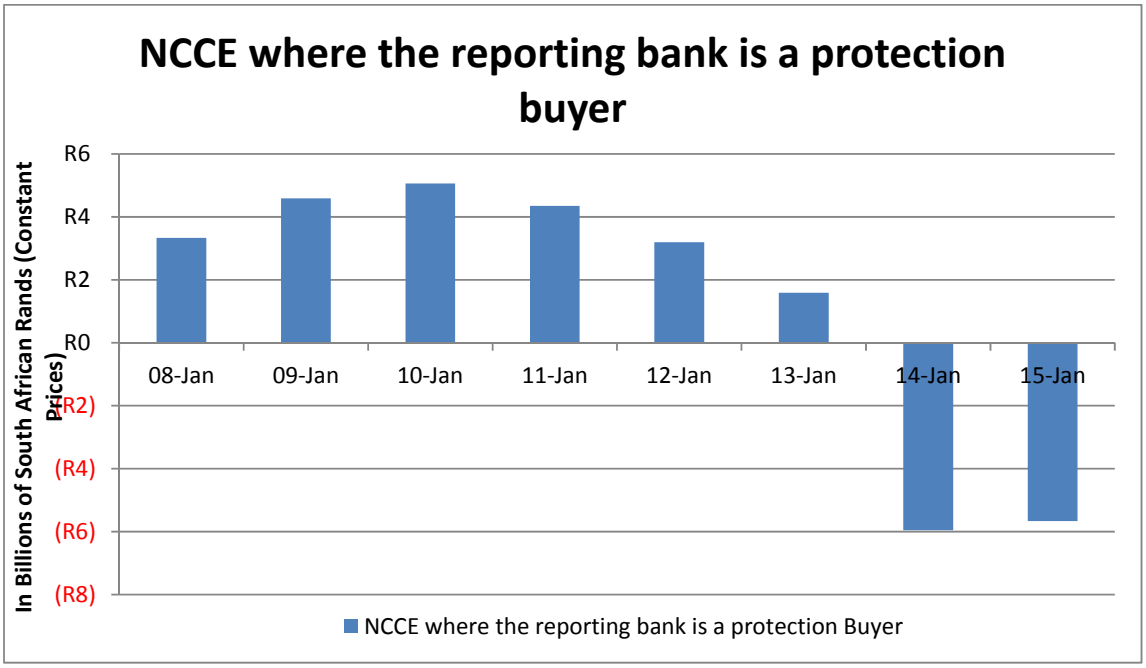

Figure 21: NCCE where the reporting bank is a protection buyer
Source: Compiled by researcher (2015)

With reference to figure 21, the GPFV of credit derivatives where the reporting bank was a protection buyer exceeded the GNFV of credit derivatives where the reporting bank was a protection seller from January 2008 until January 2013– hence the positive NCCE value. During January 2014 and 2015, however, there was a sharp increase in the GNFV and a decline in the GPFV for credit derivatives where the reporting bank was a protection buyer. For these two periods, the GNFV exceeded the GPFV leading to a negative NCCE.

CREDIT DERIVATIVES WHERE THE REPORTING BANK IS A PROTECTION SELLER NET CURRENT CREDIT EXPOSURE			
Period	**Amount**	**Year-on-year change**	**Y/Y % change**
05-Jan	N/A	N/A	N/A
06-Jan	N/A	N/A	N/A
07-Jan	N/A	N/A	N/A
08-Jan	R 2 255 011 580.03		
09-Jan	R 4 880 231 220.74	R 2 625 219 640.70	53.79%
10-Jan	R -424 657 940.27	R -5 304 889 161.00	1249.21%
11-Jan	R -96 330 705.28	R 328 327 234.99	-340.83%
12-Jan	R -1 167 511 826.63	R -1 071 181 121.35	91.75%
13-Jan	R 1 654 061 804.44	R 2 821 573 631.07	170.58%
14-Jan	R 321 427 463.58	R -1 332 634 340.86	-414.60%
15-Jan	R -1 870 556 544.50	R -2 191 984 008.08	117.18%

Table 19: NCCE for credit derivatives where the reporting bank is a protection seller
Source: Compiled by researcher (2015)

4.4.2.2 NCCE where the reporting bank is a protection seller

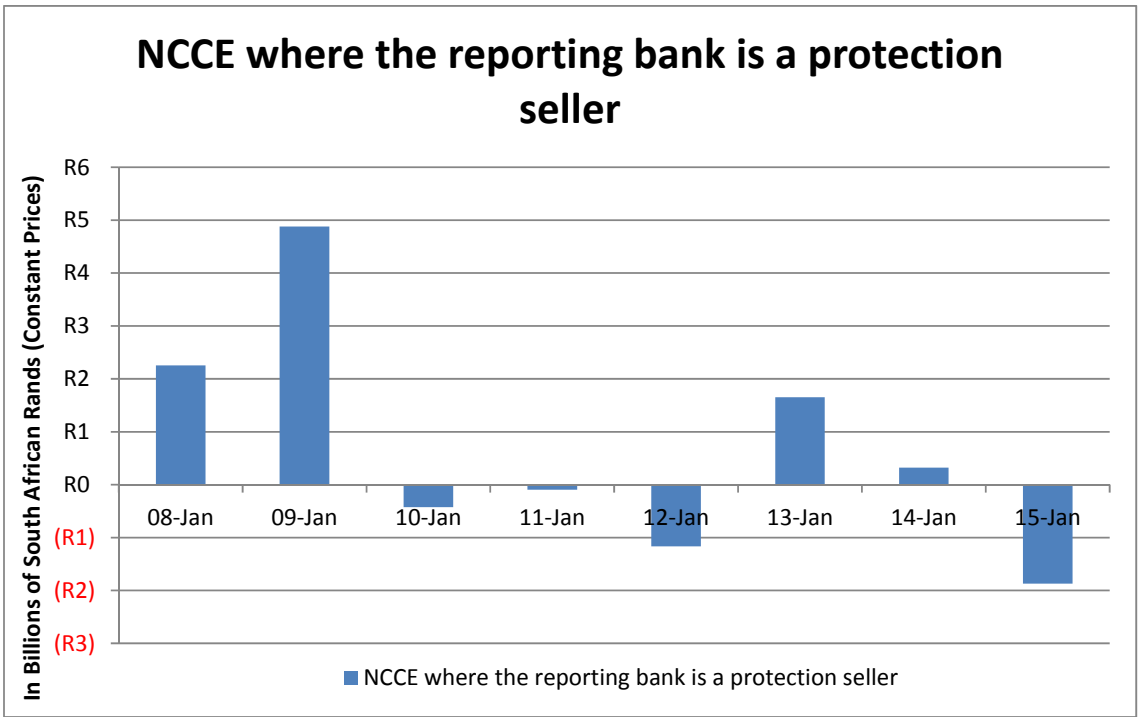

Figure 22: NCCE where the reporting bank is a protection seller
Source: Compiled by researcher (2015)

NCCE where the reporting bank is a protection seller was far more erratic (see figure 22). January 2008 and 2009 reflected a large positive NCCE, which dropped to a negative value for January 2010, 2011 and 2012, then back to a positive value for January 2013 and 2014 until diving to a negative value in January 2015.

TOTAL CREDIT DERIVATIVES: NET CURRENT CREDIT EXPOSURE			
Period	**Amount**	**Year-on-year Change**	**Y/Y % change**
05-Jan	N/A	N/A	N/A
06-Jan	N/A	N/A	N/A
07-Jan	N/A	N/A	N/A
08-Jan	R 5 591 949 466.03		
09-Jan	R 9 467 487 366.71	R 3 875 537 900.68	40.94%
10-Jan	R 4 635 907 138.97	R -4 831 580 227.74	-104.22%
11-Jan	R 4 253 448 915.68	R -382 458 223.28	-8.99%
12-Jan	R 2 029 646 665.79	R -2 223 802 249.89	-109.57%
13-Jan	R 3 245 025 496.68	R 1 215 378 830.89	37.45%
14-Jan	R -5 632 074 447.46	R -8 877 099 944.15	157.62%
15-Jan	R -7 535 250 261.78	R -1 903 175 814.32	25.26%

Table 20: NCCE for total credit derivatives
Source: Compiled by researcher (2015)

4.4.2.3 NCCE for all credit derivatives

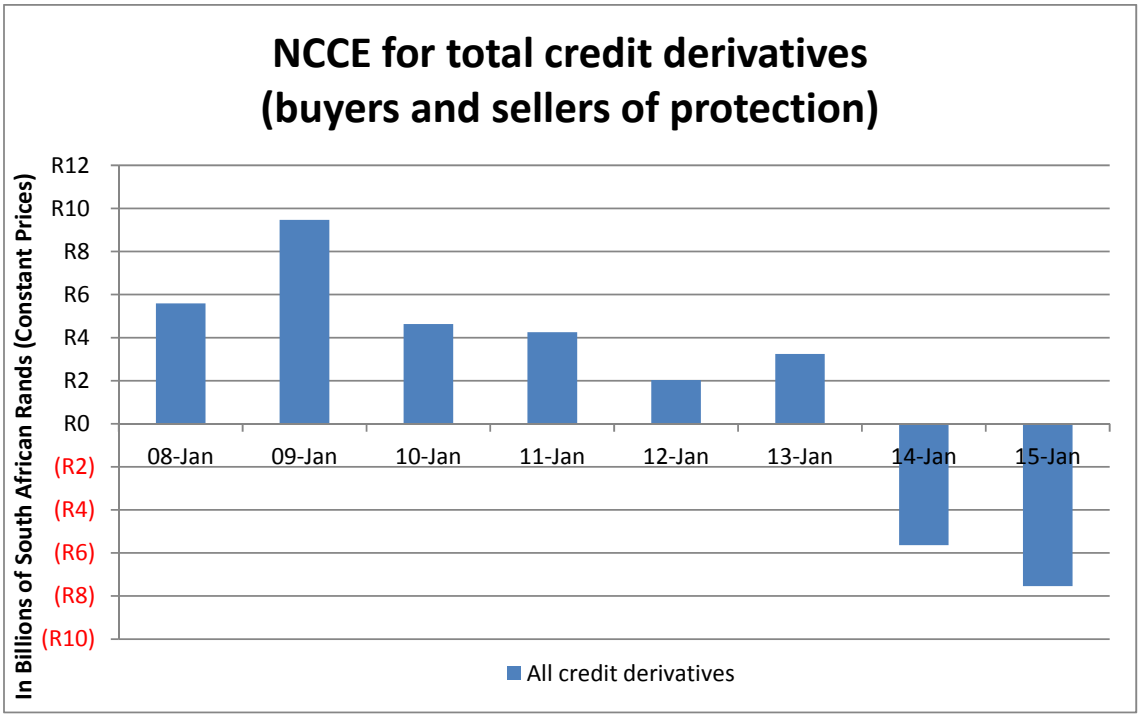

Figure 23: NCCE for all credit derivatives
Source: Compiled by researcher (2015)

From January 2008 to January 2013, the positive NCCE for credit derivatives where the reporting bank was a protection buyer overwhelmed the negative NCCE values of January 2010, 2011 and 2012, where the reporting bank was a protection seller. This resulted in a positive NCCE for all credit derivatives from January 2008 to January 2013 until the large increase in GNFV for credit derivatives, where the reporting bank was a protection buyer, resulting in a negative NCCE for all credit derivatives during January 2014 and January 2015.

ALL OTHER DERIVATIVES (OTC AND EXCHANGE TRADED) NET CURRENT CREDIT EXPOSURE			
Period	**Amount**	**Year-on-year Change**	**Y/Y % change**
05-Jan	R -3 739 406 000.00		
06-Jan	R 2 738 233 140.58	R 6 477 639 140.58	236.6%
07-Jan	R -3 364 658 571.75	R -6 102 891 712.33	181.4%
08-Jan	R 8 286 320 284.35	R 11 534 193 197.66	139.2%
09-Jan	R 10 342 827 037.09	R 2 056 506 752.74	19.9%
10-Jan	R 6 679 847 942.82	R -3 662 979 094.28	-54.8%
11-Jan	R 7 325 359 540.10	R 645 511 597.28	8.8%
12-Jan	R 18 076 406 574.30	R 10 751 047 034.20	59.5%
13-Jan	R 25 031 915 018.90	R 6 955 508 444.60	27.8%
14-Jan	R 24 012 620 617.07	R -1 019 294 401.83	-4.2%
15-Jan	R 17 735 989 005.24	R -6 276 631 611.84	-35.4%

Table 21: NCCE for all other derivatives (OTC and exchange traded)
Source: Compiled by researcher (2015)

4.4.2.3 NCCE of credit derivatives expressed as a percentage of the sum of NCCE for all other OTC derivatives plus exchange-traded derivatives

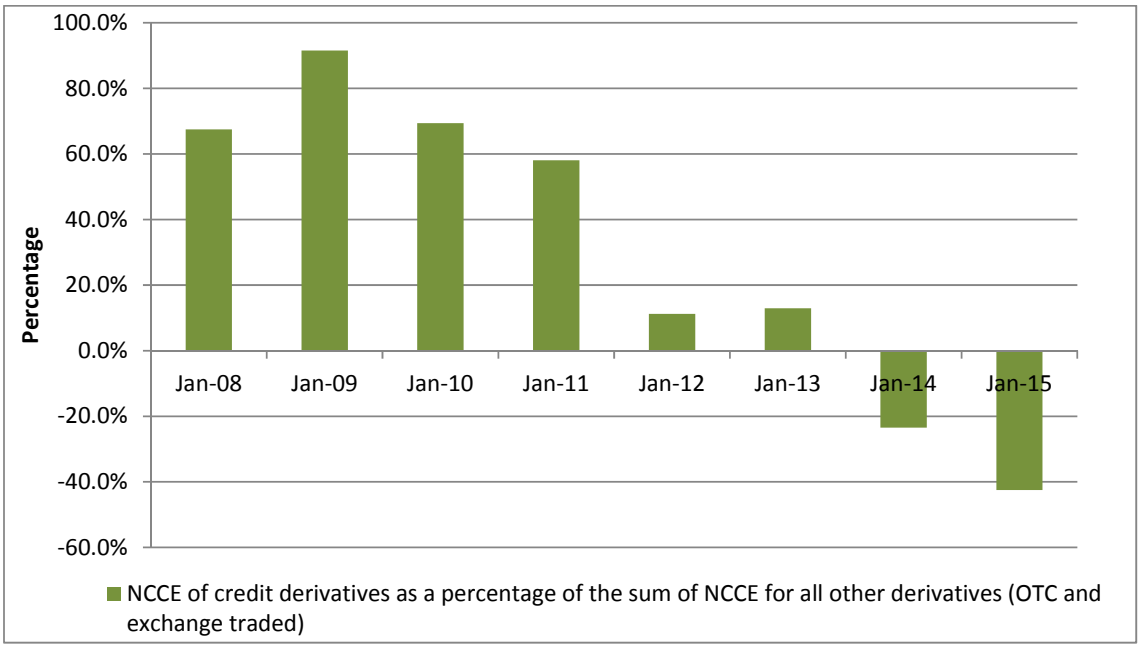

Figure 24: NCCE of credit derivatives as a percentage of the sum of NCCE for all other derivatives (OTC and exchange traded)
Source: Compiled by researcher (2015)

The NCCE of credit derivatives expressed as a percentage of the sum of NCCE for all other OTC derivatives plus exchange-traded derivatives is incredibly high. In January 2008 it was 67% and in January 2009 it reached a height of 91%.

From January 2008 to January 2015, the NCCE for all other OTC derivatives and exchange-traded derivatives was positive. The NCCE for credit derivatives was positive from January 2008 to January 2013, at which point it became negative.

4.5 Conclusion

4.5.1 Market size

The decline in the size of the market for credit derivatives, where the reporting bank was a protection buyer and a protection seller from January 2009 to January 2010, was primarily attributed to the impact of the global financial crisis which began in September 2008.

A large variation in the size of the market for "other" credit derivatives, where the reporting bank was a protection buyer, was identified. It was argued that this could have been the result of inconsistencies in reporting. It was reasoned that CLNs could be classified as credit derivatives that acquire protection for the CLN issuers which, in South Africa, are primarily banks. CLNs include an embedded CDS which, from the perspective of the reporting bank, would be recorded as protection sold. However, the CLN issuer could report the notional amounts outstanding for CLNs as protection bought under "other" credit derivatives balancing the CDS reported as protection sold.

During the observed period, protection sold by banks generally balanced protection bought by banks, the exceptions being January 2011 and January 2012 where protection sold dwarfed protection bought. During this same period, the size of other credit derivatives reported for protection bought plummeted, falling by nearly 70% from R28.6 billion in January 2010 to R8 billion in January 2011. January 2012 remained low at R9.4 billion before notional amounts outstanding started picking up again in January 2013. It is therefore possible that reporting errors (where CLNs were not fully reported during the period) were to

blame for this anomaly and that the credit derivatives books of South African banks were more balanced than the notional amounts outstanding for January 2011 and 2012 indicate.

4.5.2 Market activity

Market activity is measured over a period, in this case, January of each year. Without information on all the months in the year, it is difficult to draw conclusions about the movements in one month in isolation.

4.5.3 Market risk

The GNFV of credit derivatives was on an upward trend from January 2011 to January 2015, while the GPFV witnessed an overall decline. As a result, NCCE for total credit derivatives became negative in January 2014 and 2015. A negative NCCE indicates that the derivative holdings are a net liability to the reporting banks. According to the OCC, NCCE is not a true measure of market risk because it reflects the net present value of expected cash inflows and outflows of contracts that are traded under an enforceable netting agreement, and market volatility could change these amounts (Office of the Comptroller of the Currency (OCC), 2014).

Policy recommendations for OTC derivatives regulation in South Africa, with specific reference to credit derivatives, will be discussed in chapter 5.

Chapter 5: Conclusion, progress in the implementation of OTC derivatives regulation and policy recommendations

5.1 Introduction

OTC derivatives markets were largely unregulated prior to the crisis, but the regulatory environment has changed drastically in response to the crisis, directly affecting not only the OTC derivatives markets, but also the worldwide financial system at large. The rest of the chapter is set out as follows: Section 5.2 summarises the research findings discussed in chapter 4 (sub-problem 1). The progress in the implementation of OTC derivatives regulation is discussed in section 5.3 (sub-problem 2). Section 5.4 deals with policy recommendations for South Africa in implementing OTC derivatives regulation and for the broader financial system (sub-problem 3). Section 5.5 looks at the possible impact of OTC derivatives regulations on the economy, while in section 5.6, the future of the South African credit derivatives market is discussed. Section 5.7 makes recommendations for further study.

5.2 Summary of research findings

5.2.1 Market size

The decline in the size of the South African market for credit derivatives where the reporting bank was a protection buyer and a protection seller from January 2009 to January 2010 was primarily attributed to the impact of the global financial crisis, which began in September 2008.

A large variation in the size of the market for "other" credit derivatives, where the reporting bank was a protection buyer, was identified. It was argued that this could have been the result of inconsistencies in reporting. It was argued that CLNs could be classified as credit derivatives that acquire protection for the CLN issuer, which in South Africa, are primarily banks. CLNs include an embedded CDS, which from the perspective of the reporting bank, would be recorded as protection sold. However, the CLN issuer could report the notional amounts outstanding for CLNs as protection bought under "other" credit derivatives balancing the CDS reported as protection sold.

During the observed period, protection sold by banks generally balanced protection bought by banks, the exceptions being January 2011 and January 2012, where protection sold dwarfed protection bought. During this same period, the size of other credit derivatives reported for protection bought plummeted, falling by nearly 70% from R28.6 billion in January 2010 to R8 billion in January 2011. January 2012 remained low at R9.4 billion before notional amounts outstanding started picking up again in January 2013. It is therefore possible that reporting errors (where CLNs were not fully reported during the period) were to blame for this anomaly and that the credit derivatives books of South African banks were more balanced than the notional amounts outstanding for January 2011 and 2012 indicate.

5.2.2 Market activity

Market activity is measured over a period, in this case January of each year. Without information on all the months in the year, it is difficult to draw conclusions about the movements in one month in isolation.

5.2.3 Market risk

The GNFV of credit derivatives was on an upward trend from January 2011 to January 2015, while the GPFV witnessed an overall decline. As a result, NCCE for total credit derivatives became negative in January 2014 and 2015. A negative NCCE indicates that the derivative holdings are a net liability to the reporting banks. According to the OCC, NCCE is not a true measure of market risk because it reflects the net present value of expected cash inflows and outflows of contracts that are traded under an enforceable netting agreement and market volatility could change these amounts (Office of the Comptroller of the Currency (OCC), 2014).

5.3 Progress in the implementation of OTC derivatives regulation

The progress to date in the implementation of regulation in reforming OTC derivatives markets in South Africa, the USA and the EU are summarised in table 22 below.

	South Africa	USA	EU
Trade reporting	The FMA makes provision for a trade repository. No entity has been authorised to operate as a trade repository to date.	Enforced. Over 90% of transactions are being reported.	Enforced. Over 90% of transactions are being reported.

Central clearing	The FMA has proposed criteria for determining which products should be centrally cleared. Public review will soon begin.	Enforced. Products which must be centrally cleared have been identified. Over 90% of these products are being centrally cleared.	Enforced. Products which must be centrally cleared have been identified. Most of these products are being centrally cleared.
Capital requirements for non-centrally cleared derivatives	Basel III's standards for banks' counterparty credit risk-related capital treatment of non-centrally cleared derivatives exposures have been accepted. Enforcement is expected in 2017.	Basel III's standards for banks' counterparty credit risk-related capital treatment of non-centrally cleared derivatives exposures are being reviewed.	Basel III's standards for banks' counterparty credit risk-related capital treatment of non-centrally cleared derivatives exposures have been accepted. Enforcement is expected in 2017.
Margin requirements for non-centrally cleared derivatives	BCBS-IOSCO standards for initial margining and variation margining to be applied to non-centrally cleared derivatives have been released for consultation and will most likely be accepted. Enforcement was set to begin in December 2015 but has since been delayed to September 2016.	BCBS-IOSCO standards for initial margining and variation margining to be applied to non-centrally cleared derivatives are under consideration.	BCBS-IOSCO standards for initial margining and variation margining to be applied to non-centrally cleared derivatives have been accepted. Enforcement was set to begin in December 2015 but has since been delayed to September 2016.

Central trading	The FMA makes provision for the central trading of standardised derivatives. Authorities have not yet decided whether to enforce central trading.	Enforced. Products which must be centrally traded have been identified.	Enforced. Products which must be centrally traded have been identified. This includes interest rate and credit asset classes – enforcement to begin in January 2017.

Table 22: OTC derivative regulatory reform
Source: Financial Stability Board (2015)

The Dodd-Frank's Volcker rule only applies to the USA. It restricts banks' proprietary derivatives trading activities, that is, banking book trades. Only "bona fide hedging and traditional bank activities" will be permitted under the Volcker rule. The restrictions on proprietary trading are a strong signal of intent from US regulators that they do not want banks to speculate using derivatives in future. According to an article by the *Wall Street Journal*, the Volcker rule is "perhaps the most significant new restriction on [banks'] activities since after the Great Depression". Despite this fact, most banks were compliant when the Volcker rule was implemented on 22 July 2015 after many legal attempts to stop the rule's implementation were unsuccessful (Tracy & Rudegeair, 2015: 4 September 2015). At this stage it is uncertain whether this return to fundamentals will enhance financial stability or if banks will find more systemically risky activities in their search for yield.

A second major difference in regulation between the USA, EU and South Africa is the accounting treatment of derivatives, as discussed in section 3.4.3. The USA follows US GAAP, while the EU and South Africa follow the IFRS. Under US GAAP, banks report

derivatives as a net value (i.e. NCCE) either as an asset or a liability in their balance sheets. In contrast, under IFRS, banks report derivatives as gross amounts (i.e. the GPFV is recorded as an asset and the GNFV is recorded as a liability). These differences in reporting structures have large impacts on banks' balance sheets. If banks currently operating under US GAAP were forced to record derivatives as gross amounts on their balance sheets, they would need to either deleverage or increase their capital holdings to comply with Basel III's leverage ratio and capital adequacy requirements. However, if banks reporting under IFRS were allowed to report derivatives as a net position, they would have the capacity to increase their lending (International Swaps and Derivatives Association, 2012).

In 2010, the G20 and the Financial Stability Board requested that the boards responsible for US GAAP and IFRS discuss ways to converge the two sets of accounting standards to reduce the differences in the recording of derivative positions. However, the project was not successful (International Swaps and Derivatives Association, 2012). It is important that efforts to consolidate US GAAP and IFRS continue as the differences between the two are a source of regulatory arbitrage. According to the OCC, NCCE after collateral has been taken into account is a far better indication of an entity's ability to generate future cash flows than gross values. It is for this reason that it recommends that US GAAP standards continue to require the reporting of derivative holdings as a net amount (Office of the Comptroller of the Currency (OCC), 2014)

5.4 Policy recommendations for South Africa

5.4.1 South African trade repository

After a TR has been established, mandatory reporting will be phased in over a 12-month period following the commencement of the mandatory reporting requirement. Like the EU, South African authorities have exempted end-users from the responsibility to report transactions to a TR. However, once end-users cross over the threshold, they automatically become systemically important institutions and need to report their transactions to a TR (the FMA does not prescribe a threshold).

One local licensed TR (if a local repository is considered) is recommended to avoid duplication of data and avoid operational complexities even though the FMA allows for multiple TRs to be established (International Monetary Fund, 2015b). Strate, the central securities depository (CSD) for the JSE has applied for a licence to operate a local TR. If a foreign TR is licensed, then it is critical that South African authorities establish a MoU with the foreign TR to ensure they have access to all the data they need to monitor the local market. It is anticipated that reporting will be phased in during 2016 and completed by the first half of 2017 (Financial Stability Board, 2015).

Currently, the local data suffers from a number of defects, especially with respect to the type of data submitted and aggregated (The OTC Derivatives Working Group, 2012). A TR could therefore assist South African authorities in assessing the build-up of systemic risks in the OTC derivatives market. However, the usefulness of this data will depend on the type of

information collected and also ensure that those individuals responsible for reporting are properly trained to do so.

5.4.2 South African central clearing counterparty

As of early 2015, there was no licensed local CCP and no foreign CCP had yet been recognised in the South African OTC derivatives market. The debate between the benefits and drawbacks of using only a local CCP, only a foreign CCP, both or a hybrid approach still continues internationally. Brazil mandates that transactions are cleared by the local CCP, BM&FBOVESPA. Canada requires market participants to make use of a global CCP, while Singapore and Australia allow market participants the choice between using either a local or foreign CCP. There has been no practical application of the hybrid model to date (International Monetary Fund, 2015b). The FMA does allow for the use of both local and global CCPs, but there will still be a public consultation phase where revisions could be made. If authorities do settle on the mixed approach they should be cognisant of the timing of the licensing or recognition of the first CCP. Recognising a foreign CCP before licensing a local CCP could severely hamper a future local CCP's competitiveness in the market.

Safcom is a potential candidate for a local CCP but it is owned by the JSE which is the country's only exchange. The ESMA has identified that the connectedness of a CCP and an exchange poses additional systemic risks. In addition, South African authorities have begun investigating the effectiveness of the JSE as a self-regulatory organisation. Another risk is that Safcom has ten clearing members of which the big four are primarily responsible for its liquidity. The failure of one of these big four would place a huge burden on the surviving members. This is a challenge that would face any South Africa CCP because the country only

has five big banks that are highly interconnected. The failure of one of the CCP's large clearing members could result in the failure of the CCP itself because it is vulnerable to wrong-way risk. The failure of a local CCP would have catastrophic consequences for the local financial system. It is for this reason that it is recommended that any local South African CCP have access to liquidity from the SARB. Already the National Bank of Belgium and other central banks in Europe have committed to provide liquidity to their local CCPs (International Monetary Fund, 2015b).

It is important to consider the effect of the credit downgrade of a South African clearing member of a global CCP, or a credit downgrade of South Africa as a country. If a South African bank or the country receives a credit downgrade it could trigger margin calls by the global CCP since that CCP is concerned with the stability of the country in which it is based. Increased margin calls will increase the amount of collateral the South African bank has to post. This, in turn, will negatively affect the South African bank's liquidity which may require it to deleverage. This, in turn, could result in higher margin calls setting off a procyclical downward spiral. South African banks that post collateral in South African rands are less exposed to exchange rate fluctuations, but the use of South African rands could result in higher margin calls imposed by a global CCP.

South African banks have been using LCH.Clearnet Ltd, a foreign CCP based in London, since early 2013. Currently, there is no agreement between South African authorities and UK authorities regarding South African banks' use of LCH.Clearnet Ltd, although the Financial Services Board does intend to initiate coordination. South African banks are presently indirect clearing members, but could become direct clearing members in the future

(International Monetary Fund, 2015b). South African banks have not yet registered as market participants under Dodd-Frank because the volumes have so far been under the threshold.

5.4.3 Capital requirements

Basel III applies a lower risk weight of 2% to derivative transactions cleared through a CCP, as long as the CCP meets certain requirements. However non-centrally cleared derivatives are subject to an additional capital charge for potential mark-to-market losses on the expected counterparty risk, and this additional capital charge is known as credit value adjustment (CVA). CVA accounts for counterparty risk – the higher the perceived counterparty risk, the higher the capital charge. OTC derivative transactions that are cleared through a CCP will not be subject to CVA. These requirements came into effect at the beginning of 2013, but owing to the lack of a local licensed CCP or a recognised foreign CCP, the SARB temporarily exempted banks from the CVA requirement for transactions denominated and transacted solely in South African rand, as well as for those OTC derivatives entered into bilaterally between local counterparties until the end of 2014 (International Monetary Fund, 2015a).

In addition to higher capital charges for banks when not transacting through a CCP, the FMA has made provision for margining requirements for non-centrally cleared derivatives to be imposed. The South African authorities have allowed for a temporary exemption from margining requirements until 2015. A simple way to speed up this process would be for authorities to recognise a foreign CCP, and then phase in the capital and margin requirements for non-centrally cleared derivatives. However, this might impede the competitiveness of a local CCP once licensed (International Monetary Fund, 2015b).

5.4.4 Margin requirements

BCBS-IOSCO bilateral margin requirements call for an initial margin and variable margin to be placed. The requirements state that the initial margin be posted against "potential future bilateral derivatives exposures". In discussions with market participants, the Macroeconomic Assessment Group on Derivatives (MAGD) found that derivatives dealers have serious objections to initial margin being posted against potential future exposures. These concerns were published in the BIS's "Macroeconomic impact assessment of OTC derivatives regulatory reforms" of 2013. Their argument is fourfold. Firstly, dealers contend that they do not hold enough high quality collateral to cover initial margin requirements. Secondly, they maintain that the increased demand for high quality collateral would result in higher prices for these assets. Thirdly, initial margins are procyclical because when market volatility increases, collateral requirements will increase, and vice versa when market volatility decreases. Fourthly, an initial margin has a higher opportunity cost of interest than a variable margin. Margining is also required by end-users such as asset managers and hedge funds. Hedge funds generally have two-way positions so they would be posting and receiving margins at the same time. However, asset managers generally have one-directional positions, which means that initial margin requirements would be high (Bank for International Settlements, 2013).

These concerns are certainly relevant in the South African market which does not have a large supply of liquid assets that qualify as collateral. This point was mentioned earlier in section 2.2.11, where it was noted that the SARB was needed to provide liquidity to the market to assist banks in their compliance with the LCR. Margin requirements will only increase these strains on liquidity and raise the price of assets which qualify to be used as

collateral. The procyclical nature of margining is perhaps the most disturbing as this is in direct conflict with the G20's goal of increased stability in financial markets.

5.4.5 Centralised trading of OTC derivatives

The draft FMA does not mandate the centralised trading of standardised derivative transactions. It is recommended that authorities focus on the implementation of mandatory reporting to a TR, mandatory central clearing through a CCP, margining and capital requirements as well as the implementation of the twin peaks framework before mandating trading of standardised derivatives. Authorities may decide that mandatory trading is not required in South Africa (International Monetary Fund, 2015b).

5.4.6 International regulatory arbitrage

The FMA was specifically designed to complement the EMIR since most local banks transact heavily with European banks. South African authorities must be aware of the inconsistencies with the US regulation and work to close these gaps to prevent regulatory arbitrage, while still balancing the unique needs of the local market. A one-size-fits-all approach is not suitable, especially in the infant phase of OTC derivatives regulation. At the same time, the simultaneous implementation of twin peaks and OTC derivatives market reform poses a significant challenge for regulators who will need to plan the implementation carefully to avoid market disruptions.

5.4.7 Crisis management planning

In November 2011, the G20 encouraged the development of recovery plans and resolution plans for systemically important financial institutions (SIFIs). A recovery plan outlines credible recovery options that can be implemented quickly under a range of market-wide stress scenarios. Resolution plans are also called living wills because they provide authorities with a guide to achieving an orderly resolution of the institution should the recovery plan be unsuccessful (KPMG, 2011: 1-2). Recovery planning for D-SIBs in South Africa has already begun, but it cannot start until authorities clarify legislation requirements for bank resolution. It is recommended that this is done as soon as possible. Three of the big five South African banks, namely ABSA, Nedbank and Investec, have strong ownership ties to institutions in the UK. It is therefore recommended that the recovery and resolution plans for these D-SIBs are developed in consultation with UK authorities (International Monetary Fund, 2015a).

The G20 hopes that recovery and resolution planning will curb the moral hazard problems associated with SIFIs such as "too big to fail". Another source of moral hazard in South Africa stems from the inability of the SARB to fine individuals such as senior bank management or board members, and it is recommended that this position should be revisited (International Monetary Fund, 2015a).

In March 2014, the Financial Sector Contingency Forum (FSCF) conducted a simulation exercise including the SARB, Financial Services Board, National Treasury, JSE and other FMIs to test the coordination between authorities during a crisis scenario. The results of the simulation are being used to further improve cooperation and coordination in the event of a crisis (International Monetary Fund, 2015b).

5.5 Impact of regulation and challenges for the market

In February 2013, the OTC Derivatives Coordination Group commissioned a quantitative study of the macroeconomic impact of OTC derivatives regulatory reforms to be undertaken by the Macroeconomic Assessment Group on Derivatives (MAGD). The MAGD was chaired by Stephen G. Cecchetti of the Bank of International Settlements, which published its report in August 2013. The MAGD identified the direct costs of reforms as higher capital requirements, an improvement in the quality of capital held, additional margin requirements, and clearing fees when clearing through a CCP. It assumed that banks would pass on the increased costs of reforms to their customers in the form of higher prices and lending spreads. It concluded, therefore that the main cost would be a reduction in economic activity (GDP) resulting from higher prices. The group focused on the consequences of reforms after they have been fully implemented, and therefore the direct costs of implementation such as the one-time costs, for example, technological upgrades and legal consultation, were ignored. The MAGD assumed that the benefit of reforms would be a lower probability of financial crisis. The group estimated that the annual probability of a financial crisis propagated by OTC derivatives would be 0.26%, and that following the implementation of reforms, the probability would be negligible. Assuming that a typical crisis costs 60% of GDP, then the benefit of OTC derivatives reforms would be 0.26 x 60% = 0.16% of annual GDP (Bank for International Settlements, 2013).

Three estimates of the cost of reforms were identified as high cost, low cost and central scenarios. The main differentiation between the three cost scenarios is the assumed amount of netting capabilities, and higher netting would result in lower costs of reform. The group calculated the various costs for each scenario and came to the following percentages of

annual GDP lost per scenario: low cost 0.03%, central 0.04% and high cost 0.07%. Hence, given the benefits of 0.16% of annual GDP, in the central cost scenario the net benefits of reform are 0.12% of annual GDP. The MAGD thus found that the benefits from reform outweigh the costs, especially in the low cost and central scenario. The group recommends that OTC derivatives that can be safely cleared by a CCP should be centrally cleared, as a reduction in counterparty risk is central to the assumed benefits (Bank for International Settlements, 2013).

The study conducted by the MAGD ignored possible macroeconomic costs resulting from changes in behaviour of market participants (as these are incredibly difficult to model). One of the most concerning of these behavioural changes relates to small relatively illiquid markets, such as the South African market. Owing to increased costs, dealer banks may alter their business models and reduce their involvement in market making, resulting in lower market liquidity which could threaten the existence of the market.

A potential benefit of reforms is a reduction in price model risk. This is because currently counterparty risk is priced into derivative contracts, but because it is difficult to measure, it is often requires subjective judgement. In a post-reform environment, counterparty risk will be reduced and thus derivatives will be easier to price, making these instruments less opaque.

Since the benefits of netting decline as the number of CCPs increase, it would be beneficial for CCPs to operate together. This, however, increases systemic risk. In addition it is imperative that only derivatives which can be centrally cleared in a safe manner are forced to do so because clearing illiquid derivatives could lead to a build-up of risks in a CCP. The

failure of a CCP would have catastrophic counterparty credit risk effects and could itself lead to a financial crisis.

5.6 The future of the South African credit derivatives market

The development of the South African credit derivatives market, as indicated in section 2.3, can be split into the following four distinct phases: infancy, pre-crisis growth, crisis aftershock and post-crisis growth. The infancy stage saw the birth of the credit derivatives market in South Africa in 2003 (the first time the researcher could find credit derivatives reported on the DI430 form was January 2003) until the exchange control reforms announced by the Minister of Finance in his 2007 budget speech. Up to that point, exchange controls had been a significant barrier to growth in the market for all derivative asset classes (Adelegan, 2009). The pre-crisis growth period was characterised by an increase in the number of market participants and greater product innovation. For instance, in 2008, Absa introduced new products such as enhanced return credit-linked notes and inflation credit-linked notes, and this period also saw an increase in the number of market participants (*Risk Magazine*, 2008). The third period, beginning in late September 2008 and lasting for several months, was characterised by uncertainty and sluggishness in the market in the aftermath of the crisis. The fourth period has seen continued growth post-crisis, but the future of the South African credit derivatives market is extremely uncertain. The South African credit derivatives market is currently too small to allow for a liquid interdealer CDS market. Hence South African banks act as dealers passing risk from international counterparties to local market participants and they rarely trade with one another. This lack of liquidity will continue to restrict the range of

local structured credit products on offer. This one-directional risk transfer would also severely limit the benefits of netting if central clearing were mandated.

In the USA, mandatory central clearing of certain standardised credit derivatives has already been enforced. These are selected North American CDX and European iTraxx indices; already 79% of new index credit derivatives transactions in the USA are centrally cleared. In the EU, selected iTraxx credit derivatives indices have been identified and it is anticipated that mandatory central clearing will be enforced for these products by the first half of 2016 (Financial Stability Board, 2015). Credit derivative indices are the most standardised products in the credit derivatives asset class, which makes them more suitable for central clearing. In South Africa, the vast majority of CDSs are single name, with only a few basket CDSs being used. There are no South African issued CDS indices, which could present an obstacle to speedy central clearing. In addition, the depth and liquidity of the South African credit derivatives market are most likely not high enough to warrant central clearing. The costs associated with operating an authorised CCP for the credit derivatives asset class could outweigh the revenue that may be generated from offering services in South Africa.

South African authorities must recognise the need to establish a CCP for improving the safety of the market and aligning with international regulation, particularly in respect of interest rate derivatives, which make up the majority of the OTC market. The costs and benefits of central clearing for other derivative asset classes such as credit derivatives should also be carefully considered. Careful planning of regulation and supervisory powers is essential given the systemic importance of CCPs. Higher capital charges will force banks to reduce their leverage, resulting in tighter credit extension in the economy, which will be a constraint on future growth.

5.7 Recommendations for further study

The international financial sector is in the midst of regulatory changes unlike anything ever experienced in any other period in history. This creates scope for research into the implementation of regulations and their effect on the economy, also relating to South Africa specifically. The following are some suggested avenues for further research:

- the effect of regulation on the liquidity and structure of OTC credit derivatives market as well as the OTC derivatives market at large.
- how extensively banks use credit derivatives to hedge their own risk and how regulation has affected this.
- the effect of the implementation of Basel III on bank behaviour and lending spreads
- the challenges of implementing twin peaks in South Africa.
- conducting a cost/benefit analysis of post-crisis regulation on world GDP.

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Appendix A: GDP deflator

Date	GDP deflator index
2005/12/31	100
2006/12/31	106.528
2007/12/31	115.134
2008/12/31	124.352
2009/12/31	134.763
2010/12/31	145.077
2011/12/31	153.599
2012/12/31	160.443
2013/12/31	169.826
2014/12/31	180.53
2015/12/31	191

Table 23: GDP deflator for South Africa
Source: Quantec (2015)

Appendix B: Example of a completed BA350 form published by the SARB

Table 01

Derivative instruments other than credit derivative instruments Turnover for the month	Line No.	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking
		1	2	3	4	5	6	7	8	9	10	11	12
Derivative instruments other than credit derivative instruments Turnover for the month		-	-	-	-	-	-	-	-	-	-	-	-
Exchange traded contracts (total of items 2, 5, 8, 11 and 12)	001	218,475,908	0	223,371,451	0	108,932,256	0	3,722,634	0	0	0	554,502,250	0
Futures contracts (total of items 3 and 4)	002	218,474,508	0	217,037,244	0	90,801,038	0	3,722,634	0	0	0	530,035,424	0
Bought	003	115,027,692	0	112,819,265	0	46,718,113	0	482,427	0	0	0	275,047,497	0
Sold	004	103,446,817	0	104,217,979	0	44,082,924	0	3,240,207	0	0	0	254,987,927	0
Call options (total of items 6 and 7)	005	1,400	0	2,557,711	0	7,586,828	0	0	0	0	0	10,145,939	0
Written	006	1,400	0	439,316	0	3,053,444	0	0	0	0	0	3,494,160	0
Purchased	007	0	0	2,118,395	0	4,533,383	0	0	0	0	0	6,651,778	0
Put options (total of items 9 and 10)	008	0	0	3,776,497	0	10,544,390	0	0	0	0	0	14,320,887	0
Written	009	0	0	2,049,786	0	3,772,242	0	0	0	0	0	5,822,028	0
Purchased	010	0	0	1,726,711	0	6,772,148	0	0	0	0	0	8,498,859	0
Swaps	011	0	0	0	0	0	0	0	0	0	0	0	0
Other	012	0	0	0	0	0	0	0	0	0	0	0	0
OTC contracts (total of items 14 to 16, 19 and 22)	013	4,689,898,328	41,181,845	5,147,592,322	551,356,934	598,340,484	0	42,065,314	15,378	9,541	0	10,477,905,990	592,554,157
Forwards and FRA's	014	4,190,550,032	32,280,000	3,179,978,396	223,787,813	75,135,413	0	42,013,486	0	0	0	7,487,677,327	256,067,813
Swaps	015	390,096,958	8,651,845	1,785,001,909	288,604,709	2,417,851	0	46,376	15,378	9,535	0	2,177,572,628	297,271,932
Call options (total of items 17 and 18)	016	62,378,714	0	50,309,005	20,764,447	251,233,656	0	636	0	6	0	363,922,017	20,764,447
Written	017	32,981,714	0	16,051,904	10,512,085	89,755,414	0	0	0	3	0	138,789,035	10,512,085
Purchased	018	29,397,000	0	34,257,102	10,252,362	161,478,242	0	636	0	3	0	225,132,982	10,252,362
Put options (total of items 20 and 21)	019	38,707,000	0	46,017,149	18,199,965	249,604,386	0	4,816	0	0	0	334,333,352	18,199,965
Written	020	20,932,000	0	16,986,227	9,001,040	161,789,616	0	4,816	0	0	0	199,712,660	9,001,040
Purchased	021	17,775,000	0	29,030,920	9,198,925	87,814,770	0	0	0	0	0	134,620,691	9,198,925
Other	022	8,165,624	250,000	86,285,862	0	19,949,178	0	0	0	0	0	114,400,664	250,000

The SA OTC credit derivatives market: 2005 to 2015

Table 02

Derivative instruments other than credit derivative instruments Unexpired contracts1 at month-end	Line No.	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking
		1	2	3	4	5	6	7	8	9	10	11	12
Derivative instruments other than credit derivative instruments Unexpired contracts1 at month-end		-	-	-	-	-	-	-	-	-	-	-	-
Exchange traded contracts (total of items 24, 28, 32, 36, 40, 44, 48 and 52)	023	1,717,273,532	0	444,668,572	10,000	311,036,176	0	25,020,120	2,164,619	0	0	2,497,998,400	2,174,619
Futures contracts bought (total of items 25 to 27)	024	859,553,446	0	223,973,500	0	72,780,910	0	18,199,033	2,164,619	0	0	1,174,506,888	2,164,619
less than 1 year	025	557,116,613	0	198,000,750	0	72,159,473	0	18,199,033	2,164,619	0	0	845,475,868	2,164,619
1 year to 5 years	026	297,209,333	0	25,972,750	0	621,436	0	0	0	0	0	323,803,519	0
more than 5 years	027	5,227,500	0	0	0	0	0	0	0	0	0	5,227,500	0
Futures contracts sold (total of items 29 to 31)	028	857,720,086	0	214,693,254	0	77,975,851	0	2,127,833	0	0	0	1,152,517,025	0
less than 1 year	029	560,390,279	0	188,155,879	0	77,073,914	0	2,127,833	0	0	0	827,747,906	0
1 year to 5 years	030	292,034,552	0	26,537,375	0	901,937	0	0	0	0	0	319,473,864	0
more than 5 years	031	5,295,255	0	0	0	0	0	0	0	0	0	5,295,255	0
Call options written (total of items 33 to 35)	032	0	0	11,820	0	23,965,106	0	1,460,717	0	0	0	25,437,643	0
less than 1 year	033	0	0	11,820	0	23,510,653	0	502,535	0	0	0	24,025,008	0
1 year to 5 years	034	0	0	0	0	440,215	0	958,182	0	0	0	1,398,397	0
more than 5 years	035	0	0	0	0	14,238	0	0	0	0	0	14,238	0
Call options purchased (total of items 37 to 39)	036	0	0	2,616,364	0	25,883,665	0	1,460,717	0	0	0	29,960,746	0
less than 1 year	037	0	0	2,616,364	0	25,883,665	0	502,535	0	0	0	29,002,564	0
1 year to 5 years	038	0	0	0	0	0	0	958,182	0	0	0	958,182	0
more than 5 years	039	0	0	0	0	0	0	0	0	0	0	0	0
Put options written (total of items 41 to 43)	040	0	0	3,037,239	0	56,038,412	0	885,910	0	0	0	59,961,560	0
less than 1 year	041	0	0	3,037,239	0	54,157,294	0	304,782	0	0	0	57,499,315	0
1 year to 5 years	042	0	0	0	0	1,881,118	0	581,128	0	0	0	2,462,246	0
more than 5 years	043	0	0	0	0	0	0	0	0	0	0	0	0
Put options purchased (total of items 45 to 47)	044	0	0	336,395	0	54,392,233	0	885,910	0	0	0	55,614,538	0
less than 1 year	045	0	0	336,395	0	53,252,259	0	304,782	0	0	0	53,893,436	0
1 year to 5 years	046	0	0	0	0	1,139,974	0	581,128	0	0	0	1,721,102	0
more than 5 years	047	0	0	0	0	0	0	0	0	0	0	0	0
Swaps (total of items 49 to 51)	048	0	0	0	10,000	0	0	0	0	0	0	0	10,000
less than 1 year	049	0	0	0	0	0	0	0	0	0	0	0	0
1 year to 5 years	050	0	0	0	0	0	0	0	0	0	0	0	0
more than 5 years	051	0	0	0	10,000	0	0	0	0	0	0	0	10,000
Other (total of items 53 to 55)	052	0	0	0	0	0	0	0	0	0	0	0	0
less than 1 year	053	0	0	0	0	0	0	0	0	0	0	0	0
1 year to 5 years	054	0	0	0	0	0	0	0	0	0	0	0	0
more than 5 years	055	0	0	0	0	0	0	0	0	0	0	0	0

The SA OTC credit derivatives market: 2005 to 2015

Table 03

Derivative instruments other than credit derivative instruments Unexpired contracts1 at month-end	Line No.	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking
		1	2	3	4	5	6	7	8	9	10	11	12
Derivative instruments other than credit derivative instruments Unexpired contracts1 at month-end		-	-	-	-	-	-	-	-	-	-	-	-
OTC contracts (total of items 57, 61, 65, 69, 73, 77 and 81)	056	29,548,711,914	647,368,858	3,798,247,471	543,515,128	259,827,263	4,368,359	20,668,200	4,722,558	0	3,688,283	33,627,454,851	1,203,663,187
Forwards and FRA's (total of items 58 to 60)	057	19,538,475,248	110,306,863	1,846,537,142	119,421,002	66,715,131	0	11,789,710	0	0	0	21,463,517,231	229,727,865
less than 1 year	058	14,246,052,369	60,151,863	1,794,499,776	113,846,891	64,995,466	0	10,880,774	0	0	0	16,116,428,385	173,998,754
1 year to 5 years	059	5,292,392,946	50,155,000	46,463,078	5,566,251	1,719,665	0	908,936	0	0	0	5,341,484,625	55,721,251
more than 5 years	060	29,933	0	5,574,288	7,861	0	0	0	0	0	0	5,604,222	7,861
Swaps (total of items 62 to 64)	061	9,075,447,465	513,111,995	1,708,002,383	326,581,251	25,922,795	3,977,494	5,355,251	2,029,808	0	0	10,814,727,895	845,700,548
less than 1 year	062	2,575,174,588	161,925,187	1,213,722,403	231,382,550	23,396,189	749,487	4,740,566	1,956,368	0	0	3,817,033,746	396,013,593
1 year to 5 years	063	4,719,971,319	173,014,575	304,823,762	94,606,467	2,526,606	3,228,007	614,685	73,440	0	0	5,027,936,371	270,922,490
more than 5 years	064	1,780,301,559	178,172,232	189,456,219	592,234	0	0	0	0	0	0	1,969,757,778	178,764,466
Call options written (total of items 66 to 68)	065	258,094,627	23,700,000	55,705,808	23,501,627	20,322,867	390,865	692,399	1,346,375	0	3,383,320	334,815,700	52,322,187
less than 1 year	066	178,869,997	23,700,000	39,701,256	13,843,400	9,127,887	304,957	692,399	1,346,375	0	0	228,391,539	39,194,732
1 year to 5 years	067	74,344,630	0	16,004,552	9,658,227	9,857,555	85,908	0	0	0	3,383,320	100,206,737	13,127,455
more than 5 years	068	4,880,000	0	0	0	1,337,424	0	0	0	0	0	6,217,424	0
Call options purchased (total of items 70 to 72)	069	254,582,327	0	69,828,495	24,040,625	53,126,932	0	773,231	1,346,375	0	0	378,310,985	25,387,000
less than 1 year	070	178,552,468	0	63,936,158	14,382,398	36,981,800	0	708,778	1,346,375	0	0	280,179,204	15,728,773
1 year to 5 years	071	74,557,567	0	5,892,337	9,658,227	12,915,927	0	64,453	0	0	0	93,430,284	9,658,227
more than 5 years	072	1,472,293	0	0	0	3,229,205	0	0	0	0	0	4,701,498	0
Put options written (total of items 74 to 76)	073	173,783,447	0	43,884,525	25,093,324	34,233,184	0	1,476,443	0	0	0	253,377,600	25,093,324
less than 1 year	074	146,750,333	0	41,042,148	15,063,115	20,225,744	0	1,254,920	0	0	0	209,273,145	15,063,115
1 year to 5 years	075	25,525,000	0	2,842,377	10,030,209	7,891,020	0	221,523	0	0	0	36,479,920	10,030,209
more than 5 years	076	1,508,113	0	0	0	6,116,421	0	0	0	0	0	7,624,534	0
Put options purchased (total of items 78 to 80)	077	172,001,000	0	54,021,118	24,877,299	30,348,188	0	581,166	0	0	0	256,951,473	24,877,299
less than 1 year	078	146,961,000	0	51,032,585	14,847,090	18,038,812	0	516,713	0	0	0	216,549,111	14,847,090
1 year to 5 years	079	23,760,000	0	2,988,534	10,030,209	5,161,818	0	64,453	0	0	0	31,974,805	10,030,209
more than 5 years	080	1,280,000	0	0	0	7,147,558	0	0	0	0	0	8,427,558	0
Other (total of items 82 to 84)	081	76,327,801	250,000	20,268,000	0	29,158,166	0	0	0	0	304,963	125,753,967	554,963
less than 1 year	082	54,293,511	0	20,268,000	0	29,158,166	0	0	0	0	0	103,719,677	0
1 year to 5 years	083	20,316,191	0	0	0	0	0	0	0	0	0	20,316,191	0
more than 5 years	084	1,718,099	250,000	0	0	0	0	0	0	0	304,963	1,718,099	554,963

The SA OTC credit derivatives market: 2005 to 2015

Table 04

Derivative instruments other than credit derivative instruments Fair value at month-end	Line No.	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking
		1	2	3	4	5	6	7	8	9	10	11	12
Derivative instruments other than credit derivative instruments Fair value at month-end		-	-	-	-	-	-	-	-	-	-	-	-
Futures contracts (total of items 86 and 87)	085	-7,481	0	431,443	0	50,339	0	201,978	0	0	0	676,279	0
Bought	086	109,338	0	212,459	0	26,477	0	13,903	0	0	0	362,177	0
Sold	087	-116,819	0	218,984	0	23,862	0	188,075	0	0	0	314,102	0
Call options (total of items 89 and 90)	088	0	0	2,835	0	-1,017,921	0	-1	0	0	0	-1,015,087	0
Written	089	0	0	-2,949	0	-1,097,784	0	-23,242	0	0	0	-1,123,975	0
Purchased	090	0	0	5,784	0	79,863	0	23,241	0	0	0	108,888	0
Put options (total of items 92 and 93)	091	0	0	31,370	0	1,438	0	0	0	0	0	32,807	0
Written	092	0	0	34,605	0	-155,610	0	-11,202	0	0	0	-132,207	0
Purchased	093	0	0	-3,236	0	157,048	0	11,202	0	0	0	165,014	0
Swaps	094	0	0	0	51,775	0	0	0	0	0	0	0	51,775
Other	095	0	0	0	0	0	0	0	0	0	0	0	0
Net fair value amount	096	-7,481	0	465,647	51,775	-966,144	0	201,977	0	0	0	-306,001	51,775
Forwards and FRA's	097	530,630	-172,273	-5,216,194	116,209	-475,674	-7,956	-157,373	-2,494	0	0	-5,318,611	-66,514
Swaps	098	-4,131,935	1,497,448	-23,074,845	2,852,156	677,205	-409,263	188,411	-6,318	0	0	-26,341,164	3,934,024
Call options	099	282,012	-3,209	663,594	-33,029	-175,184	-167,948	17,157	-4,945	0	-324,337	787,579	-533,468
Written	100	-946,431	-3,209	-4,206,631	-28,986	-5,527,711	-167,948	-61,718	-24,994	0	-324,337	-10,742,490	-549,474
Purchased	101	1,228,443	0	4,870,225	-4,043	5,352,527	0	78,875	20,049	0	0	11,530,069	16,006
Put options	102	-476,430	-10,760	-107,892	-13,402	489,786	-6,186	-50,969	-1,748	0	0	-145,506	-32,096
Written	103	-841,371	-10,760	-229,178	-18,776	-1,695,494	-6,186	-70,696	-437	0	0	-2,836,740	-36,158
Purchased	104	364,941	0	121,285	5,374	2,185,281	0	19,727	-1,311	0	0	2,691,234	4,063
Other	105	-19,566	18,295	3,677	0	116,526	0	0	0	0	1	100,638	18,296
Net fair value amount	106	-3,815,288	1,329,501	-27,731,661	2,921,934	632,659	-591,353	-2,774	-15,505	0	-324,335	-30,917,066	3,320,243
Gross positive fair value1, 2 (asset)	107	174,104,510	19,818,266	114,387,320	10,303,922	11,638,888	307,428	1,226,363	36,141	0	790,205	301,357,080	31,255,163
Gross negative fair value1, 2 (liability)	108	151,698,201	17,183,647	109,750,472	-135,181	11,972,376	898,782	1,027,161	-27,164	0	1,114,540	270,645,598	18,616,661

Table 05

Credit-derivative instruments	Line No.	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking	Positive	Negative	Positive	Negative
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Credit-derivative instruments		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Credit-default swaps	109	37,887,073	10,674,582	985,347	0	814,030	151,608	2,363,138	1,076,423	40,421,528	11,599,396	1,162,887	1,847,519	297,185	119,384
Total return swaps	110	246,066	0	25,846	0	0	0	17,271	0	289,183	0	0	0	0	0
Other1	111	23,736,314	4,157,025	1,357,427	0	180,000	0	-155,018	0	24,758,723	4,157,025	708,685	6,781,669	7,060	4,175,102
Total (of items 98 to 100)	112	61,869,453	14,831,607	2,368,620	0	994,030	151,608	2,225,391	1,076,423	65,469,434	15,756,421	1,871,572	8,629,188	304,245	4,294,486

Table 06

Credit-derivative instruments	Line No.	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking	Trading	Banking	Positive	Negative	Positive	Negative
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Credit-derivative instruments		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Credit-default swaps	113	74,628,267	8,610,072	4,489,708	0	374,019	0	3,891,744	-82,481	82,635,699	8,527,590	2,684,247	2,999,310	413,614	408,639
Total return swaps	114	1,245,200	0	0	0	0	0	0	0	1,245,200	0	0	0	0	0
Other1	115	565,000	663,262	439,648	0	300,000	0	225,000	45,947	929,648	709,209	421,263	226,518	700,821	5,205
Total (of items 102 to 104)	116	76,438,467	9,273,334	4,929,356	0	674,019	0	4,116,744	-36,534	84,810,546	9,236,799	3,105,510	3,225,828	1,114,435	413,844
Hashtotal	117	-	-	274,961,436,840	-	-	-	-	-	-	-	-	-	-	-

Figure 25: BA350 form (January 2014): values are in thousands of rand
Source: South African Reserve Bank (2014)

Appendix C: Data tables

Notional amount outstanding - outstanding balance at the end of the reporting month (Current Prices)																	
Month	Instrum	Credit Derivatives where the reporting bank is a **protection buyer**			Credit Derivatives where the reporting bank is a **protection seller**			Total Credit derivatives	Total of all other OTC Derivatives		
		Trading	Banking	Total	Trading	Banking	Total		Trading	Banking	Total
Jan-05	CDS	R 7 159 846 000.00	R 5 002 389 000.00	R 12 162 835 000.00	R 11 621 700 000.00	R 1 189 927 000.00	R 12 811 627 000.00				
	TRS	R 241 646 000.00	R -	R 241 646 000.00	R 179 250 000.00	R -	R 179 250 000.00				
	Other	R 3 633 374 000.00	R 1 841 976 000.00	R 5 475 350 000.00	R 635 007 000.00	R 1 094 053 000.00	R 1 729 060 000.00				
	Total	**R 11 034 866 000.00**	**R 6 844 965 000.00**	**R 17 879 831 000.00**	**R 12 435 957 000.00**	**R 2 283 980 000.00**	**R 14 719 937 000.00**	**R 32 599 768 000.00**	**R 6 554 039 967 000.00**	**R 682 958 575 000.00**	**R 7 236 998 542 000.00**
Jan-06	CDS	R 5 301 772 000.00	R 3 041 608 000.00	R 8 943 380 000.00	R 8 944 460 000.00	R 110 000 000.00	R 9 054 460 000.00				
	TRS	R 561 083 000.00	R -	R 561 083 000.00	R 61 083 000.00	R -	R 61 083 000.00				
	Other	R 2 711 165 000.00	R 889 470 000.00	R 3 600 635 000.00	R 650 424 000.00	R 1 003 818 000.00	R 1 654 242 000.00				
	Total	**R 9 174 020 000.00**	**R 3 931 078 000.00**	**R 13 105 098 000.00**	**R 9 655 967 000.00**	**R 1 113 818 000.00**	**R 10 769 785 000.00**	**R 23 874 883 000.00**	**R 6 595 198 855 000.00**	**R 998 527 955 000.00**	**R 7 593 726 810 000.00**
Jan-07	CDS	R 5 441 440 000.00	R 3 562 372 000.00	R 9 003 812 000.00	R 11 912 335 000.00	R 1 047 245 000.00	R 12 959 580 000.00				
	TRS	R 572 650 000.00	R -	R 572 650 000.00	R 72 650 000.00	R -	R 72 650 000.00				
	Other	R 11 461 856 000.00	R 338 523 000.00	R 11 800 379 000.00	R 1 279 740 000.00	R 1 995 943 000.00	R 3 275 683 000.00				
	Total	**R 17 475 946 000.00**	**R 3 900 895 000.00**	**R 21 376 841 000.00**	**R 13 264 725 000.00**	**R 3 043 188 000.00**	**R 16 307 913 000.00**	**R 37 684 754 000.00**	**R 7 453 817 661 000.00**	**R 1 362 920 640 000.00**	**R 8 816 738 301 000.00**
Jan-08	CDS	R 5 518 300 000.00	R 5 339 756 000.00	R 10 858 056 000.00	R 17 604 942 000.00	R 109 855 000.00	R 17 714 797 000.00				
	TRS	R 500 073 000.00	R -	R 500 073 000.00	R 75 233 000.00	R -	R 75 233 000.00				
	Other	R 21 537 677 000.00	R 675 325 000.00	R 22 213 002 000.00	R 1 392 573 000.00	R 4 285 107 000.00	R 5 677 680 000.00				
	Total	**R 27 556 050 000.00**	**R 6 015 082 000.00**	**R 33 571 132 000.00**	**R 19 072 748 000.00**	**R 4 394 962 000.00**	**R 23 467 710 000.00**	**R 57 038 842 000.00**	**R 15 025 732 052 000.00**	**R 555 761 229 000.00**	**R 15 581 493 281 000.00**
Jan-09	CDS	R 5 832 086 000.00	R 2 156 800 000.00	R 7 988 886 000.00	R 30 121 763 000.00	R 1 146 767 000.00	R 31 268 530 000.00				
	TRS	R 714 418 000.00	R -	R 714 418 000.00	R 4 798 430 000.00	R -	R 4 798 430 000.00				
	Other	R 26 387 786 000.00	R 13 929 653 000.00	R 40 317 439 000.00	R 2 030 041 000.00	R 969 810 000.00	R 2 999 851 000.00				
	Total	**R 32 934 290 000.00**	**R 16 086 453 000.00**	**R 49 020 743 000.00**	**R 36 950 234 000.00**	**R 2 116 577 000.00**	**R 39 066 811 000.00**	**R 88 087 554 000.00**	**R 25 192 207 927 000.00**	**R 611 124 175 000.00**	**R 25 803 332 102 000.00**
Jan-10	CDS	R 5 486 886 000.00	R 2 129 781 000.00	R 7 616 667 000.00	R 25 015 218 000.00	R 1 260 625 000.00	R 26 275 843 000.00				
	TRS	R 105 532 000.00	R -	R 105 532 000.00	R 4 486 634 000.00	R -	R 4 486 634 000.00				
	Other	R 29 791 683 000.00	R 11 662 332 000.00	R 41 454 015 000.00	R 1 857 446 000.00	R 644 521 000.00	R 2 501 967 000.00				
	Total	**R 35 384 101 000.00**	**R 13 792 113 000.00**	**R 49 176 214 000.00**	**R 31 359 298 000.00**	**R 1 905 146 000.00**	**R 33 264 444 000.00**	**R 82 440 658 000.00**	**R 22 119 388 442 000.00**	**R 661 494 165 000.00**	**R 22 780 882 607 000.00**
Jan-11	CDS	R 8 443 828 000.00	R 308 000.00	R 8 444 136 000.00	R 66 519 192 000.00	R 624 067 000.00	R 67 143 259 000.00				
	TRS	R 627 802 000.00	R -	R 627 802 000.00	R 3 439 670 000.00	R -	R 3 439 670 000.00				
	Other	R 5 898 600 000.00	R 6 420 109 000.00	R 12 318 709 000.00	R -	R 938 149 000.00	R 938 149 000.00				
	Total	**R 14 970 230 000.00**	**R 6 420 417 000.00**	**R 21 390 647 000.00**	**R 69 958 862 000.00**	**R 1 562 216 000.00**	**R 71 521 078 000.00**	**R 92 911 725 000.00**	**R 29 305 323 415 000.00**	**R 514 521 204 000.00**	**R 29 819 844 619 000.00**
Jan-12	CDS	R 23 720 906 000.00	R 21 010 000.00	R 23 741 916 000.00	R 56 929 137 000.00	R 4 507 417 000.00	R 61 436 554 000.00				
	TRS	R -	R -	R -	R 5 162 114 000.00	R -	R 5 162 114 000.00				
	Other	R 5 916 200 000.00	R 9 120 026 000.00	R 15 036 226 000.00	R 760 000 000.00	R 1 130 508 000.00	R 1 890 508 000.00				
	Total	**R 29 637 106 000.00**	**R 9 141 036 000.00**	**R 38 778 142 000.00**	**R 62 851 251 000.00**	**R 5 637 925 000.00**	**R 68 489 176 000.00**	**R 107 267 318 000.00**	**R 29 881 988 110 000.00**	**R 1 033 556 025 000.00**	**R 30 915 544 135 000.00**
Jan-13	CDS	R 40 734 335 000.00	R 245 717 000.00	R 40 980 052 000.00	R 71 711 003 000.00	R 5 789 711 000.00	R 77 500 714 000.00				
	TRS	R 500 000 000.00	R -	R 500 000 000.00	R 2 281 205 000.00	R -	R 2 281 205 000.00				
	Other	R 18 431 217 000.00	R 8 078 309 000.00	R 26 509 526 000.00	R 1 840 268 000.00	R 741 372 000.00	R 2 581 640 000.00				
	Total	**R 59 665 552 000.00**	**R 8 324 026 000.00**	**R 67 989 578 000.00**	**R 75 832 476 000.00**	**R 6 531 083 000.00**	**R 82 363 559 000.00**	**R 150 353 137 000.00**	**R 25 170 756 706 000.00**	**R 1 090 351 627 000.00**	**R 26 261 108 333 000.00**
Jan-14	CDS	R 40 421 528 000.00	R 11 599 396 000.00	R 52 020 924 000.00	R 82 635 699 000.00	R 8 527 590 000.00	R 91 163 289 000.00				
	TRS	R 289 183 000.00	R -	R 289 183 000.00	R 1 245 200 000.00	R -	R 1 245 200 000.00				
	Other	R 24 758 723 000.00	R 4 157 025 000.00	R 28 915 748 000.00	R 929 648 000.00	R 709 209 000.00	R 1 638 857 000.00				
	Total	**R 65 469 434 000.00**	**R 15 756 421 000.00**	**R 81 225 855 000.00**	**R 84 810 546 000.00**	**R 9 236 799 000.00**	**R 94 047 345 000.00**	**R 175 273 200 000.00**	**R 33 627 454 851 000.00**	**R 1 203 663 187 000.00**	**R 34 831 118 038 000.00**
Jan-15	CDS	R 32 994 166 000.00	R 10 323 688 000.00	R 43 317 854 000.00	R 78 208 536 000.00	R 7 092 303 000.00	R 85 300 839 000.00				
	TRS	R 828 146 000.00	R -	R 828 146 000.00	R 2 490 400 000.00	R -	R 2 490 400 000.00				
	Other	R 38 502 009 000.00	R 4 626 353 000.00	R 43 128 362 000.00	R 8 538 564 000.00	R 727 560 000.00	R 9 266 124 000.00				
	Total	**R 72 324 321 000.00**	**R 14 950 041 000.00**	**R 87 274 362 000.00**	**R 89 237 500 000.00**	**R 7 819 863 000.00**	**R 97 057 363 000.00**	**R 184 331 725 000.00**	**R 34 791 984 239 000.00**	**R 963 690 822 000.00**	**R 35 755 675 061 000.00**

Table 24: Notional amounts outstanding in current (nominal) prices

Source: Compiled by researcher (2015)

The SA OTC credit derivatives market: 2005 to 2015

Market Activity - Turnover (Current Prices)											
Month	Instrumer	Credit Derivatives where the reporting bank is a **protection buyer**			Credit Derivatives where the reporting bank is a **protection seller**			**Total Credit derivatives**	**Total of turnover all other OTC Derivatives**		
		Protection aquired during the reporting month		**Total**	Protection aquired during the reporting month		**Total**		Trading	Banking	Total
		Trading	Banking		Trading	Banking					
Jan-05	CDS	R 581 342 000.00	R -	R 581 342 000.00	R 1 723 821 000.00	R 1 189 927 000.00	R 2 913 748 000.00				
	TRS	R -	R -	R -	R -	R -	R -				
	Other	R 737 881 000.00	R 1 178 000 000.00	R 1 915 881 000.00	R -	R -	R -				
	Total	**R 1 319 223 000.00**	**R 1 178 000 000.00**	**R 2 497 223 000.00**	**R 1 723 821 000.00**	**R 1 189 927 000.00**	**R 2 913 748 000.00**	**R 5 410 971 000.00**	**R 1 391 867 309 000.00**	**R 484 613 643 000.00**	**R 1 876 480 952 000.00**
Jan-06	CDS	R -	R -	R -	R 324 032 000.00	R -	R 324 032 000.00				
	TRS	R -	R -	R -	R -	R -	R -				
	Other	R 392 125 000.00	R -	R 392 125 000.00	R -	R -	R -				
	Total	**R 392 125 000.00**	**R -**	**R 392 125 000.00**	**R 324 032 000.00**	**R -**	**R 324 032 000.00**	**R 716 157 000.00**	**R 1 418 780 563 000.00**	**R 820 697 581 000.00**	**R 2 239 478 144 000.00**
Jan-07	CDS	R -	R -		R 531 752 000.00	R -	R 531 752 000.00				
	TRS	R -	R -		R -	R -	R -				
	Other	R 742 377 000.00	R -	R 742 377 000.00	R -	R -					
	Total	**R 742 377 000.00**	**R -**	**R 742 377 000.00**	**R 531 752 000.00**	**R -**	**R 531 752 000.00**	**R 1 063 504 000.00**	**R 1 877 147 008 000.00**	**R 1 042 932 429 000.00**	**R 2 920 079 437 000.00**
Jan-08	CDS	R -	R -	R -	R 806 355 000.00	R -	R 806 355 000.00				
	TRS	R 359 784 000.00	R -	R 359 784 000.00	R -	R -	R -				
	Other	R 2 570 393 000.00	R -	R 2 570 393 000.00	R 100 000 000.00	R 75 000 000.00	R 175 000 000.00				
	Total	**R 2 930 177 000.00**	**R -**	**R 2 930 177 000.00**	**R 906 355 000.00**	**R 75 000 000.00**	**R 981 355 000.00**	**R 3 911 532 000.00**	**R 4 706 686 809 000.00**	**R 658 184 133 000.00**	**R 5 364 870 942 000.00**
Jan-09	CDS	R 409 480 000.00	R -	R 409 480 000.00	R 600 759 000.00	R -	R 600 759 000.00				
	TRS	R -	R -		R -	R -	R -				
	Other	R 221 897 000.00	R 1 501 000 000.00	R 1 722 897 000.00	R -	R -	R -				
	Total	**R 631 377 000.00**	**R 1 501 000 000.00**	**R 2 132 377 000.00**	**R 600 759 000.00**	**R -**	**R 600 759 000.00**	**R 2 733 136 000.00**	**R 5 041 096 747 000.00**	**R 140 432 907 000.00**	**R 5 181 529 654 000.00**
Jan-10	CDS	R 826 841 000.00	R -	R 826 841 000.00	R 359 681 000.00	R -	R 359 681 000.00				
	TRS	R -	R -	R -	R 52 716 000.00	R -	R 52 716 000.00				
	Other	R 1 750 000 000.00	R -	R 1 750 000 000.00	R 70 000 000.00	R -	R 70 000 000.00				
	Total	**R 2 576 841 000.00**	**R -**	**R 2 576 841 000.00**	**R 482 397 000.00**	**R -**	**R 482 397 000.00**	**R 3 059 238 000.00**	**R 4 384 643 420 000.00**	**R 219 945 551 000.00**	**R 4 604 588 971 000.00**
Jan-11	CDS	R 1 693 389 000.00	R -	R 1 693 389 000.00	R 1 708 496 000.00	R -	R 1 708 496 000.00				
	TRS	R -	R -	R -	R -	R -	R -				
	Other	R -	R 100 000 000.00	R 100 000 000.00	R -	R -	R -				
	Total	**R 1 693 389 000.00**	**R 100 000 000.00**	**R 1 793 389 000.00**	**R 1 708 496 000.00**	**R -**	**R 1 708 496 000.00**	**R 3 501 885 000.00**	**R 8 168 790 449 000.00**	**R 376 939 105 000.00**	**R 8 545 729 554 000.00**
Jan-12	CDS	R 3 310 779 000.00	R -	R 3 310 779 000.00	R 1 477 184 000.00	R -	R 1 477 184 000.00				
	TRS	R -	R -	R -	R -	R -	R -				
	Other	R -	R 520 000 000.00	R 520 000 000.00	R -	R -	R -				
	Total	**R 3 310 779 000.00**	**R 520 000 000.00**	**R 3 830 779 000.00**	**R 1 477 184 000.00**	**R -**	**R 1 477 184 000.00**	**R 5 307 963 000.00**	**R 6 459 411 279 000.00**	**R 548 513 696 000.00**	**R 7 007 924 975 000.00**
Jan-13	CDS	R 4 949 387 000.00	R -	R 4 949 387 000.00	R 5 952 871 000.00	R 938 720 000.00	R 6 891 591 000.00				
	TRS	R -	R -	R -	R -	R -	R -				
	Other	R 27 713 000.00	R -	R 27 713 000.00	R -	R 9 537 000.00	R 9 537 000.00				
	Total	**R 4 977 100 000.00**	**R -**	**R 4 977 100 000.00**	**R 5 952 871 000.00**	**R 948 257 000.00**	**R 6 901 128 000.00**	**R 11 878 228 000.00**	**R 5 741 393 262 000.00**	**R 739 806 890 000.00**	**R 6 481 200 152 000.00**
Jan-14	CDS	R 985 347 000.00	R -	R 985 347 000.00	R 4 489 708 000.00	R -	R 4 489 708 000.00				
	TRS	R 25 846 000.00	R -	R 25 846 000.00	R -	R -	R -				
	Other	R 1 357 427 000.00	R -	R 1 357 427 000.00	R 439 648 000.00	R -	R 439 648 000.00				
	Total	**R 2 368 620 000.00**	**R -**	**R 2 368 620 000.00**	**R 4 929 356 000.00**	**R -**	**R 4 929 356 000.00**	**R 7 297 976 000.00**	**R 10 477 905 990 000.00**	**R 592 554 157 000.00**	**R 11 070 460 147 000.00**
Jan-15	CDS	R 76 704 000.00	R 584 000.00	R 77 288 000.00	R 258 970 000.00	R 508 230 000.00	R 767 200 000.00				
	TRS	R 3 135 000.00	R -	R 3 135 000.00	R -	R -	R -				
	Other	R 238 639 000.00	R -	R 238 639 000.00	R 418 475 000.00	R -	R 418 475 000.00				
	Total	**R 318 478 000.00**	**R 584 000.00**	**R 319 062 000.00**	**R 677 445 000.00**	**R 508 230 000.00**	**R 1 185 675 000.00**	**R 1 504 737 000.00**	**R 9 817 569 004 000.00**	**R 775 057 129 000.00**	**R 10 592 626 133 000.00**

Table 25: Turnover in current (nominal) prices

Source: Compiled by researcher (2015)

Market Risk - Fair Value of outstanding contracts at month end (Current Prices)

Month	Instrument	Credit Derivatives where the reporting bank is a **protection buyer**																		
		Trading				Banking														
		Positive			Negative			Positive			Negative			GPFV			GNFV			NCCE
Jan-05	CDS																			
	TRS																			
	Other																			
	Total																			
Jan-06	CDS																			
	TRS																			
	Other																			
	Total																			
Jan-07	CDS																			
	TRS																			
	Other																			
	Total																			
Jan-08	CDS	R	249 407 000.00	R	6 000.00	R	22 225 000.00	R	-											
	TRS	R	180 174 000.00	R	-	R	-	R	-											
	Other	R	4 183 736 000.00	R	151 963 000.00	R	27 899 000.00	R	361 924 000.00											
	Total	**R**	**4 613 317 000.00**	**R**	**151 969 000.00**	**R**	**50 125 000.00**	**R**	**361 924 000.00**	**R**	**4 663 442 000.00**	**R**	**513 893 000.00**	**R**	**4 149 549 000.00**					
Jan-09	CDS	R	583 541 000.00	R	8 355 000.00	R	2 106 894 000.00	R	2 106 513 000.00											
	TRS	R	125 447 000.00	R	524 399 000.00	R	-	R	-											
	Other	R	6 285 813 000.00	R	495 191 000.00	R	2 715 054 000.00	R	2 500 367 000.00											
	Total	**R**	**6 994 801 000.00**	**R**	**1 027 945 000.00**	**R**	**4 821 948 000.00**	**R**	**4 606 880 000.00**	**R**	**11 816 749 000.00**	**R**	**5 634 825 000.00**	**R**	**6 181 924 000.00**					
Jan-10	CDS	R	292 376 000.00	R	107 625 000.00	R	2 022 981 000.00	R	2 022 981 000.00											
	TRS	R	109 737 000.00	R	-	R	-	R	-											
	Other	R	7 418 084 000.00	R	349 566 000.00	R	2 296 870 000.00	R	2 318 160 000.00											
	Total	**R**	**7 820 197 000.00**	**R**	**457 191 000.00**	**R**	**4 319 851 000.00**	**R**	**4 341 141 000.00**	**R**	**12 140 048 000.00**	**R**	**4 798 332 000.00**	**R**	**7 341 716 000.00**					
Jan-11	CDS	R	1532 563 000.00	R	966 463 000.00	R	308 000.00	R	308 000.00											
	TRS	R	-	R	158 161 000.00	R	-	R	-											
	Other	R	6 362 422 000.00	R	-	R	22 122 000.00	R	111 265 000.00											
	Total	**R**	**7 894 985 000.00**	**R**	**1 124 624 000.00**	**R**	**22 430 000.00**	**R**	**111 573 000.00**	**R**	**7 917 415 000.00**	**R**	**1 236 197 000.00**	**R**	**6 681 218 000.00**					
Jan-12	CDS	R	1955 710 000.00	R	600 269 000.00	R	21 010 000.00	R	21 010 000.00											
	TRS	R	-	R	-	R	-	R	-											
	Other	R	4 211 433 000.00	R	-	R	77 329 000.00	R	514 586 000.00											
	Total	**R**	**6 167 143 000.00**	**R**	**600 269 000.00**	**R**	**98 339 000.00**	**R**	**535 596 000.00**	**R**	**6 265 482 000.00**	**R**	**1 135 865 000.00**	**R**	**5 129 617 000.00**					
Jan-13	CDS	R	1520 719 000.00	R	2 247 676 000.00	R	6 146 000.00	R	-											
	TRS	R	-	R	-	R	-	R	-											
	Other	R	5 649 646 000.00	R	1 716 113 000.00	R	113 618 000.00	R	624 470 000.00											
	Total	**R**	**7 170 365 000.00**	**R**	**3 963 789 000.00**	**R**	**119 764 000.00**	**R**	**624 470 000.00**	**R**	**7 290 129 000.00**	**R**	**4 588 259 000.00**	**R**	**2 701 870 000.00**					
Jan-14	CDS	R	1162 887 000.00	R	1847 519 000.00	R	297 185 000.00	R	119 384 000.00											
	TRS	R	-	R	-	R	-	R	-											
	Other	R	708 685 000.00	R	6 781 669 000.00	R	7 060 000.00	R	4 175 102 000.00											
	Total	**R**	**1 871 572 000.00**	**R**	**8 629 188 000.00**	**R**	**304 245 000.00**	**R**	**4 294 486 000.00**	**R**	**2 175 817 000.00**	**R**	**12 923 674 000.00**	**R**	**-10 747 857 000.00**					
Jan-15	CDS	R	1649 134 000.00	R	1542 787 000.00	R	536 912 000.00	R	322 083 000.00											
	TRS	R	-	R	-	R	-	R	-											
	Other	R	2 833 728 000.00	R	9 314 924 000.00	R	-	R	4 659 545 000.00											
	Total	**R**	**4 482 862 000.00**	**R**	**10 857 711 000.00**	**R**	**536 912 000.00**	**R**	**4 981 628 000.00**	**R**	**5 019 774 000.00**	**R**	**15 839 339 000.00**	**R**	**-10 819 565 000.00**					

Table 27: Fair value in current (nominal) prices
Source: Compiled by researcher (2015)

Market Risk - Fair Value of outstanding contracts at month end (Current Prices)																	
Month	Instrumer	Credit Derivatives where the reporting bank is a **protection seller**											Fair value of all other OTC Derivatives (INCLUDES EXCHANGE TRADED)				
		Trading				Banking							GPFV		GNFV		NCCE
		Positive		Negative		Positive		Negative		GPFV	GNFV	NCCE	NCCE				
Jan-05	CDS																
	TRS																
	Other																
	Total													R 135 996 394 000.00	R 139 870 260 000.00	R	-3 873 866 000.00
Jan-06	CDS																
	TRS																
	Other																
	Total													R 170 908 814 000.00	R 167 991 829 000.00	R	2 916 985 000.00
Jan-07	CDS																
	TRS																
	Other																
	Total													R 199 375 210 000.00	R 203 114 616 000.00	R	-3 739 406 000.00
Jan-08	CDS	R	30 828 000.00	R	315 888 000.00	R	-	R	103 230 000.00								
	TRS	R	-	R	9 883 000.00	R	-	R	-								
	Other	R	364 670 000.00	R	-	R	1 979 653 000.00	R	-								
	Total	**R**	**395 498 000.00**	**R**	**325 771 000.00**	**R**	**1 979 653 000.00**	**R**	**103 230 000.00**	**R 2 375 151 000.00**	**R 429 001 000.00**	**R 2 804 152 000.00**	**R 6 953 701 000.00**	**R 192 896 099 000.00**	**R 182 591 894 000.00**	**R**	**10 304 205 000.00**
Jan-09	CDS	R	14 820 000.00	R	2 133 583 000.00	R	980 403 000.00	R	979 778 000.00								
	TRS	R	568 023 000.00	R	569 136 000.00	R	-	R	-								
	Other	R	1 113 940 000.00	R	3 655 000.00	R	109 139 000.00	R	104 269 000.00								
	Total	**R**	**1 696 783 000.00**	**R**	**2 706 374 000.00**	**R**	**1 089 542 000.00**	**R**	**1 084 047 000.00**	**R 2 786 325 000.00**	**R 3 790 421 000.00**	**R 6 576 746 000.00**	**R 12 758 670 000.00**	**R 477 905 058 000.00**	**R 463 966 754 000.00**	**R**	**13 938 304 000.00**
Jan-10	CDS	R	223 584 000.00	R	726 997 000.00	R	1 111 584 000.00	R	1 111 172 000.00								
	TRS	R	-	R	401 241 000.00	R	-	R	-								
	Other	R	349 190 000.00	R	42 480 000.00	R	-	R	18 549 000.00								
	Total	**R**	**572 774 000.00**	**R**	**1 170 718 000.00**	**R**	**1 111 584 000.00**	**R**	**1 129 721 000.00**	**R 1 684 358 000.00**	**R 2 300 439 000.00**	**R -616 081 000.00**	**R 6 725 635 000.00**	**R 272 157 288 000.00**	**R 262 466 365 000.00**	**R**	**9 690 923 000.00**
Jan-11	CDS	R	2 066 682 000.00	R	3 024 983 000.00	R	624 587 000.00	R	135 413 000.00								
	TRS	R	-	R	-	R	-	R	-								
	Other	R	-	R	-	R	325 023 000.00	R	3 859 000.00								
	Total	**R**	**2 066 682 000.00**	**R**	**3 024 983 000.00**	**R**	**949 610 000.00**	**R**	**139 272 000.00**	**R 3 016 292 000.00**	**R 3 164 255 000.00**	**R -147 963 000.00**	**R 6 533 255 000.00**	**R 218 327 153 000.00**	**R 207 075 474 000.00**	**R**	**11 251 679 000.00**
Jan-12	CDS	R	1 542 452 000.00	R	3 067 972 000.00	R	851 516 000.00	R	713 840 000.00								
	TRS	R	-	R	179 859 000.00	R	-	R	-								
	Other	R	-	R	769 422 000.00	R	467 810 000.00	R	3 876 000.00								
	Total	**R**	**1 542 452 000.00**	**R**	**4 017 253 000.00**	**R**	**1 319 326 000.00**	**R**	**717 716 000.00**	**R 2 861 778 000.00**	**R 4 734 969 000.00**	**R -1 873 191 000.00**	**R 3 256 426 000.00**	**R 286 671 054 000.00**	**R 257 668 725 000.00**	**R**	**29 002 329 000.00**
Jan-13	CDS	R	2 155 926 000.00	R	1 475 098 000.00	R	3 405 865 000.00	R	1 939 435 000.00								
	TRS	R	-	R	-	R	-	R	-								
	Other	R	103 341 000.00	R	-	R	561 896 000.00	R	3 409 000.00								
	Total	**R**	**2 259 268 000.00**	**R**	**1 475 098 000.00**	**R**	**3 967 761 000.00**	**R**	**1 942 904 000.00**	**R 6 227 029 000.00**	**R 3 418 002 000.00**	**R 2 809 027 000.00**	**R 5 510 897 000.00**	**R 256 941 650 000.00**	**R 214 430 950 000.00**	**R**	**42 510 700 000.00**
Jan-14	CDS	R	2 684 247 000.00	R	2 999 310 000.00	R	413 614 000.00	R	408 639 000.00								
	TRS	R	-	R	-	R	-	R	-								
	Other	R	421 263 000.00	R	226 518 000.00	R	700 821 000.00	R	5 205 000.00								
	Total	**R**	**3 105 510 000.00**	**R**	**3 225 828 000.00**	**R**	**1 114 435 000.00**	**R**	**413 844 000.00**	**R 4 219 945 000.00**	**R 3 639 672 000.00**	**R 580 273 000.00**	**R -10 167 584 000.00**	**R 332 612 243 000.00**	**R 289 262 259 000.00**	**R**	**43 349 984 000.00**
Jan-15	CDS	R	2 482 453 000.00	R	3 369 674 000.00	R	243 687 000.00	R	378 012 000.00								
	TRS	R	-	R	-	R	-	R	-								
	Other	R	1 144 510 000.00	R	4 418 490 000.00	R	727 168 000.00	R	4 405 000.00								
	Total	**R**	**3 626 963 000.00**	**R**	**7 788 164 000.00**	**R**	**970 855 000.00**	**R**	**382 417 000.00**	**R 4 597 818 000.00**	**R 8 170 581 000.00**	**R -3 572 763 000.00**	**R -14 392 328 000.00**	**R 357 555 235 000.00**	**R 323 679 496 000.00**	**R**	**33 875 739 000.00**

Table 28: Fair value in current prices (continued)

Source: Compiled by researcher (2015)