

Educatis

Graduate School of Management

Risk Analysis of a Credit Default Swap for a New Product Concept

Freie wissenschaftliche Arbeit

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Preface

The purpose of the thesis is to provide the reader with a good understanding of the risk analysis of a single name Credit Default Swap (CDS) in accordance with the New Product Process (NPP). This incorporates the risk content analysis of the product and the implications for risk management and risk control. In order to understand the thesis, the reader must be knowledgeable of the NPP and what is meant by risk analysis of a new product.

The paper is intended for capital market managers, portfolio managers and the trade support management of a bank, who have essential knowledge of risk control, risk management and credit derivatives. The paper may provide useful information that can be incorporated in a new product concept for a single name CDS. The paper confines itself to the application of theory and does not strive to develop theories or mathematical formulas.

In my previous position at the SEB AG bank, one of my major challenges was the implementation of the NPP. Based on my experience of the impact that a new product can have on risk, staff requirements, processes and technology, I believe that the NPP adds significant value to a bank. This is excellently demonstrated by a single name CDS.

I would like to express my sincere thanks to Professor Dr. Theile for enabling me to do my thesis on a risk management topic and to Professor Dr. Daxhammer, my "Betreuer Professor" for guiding and supporting me through the process. I would also like to thank my parents for their assistance during my MBA and especially during my thesis. Many thanks also to my colleagues and my friends from the Risk Management Department of the NRW.BANK and from other institutions for providing me with information.

Summary

In accordance with the MaRisk AT8, activities in new products or on new markets, banks must use a structured approach, the NPP, before the commencement of business activities relating to new products or new markets. This thesis examines this process by investigating the implementation of a single name CDS as a new product. Specifically, it demonstrates the meaning of risk content analysis of a new product and the assessment of the impact on risk management and risk control.

A key element of the NPP is the completion of a concept that details the implementation of a new product. The concept must incorporate a thorough risk analysis of the new product and the implications for risk management and risk control. A single name CDS is a product that synthetically transfers credit default risk and to some extent credit spread risk of a bond or a loan from a protection buyer to a protection seller. A CDS can be used as a trading product, a hedge or risk management instrument. This thesis explores the risk content of this product when it is used by a bank as a hedge instrument or for risk management purposes by analyzing the basic components of the product.

The implementation of a single name CDS as a hedge or a risk management instrument changes the risk profile of the bank and requires the bank to use new valuation methodologies. From a protection buyer's perspective, the new product influences mainly counterparty risk and operational risk. Regarding counterparty risk, the buyer exchanges credit default risk and some credit spread risk for pre settlement risk, double default risk and basis risk. The protection seller can use the CDS to manage concentration risk of the bank's credit portfolio and therefore gain credit default exposure to an industry, a country or a company by selling a single name CDS. However, the new product exposes the seller also to pre settlement risk and operational risk. As well, the protection seller is exposed to funding risk due to the potential settlement payment required in the case of a credit event. Both as protection buyer or seller, the bank will need to assess the impact that single name CDSs have on the credit portfolio by examining correlation and concentration risk.

The MaRisk requires that risk management and control processes guarantee that all the major risks are identified, evaluated and assessed, managed, controlled and communicated. In a first step, the bank must ensure that it captures all of the single name CDSs in order to incorporate them in risk management and control processes. Regarding risk evaluation and assessment, new methodologies such as for the calculation of double default risk will need to be implemented or old methods such as for the calculation of pre settlement risk or credit spread risk will need to be adjusted in order to reflect peculiarities of the new product. From a risk management's viewpoint, the bank will need to review its limits in order to ensure that the single name CDS is incorporated correctly. Netting and collateral management as risk mitigation instruments can be used to reduce pre settlement risk. However, these are complex processes that expose the bank to other risks that also need to be analyzed. Risk control and communication processes will also need to be reviewed in order to ensure that the risk analysis is incorporated and that the management of the bank fully understands the risks and changes.

The risk content analysis of the single name CDS demonstrates the importance of completing a thorough risk analysis of a new product before it is implemented. Without this process, the bank would not have been able to mark the product to market and have taken serious risks. As well, calculations of the bank's earnings, economic and regulatory capital, risk reserves and limit utilizations would be distorted.

The implementation of a single name CDS results in changes for other areas of the bank such as treasury, back office, finance and controlling, regulatory reporting, strategy, internal audit and organization and compliance. Each of these areas must be analyzed and the new product concept must include how the new product will be managed.

The thesis shows that the NPP is not merely an administrative duty required by the regulators, but a process that adds considerable value to the bank. As can be seen by the implementation of a single name CDS, the risk content analysis of a new product and the examination of the consequences for risk management and control are of significant importance to the NPP.

Zusammenfassung

Gemäß MaRisk AT 8, „Aktivitäten in neuen Produkten oder auf neuen Märkten“, müssen Banken einen strukturierten Prozeß, der neue Produkte Prozeß (NPP), zur Einführung von neuen Produkten und zur Erschließung neuer Märkte einführen. Diese These ermittelt diesen Prozeß durch das Überprüfen der Anwendung einer Single Name Credit Default Swap (CDS). Insbesondere, erläutert diese These die Analyse des Risikogehaltes einer Single Name CDS und die sich daraus ableitenden wesentlichen Konsequenzen für das Risikomanagement.

Ein wichtiger Teil des NPPs ist das Konzept, das alle wesentlichen damit verbundenen Konsequenzen aufzeigt. Das Konzept muß das Ergebnis der Analyse des Risikogehaltes dieses neuen Geschäftes und die daraus resultierenden Auswirkungen für Risikomanagement und -controlling beinhalten. Bei einer Single Name CDS wird der Kreditausfall und zum Teil das Credit Spread Risiko einer Anleihe oder eines Kredites synthetisch von einem Sicherungsnehmer auf einen Sicherungsgeber übertragen. Ein CDS kann als Handelsprodukt, als Absicherungsinstrument oder als Instrument für das Risikomanagement eingeführt werden. Diese These untersucht den Risikogehalt des Single Name CDSs bei der Einführung als Absicherungsinstrument oder als Instrument des Risikomanagements durch die Aufteilung in Basiskomponente.

Die Einführung einer Single Name CDS als Absicherungs- oder Risikomanagement Instrument verändert das Risikoprofil einer Bank und erfordert die Einführung von neuen Bewertungsmethoden. Aus der Perspektive eines Sicherungsnehmers, werden hauptsächlich das Adressenausfallrisiko und das operationelle Risiko durch das neue Produkt verändert. Bezüglich des Adressenausfallrisiko tauscht der Sicherungsnehmer das Ausfallrisiko und zum Teil das Risiko einer Bonitätsverschlechterung (Credit Spread Risiko) gegen Wiedereindeckungsrisiko, Double-Default-Risiko und Basisrisiko. Der Sicherungsgeber kann das Konzentrationsrisiko von einem Bankkredit- und Wertpapierportfolio steuern und durch gezielte Verkäufe eines oder mehrerer CDSs das Ausfallrisiko gegenüber einem Industriezweig, einem Land oder einer Firma diversifizieren. Allerdings, geht der Sicherungsgeber auch ungewollte Risiken ein, wie zum Beispiel Wiedereindeckungsrisiko und operationelles Risiko. Zusätzlich, sollte ein Kreditereignis eintreten, muß der Sicherungsgeber den Ausfall finanzieren und somit trägt er auch ein gewisses Refinanzierungsrisiko (Liquiditätsrisiko). Als Sicherungsnehmer oder als Sicherungsgeber wird die Bank die Auswirkung der Single Name CDS auf das Kredit- oder Wertpapierportfolio durch die Analyse des Korrelationsrisikos und des Konzentrationsrisikos untersuchen müssen.

Eine weitere Anforderung des MaRisk ist daß die Risikosteuerungsprozesse und Risikocontrollingprozesse eine Identifizierung, Beurteilung und Steuerung sowie Überwachung und Kommunikation aller wesentlichen Risiken gewährleisten. In einem ersten Schritt muß die Bank sicherstellen daß die Risikosteuerungsprozesse und die Risikocontrollingprozesse alle von der Bank abgeschlossenen Single Name CDSs beinhalten. Bezüglich der Risikobeurteilung müssen neue Methoden (für zum Beispiel Double-Default-Risiko) eingeführt werden und vorhandene Methoden angepaßt werden, wie zum Beispiel, die für die Kalkulation des

Wiedereindeckungsrisikos oder für das Risiko einer Bonitätsverschlechterung, um die Eigenarten des Produktes wiederzuspiegeln. Aus der Sicht des Risikomanagements muß die Bank ihr Limitsystem überprüfen um zu gewährleisten daß der Single Name CDS korrekt berücksichtigt wird. Netting und Sicherheitenaustausch können als risikomindernde Techniken für das Wiedereindeckungsrisiko eingeführt werden. Es muß jedoch beachtet werden, daß die Bank durch diese komplexen Prozesse neuen Risiken ausgesetzt wird und daß diese analysiert werden müssen. Die Risikoüberwachungsprozesse und die Kommunikationsprozesse müssen auch überprüft werden um sicherzustellen, daß die Risikoanalyse integriert ist und daß das Bankmanagement die Risiken und die Veränderungen vollständig versteht.

Die Risikoanalyse einer Single Name CDS demonstriert die Bedeutung einer gründlichen Risikoanalyse eines neuen Produktes bevor es eingeführt wird. Ohne diesen Prozeß, hätte die Bank das neue Produkt nicht bewerten können und wäre schwerwiegende Risiken eingegangen. Zusätzlich wären die Kalkulation der Bankergebnisse, das ökonomische und das regulatorische Eigenkapital, die Rücklagen für Risiken und Limitausnutzungen, verzerrt worden.

Die Einführung von Single Name CDSs resultieren auch in Veränderungen in anderen Bereichen wie zum Beispiel Treasury, Abwicklung, Rechnungslegung, Meldewesen, Unternehmenssteuerung, Innenrevision sowie Organisation und Compliance. Jeder Bereich muß analysiert werden und das Konzept zur Einführung einer Single Name CDS muß beschreiben wie jede Abteilung das neue Produkt handhaben wird.

Diese These zeigt, daß der NPP nicht nur eine von den Regulatoren aufgetragene administrative Pflicht ist, sondern daß der Prozeß einen erheblichen Mehrwert für die Bank darstellt. Durch die Einführung einer Single Name CDS wird ersichtlich, daß die Analyse des Risikogehaltes und die sich daraus ergebenden Auswirkungen auf die Steuerung und die Überwachung der Risiken sehr wichtige Komponenten des NPP sind.

Table of Abbreviations

AT	Allgemeiner Teil der MaRisk/General Part of the MaRisk
BaFin	Federal Financial Supervisory Authority
Basel II	International Convergence of Capital Measures and Capital Standards
BBA	British Bankers' Association
bp	Basis Point
BT	Besondere Anforderungen der MaRisk/Specific Part of the MaRisk
BTO	Requirements for the organizational and operational structure MaRisk
BTR	Requirements for processes for identifying, assessing, treating, monitoring and communicating risks, MaRisk
CDS	Credit Default Swap
CGFS	Committee on the Global Financial System
CRMPG II	Counterparty Risk Management Policy Group
CRT	Credit Risk Transfer
DRSC	Deutsche Rechnungslegungs Standards Committee e.V.
EAD	Exposure at Default
GoB	German Principles of Orderly Accounting
GroMiKV	Large Exposures and Million Loans Reporting Regime
IAS	International Accounting Standards
IASC	International Accounting Standards Committee
ICAAP	International Capital Adequacy Assessment Process
IFRS	International Financial Reporting Standards
ISDA	International Swaps and Derivatives Association
IT	Information Technology
KWG	Kreditwesengesetz/German Banking Act
LGD	Loss given Default
MaH	Minimum Requirements for Trade
MaK	Minimum Requirements for Lending
MaIR	Minimum Requirements for Internal Audit
MaRisk	Minimum Requirements for Risk Management
Mod Mod R	Modified Modified Restructuring
Mod R	Modified Restructuring
MTM	Mark-To-Market
No R	No Restructuring
NPP	New Product Process
Old R	Old Restructuring
OTC	Over-the-Counter
PD	Probability of Default
ROE	Return on Equity
SRP	Supervisory Review Process
SolvV	Solvabilitätsverordnung/Solvency Regulation
TRS	Total Return Swap
VaR	Value at Risk

Table of Symbols

Credit Default Swap

Discount factor (T) to time i	$DF(T_i)$
Length of period i in years	Δ_i
Probability of survival to time i	$q(T_i)$
Recovery rate on default	R
Spread for protection to period n	$s(n)$

Credit Equivalent

Nominal amount of the CDS	NPA
Mark-To-Market value of the CDS	$marketvalue$

Double Default Risk

Correlation between the two events A and B	$Corr(A,B)$
Default of the reference entity	A
Default of the protection seller	B
PD of A and B at the same time	$P(AandB)$
PD of A	$P(A)$
PD of B	$P(B)$

Glossary

General Terms	
BaFin	The BaFin is a federal institution governed by public laws. It belongs to the Ministry of Finance. Its primary responsibilities include the supervision of banks, financial service companies and insurances that comprise all of the key functions of consumer protection and solvency supervision.
Basel Committee on Banking Supervision	The Basel Committee on Banking Supervision was established by the central bank governors of the Group of Ten countries in 1975 and consists of senior representatives of bank supervisory authorities and central banks from Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom and the United States. The Committee's goal is to improve the understanding of key regulatory issues and to improve the quality of banking.
Committee on the Global Financial System (CGFS)	The CGFS, which was established in 1971, is a central bank forum with a mandate to identify and assess potential sources of stress in global financial markets and to enhance the understanding of and to promote improvements of the functioning and stability of financial markets. Its members include Deputy Governors and senior officials of central banks who are responsible for financial policy, financial stability assessments and international issues from the following institutions: National Bank of Belgium, Bank of Canada, European Central Bank, Bank of France, Deutsche Bundesbank, Bank of Italy, Bank of Japan, Central Bank of Luxembourg, Netherlands Bank, Sveriges Riksbank, Swiss National Bank, Bank of England, Board of Governors of the Federal Reserve System and Federal Reserve Bank of New York.
Counterparty Risk Management Policy Group (CRMPG II)	CRMPG II, which includes senior officials from major financial institutions and is chaired by the Managing Director of Goldman Sachs, focuses on making recommendations to the private sector to promote the efficiency, effectiveness and stability of the global financial system.
International Swaps and Derivatives Association (ISDA)	ISDA has more than 600 members, which incorporate institutions from 46 countries on six continents. It has played a significant role in providing standardized derivatives documentation and expertise. Its principle undertaking in the CDS market has been to establish a robust documentation with legal certainty which is considered as the market standard.
Mark-it Partners	Mark-it Partners supplies independent CDS data derived from its partner banks, which include 13 major investment and commercial banks and nearly 30 other contributing banks and institutions.

Risk Glossary	
Banking Book Products	The banking book incorporates all commercial banking activities. It includes all lending and borrowing and follows traditional accounting rules of accrued interest income and costs. The transactions in this book are expected to be held until maturity.
Basis Point	One hundredth of a percentage point (0.01 %).
Basis Risk	Basis risk is the risk associated with an imperfect hedge. It is the risk that the profits generated from the hedge will not cover all of the losses of the primary position.
Calibration	Calibration (or parameterization) means the subjective choice of parameters used as inputs to a risk model.
Counterparty Risk	Counterparty risk is defined as the risk of an adverse movement in profits or a loss due to the deterioration of a counterparty credit standing or a counterparty default. It incorporates the following risk dimensions: Credit risk (or issuer risk), pre settlement risk, settlement risk, country risk and investment risk.
Country Risk	Country risk is the risk that is caused by the country in which the counterparty is located.
Correlation	Correlation is the degree with which random variables move together or not; for instance the degree with which they move in the same direction or the opposite direction. In terms of credit risk, it results from common factors influencing risk drivers and the individual credit standing of the borrowers. It is a critical factor for modeling portfolio credit risk.
Credit Concentration Risk	Credit concentration risk is the risk associated with inordinately high levels of direct or indirect exposures to a single or related group of borrowers. See portfolio credit risk.
Credit Risk	Credit risk can be divided into credit default risk and credit spread risk. Credit default risk is the risk of a loss due to the default of the counterparty. Credit spread risk is the risk of an adverse movement in profit or a loss due to the deterioration in the credit standing of the counterparty or an issuer.
Double Default Risk	Double default risk is the risk that both the reference entity and the counterparty default at the same time. It is dependent on the default correlation between the two parties. See also correlation
Economic Capital	Economic capital (or risk-based capital) is the capital required to cover unexpected losses at a given confidence interval calculated using a bank's internal models. The confidence interval reflects the risk appetite of the bank.
Exceptional Loss	An exceptional loss is the loss arising from defaults of catastrophic magnitude.
Expected Loss	An expected loss represents the average loss that a bank can expect to incur on a portfolio over the period up to a specified horizon. It is used as a basis for loan provisions.

Risk Glossary	
Lending Business	In accordance with MaRisk, lending business comprises all transactions in accordance with section 19 (1) KWG, which incorporates all balance sheet assets and off balance sheet transactions that have counterparty risk.
Liquidity Risk	Liquidity risk can be decomposed into funding risk, market liquidity risk and asset liquidity risk. Funding risk is the risk that a bank cannot raise funds to meet cash flow requirements. Market liquidity refers to the risk associated with trades made in illiquid markets. Asset liquidity refers to how quickly an asset can be changed into cash.
Market Risk	Market risk is the risk of a transaction relating to a change in the value of a market parameter such as interest rate, foreign exchange rate, equity or commodity prices. It encompasses price changes in shares, bonds and currencies due to market movements and changes in the term structure of the interest rate or volatility.
Marked-To-Market	The discounted value of future cash flows using appropriate discount rates.
Operational Risk	Operational risk can be defined as the risk of a direct or an indirect loss resulting from deficiencies in processes, people or technology or from external events. It does not incorporate strategic risk, but does incorporate legal risk.
Pre Settlement Risk	The risk that a counterparty could default before the settlement of the final cash flow of a transaction. It is a two-way risk which shifts from one counterparty to another depending on whether the market value is positive or negative.
Portfolio Credit Risk	Portfolio credit risk is the risk associated with a portfolio or a group of transactions as opposed to an individual transaction. See correlation and concentration risk.
Regulatory Capital	Regulatory capital is the capital that is imposed by regulators on banks that must be maintained to absorb losses.
Return on Equity	A measure of profitability of equity indicating the return that a company achieves on the capital it employs.
Risk	Risk can be defined as uncertainties regarding adverse movement in profits or in losses.
Settlement Risk	Settlement risk is the risk that funds or a financial instrument will not be delivered to the bank as expected.
Trading Book	The trading book includes all transactions that can and are intended to be traded in the market. The primary purpose of the transactions is to buy and sell to earn profit. The accounting rules in the trading book are based on market values of transactions and profit and loss (P&L).

Risk Glossary	
Trading Business	The MaRisk defines trading business as all money market transactions, securities transactions, forex business, transactions in marketable receivables, commodities and derivatives, which are concluded in the credit institute's own name and for their own account.
Unexpected Loss	Unexpected losses are potential losses in excess of expected losses. They are measured by the Value at Risk (VaR) approach and serve as a basis for economic capital calculations.
Value at Risk	VaR is a statistical measure of financial risk over a specified time horizon. It is the worst-case loss expected over the holding period within the probability set out by the confidence interval. The VaR methodology serves to define economic capital.
Credit Default Swap Glossary	
Cash Settlement	If a credit event is triggered, cash settlement or physical settlement may be agreed. In the case of a credit event, the protection seller pays nominal amount less market value of the defaulted debt of the reference name less accrued premium and subject to a minimum of zero.
CDS – Bond Basis	CDS-Bond basis is the difference between a CDS spread and a bond's par equivalent CDS spread with the same maturity. Basis can either be negative, positive or zero.
Cheapest to Deliver Option	In the case of physical settlement, the protection buyer has the option of which debt to deliver within certain constraints as defined in the documentation. Hence, the buyer will deliver the cheapest deliverable obligation available to the protection seller.
Credit Event	A credit event triggers the settlement payment by the protection seller of the CDS. Based on the 2003 ISDA Credit Derivative Definitions, it incorporates bankruptcy, failure to pay, restructuring, repudiation and obligation acceleration. Cash or physical settlement may be agreed.
Default Rate	The default rate is the rate of default at a future time under the assumption that the entity is alive now.
Hazard Rate	The hazard rate is the rate of default at any time assuming the entity has survived up to that point.
Maturity	The maturity is the expiration of the contract. This is usually on the 20 th of March, June, September or December.
Nominal Amount	The nominal amount (or notional amount) is the amount of credit risk that is transferred. It is agreed between the protection buyer and the protection seller and may or may not be equal to the nominal amount of the reference obligation.
Physical Settlement	If a credit event is triggered, cash or physical settlement may be agreed. In the case of physical settlement the protection buyer delivers the bond and receives par less the accrued spread.

Credit Default Swap Glossary	
Protection Buyer	The protection buyer is the counterparty in a CDS transaction that purchases the credit protection.
Protection Seller	The protection seller is the counterparty in a CDS that sells the credit protection.
Recovery Rate	The value of the deliverable obligation received by the protection seller when a credit event occurs. It is calculated as a percentage of par.
Reference Entity	The reference entity is the precise name of the legal entity on which the CDS provides default protection. It is the entity or entities specified as such in the confirmation.
Reference Obligation	The bond or loan specified in a CDS contract, used to determine other deliverable obligations in case the reference entity defaults.
Restructuring	Restructuring is included as a credit event and is intended to guard against the eventuality of the debt of a reference entity losing value after the restructuring of its debt.
Risky Duration	Risky duration is a measure for sensitivity of a CDS. It is the sensitivity of the Mark-To-Market value of a CDS trade to a 1 basis point shift in the CDS spreads.
Spread	The spread is the payment made by the protection buyer to the protection seller for the CDS.
Z-Spread (Zero Spread)	The z-spread is a constant spread over the Libor zero curve that equates the present value of a bond's cash flows to its market price.

1. Background

1.1 MaRisk - The New Product Process

During the past years, the Basel Committee on Banking Supervision has been working to revise the 1988 Basel Accord. In June 2006, the Basel Committee published “Basel II: The International Convergence of Capital Measurement and Capital Standards: A Revised Framework” (Basel II). The paper sets out details of the agreed framework for measuring capital adequacy and the minimum standard for risk management and reporting. This framework is intended to promote the adoption of stronger risk management practices in the banking industry and is divided into three sections:

- Pillar 1 (P-1): Minimum Capital Requirements/Quantitative Requirements
- Pillar 2 (P-2): Supervisory Review Process (SRP)/Qualitative Requirements
- Pillar 3 (P-3): Market Discipline/Reporting Requirements

The SRP encompasses qualitative requirements and is designed to ensure that the bank has adequate capital for its risk profile and has a strategy for maintaining capital. National supervisors are expected to ensure that a bank’s level of capital is aligned with its risk profile. The key elements of the P-2 are:

- SRP and
- International Capital Adequacy Assessment Process (ICAAP)

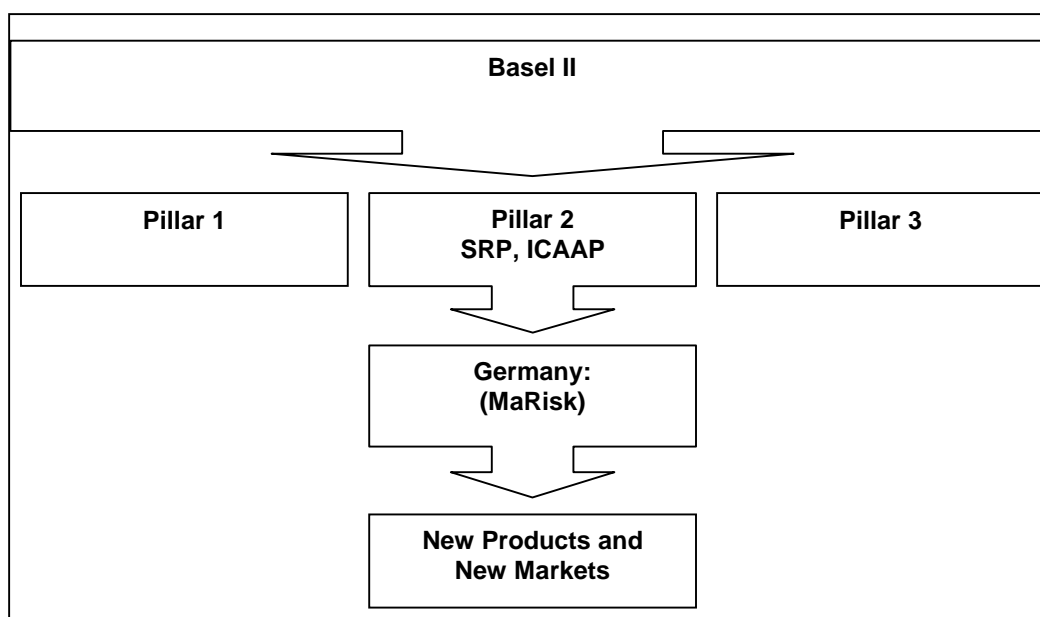
These will be implemented on a European and on a national level.

In Germany, the new framework will be adopted in the German Banking Act (KWG) and then specified in the Solvency Regulations (SolvV), Large Exposures and the Million Loans Reporting Regime (GroMiKV) and the Minimum Requirements for Risk Management (MaRisk). SolvV and GroMiKV cover P-1 and P-3 and MaRisk encompasses P-2.

The NPP is specified in MaRisk AT 8 – activities in new products or on new markets. A bank must complete certain phases as defined in the MaRisk AT 8 before business can be commenced in a new product or on a new market. A key component of implementing a new product is a thorough analysis of the risk content of the new product and its impact on risk management.

Exhibit 1-1 shows the relationship between Basel II, the MaRisk and the NPP.

Exhibit 1-1: Legal Framework for the NPP



Source: Own Development

Hence it can be seen that regulators view new products as a source of risk and believe that a structured approach to implementing new products prevents institutes from being exposed to unexpected risks.

1.2 The Credit Derivatives Market in Germany

Credit derivatives can be classified as a credit transfer product. (CGFS, 2003, Pg.5) As can be seen by the developments in the credit transfer market and the developments in the German credit market, credit derivatives are an important product category for German banks. This section focuses on developments in the CRT market and changes in the German credit markets that have led to the development and the rapid growth in the credit derivatives market in Germany. The last part of the section provides an overview of the German credit derivatives market.

1.2.1 Developments in the Credit Transfer Market

Credit derivatives can be viewed in general as an instrument to transfer credit risk. Credit Risk Transfer (CRT), which is not new to the financial markets, encompasses a large range of products. Guarantees and credit insurance have been used to transfer credit risk for a long time. During the 1970's, banks used syndicated loans in order to provide a client with a significant credit and then reduce the risk by selling parts of the loan to investors. Securitization, which is a more complex form of selling credit risk, began in the US during the 1970's and a secondary loans market

developed in the 1980's. Parallel credit risk, credit portfolio management and risk-return concepts were being developed and were increasing the demand for CRT products. (CGFS, 2003, Pg. 1-9) Credit derivatives alter the original credit relationship and hence make credit tradable on the market. They are similar to insurance contracts given that they only provide funds if the insurance is triggered. The protection buyer pays a premium for the insurance. His motive could be to eliminate or reduce the exposure to a certain client or portfolio grade. The protection seller receives an insurance premium and his motive could be to diversify his credit portfolio. Intermediaries trade in the product earning fee income or speculation profit.

1.2.2 Developments in the German Credit Market

In Germany, companies have traditionally used bilateral credit agreements as a main source of external funds whereas in other markets, such as the US, the capital markets have taken on this role. Disintermediation and the emergence of new entrants, regulatory changes and the increasing importance of Return on Equity (ROE) are the main trends that have caused major changes to the German credit market and supported developments in CRT.

The development of the information economy has changed the way in which banking business is done. Due to lower costs, investors have better access to information, which has led to an increase in demand for securitized products and other structured products. The emergence of new competitors from the non-banking sector and on-line banks has intensified the competition in the banking sector. Through the use of the Internet, investors are also able to contact potential borrowers directly. In the US a number of bond issuers (e.g. GM, GE) and equity issuers (e.g. Google) have gone directly through the Internet to sell their bonds and equities without using a bank. These trends pose a threat for banks since only high-risk clients such as poorly rated companies that have no chance to obtain capital on the markets or small to medium sized companies that have no external rating will continue to use banks to raise capital. In response to these threats, German banks began developing credit strategies and positioning themselves on the market. Regional banks began focusing on building strong relationships with clients in order to assist them with meeting their financial needs throughout the business cycle while large international banks and investment banks concentrate on innovations (e.g. securitization, project finance, credit derivatives). Innovations such as credit derivatives enable banks to manage their credit portfolios and offer their clients better financing alternatives. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 18-27)

The implementation of the Minimum Requirements for Lending (MaK) in 2002 clearly indicates that German regulators (BaFin) reacted to the large losses in the credit market (e.g. Schneider, Flowtex) and increased their focus on credit risk. Parallel to the Minimum Requirements for Trade (MaH), which provided a risk management framework for trading products, the MaK provided a risk management framework for lending products. A key element of the MaK is the credit risk strategy, which must be aligned with the overall strategy of the bank. Other elements of the MaK include credit risk classification, early warning and limit system and also credit risk reporting. The implementation of Basel II (SolvV, MaRisk) will require banks to directly link

capital to a professional rating for credit risk. Banks are in the process of developing and aligning their tools for risk management, rating and capital calculation. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 18-27) It is not within the scope of this research paper to provide an in depth overview of the regulatory changes. It is, however, important to recognize that the changes in the regulatory framework will continue to lead to developments in the credit and in the CRT market.

ROE has been a key indicator used by investors in the international capital markets for a number of years. This factor became important for German banks when they started raising capital on international markets. American banks and European banks excluding German banks had an ROE of approx. 14 % and 10 % respectively. Therefore in comparison German banks with an ROE of approx. 6.2 % were a poor investment. The main reasons for the relatively low ROE were related to the credit business. Low margins, large credit losses and expenses in credit due to increasing regulatory requirements (MaK) have led to poor profitability. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 18-27) From an investor's perspective, foreign banks seemed to have a better business model. One key factor is the general acceptance and development of rating and the risk-return concepts. The sale of risk provides an additional income from the exposure, which increases the overall return. As well, the sale reduces risk and hence the capital requirement. Overall, the higher return and the lower capital requirement lead to an increase in the ROE. Also from an investment perspective, topics such as risk-return, CRT products and risk management will become increasingly important.

One can conclude that the changing environment in Germany and globally will continue to drive the CRT market and specifically the use credit derivatives. Based on a study completed by the British Bankers' Association (BBA), "Credit derivatives represent one of the most significant markets in banking today". (Barrett, Ewan, 2006, Pg. 5) The diversity in products – index trades, tranching index trades and equity-linked products - is also expanding. Whilst hedge funds are becoming increasingly important, international banks remain the main players. (Barrett, Ewan, 2006, Pg. 5) The German market entered the credit derivative market relatively late when compared with their international counterparts. The main players are Deutsche Bank, Commerzbank, Dresdner Bank, WestLB and HypoVereinsbank. The main product is the CDS, which is often used as a building block for a new structure. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 157-158)

2. Problem Discussion

The primary goal of the thesis is to complete the risk analysis of a single name CDS for a new product concept. More specifically the thesis is intended to examine the risk content of the product and assess the implications for risk management and risk control.

The research paper sets out to answer the following questions:

- 1) What are the key aspects of the NPP?

2) Specifically what does “risk analysis of the product” encompass?

3) What is a single name CDS?

4) What are the inherent risks of a single name CDS?

5) What are the implications for risk management and risk control?

6) What other areas of the NPP are important for the CDS?

This thesis begins with a background review of the regulatory framework in which the NPP is embedded and also an overview of the credit derivatives market in Germany.

The second chapter highlights the goals of the thesis and the main questions that this paper sets out to answer. Chapter 3 provides a theoretical basis for the NPP and risk assessment. It examines the components of the NPP. As well, it provides the basis for a risk content analysis and an assessment of the implications for risk management and risk control. Chapter 4 explains the product, CDS. Both chapters 3 and 4 are critical for understanding chapter 5.

Chapter 5 is the main focus of the paper. It combines chapters 3 and 4 to analyze the inherent risks of a single name CDS when it is used as a hedge and a risk management instrument. This chapter examines the impact that a single name CDS has on the risk profile of the bank and the implications for risk management and risk control.

Chapter 6 discusses other aspects of the NPP for a CDS, which need to be considered when implementing the product.

The final chapter provides a summary of the results of the research.

3. Theoretical Framework: The New Product Process

This section focuses on the NPP and is divided into two main subsections. The first subsection examines the NPP as defined by the MaRisk and the second subsection covers risk analysis of a new product as a key component of the NPP.

The chapter begins with an introduction to the MaRisk and a comparison of the MaH, MaK and MaRisk requirements for the NPP. The remaining part of the subsection focuses in detail on the key components of the NPP.

The latter part of the chapter covers the risk analysis component of the NPP and begins with an overview of the key sources of risk in accordance with MaRisk. It then provides an overview of risk management and risk control.

The goal of the section is to enable the reader to understand the key components of the NPP and the meaning of “risk analysis of the product” and of “implications for risk management and control”.

3.1 The New Product Process as defined in the MaRisk

The primary goal of the German banking regulation is to provide depositors insurance against bank insolvency. The main component of the legal framework is the KWG and related circulars. The framework regulates the amount of risk in relation to capital, balance sheet structure, risk management organization and processes and information requirements for a bank. (Hartmann-Wendels, Pfingsten, Weber, 2006, Pg. 380-381)

The general organizational requirements for credit institutions are stipulated in § 25a KWG. The MaRisk circular provides a framework for risk management at credit institutions and specifies this paragraph. As well, the circular aims to provide a qualitative framework for the Basel II, P-2. In accordance with MaRisk, risk management encompasses the development of appropriate strategies and internal surveillance procedures, which include the internal control system and the internal audit. The internal control system incorporates organizational structure and processes and also risk management and control processes. (BaFin, 2005, Pg. 3) The MaRisk combines and replaces the MaK, the MaH and the Minimum Requirements for the Internal Audit (MaIR).

The MaRisk differentiates between lending and trading business. The lending business incorporates all transactions in accordance with section 19 (1) KWG, which encompasses all balance sheet assets and off balance sheet transactions that have counterparty risk. Money market transactions, securities transactions, forex business, transactions in marketable receivables, commodities and derivatives which are concluded in the credit institutions own name and for their own account are considered trading business. (BaFin, 2005, Pg. 4)

The MaRisk provides requirements for counterparty risk, market risk, liquidity risk and operational risk. It is divided into two sections with the first section covering general requirements for risk management and the second section encompassing specific requirements for the organization of the lending and the trading business. The specific requirements also focus on the identification, analysis, management and control of the different risk types. As well, this section incorporates a framework for internal audit. (bank-verlag köln, 2006, Pg. 14-16)

The NPP was first introduced in the MaH for trading products and then in the MaK for lending products. The MaRisk combines both the MaH and the MaK regulations for new products and new markets.

3.1.1 A Comparison of the MaH and the MaK for the NPP

The MaH required that a detailed and comprehensive report must be written before the commencement of trade in new products or markets. Details of the concept were not specified. Following the completion of the concept, a mandatory test phase involving all relevant organizational units had to be completed. (Theileis, Althoff, Hörlin, 2006, Pg. 116-122) A third key component was communication. Board approval was required for the commencement of the test phase and the commencement of trade. The Board had to be informed of the initial transactions during the test phase. (Pfeifer, Ullrich, Wimmer, (Hrsg.), 2006, Pg. 134)

The MaK, which was implemented for the lending business, differed somewhat from the MaH. As with the MaH, the commencement of new business was only approved on the basis of a detailed and comprehensive report. However, the MaK required a risk analysis of the new product and an assessment of the impact on risk management. The test phase and the approval process also differed from those of the MaH in that the test phase for the MaK was optional depending on product complexity. As well, in accordance with the MaK, the Board could delegate the “approval” to the managers responsible for the business and for the monitoring of the activities in question. The MaK also touched on the new product identification process. For the following types of new products, there was no requirement for the NPP to be completed, provided that their risk content remained unchanged:

- Combination of standardized approved products
- Modification of an approved product
- Implementation in new markets of approved products

(Füser, Weber, 2005 Pg. 36-38)

While the details of the processes differed somewhat, the regulators required that banks implement a standardized NPP for new products and new markets for both lending and trading products. The MaK introduced the risk analysis concept for new products. It was also somewhat less administrative and formal than the MaH.

3.1.2 A Comparison of the MaRisk with the MaH and the MaK

MaRisk AT 8, activities in new products or on new markets, combines new product requirements based on the MaH and the MaK. According to MaRisk AT 8 before the commencement of business in a new product, a detailed and comprehensive concept must be completed. As with the MaK, it requires a thorough risk analysis of the new product and the resulting impact on risk management. (Theileis, Althoff, Hörlin, 2006, Pg. 116) The concept, which is explained in more detail than in the MaH, incorporates key changes to staff, organization, IT, accounting, finance and tax. Legal implications resulting from the product must also be analyzed and incorporated. (Theileis, Althoff, Hörlin, 2006, Pg. 118-119) Included in the development of the concept are all workflow relevant departments and Internal Audit.

The MaRisk differentiates between lending business and trading products with respect to the test phase as only trading products require a test phase.

Regular business can only begin once:

- The test phase has been successfully completed (only trading products)
- Organizational processes have been implemented
- Qualified staff has been retained
- IT is available
- The risk control system has been aligned

The MaRisk adopted the option of delegation from the MaK. Hence the Board may delegate the approval decision for the test phase, the concept and the commencement of regular trading to the managers responsible for trade and for the monitoring of the activities in question. A delegation policy or guideline must be completed and the Board needs to be informed of the key process steps. (Theileis, Althoff, Hörlin, 2006, Pg. 122-123)

A new aspect of the MaRisk relates to the decision of whether a product should be deemed as new or not. The MaK touched on the subject by defining certain features that did not constitute a new product, but did not regulate the identification process. MaRisk AT 8 stipulates that a unit independent of trade or sales should decide whether a product is new or not. (Theileis, Althoff, Hörlin, 2006, Pg. 118) The decision concerning a new product should be based on whether or not current work-flows and processes, IT-systems, risk methods, valuation models and limit systems can handle the product. If no major changes are required then the product does not need to be classified as “new”. (Deutscher Sparkassen- und Giroverband, (Hrsg.), 2006, Pg. 130) As well, if all NPP relevant units can handle the new product or new market, the complete NPP does not have to be used. (Füser, Weber, 2005 Pg. 177)

As with the MaH and MaK, it is evident with the MaRisk that the regulators view new products and markets as a source of risk. The MaRisk has defined a more risk oriented and analytical process than the MaH or the MaK. Innovation is a critical success factor for banks and this often incorporates structuring, combining or tailoring products to meet a client’s needs. Therefore, the market is becoming increasingly complex making it difficult to identify new products and to apply a complex internal process for slight changes. The MaRisk seems to have incorporated this into the process and provides a stable framework for the NPP without forcing additional administrative burdens onto the cost structure of the bank. In essence the MaRisk focuses on ensuring that a bank understands the risk and can handle their products.

3.1.3 Components of the New Product Process

The key aspects of the NPP incorporate:

- Identification of a New Product
- Product Categorization
- The High Level Concept
- The New Product Concept
- The Test Phase and the Final Report

Each of these components serves to ensure that the bank understands the consequences of implementing the new product.

3.1.3.1 Identification of a New Product

An organizational unit independent of the trading department must assess whether a product is new or not. Hence, the unit requires a list of all products and markets that have been approved through the NPP or with which the bank has had experience. The more detailed the product list is, the less chance there is of a misinterpretation. The product list should include assets and liabilities and whether the product may be used as an asset, liability or both. (Pfeifer, Ullrich, Wimmer, (Hrsg.), 2006, Pg. 139)

Factors that can be considered when defining a new product include:

- Major changes in organizational structures, processes or IT systems
- Structure variations
- Products which require a new pricing methodology
- Booking methodologies
- Accounting and valuation procedures
- Risk measurement, analysis, management and control

All staff involved in the product and market processes of the bank should understand the product list. An unauthorized new product can often be identified at some other point in the process. Should a new product be recognized after it is in the bank's books, the risk of the product should be measured extremely conservatively, which means blocking limits until it can be thoroughly analyzed and assessed or the product reversed. (Pfeifer, Ullrich, Wimmer, (Hrsg.), 2006, Pg. 141-143)

The NPP begins with the identification of the new product or market. If a new product is not identified as a "new product", the bank may enter into risks without knowing it. This may distort the bank's reported earnings, risk figures, limit utilization and economic and regulatory capital requirements. In cases where the bank is using a number of structures and product variations, it can be extremely difficult to identify the new product.

3.1.3.2 Product Categorization

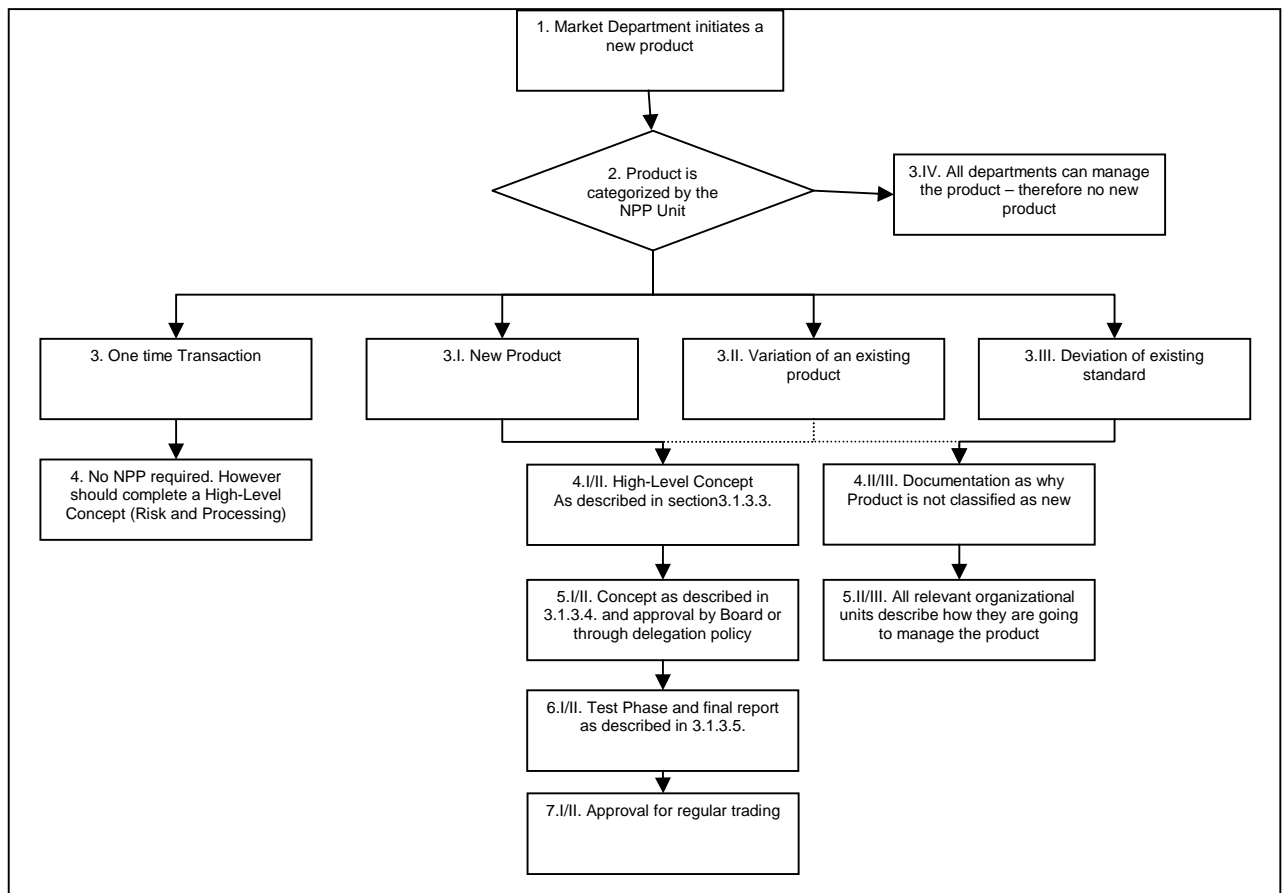
The NPP is generally initiated from the trading department or alternatively from the sales department. A product can be categorized as follows:

- New product
- Variation of an existing product
- Deviation from a market standard (maturity extension)
- One time transaction

(Pfeifer, Ullrich, Wimmer, (Hrsg.), 2006, Pg. 144)

The new product and some variations are the most intensive because they involve an extensive NPP, as shown in Exhibit 3-1. Variations of existing products and deviations from market standards require only a short NPP. (Pfeifer, Ullrich, Wimmer, (Hrsg.), 2006, Pg. 143-144) Specifically, if all relevant departments can manage the product appropriately, there is no need for an NPP. Some examples are new products that are a combination of standard products, product modifications or existing products in new related markets. In these cases only the relevant departments need to be involved and they need to ensure that they can manage the product variation or deviation. (Deutscher Sparkassen- und Giroverband, (Hrsg.), 2006, Pgs. 128)

Exhibit 3-1 shows the process diagram for the NPP beginning with product classification.

Exhibit 3-1: Process Diagram for the NPP

Source: Own Development

The classification of the product needs to incorporate a risk review since this will determine the level of intensity required for implementation. Decisions regarding product classification should be documented. (Eller, Heinrich, Perrot, Reif (Hrsg.), 2006, Pg. 142) A product variation may change the risk profile of the bank and have significant implications for risk management and control processes. In this case, it should be treated as a new product as shown in Exhibit 3-1.

3.1.3.3 The High Level Concept

The high level concept is not a MaRisk requirement. However, given that its purpose is to assess the cost and benefit as well as the timeframe required for implementation of the new product, it can be a good tool for new products. The high-level concept can be viewed as a business case for a project. It is only suited when examining products that are completely new to a bank or one-time transactions. This concept should involve NPP members in order to get a high level analysis quickly.

A high-level concept incorporates:

- A comprehensive product description and developments in the market
- Goals of the product implementation (e.g. expected profits and other benefits to the bank, potential clients). This section can also incorporate whether or not the product is aligned with the current and potential strategy of the bank
- Project time frame and planned product/market implementation
- Assessment of whether or not there are adequate staff qualifications for the NPP
- Implications of the implementation for organization (incl. IT- organization) and staff
- Risk content analysis and implications for risk management and control
- Legal aspects

Once the high-level concept is completed and agreed, the managers responsible for trade and for monitoring the activities in question need to decide whether or not to implement the new product. (Pfeifer, Ullrich, Wimmer, (Hrsg.), 2006, Pg. 146-150)

The high-level concept should not be as comprehensive as the new product concept and should only provide management with the information required to make a decision on whether or not to invest in the product implementation. The risk content analysis should enable management to decide whether to accept the risk associated with the product.

3.1.3.4 The New Product Concept

The concept must be detailed and comprehensive. In cases where the bank completes a high level concept, it can be used as a basis.

The MaRisk explicitly states that all organizational units that will be involved in the workflow for the product must be included in the writing of the concept. (BaFin, 2005, Pg. 9) In a centralized organizational structure, the central NPP unit writes the concept and obtains approval from the relevant departments. In a decentralized approach, each department describes how they intend on handling the new product in a document and sends it to the NPP unit. The NPP unit then creates a master document with each unit's part and completes a quality check.

In accordance with the MaRisk the concept must incorporate the following:

- A thorough risk analysis of the product and the impact on risk management and risk control
- Significant consequences of the implementation for organization, staff, accounting and tax
- Required IT changes
- Legal considerations

(BaFin, 2005, Pg. 9)

By completing and approving the concept before the commencement of any transaction, the bank should be able to manage the deals and associated risks that

they enter into. Once the management has approved the concept, the test phase is started.

3.1.3.5 The Test Phase and Final Report

Based on MaRisk AT 8, the test phase is mandatory for trading products but generally not for credit products. With respect to complex credit transactions, the MaRisk states that a test phase can be used as a basis for the concept. (BaFin, 2005, Appendix 1, Pg. 16)

The purpose of the test phase is to ensure that the bank can handle the product. Since only a limited number of transactions can be completed, the risk is considered manageable. There is no regulated or recommended time for the test phase. It depends on the complexity of the product, the number of deals that can be completed and the bank's ability to handle the deals.

After the test phase is completed, a report should be written covering the following aspects:

- Relevant new issues and problems
- Problems that have not been resolved during the test phase
- Requirements concerning staff qualifications
- Gaps in IT
- Accounting and tax issues

(Pfeifer, Ullrich, Wimmer, (Hrsg.), 2006, Pg. 153)

The concept has to be approved before the test phase commences and therefore only problem areas need to be incorporated into the final report. During the test phase, documents such as internal procedures, processes, functional job descriptions including responsibilities should be completed. (Pfeifer, Ullrich, Wimmer, (Hrsg.), 2006, Pg. 153)

The MaRisk emphasizes that for trading products regular trading may only commence after the test phase has been successfully completed and appropriate risk management and controlling processes are in place. Hence, the Board must then decide, based on the report, whether or not to end the test phase. The basic requirement for completing the test phase and approving the commencement of regular trade should be that all relevant organizational units can handle the new product without any restrictions. (Pfeifer, Ullrich, Wimmer, (Hrsg.), 2006, Pg. 154) The Board may choose to delegate the decision to the management of trade and to the management of relevant organizational units based on a guideline or a policy. (Füser, Weber, 2005 Pg. 176)

3.2 The New Product Process and Risk Assessment

One of the essential requirements of the NPP is the risk content analysis of the new product and the implications for the management of these risks. (Füser, Weber, 2005 Pg. 36) In order to understand what "risk analysis of the product" encompasses, it is

important that the main sources of risk are understood and how these fit into the risk management and control functions of a bank. This is a two step process:

- Analysis of the risk content of the new product
- Implications for risk management and risk control

3.2.1 Sources of Risk

The MaRisk defines specific requirements pertaining to risk management and control for each of the main risk types:

- Counterparty risks (incl. country risks)
- Market price risk
- Liquidity risks
- Operational risk

(Hartmann-Wendels, Pfingsten, Weber, 2006, Pg. 384-385)

The MaRisk also incorporates portfolio aspects. (Eller, Heinrich, Perrot, Reif (Hrsg.), 2006, Pg. 240-241)

A new product can be stripped into its basic components in order to complete a risk analysis. Legal risk, while it is a part of operational risk, can be analyzed separately. (Pfeifer, Ullrich, Wimmer, (Hrsg.), 2006, Pg. 160-161) It should be noted that especially new products result in extreme risks. Hence, the opportunities and the risks need to be considered before the product is implemented. (Eller, Heinrich, Perrot, Reif (Hrsg.), 2006, Pg. 139-141)

It is important to note that regulators and the literature on the NPP focus on the main sources of risk. However, the implementation of a new product may expose the bank to new risks or risk components that require a definition and a new risk process. As well, for new products such as credit derivatives, portfolio risks (e.g. correlation risk and concentration risk) may play an important role. While the MaRisk does not explicitly incorporate correlation and concentration risk as a main source of risk, it is a component of the risk management and the risk control process and is discussed in this section.

3.2.1.1 Counterparty Risk

Counterparty risk is the risk of a loss of an unrealised profit or a loss resulting from a counterparty default. (Krumnow, Sprissler, Bellavite-Hoevermann et al, 2004, Pg. 1751)

Counterparty risk is the main risk within banking and has several dimensions:

- Credit risk (issuer risk)
- Pre-settlement risk
- Settlement risk
- Country risk
- Investment risk

Credit risk is twofold. It incorporates the risk of a default and the risk of a deterioration of the credit standing of the counterparty or issuer. Default risk is the loss that will be incurred if a counterparty does not fulfil its obligations to service debt as defined in the loan agreement. Default events include delay in payment obligations, restructuring of debt obligations due to a major deterioration of the credit standing of the borrower and bankruptcies. Simple delinquencies and payment delays due to administrative errors do not result in a default. (Bessis, 2002, Pg. 13)

Credit spread risk is the risk of a material loss due to the deterioration in the credit standing of the counterparty or issuer. Deterioration in credit standing of a counterparty or an issuer results in an increase in the probability of default. Investors then require a higher yield to compensate for the increase in risk. This in turn leads to a decrease in the market value and hence a material loss. Therefore, while the deterioration in a credit standing does not necessarily trigger a default, it results in a material loss. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 771)

The risk associated with a specific issue depends on the nature of the issue and the credit enhancements (e.g. collateral, guarantees) specific to that issue. The risk of an issue may differ from the credit risk or issuer risk relating to the counterparty. (Bessis, 2002, Pg. 13)

Basel II defines pre-settlement risk as “the risk that the counterparty to a transaction could default before final settlement of the transaction’s cash flows. An economic loss would occur if the transaction or portfolio of transactions with the counterparty has a positive economic value at the time of default”. (Basel Committee on Banking Supervision, 2006, Pg. 19) It differentiates between a bank’s credit exposure and counterparty credit risk. Credit risk is unilateral and only the lending bank faces a loss. Pre-settlement risk creates a bilateral exposure and the bank only faces a loss if the market value of the transaction is positive at the time of default. (Basel Committee on Banking Supervision, 2006, Pg. 19)

Settlement risk refers to the risk that funds or a financial instrument will not be delivered to the bank as expected. (Schwartz, Smith, 1997, Pg. 318)

Country risk is similar to credit risk except that it involves a country. Country risk incorporates credit risk, settlement risk and pre-settlement risk that is not caused by the actual counterparty but rather by the country in which the counterparty is located. (Caouette, Altman, Narayanan, 1998, Pg. 338) Sovereign risk is the risk that a sovereign issuer or counterparty (e.g. central bank or government sponsored banks) defaults. This often incorporates the restructuring of debt within a country. Country risk also includes the risk of political and financial instability, which may be reflected by a decrease in the value of home currency. This may lead to a deterioration of the credit standing of local borrowers. Transfer risk refers to the impossibility of transferring funds out of a country due to the local legal restrictions or the inability to convert the local currency. The country risk is often a cap for the local counterparty’s rating. They serve as benchmarks for local clients and banks. (Bessis, 2002, Pg. 16-17)

Investment risk is the risk of a loss on funds that a bank provides to a third party as equity. (Krumnow, Sprissler et al, 2004, Pg. 1751)

The first step in the risk process is risk identification. Hence, the risk content of a new product must be analyzed with respect to the different dimensions of counterparty risk in order to ensure that there is a sound understanding of the risk that the bank will have due to the product. As well, the impact that the product will have on the credit portfolio needs to be analyzed. Country risk is fundamentally important when entering new markets or deciding on which markets to trade or sell a new product.

3.2.1.2 Operational Risk

Operational risk is defined as the “risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events”. (Basel Committee on Banking Supervision, 2006, Pg. 144) This does not encompass strategic risk, but it does include legal risk.

People risk is defined as risk associated with human error, lack of knowledge and expertise, breach of policies and procedures and fraud. Process risk encompasses processes and organizational deficiencies. Inadequacies of risk measurement tools or model errors are considered technical risk. (Bessis, 2002, Pg. 21)

Model risk is a key component of operational risk and is becoming more significant with the increase in complexity of products and markets. It incorporates the specification of the model and also the data requirements such as data inputs. This is pertinent when considering the scarcity of data for credit risk and operational risk calculations. For operational risk many banks use external data to compensate for a lack of internal data in order to calculate an operational risk Value at Risk (VaR). Integrating external data is a key source of error that can lead to miscalculations of a model. (Bessis, 2002, Pg. 21-22)

Legal risk is the risk of not conforming with the legal framework (laws, guidelines etc.) and all legal interpretations that are related to this. As well, it incorporates all contracts and documentation and their legal enforceability in relevant jurisdictions. (Pfeifer, Ullrich, Wimmer, (Hrsg.), 2006, Pg. 160-161)

Many of the requirements of the MaRisk (e.g. organizational requirements, qualification of staff, NPP) are also mitigations of operational risk. (Deutscher Sparkassen- und Giroverband, (Hrsg.), 2006, Pgs. 183)

With respect to the implementation of a new product, the analysis of operational risk involves almost the complete NPP. In order to identify the main issues the relevant units will need to review their internal deficiencies and the potential operational risk associated with these.

3.2.1.3 Market Risk

Market risk is the exposure of a transaction to a change in the value of a market parameter such as interest rate, foreign exchange rate, equity or commodity prices. (Gregory, 2003, Pg. 474) Market risk encompasses price changes in shares, bonds and currencies due to market movements and changes in the term structure of the

interest rates or volatility. (Deutscher Sparkassen- und Giroverband, (Hrsg.), 2006, Pgs. 161)

There is an overlap between market risk and credit risk. Credit spread risk is a risk that can be considered a market risk or a credit risk. In market risk terminology market price risks that are a result of changes in the credit standing of the counterparty are known as specific risk. (BaFin, 2005, Appendix 1, Pg. 40) Specific risk can be further delineated in event risk and residual risk. Event risk is the risk that an event, specific to the issuer, causes a change in market risk. These events may include expected or actual changes in shareholders, rating changes, profit warnings or bankruptcy of the issuer. Residual risk is the degree with which the paper normally deviates from the market. (Deutscher Sparkassen- und Giroverband, (Hrsg.), 2006, Pgs. 163)

Interest rate risk is the risk of a decline in earnings due to the movements of interest rate. (Bessis, 2002, Pg. 16) Repricing risk, changes in slopes and shifts of the yield curve, imperfect correlations between interest rates on the asset and liability side of the balance sheet and implicit options are the main sources of interest rate risk. (Basel Committee on Banking Supervision, 2004, Pg. 9-10)

As with credit risk, the new product needs to be analyzed with respect to each of the dimensions of market risk.

3.2.1.4 Liquidity Risk

Liquidity risk encompasses funding risk, market liquidity risk and asset liquidity risk.

Funding risk is the risk that a bank faces with respect to raising funds to meet its cash flow requirements. This depends on how the market views the bank, its funding policy and credit standing. If the perception of the bank is poor (incl. negative credit standing), then the cost of funding will increase. This will not only influence the bank's ability to raise funds, but also have an impact on profitability. As well, extreme lack of liquidity can lead to bankruptcy, should the bank not be able to meet its short-term requirements. (Bessis, 2002, Pg. 16) Market liquidity is the risk resulting from trades made in illiquid markets. These markets are characterized by price volatility, large bid-offer spreads and little transparency. (Gregory, 2003, Pg. 474) Asset liquidity is the risk that there is no market in which to sell an asset.

When implementing a product it must be ensured that the bank's cash flow calculations and projections (incoming and outgoing cash flows) incorporate the cash flows generated by it. Market and asset liquidity is an important consideration with respect to pricing and valuation.

3.2.2 Portfolio Credit Risk

This risk focuses on the risk profile of a portfolio as opposed to an individual transaction. Key portfolio risks are correlation risk and concentration risk. Correlation measures the degree with which random variables change together or not. A

negative correlation means that they change together in the opposite direction and a positive correlation means that they change in the same direction. The correlation coefficient defines the extent to which the parameters change by the same amount. (Bessis, 2002, Pg. 343)

Concentration risk is the risk that a bank's earnings or capital are exposed to a specific counterparty, industry or geographical area. The Basel Committee defines risk concentration as "any single exposure with the potential to produce losses large enough to threaten a bank's health or ability to maintain its core operations". (Basel Committee on Banking Supervision, 2006, Pg. 214) It divides concentration of credit into those that are conventional and those based on common or correlated risk factors. Conventional concentrations incorporate exposures to single counterparties, a group of borrowers or an industry. Concentrations based on common or correlated risk factors incorporate cases where a downgrade or default of a counterparty triggers the default of another counterparty. (Basel Committee on Banking Supervision, 2006, Pg. 214)

3.2.3 Risk Management and Risk Control

The MaRisk requires that risk management and control processes guarantee that all the major risks are identified, evaluated and assessed, managed, controlled and communicated. These processes should be integrated in a risk-return concept on a bank-wide level.

The MaRisk AT 8, only states that the main consequences for the management of risk need to be incorporated in the concept. This leaves room for interpretation with respect to the depth of the analysis. However, the MaRisk AT 3 and the literature make it very clear that the management must understand the risk profile and the impact of the risk profile on the risk elements of the bank. Therefore, it is in their best interest to ensure that this section is handled in accordance with the complexity of the product. As well, given that risk evaluation and assessment are used as a basis for calculating reserves, capital, return on equity and risk-return, it is also in the business interest to ensure that the new product is adequately incorporated into the risk management and risk control of the bank.

3.2.3.1 Risk Identification

The processes have to ensure that all of the key risks within a bank are identified at an early stage and captured and reported in an appropriate fashion. Interactions between the different risk types are to be taken into consideration. (Füser, Weber, 2005 Pg. 24) Based on the MaRisk, management must understand the risk profile of the bank. A risk tableau can be developed showing all the main risks and whether risk evaluation is completed on a quantitative basis or a qualitative basis. (Eller, Heinrich, Perrot, Reif, (Hrsg.), 2006, Pg. 80-81)

3.2.3.2 Risk Evaluation and Assessment

Risk evaluation and assessment incorporate measuring risk on a transaction and on a portfolio level. A key goal of risk evaluation and measurement is the quantification of risk in order to establish the required level of capital. Both regulators (regulatory capital) and banks (economic capital) have a vested interest in this. Methodologies have been developed for the quantification of market risk and to a somewhat lesser degree for credit risk. Analogous to market risk, credit risk can be quantified using the VaR methodology. The VaR for credit risk can be defined as “the adverse deviation of value, due to credit risk losses or migrations, at a preset confidence interval”. (Bessis, 2002, Pg. 87) The VaR methodology calculates the potential loss, which incorporates expected loss, unexpected loss and exceptional loss. The expected loss serves as a basis for provisioning. Since expected loss is the value that the bank expects to lose, it makes economical sense that it is deducted from the revenue. The unexpected loss, which is the VaR, is defined as the potential loss that exceeds the expected loss and is exceeded only by the exceptional loss. The unexpected loss is defined by a preset confidence interval, which is based on the risk appetite of the bank. The unexpected loss serves as the basis for calculating the economic capital required for credit or market risk. The exceptional loss is the loss beyond the unexpected loss and is not included in the calculation of the unexpected losses. Stress scenarios need to be used to assess the impact of exceptional losses. (Bessis, 2002, Pg. 87-91)

Credit portfolio models enable banks to assess credit risks on a portfolio level and incorporate the impact of correlations between individual counterparties. (Pfeifer, Ullrich, Wimmer, (Hrsg.), 2006, Pg. 312-313) A main prerequisite for a bank to use credit derivatives as a credit risk mitigation tool is the use of a credit portfolio model. A key challenge that banks are faced with is the incorporation of credit derivatives into the current models. Two main contributors to a potential solution are J.P. Morgan (CreditMetrics) and Credit Suisse First Boston (CreditRisk⁺). (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg.463-464)

Once the portfolio income and risk are available the risk-return can be calculated. This enables a portfolio manager to structure the portfolio by either maximizing profit for a given level of risk or minimizing risk for a predefined return. This allows a bank to assess the impact of risk mitigation (e.g. securitization or credit derivatives) on the portfolio’s risk-return profile. (Bessis, 2006, 430)

Since standard methodologies have not been developed for liquidity or operational risk, these risks are generally assessed qualitatively. In this case, it is essential to establish a process for handling these risks. (Eller, Heinrich, Perrot, Reif, (Hrsg.), 2006, Pg. 81)

3.2.3.3 Risk Management

Risk management incorporates avoiding, mitigating, transferring and diversifying risk. The MaRisk requires that measures are to be taken to limit the risks from the main business areas. Transactions should not be entered into without an approved limit or

deal approval. Limits should also be set to manage concentration risk. (Eller, Heinrich, Perrot, Reif, (Hrsg.), 2006, Pg. 82) Limits are based on the bank's risk capital and risk appetite. (Pfeifer, Ullrich, Wimmer, (Hrsg.), 2006, Pg. 312-313) Through the use of netting and collateral, banks can mitigate risk exposure and hence reduce limit utilization. Risk transfer instruments, such as credit derivatives, also enable a bank to reduce exposure by transferring or hedging the risk. Concentration risk is two dimensional in that it incorporates a concentration on a risk type (e.g. interest rate risk) or a concentration to an industry, region or counterparty. Therefore diversification can mean reducing exposure to a risk type or an industry, region or counterparty.

3.2.3.4 Risk Control and Communication

Risk control and communication encompasses monitoring the individual transaction risks and the portfolio risks and the adherence to the risk strategy. A central aspect is the reporting of the risk situation and the results of scenario analysis to the management. The report should incorporate a description and an analysis of the risk situation of the bank and recommendations for issues relating to risk. (Eller, Heinrich, Perrot, Reif, (Hrsg.), 2006, Pg. 83) These processes have to be amended to reflect new products in accordance with the NPP.

4. Theoretical Framework: Credit Default Swap

Section 4 provides the theoretical foundation for the product, single name CDS. The chapter begins with a product description and a comparison to other credit transfer products. Section 4.2 focuses on the terminology that is required to understand the risks of the product. The final part covers the sections of the MaRisk that need to be adhered to and therefore understood when integrating the product into the bank.

The goal of this chapter is to provide the reader with a solid foundation in credit derivatives, which is required to understand the remaining part of the thesis.

4.1 Introduction

Credit derivatives transfer all or part of the credit risk of a single name or a portfolio of names from a protection buyer to a protection seller. The protection seller receives a fee income upfront or on an annual basis. Credit derivatives offer the protection buyer an opportunity to hedge credit exposure. The protection seller is able to invest in credit risk without having to fund the transaction. Credit derivatives differ from other derivatives in that their payment is dependent on a credit risk.

As with other capital market products, credit derivatives can also be used for trading purposes.

4.1.1 The Single Name Credit Default Swap

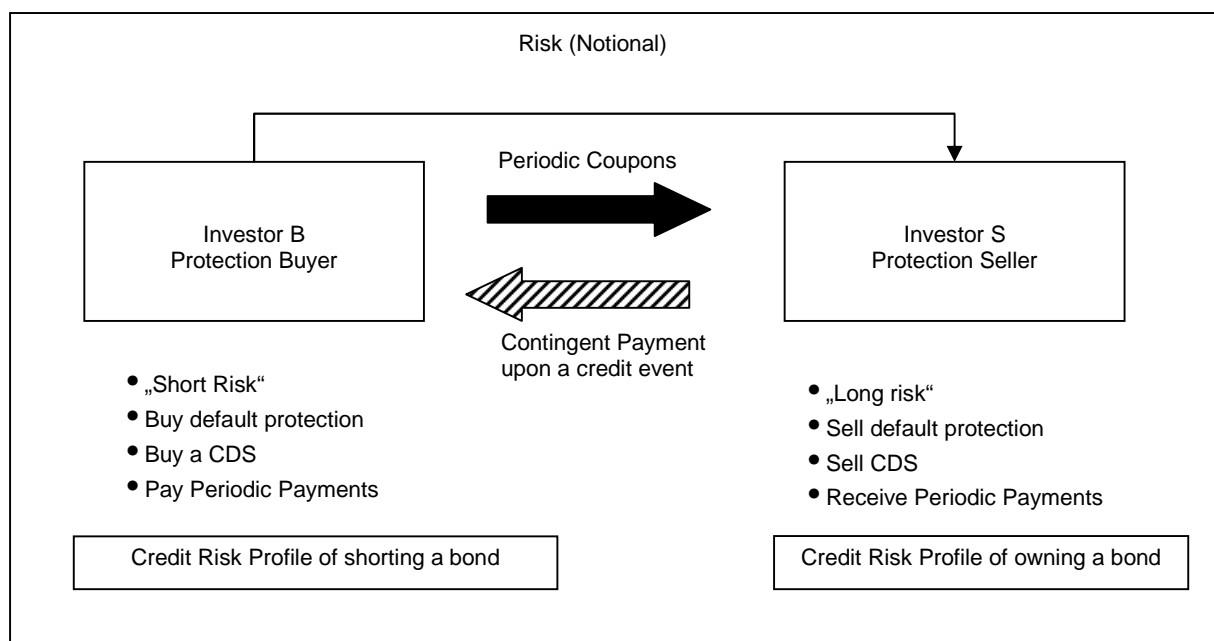
“A credit default swap is a bilateral financial contract in which the risk shedder pays a fixed periodic fee in return for a contingent payment by the risk taker triggered by a credit event on a reference asset.” (CGFS, 2003, Pg. 31) The risk shedder can also be called a protection buyer.

“A credit default swap or option is simply an exchange of a fee in exchange for a payment if a credit default event occurs.” (Tavakoli, 1998, Pg. 61)

“A (single name) credit default swap (CDS) is a bilateral off-balance sheet agreement between two counterparties, in which one party (“the writer”) offers the other party (“the buyer”) protection against a credit event by a third party (“the reference name”) for a specified period of time, in return for premium payment.” (Chaplin, 2005, Pg. 56)

“A credit default swap is an agreement in which one party buys protection against losses occurring due to a credit event of a reference entity up to the maturity date of the swap. The protection buyer pays a periodic fee for this protection up to maturity date, unless a credit event triggers the contingent payment. If such a trigger happens, the buyer of protection only needs to pay the accrued fee up to the day of the credit event (standard credit default swap), and deliver an obligation of the reference credit in exchange for the protection payout.” (JPMorgan, 2006, Pg. 8) Exhibit 4-1 shows the payment flows of a single name CDS. Going “short risk” means that the protection buyer does not actually own the bond or loan that is being transferred to the protection seller. In this case the CDS is being used for trading purposes as opposed to hedge an existing risk.

Exhibit 4-1: Payment Flows of a CDS



Source: JPMorgan, 2006, Pg. 8

The protection buyer pays an annual fee, which is usually calculated as Basis Points (bp) of the nominal amount of the transaction, to the protection seller. If a credit event occurs before the contract matures, the protection seller has to make a settlement payment to the protection buyer. The credit event and the payment in case of a credit event are negotiable. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 56) A CDS allows the protection buyer to isolate and transfer the credit risk of an underlying reference entity. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 118)

The CDS enables the protection seller to take on risk of a reference asset without actually funding the purchase of the asset. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 56) In the case of a bond, the purchaser is exposed directly and immediately to funding risk; however, in the case of a single name CDS, the protection seller is only exposed to funding risk if a credit event is triggered. Reference assets can be loans, bonds, sovereign risk or credit exposure due to derivative contracts. (Tavakoli, 1998, Pg. 62)

4.1.2 Basket Credit Default Swaps

A basket CDS is an unfunded synthetic securitization. It is similar to a single name CDS in that a credit event initiates the payout. In this case, the credit event is based on the default of some combination of credits in a specified basket of credits. (CGFS, 2003, Pg. 32) By definition the CDS does not provide protection against the default of a single asset but rather protection of a portfolio or part of a portfolio. Hence, the basket CDS is riskier for the protection seller than the single name CDS. In particular the credit risk analytics for the portfolio are more complex than with a single name CDS.

The payment of a basket CDS can be based on a proportion of all the reference assets in the basket (green-bottle-structure) or on a first-to-default-structure. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 74)

In the case of a first-to-default basket, the first default event of any one asset in the basket constitutes a credit event as long as it is a part of the basket. The probability that a credit event will occur is higher for a basket CDS than for a single name CDS. (Bessis, 2002, Pg. 729-730)

A green-bottle-basket CDS provides a hedge for all assets in the basket on a proportional basis. Therefore, each default of an asset in the basket results in a payment. However, the amount paid is a pre-agreed proportional amount of the loss.

4.1.3 Single Name CDSs and Classical CRT Products

Of the classical CRT products, guarantees and credit insurances have the most similar cash flow structure to a single name CDS. Credit insurance is generally provided by specialized companies and used to support trade credit. As with single name CDSs, guaranties and insurances are unfunded single name CRT instruments

that transfer credit risk from the protection buyer to the protection seller. As opposed to classical CRT instruments, the CDS has been designed as a “standardized instrument in order to encourage trading and price discovery”. (CGFS, 2003, Pg. 13) The main differences between the CDS and these products are:

- The range of credit events that trigger payment
- The settlement process
- The documentation

(CGFS, 2003, Pg. 31-32)

A further key difference is that for a CDS, there is a range of deliverable debt should a credit event be triggered. (Chaplin, 2005, Pg. 47) As well, the credit events that can trigger payments are much broader for a CDS than for classical CRT products. These include bankruptcy, obligation default, failure to pay and restructuring. In a credit insurance policy, a payment is triggered by loss events that are defined in the policy. The failure to pay by the borrower triggers a credit event for a guarantee. (CGFS, 2003, Pg. 35-37)

The protection buyer of a CDS does not have to prove that a loss has been suffered in order to obtain a settlement. The protection buyer and seller may agree on cash or physical settlement. If cash settlement has been agreed then once a credit event has been triggered, the market price of the reference asset must be established. A cash payment made from the protection seller to the protection buyer is the difference between the market price and the face value of the debt. In the case of physical delivery the reference asset is delivered to the protection seller in exchange for the face value of the paper in cash. (CGFS, 2003, Pg. 35-37) In the case of credit insurance, the insurer pays out the insured losses less any agreed deductible amount. The losses are usually claimed by the insurance buyer and examined by the insurer before the payment is made. With a guarantee the guarantor pays the lender the value of the loan for which the guarantee was taken and takes the claim. (CGFS, 2003, Pg. 35-37)

The legal form of CRT for a single name CDS is contractual. It is based on standardized ISDA Master Agreements, ISDA Credit Definitions and a confirmation framework. There is no internationally agreed documentation or confirmation framework for guarantees. The guarantee is contractually agreed between the two parties. Credit insurance is based on an insurance contract. (CGFS, 2003, Pg. 31)

In Germany credit insurances are not adequate alternatives for a single name CDS. There are two groups of insurances; one provides insurance against export credits (Spezialinstitute Euler Hermes S.A., PwC Deutsche Revision AG Wirtschaftsprüfungsgesellschaft) and the other provides government subsidized insurances against the credit losses resulting from defaults of small companies (Verband der Bürgschaftsbanken). In these cases, the banks would not have economically entered into the underlying position without the insurances and therefore are not actually hedging a risk position. While the products separate and transfer credit risk, they cannot seriously be considered a credit risk management instrument. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 107-108)

Alternatively, single loans can also be sold on a secondary loans market. However, this may require the consent of the borrower. (CGFS, 2003, Pg. 32) The credit risk is bundled and all the risks pertaining to the loan are sold on a market. A further alternative is loan participation in which case the protection buyer passes all cash flows relating to the loan to the protection seller in exchange for an upfront payment. The loan is assigned and therefore does not require the consent of the lender. (CGFS, 2003, Pg. 37)

A further factor for comparison is that as opposed to classical CRT products, a single name CDS can be used to “short risk” by buying protection for a position that the bank does not have. (JPMorgan, 2006, Pg. 8) Finally, a single name CDS can be used as a building block for a more complex structure. Classical CRT instruments are pure hedge instruments. The differences between the classical CRT products and the single name CDS lead to significant differences in the risks inherent in the products.

4.1.4 Credit Default Swaps and Total Return Swaps

A CDS transfers solely the credit risk based on defined credit events from a protection buyer to a protection seller. It has an “optional” character in that a credit event may or may not occur.

A single name Total Return Swap (TRS) enables an investor to access all the cash flows of the reference asset without having to purchase the underlying. The reference asset can be a bond, loan, index, equity or commodity. The protection seller gains full exposure to the underlying reference asset, which incorporates interest, fees and market movement. In return the protection buyer pays LIBOR or EURIBOR plus a spread. Payments to the protection buyer are based on market movements of the underlying instrument and not on a credit event. However, the protection seller bears the risk of default since the investor covers market and credit risk. (Tavakoli, 1998, Pg. 20-21) Market movements are determined by prices from various reference dealers. Payments due to market changes can be made periodically or at transaction maturity. At termination or default, either cash or physical settlement can be agreed. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 61-63)

Both the CDS and TRS are unfunded transactions in that the protection seller does not need to invest in the underlying reference asset in order to gain exposure to the risk of the asset. One of the key differences between the CDS and the TRS is that with a CDS only the credit risk is transferred, whereas with the TRS the credit and any market risk (e.g. interest rate, FX) associated with the underlying is transferred. Since all of the risks are automatically transferred with a TRS, there are no defined “trigger” events and no requirement to define settlement following “trigger events”. (CGFS, 2003, Pg. 37)

In both a CDS and a TRS, the protection buyer is able to go short which means that risk of the underlying can be sold without the protection buyer actually being exposed to the risk.

In both cases the legal form of CRT is contractual based on ISDA Master Agreements. (CGFS, 2003, Pg. 35) This aligns these products with other derivatives such as interest rate swaps and options.

4.2 Key Terminology

In order to obtain a solid foundation in single name CDSs, the reader must understand the key terminology, which incorporates the International Swaps and Derivatives Association (ISDA) documentation, asymmetric information, moral hazard (principal/agent problems) and recovery versus ultimate recovery.

4.2.1 ISDA Documentation

A CDS is an Over-the-Counter (OTC) instrument as opposed to an exchange traded product and is therefore subject to its own documentation. ISDA provides a standardized documentation set for OTC derivatives. It incorporates the ISDA Master Agreement, ISDA Credit Support Annex and the ISDA Credit Derivatives Definitions. The goal of the ISDA documentation is to support the functioning and standardization of the market. In the CDS market, documentation work began with the development of a long-form confirmation for CDS in 1998. In 1999, the ISDA Credit Derivatives Definitions were published as a component of the ISDA Master Agreement. In 2003, a new set of ISDA Credit Derivatives Definitions based on lessons learned were published. The contracts can be written in accordance with English or New York law. (Chaplin, 2005, Pg. 57-58)

A CDS is generally closed with a letter of confirmation that references the agreed 2003 ISDA Credit Derivatives Definitions and an umbrella ISDA Master Agreement. In order to mitigate pre settlement exposure, collateralization may be used. In this case, the ISDA Credit Support Annex will also be referenced in the confirmation.

The ISDA Master Agreement is a contract between two counterparties that specifies all definitions, non-trade detail elements and laws governing specified products between the parties. It enables the parties to execute one agreement and to transact multiple transactions through a confirmation as opposed to completing documentation for each transaction. (Schwarz, Smith, 1997, Pg. 637-638)

The ISDA Credit Support Annex provides a standardized documentation for collateral. The ISDA supports the documentation with legal opinions done by lawyers in various jurisdictions in order to provide legal certainty with the enforceability of the contracts. (Gregory, 2003, Pg. 423-424)

The ISDA Credit Derivatives Definitions describe the credits that can trigger a CDS, obligations covered under the contract, the notional amount of the contract, credit events and settlement procedures. (JPMorgan, 2006, Pg. 24)

ISDA also provides legal opinions from local lawyers that supply an analysis with respect to the enforceability of the documentation in the various jurisdictions.

ISDA Credit Derivatives Definitions (incl. other documentation) have been successfully tested through Worldcom, Parmalat, Delphi Corp, Calpine Corp, Northwest and Delta Airlines. Through these companies' filing for bankruptcy thousands of CDS contracts with over USD 50 billion notional amount have been successfully settled after a default. (JPMorgan, 2006, Pg. 24)

Due to their standardization and legal and market recognition, ISDA documentation serves as a basis for analyzing legal risk.

4.2.1.1 Credit Events

Credit events are the key component of a CDS because they determine under what conditions the protection buyer can exercise the right of settlement. The CDS documentation stipulates what constitutes a credit event. The ISDA documentation incorporates the following credit events with respect to the reference entity:

- Bankruptcy which involves insolvency and the appointment of administrators or liquidators and creditor arrangements
- Failure to pay one or more obligations within a certain defined grace period and generally subject to a predefined materiality threshold
- Obligation acceleration of one or more obligations due to the occurrence of default or other condition or described event
- Obligation default
- Repudiation/Moratorium
- Restructuring of debt due to deterioration of creditworthiness or financial condition of the reference entity

(JPMorgan, 2006, Pg. 9-10)

Due to the wide interpretation of bankruptcy, this is generally specified to fit the relevant jurisdiction. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 220) The selection of credit events is subject to negotiation between the protection buyer and the protection seller. Although the credit event is often referred to as a "default" event, it is per definition much wider than a bond default event. Market participants differentiate between hard credit events such as bankruptcy, failure to pay and obligation default and soft credit events such as restructuring. (Gregory, 2003, Pg. 49)

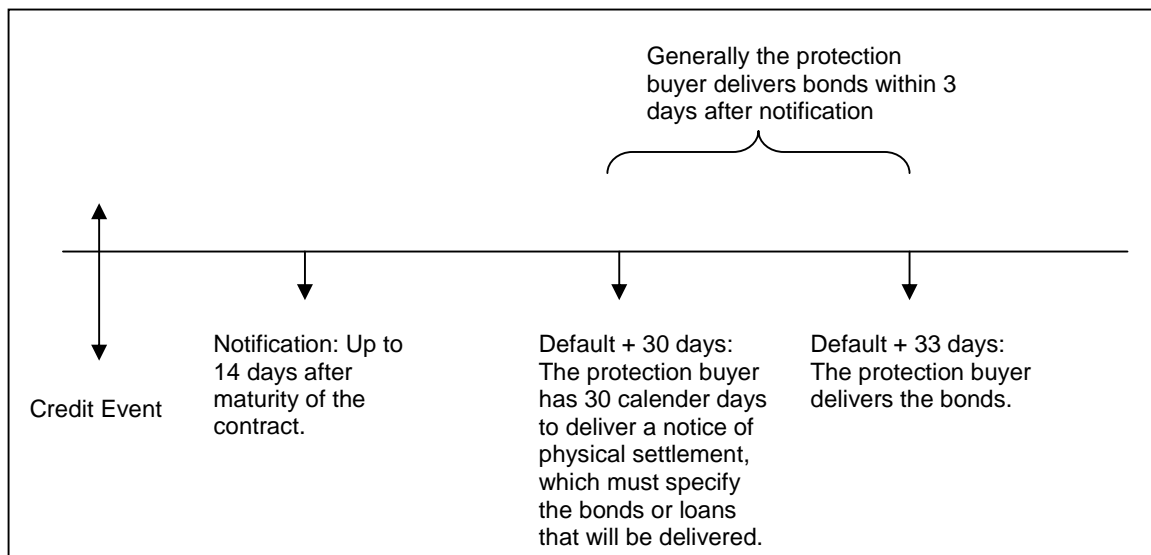
4.2.1.2 Settlement

The credit event is triggered by the protection buyer or the protection seller. The protection buyer must inform the protection seller of the event within the agreed time and via the agreed form. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 225) The protection buyer must pay the accrued CDS spread from the last coupon date until the credit default date to the protection seller. After this date the spread payment stops.

In the case of a credit event, cash or physical settlement may be agreed. In the case of cash settlement, the protection seller must pay the protection buyer par minus market value of the defaulted debt of the reference name less any accrued premium. The market value is determined by a dealer poll that provides independent valuations of the defaulted debt. The average price is paid. The process is defined in the ISDA documentation. (Chaplin, 2005, Pg. 59)

Alternatively, physical settlement may be agreed. The protection buyer can deliver any bond issued by the reference entity provided that it meets certain criteria and is pari passu to the bond referenced in the contract. The protection buyer has a “cheapest to deliver” option which means that he may deliver the lowest priced bond for settlement and receives par. The recovery rate of the bond delivered under the CDS may differ from the actual recovery rate of the later defaulted bond. (JPMorgan, 2006, Pg. 10-11) The three step physical settlement procedure is shown in Exhibit 4-2.

Exhibit 4-2: Settlement Timeline for Physical Delivery



Source: Based on JPMorgan, 2006, Pg. 11

As shown in Exhibit 4-2, the notice of physical settlement may be delivered up to 14 days after the maturity of the CDS contract. Therefore, the settlement may occur well after the actual occurrence of the credit event. (JPMorgan, 2006, Pg. 11)

4.2.1.3 Restructuring

Restructuring refers to the case where the borrower changes the terms of the contract with the permission of the lender. Generally, it occurs when the credit standing of the lender has dropped and the borrower may be at risk with respect to the loan. (Chaplin, 2005, Pg. 61-62) It is important to note that restructuring only

constitutes a credit event if it is directly or indirectly related to a credit deterioration. (Morgan Stanley, (Hrsg.), 2006, Pg. 20)

The reason that restructuring is included as a credit event is to provide protection against the economic loss of a bond of a reference entity after the loan has significantly deteriorated. (Chaplin, 2005, Pg.61) There are four choices with respect to the restructuring clause:

1. No Restructuring (No R)
2. Modified Restructuring (Mod R)
3. Modified Modified Restructuring (Mod Mod R)
4. Old Restructuring (Old R)

Hard credit events generally cause all debt to trade at the same price. However, soft credit events, such as restructuring, are different and deliverable obligations trade with a term structure. (Gregory, 2003, Pg. 48) Under physical settlement the protection buyer can deliver any one of a potentially large number of assets upon occurrence of a credit event. Ceteris Paribus in the case of a default all pari passu assets should trade at their recovery values. A "soft" credit event, such as restructuring, however, allows assets to continue trading with price differentials. (Gregory, 2003, Pg. 38-40) In the case of restructuring, the market expects short-term bonds to be paid back and considers long-term bonds riskier since the same financial situation that led to the restructuring may reoccur. Hence, the market demands a higher yield for long-term bonds which makes them cheaper. Under Old R, once restructuring triggered the credit event, the protection buyer could deliver long-term bonds or cheapest to deliver bonds to the protection seller in return for cash. Since long-term bonds are worth less than short-term bonds, the seller faces an economic loss. The Conesco debt restructuring case in 2000 is a very good example of the disadvantages of Old R. Conesco's debt restructuring was considered credit neutral, but led to a credit event as defined by ISDA documentation. The market did not react to the "credit event" since it was not considered a serious issue by rating agencies. Therefore, there was no major price deterioration. However, protection buyers triggered the credit event and delivered low priced long-term bonds to the protection sellers rather than the restructured loans. In 2001, ISDA incorporated the Mod R option in its documentation in order to enable the protection seller to limit the risk exposure of a restructuring credit event. (Gregory, 2003, Pg. 424 - 425)

Under the No R trigger, restructuring is not a credit event. Therefore, there is no protection in the case of the loss of economic value of the debt following a restructuring. This is advantageous to protection seller.

Mod R is the market standard in the US. It means that if restructuring has been agreed and the CDS contract specifies physical delivery, there are maturity restrictions on the contract that may be delivered in case of a credit event. The bond that is delivered under this clause may not have a scheduled maturity date of more than 30 months from the CDS maturity date, but it may have a scheduled maturity date of equal to or less than the maturity of the CDS contract. (Gregory, 2003, Pg. 52)

Mod Mod R is the European market standard due to the regulatory requirements of using CDSs to mitigate risk. It differs from Mod R in that the remaining maturity of a

deliverable bond must be 30 months and in the case of restructuring it may be 60 months after the restructuring date. The deliverable obligation must also be “conditionally transferable” which means that consent may not be unreasonably withheld. (Chaplin, 2005, Pg. 62)

Old R has no modifications to the bond delivery in the case of restructuring and therefore enables the protection buyer to exercise the “cheapest to deliver” option without restrictions. (Gregory, 2003, Pg. 425)

The impact of the different restructuring clauses on the value of the CDS depends on the likelihood of a restructuring event and the post restructuring cheapest to deliver. Old R bears the most risk for the protection seller and hence ceteris paribus should have the most impact on the theoretical market value of the CDS.

Mod R and Mod Mod R add protective clauses to the protection seller by specifying maturity limitation dates for deliverable obligations in the case of a restructuring.

4.2.2 Asymmetric Information

Asymmetric information means that the protection buyer is better informed about the creditworthiness of the reference entity than the protection seller. This may be exploited at the time of the risk transfer. (CGFS, 2003, Pg. 17)

To what extent information asymmetry exists is dependent upon the underlying credit of the CDS. For example if the reference entity is a rated corporate for which reliable public information is available, the protection seller can obtain information on the market. Therefore, there is little risk of information asymmetry. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 315-317)

The situation is different for a less known company (e.g. German Mittelstand) that does not publish information very often. In this case the protection seller may have difficulty obtaining information on the reference entity and may have to rely on the protection buyer. As well, the CRT may have to remain confidential. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 315-317)

Adverse selection means that the protection buyer transfers risks for which the information asymmetry is high and the protection seller has a disadvantage. However, the protection seller is aware of the risk and can increase the required premium and add a mistrust premium. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 315-317)

4.2.3 Moral Hazard

Moral hazard is also caused by information asymmetry. In the case of a CDS, credit risk is transferred and the protection buyer may not have any continuing relationship with the lender. Hence, the buyer loses interest in the credit and does not continue doing a proper credit analysis. (CGFS, 2003, Pg. 18)

The protection seller has an interest in the credit, but may not have access to information on the reference entity. Once again, problems do not arise in cases where the reference entity is a sovereign or a large rated company. However, if the reference asset is a German Mittelstand company with no rating, principal agent problems may arise. In this case, the protection seller can require the protection buyer to maintain some exposure to the reference asset or they can increase the premium of the CDS and add a mistrust premium.

If the protection buyer intends on continuing to enter into CRT agreements, it is in his interest to minimize information asymmetry and moral hazard issues in order to maintain his reputation.

4.2.4 Recovery, Ultimate Recovery and Market Recovery

A bond is usually documented under an issue document which specifies all key parameters of the bond such as the borrower, legal jurisdiction, payment information and grace period. The grace period or the number of days grace is a clause that ensures that a scheduled payment that is not made directly on the due date resulting from an administrative or technical error does not constitute a default. (Chaplin, 2005, Pg. 6) Loans are subject to loan documentation which is not as standardized as bond documentation. The documentation specifies what constitutes a default and the recourses that the lender has in the case of a default. (Chaplin, 2005, Pg. 6)

Ultimate recovery is a term that is used in bond default terminology and is regulated in the issue documentation of a bond and involves a legally defined process. (Chaplin, 2005, Pg. 6) Usually it requires that tax payments and employee payments are settled before banks and other lenders can claim repayments. (Chaplin, 2005, Pg. 8) The seniority of the debt as defined in the issue document will determine at what level the debt will be paid back. Debt can be secured with a specific asset in which case the sale of the asset will determine how much will get repaid. Generally debt is repaid by the value of the residual assets. Loans are usually more senior than bonds. (Chaplin, 2005, Pg. 13)

Rating agencies define market recovery as the “price of traded debt in the marketplace one month after the “default” event”. (Chaplin, 2005, Pg. 14) Market recovery is what the market believes the ultimate recovery will be.

The settlement date of a CDS is before the ultimate recovery is known. The settlement incorporates the price at which debt is traded, which is the expected recovery. (Chaplin, 2005, Pg. 81)

4.3 Credit Default Swaps and the MaRisk

The MaRisk AT 2.3 defines derivatives as forward transactions whose price is dependent on an “underlying asset, a reference price, a reference interest rate, a reference index or an event defined in advance”. (BaFin, 2005, Pg. 5) Since credit derivatives incorporate a predefined event, the MaRisk classifies them as a

“derivative”. (Hannemann, Schneider, Hanenberg, 2006, Pg. 96) The MaRisk bases its credit categorization on the definition of credit as per 19 Abs. 1 KWG (assets and off-balance sheet transactions with credit risk). Therefore, the MaRisk also categorizes credit derivatives as “lending” activities. Hence, the MaRisk requirements for lending need to be met when implementing credit derivatives. However, only those rules are to be implemented that make sense for the business. Some lending requirements are specifically for traditional lending transactions and it would be unreasonable to apply these to credit derivatives. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 430-431) Appendix 1 shows the general requirements of the MaRisk that pertain to credit derivatives.

Since credit derivatives are classified as trading products in the MaRisk, process and organizational requirements as defined in BTO 2 (requirements for the organizational and operational structure – trading business) are applicable. Regarding the valuation and reporting requirements, BTR 1 (requirements for processes for identifying, assessing, treating, monitoring and communicating risks – counterparty risk) and BTR 2 (requirements for processes for identifying, assessing, trading, monitoring and communicating risks – market price risk) need to be followed. (Hannemann, Schneider, Hanenberg, 2006, Pg. 98) BTO 2 incorporates regulations on segregation of duties and requirements for trading business processes. BTR 1 and BTR 2 cover counterparty risks and market risks respectively. Appendix 1 provides further information on the MaRisk specific requirements that need to be considered when implementing credit derivatives.

The MaRisk requires that if a bank uses credit derivatives as a hedge instrument, as a risk management tool or as a trading instrument, it has a solid understanding of the impact of these types of products on its risk management and control processes and on specific lending and trading processes.

5. Risk Analysis of a Single Name Credit Default Swap

Chapter 5 examines the risks inherent in a single name CDS and the implications for risk management and risk control. In order to assess the risk adequately, it is important to define in which context the bank intends to use the CDS. A bank that is actively trading single name CDSs would take different types of risk than a bank that is using the CDS as a hedge instrument. Traders tend to focus more on market inefficiencies and market risks with the intension of taking positions. A bank that intends on using the CDS for hedging purposes will likely be more interested in counterparty risk and operational risk. (Basel Committee on Banking Supervision, 2005, Pg. 25)

Chapter 5 is divided into three main sections. The first section describes how the bank intends on using the single name CDS. The second section examines the risks associated with the product when used in the context described in the first section. The third section examines the implications for risk management and risk control. At the end of the chapter, the reader should have a good understanding of the risks inherent in a single name CDS when it is used to hedge credit risk and to manage

concentration risk. As well, the reader should understand the implications for risk management and risk control.

5.1 Background

A CDS isolates the credit risk component of the underlying product and transfers the credit risk associated with specific credit events from a protection buyer to a protection seller. Since the underlying bond or loan is not legally transferred, permission to transfer the credit is not required from the borrower. This allows both parties (protection buyer and seller) to optimize their credit or bond portfolios confidentially.

Based on their risk strategy, the bank would like to use credit derivatives for hedging purposes and managing concentration risk. Through the transfer of credit risk, the bank can free up risk limits and reduce the required economic capital. By entering into a CDS, as a protection seller, the bank can obtain exposure to certain counterparties or types of counterparties with the goal of diversifying their portfolio.

In a first step, the bank would like to implement a single name CDS. It would like to enter transactions either as a protection buyer or a protection seller. The CDS is to be documented using ISDA documentation with standard credit events including restructuring and physical or cash settlement. The underlying will be bond or loan exposure to large rated investment grade companies. The CDS and the underlying credit risk will be in Euro.

5.2 Risk Analysis for a Single Name Credit Default Swap

A single name CDS is an OTC derivative, which isolates credit risk (e.g. default risk, spread risk) and transfers it from a protection buyer to a protection seller. It can be decomposed into a bond and a protection component. The protection component has a "contingent" character since it is dependent on the occurrence of a credit event. (JPMorgan, 2006, Pg. 8) The following product risk matrix (Exhibit 5-1) shows the key risks that are associated with the bond or loan and the protection component.

Exhibit 5-1: Product Risk Matrix for a Single Name CDS

Product/Risk Type	Counterparty Risk					Market Risk		Operational Risk			Liquidity Risk		Other Risks	
	Credit Risk	Pre Settlement Risk	Double Default Risk	Country Risk	Credit Spread Risk	General Market Risk	Specific Market Risk	Operational Risk	Model Risk	Legal Risk	Funding Risk	Market Liquidity Risk	Basis Risk	Portfolio Risks
Underlying Bond or Loan														
Bond	X			X	X	X	X				X	X		
Loan	X			X	X	X	X				X	X		
Protection Leg														
Protection Buyer	↓	X	X	X	↓			X	X	X		X		
Protection Seller	X	X		X	X			X	X	X	X			
CDS (Underlying plus Protection Leg)														
Protection Buyer													X	X
Protection Seller														X

Source: Own Development

The above product risk matrix shows that the main sources of risk for bonds and loans are credit, credit spread, market risk (e.g. interest rate risk) and funding risk. A further possible source is market liquidity risk. Given that these products are on the current product list of the bank, it can be assumed that these sources of risk are incorporated in the current risk management and risk control system.

The implementation of the single name CDS incorporates the addition of a protection leg. Hence when examining the risk position, the impact of the protection leg on the underlying bond position must be analyzed. As a protection buyer, the bank hedges credit default risk and to some extent credit spread risk. However, it becomes exposed to pre settlement risk, double default risk and operational risk. When examining the combined position (underlying plus protection leg), basis risk is a further source of risk. The CDS will also have an impact on the portfolio risk. As a protection seller, the bank will become exposed to credit default risk and pre settlement risk. Further sources of risk are operational risk and funding risk. Given that the protection seller intends on managing portfolio concentrations, portfolio risks must also be reviewed.

As with all products, country risk may be a further source of risk for the protection buyer and the protection seller. The general market risk from a single name CDS is relatively small. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 368)

Both the protection buyer and the protection seller also need to be able to mark the CDS to market.

The main risks that are affected by the implementation of the CDS are basis risk, counterparty risk, portfolio credit risk, operational risk and liquidity risk. The remaining part of this section will focus on valuation of a CDS or marking a CDS to market and these risks.

5.2.1 Valuation

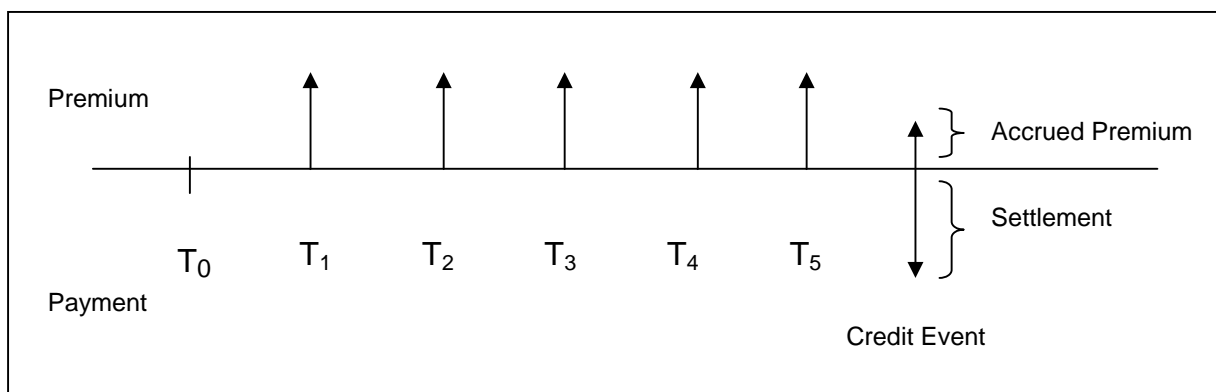
Both the protection buyer and the protection seller need to calculate the Mark-To-Market (MTM) value of the single name CDS. When the CDS is purchased or sold, the market value is close to zero. However, as pricing input parameters change, the market value may become negative or positive.

A single name CDS consists of two payment streams as is shown in Exhibit 5-2. The protection buyer pays a premium or a CDS spread until a credit event occurs or until the CDS matures. The premium is generally paid on a semi-annual or annual basis and is quoted as bp of the agreed nominal amount. In the case of a credit event, the accrued premium is paid. (Schmidt, 2006, Pg.17)

The protection seller makes a payment only in the case of a credit event. The payment is dependent on the agreed settlement method. In the case of a cash settlement, it is par minus the market value of the reference asset and in the case of a physical settlement, it is the nominal amount. (Schmidt, 2006, Pg. 17) If physical settlement has been agreed, the protection seller receives the defaulted debt and can obtain the recovery value for the paper.

Both payment streams are dependent on the probability of a credit event occurring, which in turn is dependent on the credit standing of the reference entity.

Exhibit 5-2: Single Name CDS Cash Flows



Source: Schmidt, 2006, Pg. 20

The value of the CDS is equivalent to the discounted payment streams. The fair default swap spread (CDS spread) is the premium that makes the value of the CDS zero. CDSs are quoted as fair default swap spreads on the market and are based on ISDA standard definitions. The probability that a credit event will occur during the life of the CDS is implicit in the market quotes. (Schmidt, 2006, Pg. 16- 24)

There are observable market prices for a standard single name CDS and bid-offer market quotes directly provide the CDS premium. (Felsenheimer, Gisdakis, Zaiser, 2006, Pg. 311) Alternatively, CDSs can be priced using theoretical pricing models. The primary difference between the two methodologies is that pricing based on market quotes reflects the market and pricing using theoretical pricing models reflects the assumptions and data input used.

5.2.1.1 Mark-To-Market Value of a CDS using Market Quotes

This section examines the MTM valuation using market parameters. Two key parameters that are required for the MTM valuation are the probability of default or alternatively the probability of survival and the recovery rate in the case of a default. These parameters are implicit in the market quotes and therefore use market views on default and recovery values.

As shown in Exhibit 5-2, the single name CDS is comprised of a premium leg and a contingent leg (payment leg). A fair premium for a CDS is defined as the premium for which the value of the spread leg equals the value of the payment leg. (Morgan Stanley, (Hrsg.), 2006, Pg. 11) Given that CDSs are quoted at fair premiums, at the time of closing, the premium leg will be equal to the value of the payment leg. (Schmidt, 2006, Pg. 42) However, after the transaction is closed, the CDS quotes may move and the value of the premium leg may no longer equal the value of the payment leg. If the market spread is greater than the agreed spread, the market value will be positive and if it is lower than the agreed spread the market value will be negative.

Market quotes for a single name CDS are determined by supply and demand. There is a liquid market or at least a fairly liquid market in Europe and the US for CDSs with maturities of 1, 2, 3, 5, 7 and 10 years. (Martin, Reitz, Wehn, 2006, Pg. 167)

In order to calculate the MTM value of a CDS, a model is required that incorporates the hazard rate (or the survival probability) and the recovery rate. (Martin, Reitz, Wehn, 2006, Pg. 167)

The JPMorgan model, which is available in Bloomberg's CDSW tool, has established itself as the market standard. (Felsenheimer, Gisdakis, Zaiser, 2006, Pg. 305) The CDS spreads reflect the probability of survival and the potential recovery in the case of default. If an assumption is made regarding the recovery rate (e.g. $R = 15\%$), the probability of survival, which is equal to one minus the hazard rate, can be extracted from the market CDS spread. (Schmidt, 2006, Pg. 39) The CDS market quotes at fair prices and therefore the value of the spread at a time period T , is equal to the value of the recovery in the case of default at T . The mathematical formula is:

Formula 1

$$0 \approx \dots SP \dots + AccruedSP \dots + DefaultPayment$$

The spread payment (SP) for each grid point (period) is:

$$SP = \dots s(n) \cdot \sum_{i=1}^n \Delta_i \cdot DF(T_i) \cdot q(T_i)$$

The accrued spread payment at default ($AccruedSP$) is:

$$AccruedSP = \dots s(n) \cdot \sum_{i=1}^n \frac{\Delta_i}{2} \cdot DF\left(\frac{T_{i-1} + T_i}{2}\right) \cdot [q(T_{i-1}) \dots q(T_i)]$$

The payment in the case of default ($DefaultPayment$) is:

$$DefaultPayment = (1 - R) \cdot \sum_{i=1}^n \frac{\Delta_i}{2} \cdot DF\left(\frac{T_{i-1} + T_i}{2}\right) \cdot [q(T_{i-1}) \dots q(T_i)]$$

(Schmidt, 2006, Pg. 42)

Using Formula 1, for each time interval, T_1 to T_n , the corresponding fair spread, $s(1)$ to $s(n)$, can be used to calculate the probabilities of survival for $q(T_1)$ to $q(T_n)$ provided that an assumption has been made for R . (Schmidt, 2006, Pg. 42) This procedure can be used for the grid points 1, 2, 3, 5, 7 and 10 years, since market information is relatively liquid for this segment. (JPMorgan, 2006, Pg. 12)

In order to obtain the probability of survival at any point of time, the points between the grid points need to be calculated using an interpolation method for which an assumption for the hazard rate is required. (Schmidt, 2006, Pg. 43-44) Flat curves imply constant hazard rates and upward sloping curves imply hazard rates that increase over time. Hazard rates are generally modelled as a step function, which means that they are held constant between periods. (JPMorgan, 2006, Pg. 18-20) For risk management purposes, it is advisable to examine the impact of more than one assumption. (Chaplin, 2005, Pg. 84)

The price of the CDS can be calculated with Formula 1 using the same assumption for the recovery rate as was used for the calculation of the survival curve (e.g. $R = 15\%$). The assumption concerning the recovery rate is not critical as long as the same assumptions are used for calculating the probabilities of survival for the survival curve as are used for calculating the market value of the CDS. (Schmidt, 2006, Pg. 45)

5.2.1.2 Restructuring Clauses

Restructuring is a soft credit event. ISDA documentation currently incorporates four restructuring clauses. The value of a restructuring credit event depends on the

contractual maturity restrictions that are on deliverable obligations, the term of the CDS contract, the capital structure of the reference entity and the probability of a restructuring event relative to a hard credit event. Mod R places the most restrictions on the deliverable assets followed by Mod Mod R and Old R. Hence Mod R should have the lowest value for restructuring and Old R the highest. (Gregory, 2003, Pg. 47) In a study completed on “Contractual terms and CDS Pricing” by Zhu and Packer, it was found that the incorporation of restructuring has an impact on the CDS quotes. (Packer, Zhu, 2005, Pg. 99)

Gregory presents a model for valuing CDSs that incorporates hard (e.g. bankruptcy) and soft credit events (e.g. restructuring). However, according to Gregory, currently the market is not specifically incorporating this parameter into the CDS spread. (Gregory, 2003, Pg. 53-64)

The literature on calculating the MTM value of a single name CDS, did not make a specific mention to the impact of the different restructuring clauses. Therefore, when using market quotes to calculate the MTM value of a single name CDS, this question should be researched or posed to the source of the quotes.

5.2.1.3 Pricing Methodologies

An alternative to using the market spreads to calculate the MTM value for a single name CDS, is to use a mathematical model. For risk management purposes, it is advisable to supplement the market quotes methodology with a model. This enables a bank to carry out simulations in order to assess the impact of changes to different input parameters on the MTM value. Although there have been significant model developments, there is a lack of empirical work. (CGFS, 2003, Pg. 18)

The following factors can pose problems for the valuation of credit derivatives:

- Non standardized products
- Lack of historical information about the underlying credit risk
- The past does not represent the future adequately
- Illiquid underlying markets
- Soft credit events such as restructuring

The two main groups of models that have been developed are referred to as intensity models and structural models. Structural models are based on the ideas of Merton (1974) and Black/Scholes. The models were operationalized by KMV and JPMorgan (CreditMetrics). (CGFS, 2003, Pg. 44) A central aspect of structural models is the financial structure of the company (e.g. debt vs. equity). In the model, the assets of a balance sheet represent the firm's value. The liability side of the balance sheet encompasses the debt, which in this case is represented by a zero bond, and the equity of a company. Lenders have contractual rights to the assets of the company and shareholders have residual rights. The price of the bonds and shares is driven by the firm's value. A default occurs if the value of the company drops below the level of debt at which point the equity becomes negative. The Probability of Default (PD) increases as the value of the company approaches the boundary between debt and

equity financing. The MERTON Model uses option pricing theory in order to calculate the value of credit risk. (Martin, Reitz, Wehn, 2006, Pg. 88-91)

The intensity model or reduced-form model calculates the defaults (hazard rates) directly. The model is based on timing risk and recovery risk. The timing risk is the uncertainty associated with the time point when a reference entity will go into bankruptcy while the recovery risk is the risk relating to the recovery amount. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 676-677) Some of the key contributors to this approach are Jarrow et. Al (1997), and Duffie and Singleton (1999). The application to credit derivatives has been developed by Acharya et al (2002), Cheng (2001) and Hull and White (2000, 2001). (CGFS, 2003, Pg. 45)

5.2.1.4 Conclusion

The implementation of the CDS valuation model is a part of the NPP. CDS valuation is important not only for daily risk measures, but it is also essential for pricing before concluding a CDS. The discrete-time CDS pricing algorithm (JPMorgan model) appears to be the established market model. Before the bank begins using single name CDSs, the staff, process and technical requirements to handle the model used for valuation need to be in place. It must be ensured that all relevant staff members (e.g. Risk Control, Trade and Middle Office) understand the model, model parameters and the assumptions used for calculations. As well, relevant staff should understand the credit curve, the meaning of the shape of the curve and the impact that the shape has on calculations. Data requirements are a further significant area of importance. Credit information is required for the credit curve. For certain reference obligations and maturities, the market is very liquid and for others it is not. In some cases, such as for illiquid loans, data engineering may be required.

5.2.2 Basis Risk

The CDS provides a hedge for default risk and a potential hedge for some or all of the credit spread risk. Basis risk arises from imperfect hedges. There is a risk of a loss due to differences in the position and the hedge. (Basel Committee on Banking Supervision, 2005, Pg. 83)

When hedging default risk of a bond or a loan, transaction costs need to be taken into consideration. A CDS covering the exact remaining maturity of a bond or a loan may not be readily available and an off market CDS may be expensive. The less standardized and illiquid a CDS is, the wider the bid-ask spread and the higher the transaction costs are likely to be. Hence, it may be more economical to choose a CDS with a maturity that is only very close to the bond or the loan. (Felsenheimer, Gisdakis, Zaiser, 2006, Pg. 445) In this case basis risk is caused by a maturity mismatch.

A second source of basis risk arises from slight differences in the terms of the bond position and the reference obligation that is specified in the CDS. There may be

differences in seniority, maturity and coupon payments. This may result in different recovery rates. Therefore, in the case of default of the reference entity, the bond's market price rate may drop by more or less than the reference obligation of the CDS. This results in a loss or a gain to the bank due to an imperfect hedge. (Felsenheimer, Gisdakis, Zaiser, 2006, Pg. 445-446)

Basis risk also arises when the position to be hedged was not purchased at par, since the CDS pays par (or par minus recovery rate) when a credit event is triggered. There is again a risk of overhedging which results in higher transaction costs or underhedging which leads to an open position. The hedge ratio will enable the bank to adjust the nominal value of the CDS to offset the position. However, since it is dependent on an estimate of the recovery rate, it will likely not provide a perfect hedge. (Felsenheimer, Gisdakis, Zaiser, 2006, Pg. 445-447) This issue is not as important for loans or other positions that are held to maturity. Given that these are held to maturity, they are recorded at book value and hedged on a nominal basis. (Chaplin, 2005, Pg. 121-122)

Basis risk due to documentation is a result of differences in the bond or loan legal terminology and that of the CDS (e.g. restructuring). (Basel Committee on Banking Supervision, 2005, Pg. 83)

Given that the protection buyer enters into a CDS transaction to hedge a bond or a loan position, they are exposed to basis risk. A protection seller's goal is to gain exposure to credit risk in order to diversify the portfolio and hence is not exposed to basis risk.

The basis risk of the position and the hedge is usually assessed using sensitivity and scenario analysis.

5.2.3 Counterparty Risk

Through the default hedge, the protection buyer basically exchanges credit default risk for pre settlement risk and double default risk. Since credit spread risk is not necessarily transferred, the protection buyer may remain exposed to some or all of the credit spread risk of the underlying bond or loan. The protection seller is exposed to credit default risk and depending on the premium payments to pre settlement risk.

5.2.3.1 Credit Risk

The single name CDS synthetically transfers default risk from the protection buyer to the protection seller. Therefore, the credit risk profile and the parameters for the measurement of credit risk are altered for both the protection buyer and the protection seller. The loan or bond remains on the books of the protection buyer and the buyer is the "Lender by Record"; however, credit default risk is transferred "off-balance-sheet" to the protection seller. Through the transaction, the protection seller gains an off-balance-sheet exposure to the default risk of the reference obligation.

Through the purchase of a single name CDS, the protection buyer reduces exposure to credit risk of the reference obligation in terms of default risk. The protection seller gains exposure to the reference obligation and carries credit default risk. The default risk associated with this is similar to the default risk associated with a loan or a bond except that the credit event is a negotiable term and may encompass more than the default of the reference obligation (e.g. restructuring). (Tavakoli, 1998, Pg. 64)

Standalone credit risk is determined by risk drivers, which are factors that trigger a credit risk event, default or rating migration, and risk exposures. Key credit risk drivers are the Loss given Default (LGD) or the recovery under default, the PD and the rating migration, which is the change in PD through time. The PD is determined by the risk associated with the borrower and is generally assigned through the internal rating system of the bank. This is then mapped to a rating scheme of external rating agencies (e.g. S&P's) and transformed into a PD. LGD is the loss less the recovery and is an uncertain future value. Collateral (incl. guarantees) can be taken into consideration. Recovery also may rely on expert judgment for estimating a recovery rate. Exposure at Default (EAD) can be valued using the book value or the MTM value depending on the product and purpose. (Bessis, 2002, Pg. 420-425)

The purchase of a single name CDS changes the protection buyer's calculation of LGD and PD. The PD is the joint probability of default of the reference obligation and the protection seller. The LGD is recovery under the CDS as opposed to the recovery value of the reference obligation.

The protection seller's standalone credit risk, which incorporates PD, EAD and LGD, will also change. The PD is the probability of default of the reference obligation. The EAD is the book or market value of the synthetically transferred position. In the case of physical delivery the LGD is the estimated ultimate recovery of the reference obligation. In the case of cash settlement it is the estimated loss or par minus estimated recovery at the time of the credit event.

5.2.3.2 Pre Settlement Risk

A CDS is classified as an OTC derivative instrument and hence contains pre settlement risk. These instruments generate a credit exposure that is measured as the cost of replacement under the assumption of no recovery of value. In these cases credit risks are bilateral and the exposure is driven by market parameters. (Basel Committee on Banking Supervision, July 2005, Pg. 4)

EAD of pre settlement risk is not equivalent to a nominal amount but rather a credit equivalent amount. The credit equivalent amount is the sum of the current risk and the potential future risk from the derivative. The current risk includes all transactions with positive market values since transactions with negative market values do not represent a risk.

Through the purchase of a single name CDS, the protection buyer becomes exposed to pre settlement risk. Should the protection seller go bankrupt, the protection buyer will need to replace the CDS on the market in order to continue to be protected against default risk. Since the protection buyer replaces the CDS on the market at market value and not at the nominal amount, the EAD is equivalent to the positive

current market value plus the potential future exposure. Since the protection buyer is assumed to purchase the CDS at the fair premium, the market value of the CDS at the time of purchase is zero. However, after the CDS is purchased the market value fluctuates in line with the market movements (e.g. interest rates, hazard rates). If the premium of the CDS declines the market value will be negative and there will be zero current exposure. If however, the premium of the CDS increases, the market value will be positive and the current exposure will be the current CDS premium minus the premium at the time of purchase. The potential future exposure can be calculated using regulatory add-ons or a mathematical model. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 380-381) The total risk (EAD) at any point in time is the current exposure plus the potential future exposure. The PD is based on the credit rating of the protection seller.

Unless the premium is paid upfront, the protection seller is also exposed to pre settlement risk. If the protection buyer goes bankrupt the protection seller loses the premium. While the protection seller's total risk (EAD) is also the current exposure plus the potential future risk, it should be capped at the level of outstanding premium. (Basel Committee on Banking Supervision, 2006, Pg. 165) The credit rating of the protection buyer determines the PD.

5.2.3.3 Double Default Risk

Double default risk is the probability of default of both the reference entity and the protection seller at the same time. It is dependent on the default correlation between the reference entity and the protection seller and the marginal probability of default of either the reference entity or the protection seller. (Caouette, Altman, Narayanan, 1998, Pg. 314)

Double default risk is a source of risk for the protection buyer. Hence not only is the creditworthiness of the protection seller important but also the default correlation between the counterparty and the reference obligation. If both the counterparty and the reference entity default, the protection buyer must carry the loss of the hedged position. In this case the PD is the probability of default of both the protection seller and the reference obligation. (Caouette, Altman, Narayanan, 1998, Pg. 315)

The protection seller is not exposed to a double default risk. Double default risk is also referred to as wrong way risk.

5.2.3.4 Credit Spread Risk

Credit spread risk is the risk associated with the deterioration in the credit standing of a counterparty. A higher counterparty PD triggers a higher yield requirement to compensate for the higher risk, which in turn leads to a value decline of a bond. (Bessis, 2002, Pg. 13) Generally, investors are subject to spread risk rather than default risk. (Felsenheimer, Gisdakis, Zaiser, 2006, Pg. 448)

Assuming that the bank is primarily hedging default risk, credit spread risk is a source of risk. Therefore, the profit and loss for bond or loan positions that are marked-to-

market are sensitive to movements in the credit spreads. Spread risk reflects the sensitivity of the marked-to-market changes due to the underlying credit spread risk factors of the primary bond or loan position and the single name CDS. (Felsenheimer, Gisdakis, Zaiser, 2006, Pg. 448) In the case of a perfect hedge, the spread increase of the CDS due to a decline in the credit standing of the counterparty offsets the market value decline of the underlying bond or loan position.

The sensitivity measure, SpreadDV01, measures the impact of a one bp shift of the spread curve on the position (bond or credit and CDS). The SpreadDV01 may change over time.

5.2.3.5 Country Risk

Country risk can be considered the possibility of delayed or non-payment not due to a specific counterparty, but rather attributable to the country in which the counterparty is located. (Caouette, Altman, Narayanan, 1998, Pg. 338)

The protection buyer is exposed to country risk if the protection seller is located outside of Germany. If the country in which the protection seller is located deteriorates, the protection seller may be unable to meet obligations under the CDS.

The protection seller is also exposed to country risk regarding the protection buyer and the reference entity if they are located outside of Germany. If a crisis occurs in the country in which the protection buyer or the reference entity is located, such that the obligations cannot be met, the protection seller may suffer a loss.

5.2.4 Portfolio Credit Risk

Key risks that are applicable to a credit portfolio are correlation and concentration risk. As discussed in section 3.2.2, concentration risk arises from the exposure to a counterparty, an industry segment or a geographic area or from correlated risk factors. The exposure to concentration risk should be analyzed on a bank-wide level. The bank may have entered into a single name CDS to transfer risk from a particular name with an investment bank. In another section of the bank (e.g. OTC Derivatives trading desk) considerable business may be completed with investment banks. Hence, the transfer of credit to the investment bank may have reduced concentration risk of a particular portfolio, but overall it may make the bank very vulnerable to the investment-banking segment. This may be relevant since analogous to the OTC derivatives markets there are roughly a half a dozen banks and securities firms taking the role of market making. (Basel Committee on Banking Supervision, 2005, Pg. 37) Therefore, if the bank has a high exposure to the investment-banking segment and the large international-banking segment, the bank should examine with which counterparties it intends to close single name CDSs and what impact this has on concentration risk.

Of further importance for the implementation of a single name CDS is the impact on correlation risk of the portfolio and bank wide exposure. A CDS and other CRT products may expose the bank to new or different correlation risks. As the bank

develops its capacity to use more complex products (e.g. CDOs), correlation risk will become increasingly important. (Basel Committee on Banking Supervision, 2005, Pg. 25)

Hence, while the CDS can be effective to reduce or manage concentration and correlation risk of a portfolio, the bank will need to focus on the overall aggregate exposure to counterparties in the bank. These risks may be reduced or shifted in the credit or the bond portfolio, but may not be reduced when viewing the aggregate exposure of the bank. Portfolio credit risks are relevant for both the protection buyer and the protection seller.

5.2.5 Operational Risk

The implementation of a single name CDS involves several new concepts, processes and technologies and skill sets. Aside from model developments and legal aspects, organizational structures, transaction processing and settlements are sources for operational risk. There is limited straight through processing and manual inputs increase potential sources of error. Confirmation backlogs and limitations on resources and infrastructure due to rapid volume growth in the market have put strains on Back Offices. (CRMPG, 2005, Pg. A-16)

From an organizational perspective, there is an operational risk that roles are not clearly defined. If more than one organizational unit can enter into single name CDSs (e.g. capital markets, portfolio management) there is a risk that not all of the transactions are identified and incorporated in risk calculations. As well, there is a risk that organizational units are not adequately segregated. This means that those units entering into the risk are also controlling the risk. (Burghof, Henke, Rudolph, Schönbacher, Sommer, (Hrsg.), 2005, Pg. 446)

From an IT-systems perspective, there is the risk that the current systems cannot handle CDSs. In particular, the hedged credit or bond risk may not be “marked” and therefore unidentifiable. This may lead to positions being incorrectly incorporated in the overall position reports and risk calculations.

Given the growth of the market and the high quality of staff required to manage the product, the bank may face challenges with respect to hiring and maintaining staff.

A further source of operational risk for the protection seller is the information advantage that the protection buyer has concerning the reference obligation. As well, once transferred, the protection buyer may lose interest in the underlying bond or loan and only fulfill minimum requirements. This is generally compensated for through a “mistrust” premium. However, there is a risk that it is incorrectly estimated.

Further aspects of operational risk that a CDS exposes a bank to are model risk and legal risk.

5.2.5.1 Model Risk

Model risk incorporates the risk associated with the lack of staff and expertise to understand the assumptions and limitations of the models used. Some sources of model risk are misspecifications, lack of reliable data and simplified or incorrect assumptions. The staff must understand all of the assumptions that are made in the model (e.g. correlation assumptions). (Basel Committee on Banking Supervision, 2005, Pg. 29) Staff may not understand the data inputs, evaluations and assessments and the reports generated from the model. Credit risk models often use correlation data and assumptions for valuation and risk calculations. There is an operational risk that the sources and roles of these assumptions are not correctly understood. The extent of risk capture is a further source of risk. For example the extent of risk transfer and hedging risks may not be recognized. (Basel Committee on Banking Supervision, 2005, Pg. 29)

From an operational risk perspective, it may be necessary to assess the degree to which the models are subject to misspecifications or errors in statistical techniques. (Bessis, 2002, Pg. 21) Risk and pricing models are highly complex and involve a number of assumptions and judgments.

Both the protection buyer and the protection seller are exposed to model risk.

5.2.5.2 Legal Risk

There are two dimensions of legal risk that need to be considered. The first pertains to the documentation and refers the degree with which the credit default risk is actually legally transferred. A further source of legal risk is the failure to adhere to the local legal requirements for credit derivatives.

A key risk is the failure to achieve a clean transfer of credit risk through the ISDA documentation. Reasons may relate to the enforceability of the documentation, the degree of standardization of the documentation, the legal authority of a counterparty to enter into the transaction, the definition of the underlying reference entity and the incorporation of restructuring.

The use of the ISDA standard documentation (ISDA Master Agreement and 2003 ISDA Credit Derivatives Definitions) and confirmations serve to minimize the risk associated with this. The framework has been successfully tested. The WorldCom bankruptcy involved settlement of 600 CDS contracts with a notional volume of USD 7 billion. The Parmalat SPA default involved settling 4,000 CDS contracts and USD 10 billion notional amount. Contracts were settled without settlement problems, disputes or litigation. (CRMPG, 2005, Pg. A-4)

The complexity of the documentation is a further source of legal risk. The lack of standardization and clarity in the definition of credit events and settlements can lead to misunderstandings and legal problems. Most of the problems seem to arise from the identity of the reference entity, the credit event, restructuring or repudiation/moratorium. Often, the documentation does not provide a clear and

unambiguous identification of the underlying reference entity (e.g. incorrect group company). (Basel Committee on Banking Supervision, 2005, Pg. 7)

Certain types of counterparties do not have the legal capacity to enter into derivatives transactions. This was the case for interest rate derivatives (e.g. London boroughs of Hammersmith and Fulham¹). (Schwartz, Smith, 1997, Pg. 464)

There is currently no German “standard” contract and hence the ISDA Credit Derivative Confirmation and Credit Derivatives Definitions are generally used. However, these contracts may not necessarily incorporate aspects that are specific to Germany. (CRMPG, 2005, Pg. 111-112)

In terms of legal enforceability, the ISDA documentation for a CDS may not be in line with the bankruptcy, confidentiality and banking and potentially insurance laws in relevant jurisdictions. Local jurisdictions may have different opinions about aspects of a CDS and different laws governing credit risk transfer. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 445)

The second dimension of legal risk focuses on the legal requirements of banks regarding single name CDSs. Depending on their role in the transaction, the bank may neglect to fulfill its legal responsibilities towards to their counterparty or customer. (Basel Committee on Banking Supervision, 2005, Pg. 7) As well, the protection buyer must adhere to laws pertaining to non-public information. The protection buyer, as the legal lender, may have access to confidential company information, which may not be passed on to the protection seller even though it may be important. A further aspect is the disregard or incorrect interpretation of tax laws relating to CDSs.

5.2.6 Liquidity Risk

The protection seller of a single name CDS is exposed to funding risk should a large payment relating to a credit event have to be made to the protection buyer. In order to make the payment in the defined timeframe, the protection seller may need to access money quickly and hence at a higher than normal rate.

In the case of a single name CDS, market liquidity risk refers to market liquidity and the ability to unwind or replace a position. Liquidity for CDSs is considered reasonably strong for certain maturities. (JPMorgan, 2006, Pg. 12) However, there is a risk that an open position in single name CDSs cannot be closed or involve high transaction costs due to the lack of development or liquidity in the market. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 446) Market liquidity risk is relevant for both the protection buyer and the protection seller.

¹ In 1991, the House of Lords, in the UK, decided that a number of swaps entered into by London boroughs of Hammersmith and Fulham were void since the counterparty did not have the legal capacity to enter into these types of transactions. (Schwartz, Smith, 1997, Pg. 464)

5.3 Implications for Risk Management and Risk Control

As shown above, the implementation of single name CDSs will alter the risk profile of the bank and therefore, will have an impact on the risk management and control processes. The risk position resulting from credit derivatives should be integrated into a bank-wide credit risk management and control system, which incorporates the bank-wide risk-return concept. It must be ensured that the relevant MaRisk requirements for credit derivatives as described in appendix 1 are met.

Section 5.3 focuses on the integration of a single name CDS in the risk control and risk management processes.

5.3.1 Risk Identification

In accordance with the MaRisk, the bank needs to incorporate all major risks and the resulting risk concentrations. Management must be informed of and understand the complete risk profile of the bank. This can be completed quantitatively and qualitatively. Hence, given that the implementation of the single name CDS changes the risk profile of the bank, it is important that the key risks relating to the product are identified. The basis for this has been completed in the product matrix shown in 5.2. Exhibit 5-3 shows the risks that are quantifiable and those that can be assessed using qualitative analysis. In this section, basis risk is incorporated under credit spread risk.

Exhibit 5-3: Quantifiable and Primarily Non-Quantifiable Risks

Product/Risk Type	Counterparty Risk					Market Risk		Operational Risk			Liquidity Risk		Other Risks		
	Credit Risk	Pre Settlement Risk	Double Default Risk	Country Risk	Credit Spread Risk	General Market Risk	Specific Market Risk	Operational Risk	Model Risk	Legal Risk	Funding Risk	Market Liquidity Risk	Basis Risk	Portfolio Risks	
Underlying Bond or Loan															
Bond	X			X	X	X	X				X	X			
Loan	X			X	X	X	X				X	X			
Protection Leg															
Protection Buyer	↓	X	X	X	↓			X	X	X		X			
Protection Seller	X	X		X	X			X	X	X	X				
CDS (Underlying plus Protection Leg)															
Protection Buyer													X	X	
Protection Seller														X	
	Quantifiable Risk							Primarily Non-Quantifiable Risk							

Source: Own Development

The risk strategy of the bank should incorporate credit derivatives and specifically, single name CDSs. This should include for which purposes CDSs may be used. Credit derivatives should also be incorporated in the list of markets in which the bank may be active. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 434)

If there is no designated unit for credit default products (or credit transfer products), the CDS can be closed from various organizational units in the bank (e.g. portfolio management, trade, credit department). (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 450) Risk management and control must ensure that they capture all of the CDSs that are closed and that the risks inherent in the products are incorporated in the appropriate systems.

5.3.2 Risk Evaluation and Assessment

Methodologies for measuring, analyzing, controlling and managing risks need to be developed in order to incorporate single name CDSs. Limits should be set for the product type CDS, risk type and organizational units. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 434 - 435)

5.3.2.1 Counterparty Risk – Credit Risk

From the above section, it is evident that counterparty risk is one of the key areas of focus when examining the implications for risk evaluation and assessment relating to the implementation of a single name CDS.

Credit risk can be defined in terms of expected and unexpected loss on a transaction level. It views the probability of default and the default severity. The default severity is the percent of the loan that is lost and is dependent on the recovery rate. Expected losses refer to the long-term losses or the mean of the loss distribution of a loan. These are reflected in pricing and the bank should set aside reserves to cover the losses. Unexpected loss, which is the “risk”, can be defined as the maximum potential loss at a given confidence interval. Economic capital is set aside to cover these losses. (Caouette, Altman, Narayanan, 1998, Pg. 242-244)

As shown in section 5.2.3.1, the implementation of a single name CDS will impact the credit risk calculation of the protection buyer and the protection seller given that the risk is synthetically transferred. At a transaction level, the protection seller needs to incorporate the PD and the LGD of the reference obligation in the expected loss, the unexpected loss and the exceptional loss calculations. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 434) Similarly, the new PD and LGD will need to be incorporated in the protection buyer’s expected loss, unexpected loss and exceptional loss calculations.

Both the protection buyer and the protection seller need to review the credit risk analysis process. Traditionally credits were analyzed using a buy-and-hold strategy. The lender would analyze and rate the borrower and based on this decide on whether to enter the risk. The use of a single name CDS can change this process in that the protection buyer can micro-hedge the risk. Even in the case of a hedge, the underlying risk needs to be analyzed and approved by the credit review process. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 387)

The protection seller has synthetically entered into a credit (or bond) position and therefore needs to review the long-term credit quality of the reference entity. (Basel Committee on Banking Supervision, 2005, Pg. 25) Given that the protection buyer is the “Lender of Record” and may have a good relationship with the client, they may have access to information that is not public. This may make the credit analysis more difficult for the protection seller. In this case, since the bank has stipulated that reference obligations are to be rated companies, the risk should be acceptable. These issues present more of a challenge when dealing with the German Mittelstand.

5.3.2.2 Counterparty Risk - Pre settlement Risk

As shown in section 5.2.3.2, the EAD of a derivative instrument is not the nominal amount, but the credit equivalent amount. The credit equivalent amount is equal to the current risk and the potential future risk. The current risk is the current market value of the single name CDS or in the case of a negative market value zero. This can be calculated using the valuation method that is selected by the bank as described in section 5.2.1.

Potential future risk is the “possible increase in mark-to-market value of instruments due to market movements“. (Bessis, 2002, Pg. 502) Since a bank does not know what it could lose from a derivative at a future date, it must be estimated using simulations.

For NPP purposes, potential exposure can be calculated using regulatory add-ons. Regulatory add-ons for CDSs are categorized using the reference asset. Potential exposure is then calculated by multiplying the add-on by the nominal amount of the CDS. Table 5-1 shows the add-ons based on Basel II.

Table 5-1: Add-Ons for Single Name CDS (Basel II)

Reference asset	Protection Buyer	Protection Seller
Qualified reference asset	5 %	5 %
Unqualified reference asset	10 %	10 %

Source: Basel Committee on Banking Supervision, 2006, Pg. 165

Hence the formula for the calculation of pre settlement risk is:

Formula 2

$$CreditEquivalent = \max(\text{marketvalue}, 0) + NPA \times Add - on$$

(Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 380)

In this case the bank is implementing single name CDSs using qualified reference assets that are rated investment grade or better by Moody's or Standard and Poors'.²

Both the protection buyer and the protection seller can calculate pre settlement risk using Formula. The protection seller will not be exposed to pre settlement risk if the

² e.g. investment grade is a rating of Baa or higher by Moody's and BBB or higher by S&P.

CDS premium is paid upfront. The exposure for the protection seller should be capped at the level of the outstanding premiums. (Basel Committee on Banking Supervision, 2006, Pg. 165)

5.3.2.3 Counterparty Risk - Double Default Risk

The protection buyer is subject not only to pre settlement risk but also to double default risk, which is measured by the joint probability of default between the protection seller and the reference entity.

Formula 3

$$P(A \text{ and } B) = \text{Corr}(A, B) \cdot \sqrt{P(A) \cdot (1 - P(A))} \cdot \sqrt{P(B) \cdot (1 - P(B))} + P(A) \times P(B)$$

(Caouette, Altman, Narayanan, 1998, Pg. 314-315)

Estimates of PD can be derived from the rating. However, it may be difficult to obtain reliable information for the correlation between the two events A and B. (Caouette, Altman, Narayanan, 1998, Pg. 314-315)

The protection seller is not exposed to double default risk.

5.3.2.4 Counterparty Risk - Credit Spread Risk

The protection buyer of a single name CDS is exposed to credit spread risk. Credit rating deteriorations will usually lead to wider credit spreads and hence a drop in the MTM value of the bond or the loan. Therefore, unless the position is being held until maturity, the bank will be faced with a MTM loss that will be reflected in the profit and loss. (Felsenheimer, Gisdakis, Zaiser, 2006, Pg. 444) A CDS hedge can compensate for the MTM loss, since as the credit standing of the underlying deteriorates the market value of the CDS position increases.

Sensitivity analysis measures “the extent of marked-to-market changes due to the underlying risk factors of both instruments, the hedged item and the hedging instrument”. (Felsenheimer, Gisdakis, Zaiser, 2006, Pg. 448) One key risk source that has a significant impact on the MTM value for both the bond and the CDS is the credit curve for the respective name. The sensitivity analysis focuses on the impact of a change in the spread curve. SpreadDV01 measures the sensitivity of the MTM value to a one bp shift in the spread curve. The analysis incorporates shifting the credit spread curve by one bp and recalculating the price of the cash bond. The difference between the MTM values before and after the shift is the sensitivity of the bond market value to a one bp parallel shift in the credit spread curve. The same procedure can be used for the single name CDS. That is the credit spread curve is shifted by one bp and the CDS is revalued. The difference between the MTM values

before and after the shift is the sensitivity of the CDS to a one bp parallel shift in the credit spread curve. By comparing the two values, the degree with which the cash bond position is hedged regarding credit spread risk can be examined. (Felsenheimer, Gisdakis, Zaiser, 2006, Pg. 450-451)

A key difficulty with hedging the spread risk is the divergence between the CDS premium (or spread) and the credit spread on a cash bond. The basis can be zero, positive or negative. A positive basis means that the CDS spread is greater than the cash bond spread and a negative basis means that the CDS spread is lower than the cash bond spread. The basis is affected by several factors and may change over time. Factors that drive a positive basis incorporate the cheapest-to-deliver option, coupon step-ups in corporate bonds, technical default risk and a bond price of less than par. Negative basis is caused by funding issues, counterparty risk associated with the CDS, and new issues. (Gregory, 2003, Pg. 37-44)

A further point that needs to be analyzed is the convexity effect. This describes the change in the risk duration due to changes in spreads. (JPMorgan, 2006, Pg. 64-65)

5.3.2.5 Counterparty Risk - Country Risk

From a protection buyer's point of view, the country risk will change if the protection seller is located in another country. In this case, the pre settlement risk should be added to the country exposure relating to the protection seller. As well, if the reference entity is located outside of Germany, the relevant country exposure (based on the location of the reference entity) should be reduced.

If the bank takes the role of protection seller and the protection buyer is located outside of Germany, the country risk exposure needs to be adjusted to reflect the increase in pre settlement risk relating to the CDS. If the reference entity is located outside of Germany, the credit risk exposure will need to be increased to reflect the increase in country risk based on the location of the reference entity.

5.3.2.6 Portfolio Credit Risk

Portfolio risk is less than the sum of the transaction risks due to diversification. Correlation is a key factor to determining the level of diversification in the portfolio. (Caouette, Altman, Narayanan, 1998, Pg. 267-268)

Risk analysis approaches for portfolios may vary from simple to complex. Simple approaches may use a qualitative analysis and slice and dice the portfolio. They may manage concentration risk by setting limits on various regions, industry and banking segments. As well, limits can be set for transaction types and collateral. (Caouette, Altman, Narayanan, 1998, Pg. 242)

Alternatively, banks may use more complex methodologies to quantify the expected and unexpected losses associated with credit risks. The quantification of credit risk from a portfolio perspective involves the use of complex mathematical-statistical models. (Gaal, Plank, 1998, Pg. 72)

The transaction positions must be aggregated in bank-wide positions for counterparty, portfolio and product exposure in order to assess the impact of the CDS. The impact of the CDS needs to be incorporated in the bank's credit risk portfolio model. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 451)

In order for a credit risk model to adequately assess the risks it must be able to incorporate the risks from the product that is to be hedged and the single name CDS used for hedging. It should also include basis risk and counterparty credit risk. The software for CreditMetrics (CreditManager) from JPMorgan incorporates the single name CDS and the total return swap. However, the bank may need to do development work in order to complete an exact implementation and incorporate the different risks adequately. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 463-464) The single name CDS can be captured by the model if it provides a perfect hedge. The CreditMetrics model can also capture the spread risk. Basis risk resulting from maturity differences cannot be adequately incorporated. Pre settlement risk and double default risk are also ignored. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 474-475)

Creditrisk⁺, which was developed by CSFB, is a credit portfolio model that can only incorporate a single name CDS by adjusting the exposure that is hedged. For a single name CDS, the exposure of the credit is reduced by the amount that is hedged. Through this, the VaR is also reduced. Basis risk is not taken into consideration. Variable settlement payments are also not incorporated since the system does not know the price of the bond at the time of default. A further deficit is the lack of market value calculation for the CDS and the reference obligation. Therefore, only the default risk can be roughly incorporated. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 470-473)

5.3.2.7 Operational Risk

Risk management and evaluation for operational risk is generally completed on a qualitative basis. An operational risk framework incorporates an operational risk loss database, external data, operational risk inventory or self-assessment and risk indicators.

In accordance with the Sound Practices for the Management and Supervision of Operational Risk, "banks should identify and assess the operational risk inherent in all material products, activities, processes and systems". (Eller, Heinrich, Perrot, Reif, (Hrsg.), 2006, Pg.358) Before a new product is implemented the operational risk inherent in the product should be assessed. (Eller, Heinrich, Perrot, Reif, (Hrsg.), 2006, Pg.358) Incorporated in the operational risk assessment are the IT, staff, organizational and legal consequences of the product implementation. (Eller, Heinrich, Perrot, Reif, (Hrsg.), 2006, Pg. 145)

The MaRisk BTO 2.2.1 specifically requires that all legal agreements (master agreements, collateral agreements, credit derivative definitions) be analyzed by a department that is independent from the trading department with respect to their enforceability. (BaFin, 2005, Pg. 16) Legal risk requires a qualitative operational risk

analysis and assessment. A legal specialist (e.g. an external legal office) should examine the documentation and clauses and assess the key issues such as documentation, restructuring clauses and legal entities.

Specific operational risks associated with credit derivatives should be captured in the operational risk framework of the bank in order to ensure that they are incorporated in the operational risk calculations. This may require adding specific risk indicators for credit derivatives or questions to the self-assessment that capture model or legal risk.

5.3.2.8 Liquidity Risk

A single name CDS will impact two types of liquidity calculations. From a protection seller perspective, the single name CDS can be viewed as a contingency. This is defined as “outflows of funds that are uncertain by definition, since they are contingent upon some event”. (Bessis, 2002, Pg. 149) The cash flow is projected using qualitative analysis. Scenario analysis is used to analyze the risk. (Bessis, 2002, Pg. 149-150)

The protection buyer will need to examine the market liquidity of the single name CDS. For the valuation of CDSs, the hazard rate should be the implied rate of credit events based on the CDS documentation. However, sometimes, there is no market data for specific CDSs and therefore, the bank has to use a bond and the bond pricing function in order to imply the hazard rate. (Chaplin, 2005, Pg. 93) Although external data sources are available, the reliability needs to be assessed. Mark-it Partners is one market data source. The bank may need to use a process called data engineering in order to take data and extract “best guesses” for missing data. (Chaplin, 2005, Pg. 97-99) The risk management and evaluation process should include a qualitative analysis of the CDS curve generation and the incorporation of market data. It may be useful to use different sources and compare the results.

5.3.3 Risk Management

The risk management process incorporates risk mitigation, risk avoidance, risk transfer or risk diversification. Risk avoidance encompasses the limit system. In this case the bank is implementing the single name CDS for bond and loan hedging purposes. Therefore, this section will primarily focus on counterparty risk. Secondly, given that operational risk changes through the use of a single name CDS, this will also be briefly discussed.

5.3.3.1 Counterparty Risk – Pre Settlement Risk - Limits

As shown in section 5.2.3, the implementation of a single name CDS has a particular impact on counterparty risk. By using CDSs, the protection buyer exchanges credit default risk and to some extent credit spread risk for pre settlement and double default risk. The protection seller gains exposure to credit risk and pre settlement

risk. This needs to be incorporated in the limit system of the bank. The individual counterparty and country exposure limits as well as the risk type limit (e.g. credit risk) need to be reviewed in order to reflect the new product, single name CDS.

Regarding pre settlement risk, the bank may choose to set up a new limit for credit derivatives or incorporate the new exposure in the limit for other derivative products. The bank may also choose to split the pre settlement limit into a limit for the trading department and a limit for the department that is responsible for credit derivatives. In accordance with the MaRisk, management must approve all limits. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 452-453)

5.3.3.2 Counterparty Risk – Pre Settlement Risk - Netting

In order to reduce pre settlement exposure, the bank may decide to mitigate risk by implementing netting and collateral management.

Netting is a risk management technique used to reduce a bank's exposure to pre settlement risk. An ISDA Master Agreement is a contract between two counterparties that specifies all definitions, non-trade detail elements and laws governing specified products between two parties. It enables the parties to execute one agreement and transact multiple transactions through a confirmation as opposed to completing documentation for each trade. (Schwartz, Smith, 1997, Pg. 637-638) The ISDA documentation contains a standard clause, which is known as netting. This means that if the counterparty defaults on one trade with the other counterparty, then it automatically triggers a default on all the remaining transactions. (Hull, 2006, Pg. 493) The ISDA documentation clearly defines events of early termination and bankruptcy. In both cases, the bank can then net out all of its exposure from each individual transaction under the agreement. (Schwartz, Smith, 1997, Pg. 238-243) In the case of a legally enforceable netting agreement the current exposure equals the sum of all positive and negative current market values from transactions closed under the agreement as opposed to the sum of all positive transactions. (Caouett, Altman, Narayanan, 1998, Pg. 333-334)

While netting reduces direct risk exposure, it may increase legal or documentation risk associated with the enforceability of the agreements. The MaRisk, BTO 2.2.1, requires that an organizational unit independent of trade analyze the legal documentation in order to assess to what extent the agreements are legally enforceable in the relevant jurisdictions. (bank-verlag köln, 2006, Pg. 33)

As with other derivative products, single name CDSs can be closed under an ISDA Master Agreement. If the bank has implemented netting and the CDSs are transacted under an ISDA agreement, they can be netted with a bank's derivatives portfolio to reduce pre settlement risk exposure. However, the legal enforceability of netting of CDSs is not guaranteed in all jurisdictions (e.g. France). Documentation can be analyzed using legal opinions provided by ISDA and the bank's legal department. It may in some cases be necessary to exclude the CDS from the netting portfolio.

5.3.3.3 Counterparty Risk – Pre Settlement Risk – Collateral

Collateralization is a method used to mitigate credit risk. A collateralization agreement (e.g. ISDA Credit Support Annex) encompasses all relevant aspects of exchanging collateral. A collateralized transaction is one in which a bank has current and potential credit exposure, which is hedged or partially hedged by collateral that is posted by a counterparty. (Basel Committee on Banking Supervision, 2006, Pg. 32) The collateral agreement can be “two-way”, which means that both counterparties have to post collateral based on the market value of the transaction or portfolio of transactions or it can be “one-way” which means that only one party has to post collateral. (Hull, 2006, Pg. 494)

In order to be useful, netting is a prerequisite for collateralization since, under an ISDA Master Agreement, the risk in the case of default is the net exposure and not the gross exposure. Therefore, the net exposure should be collateralized.

While collateralization clearly mitigates credit risk, it leads to other risks. It is therefore sometimes considered a risk transformation technique. The main risks associated with collateralization are operational risk, legal risk, market risk on the collateral assets, concentration and correlation risk. (ISDA, 2005, Pg. 24-25)

Collateralization eliminates the MTM exposure but it does not completely eliminate counterparty risk of a single name CDS. If a counterparty goes bankrupt, it can take time within the bank to realize that collateral is no longer being posted and declare that the counterparty has breached its contract. The market value of a CDS can move daily and hence may no longer be fully collateralized. In this case the bank is exposed to pre settlement risk for the uncollateralized amount. (Chaplin, 2005, Pg. 40)

The second issue refers to the counterparty jump risk. If the reference entity defaults or its credit standing deteriorates due to bad news, the market value of the CDS may change significantly during one day. Collateral is posted the next day based on the calculations at the end of the day. Depending on whether the market value of the CDS is positive or negative, there may be an overnight pre settlement risk. If the counterparty is positively correlated with the reference entity, it may default during the day potentially leaving the bank with a significant uncollateralized position. An assessment of correlation risk can be made by analyzing default simulations under which the counterparty defaults in a short time. (Chaplin, 2005, Pg. 289-291)

If the bank has implemented collateral, then it must be ensured that the ISDA Credit Support Annex is enforceable in all relevant jurisdictions and the CDSs can be included in the collateralized portfolio.

Double default risk is also relevant for collateralized swap portfolios. In this case it is the joint default risk of the counterparty and the issuer of the bond that is delivered as collateral. Also, it holds that the combined default probability of the counterparty and the collateral is smaller than the probability of default of the counterparty. (ISDA, 2005, Pg. 13)

If the bank already collateralizes its derivatives portfolio, CDS collateralization needs to be a part of the NPP process. If it is intended on closing CDSs under the existing

ISDA documentation, it needs to be ensured that the single name CDS can be collateralized in relevant jurisdictions and that the collateral management unit of the bank can handle the CDS.

5.3.3.4 Portfolio Credit Risk

The goal of portfolio risk management is to have a bank-wide counterparty risk management system. It is important that all counterparty risks are incorporated into the system and to have a bank-wide VaR limit for counterparty risk, which will incorporate all of its dimensions (e.g. credit risk, spread risk, pre settlement risk, double default risk). (Burghof, Henke, Rudolph, Schönbucher, Sommer,(Hrsg.), 2005, Pg. 376-377)

The protection buyer's and seller's credit portfolio exposure will be affected through the CDS. Hence, the limits set for the credit portfolio will need to be reviewed and potentially altered in order to reflect the differences resulting from the use of CDSs. This incorporates strategic risk limits for concentration risk. This may incorporate country limits, industry limits, rating class limits or regional limits. (Burghof, Henke, Rudolph, Schönbucher, Sommer,(Hrsg.), 2005, Pg. 378)

5.3.3.5 Operational Risk

The NPP serves as a key risk management tool for operational risk. It must be ensured that the bank's staff, processes and technology can handle a single name CDS. The operational risk manager can assess the level of operational risk and any need for action by analyzing the new product concept for single name CDSs.

5.3.4 Risk Control and Communication

A key requirement in this segment is that the management of the bank receives a report on the risk situation and the results of the scenario analysis. The MaRisk sets this requirement in relation to the type, volume, complexity and risk of the business. The report must describe the situation and then provide an evaluation of the risk. If required, the report should incorporate recommendations for action. (Eller, Heinrich, Perrot, Reif, (Hrsg.), 2006, Pg. 83)

The risk positions resulting from the single name CDS should be incorporated in the risk report of the bank. Main components should include the current credit risk, possible risk developments (e.g. scenarios) and utilization of the current limits. In the cases where limits have been exceeded, the report should also encompass recommendations for exposure reduction. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 453)

6. Other Aspects of the New Product Process

The implementation of a single name CDS will involve all the main departments of the bank: Treasury, back office, finance and controlling, regulatory reporting, risk controlling, strategy, internal audit, organization and compliance. Each of these departments will need to analyze the implications of the new product for their department. The new product concept should incorporate how each department intends on handling the new product. After the concept for a single name CDS has been completed by all relevant departments, the NPP coordinator can request approval from management to begin the test phase.

This section provides a brief outline and general description of other key aspects of the NPP that need to be considered when implementing a single name CDS. It is not intended to be as comprehensive as the risk section and hence will require further research and analysis for an NPP.

6.1 Regulatory Considerations

The following regulatory requirements are applicable to the single name CDS:

- Principle I for the calculation of regulatory capital
- Large Exposure Reporting (§§ 13 and 13a KWG), which regulates the amount of exposure that a bank may have to a client and can be considered a minimum requirement for diversification
- Regulation on Million Credits (§ 14 KWG), which require banks to report credits, which within a specified period have exceeded Euro 1.5 mio.

(Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 541)

In 1999, the German Federal Financial Supervisory Authority (BaFin) published Circular (10/99), "Treatment of Credit Derivatives in Principle I According to Sections 10, 10a of the German Banking Act (Gesetz über das Kreditwesen – KWG), and under the Large Exposures and Million Loan Reporting Regime" that incorporates CDSs, TRSs and credit linked notes. For other derivatives, BaFin approval must be obtained before they can be used to reduce regulatory risk exposure. (BaFin, 1999, Pg. 2) The rules constitute an interim paper until the Basel Committee on Banking Supervision clarified the treatment of credit derivatives. (BaFin, 1999, Pg. 1)

Since there are different regulations for the banking and the trading book, the single name CDS must be allocated to the banking book or the trading book in accordance with KWG Section 1 (12). While the regulators are aware that there are differences between the single name CDS and classical CRT products such as guarantees, regulators allow the protection buyer to recognize it in the form of a guarantee if it is allocated to the banking book. (BaFin, 1999, Pg. 1 & 9)

The Circular (10/99) stipulates certain general requirements that must be met in order for a protection buyer to use a single name CDS for regulatory risk reduction purposes:

1. Whether the CDS is allocated to the banking book or the trading book, the protection buyer must be able to show the regulators that the credit risk has been unconditionally transferred from the protection buyer to the protection seller. This requirement is generally fulfilled if the CDS has been closed under the ISDA documentation and is legally enforceable in all relevant legal jurisdictions. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 542)
2. The credit event must incorporate at a minimum the insolvency of the reference entity. (BaFin, 1999, Pg. 5)
3. The reference obligation in the single name CDS must be sufficiently similar to the hedged credit position. The criteria for similarity depend on whether the CDS is allocated to the trading book or the banking book. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 543)
4. If the CDS is allocated to the banking book, the maturity of the hedged position must match the maturity of the single name CDS. If this is not the case and the remaining maturity is less than one year, the risk reduction cannot be taken into account. In other cases, a back-end-risk must be incorporated in the calculation for the unhedged exposure. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 543-544)

Exhibit 6-1 shows the risk considerations according to the current regulations:

Exhibit 6-1: Explicit Regulatory Risk of a Single Name CDS

Product/Risk Type	Counterparty Risk					Market Risk		Operational Risk			Liquidity Risk		Other Risks	
	Credit Risk	Pre Settlement Risk	Double Default Risk	Country Risk	Credit Spread Risk	General Market Risk	Specific Market Risk	Operational Risk	Model Risk	Legal Risk	Funding Risk	Market Liquidity Risk	Basis Risk	Portfolio Risks
Banking Book														
Protection Buyer	X													X
Protection Seller	X													X
Trading Book														
Protection Buyer		X				X	X							X
Protection Seller		X				X	X							X

Source: Own Development

For the credit risk calculation of the banking book credit risk, the current regulations allow the protection buyer to exchange the rating of the reference obligation with that of the protection seller. Hence, the protection buyer is still exposed to credit risk. The pre settlement risk and the double default risk are not considered in order to avoid double counting. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 551-553)

A single name CDS hedges credit default risk and depending on the credit event definition to some extent specific market risk. The market value of the primary credit or bond position will not be perfectly correlated with that of the hedge position. Therefore, specific market risk is a relevant risk for both the protection seller and the protection buyer for the Principle I calculations. (BaFin, 1999, Pg. 7) General market risk is only taken into consideration if the premium is paid periodically. (BaFin, 1999, Pg.10)

Pre settlement risk is relevant for the trading book. The protection buyer is exposed to regulatory pre settlement risk if the premium is paid in advance. If the premium is paid periodically, the protection seller is subject to pre settlement risk. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 553)

From a regulatory perspective, portfolio risks only incorporate large exposure reporting and million credit reporting. The single name CDS needs to be incorporated

in both of these calculations. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 553)

When examining Exhibit 5-1 and Exhibit 6-1, it becomes evident that the regulatory risk analysis provides a good basis for the comprehensive risk content analysis. The regulators focus on the risks that are incorporated in the MaRisk and for which a bank must calculate regulatory capital based on Principle I.

Basel II allows banks to reduce counterparty exposure by hedging with credit derivatives. The extent to which the single name CDS can reduce risk exposure is firstly dependent on whether it is allocated to the trading or banking book and secondly, the approach used by the bank to measure credit risk. (Deloitte, (Hrsg.), 2006, 277-292) Basel II offers two basic approaches, standardized and Internal Ratings-Based (IRB), for the calculation of regulatory capital for credit risk. The main differences between the approaches are based on the degree with which the bank can use internal methods to calculate parameters for measuring credit risk. The IRB methodology is divided into a foundation and advanced approach. With the standardized approach, the credit rating is based on external ratings whereas with both of the IRB approaches, the bank uses an internal scoring system to determine the counterparty rating. The bank also can use more of their own estimates for PD, LGD and EAD when using the IRB advanced approach. (Hartmann-Wendels, Pfungsten, Weber, 2007, Pg. 390-391) Basel II stipulates comprehensive requirements that need to be met for CDSs to be used for capital reduction. (Deloitte (Hrsg.), 2006, 277-292) Basel II is currently being implemented via the EU in Germany as described in Section 1.1.

When implementing a single name CDS using the NPP, the regulatory experts of the bank will need to analyze the above regulatory requirements in order to assess the implications of a single name CDS for regulatory reporting. It will then need to describe how it intends on handling the new product and incorporate this into the new product concept.

6.2 Accounting

The accounting treatment for credit derivatives is based on the German Principles of Orderly Accounting (GoB). (Jaud, 2006, Pg. 482) Relevant Accounting Principles are "Vermögensgegenstand und das Verbindlichkeitsprinzip" (The Asset and Liability Principle) and the "Grundsatz der Nichtbilanzierung schwebender Posten" (The Principle of Off-Balance-Sheet Pending Transactions). This relates to HGB 243 (1) HGB and §§ 246 to 256 HGB. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 238-240)

The HGB differentiates between treatment of products in the banking book and products in the trading book. Hence, based on the HGB, the bank will either allocate the single name CDS to the banking book or to the trading book. In cases where the bank uses the CDS to hedge a position, it should be allocated to the banking book. If the CDS is used for speculation purposes it should be allocated to the trading book. In cases where the CDS is used to hedge a credit risk from the trading portfolio, it should be allocated to the trading book. (Jaud, 2006, Pg. 484)

The accounting treatment of a single name CDS that is allocated to the banking book is analogous to the accounting treatment of guarantees. The accounting treatment of a single name CDS in the trading book is aligned with the accounting treatment of option products. Since the single name CDS meets the criteria of pending transactions, they are considered “off-balance-sheet” products for accounting purposes. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 242)

As with the accounting treatment of a single name CDS, the valuation treatment of credit positions that are hedged by the CDS, depends on the objectively proven use of the CDS and the intrinsic value of the CDS. Whether or not an underlying credit exposure can be written down or not is dependent on the credit standing of the protection seller. If the credit standing of the protection seller is very good, then the protection buyer may not write down the credit position should this deteriorate. (Jaud, 2006, Pg. 484) Both as protection buyer and seller, the bank needs to review the HGB laws regarding the necessity for taking loan loss provisions or provisions on contingencies or bond write-offs.

Finally, the legal requirements (HGB requirements) for reporting of CDS positions in the annual reports and specifically the “risk report” need to be reviewed. The Deutsche Rechnungslegungs Standards Committee e.V. (DRSC) published the „Risikoberichterstattung der Kredit- und Finanzdienstleistungsinstitute“. The bank must include a section on counterparty risk which is to cover the credit portfolio and other positions that are exposed to counterparty risk. Hence, although there is no specific mention of credit derivatives, they must be incorporated. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 257)

The International Accounting Standards Committee (IASC) promotes guidelines for international institutes with the goal of providing transparency for capital market players. The International Accounting Standards Board is responsible for approving the accounting standards (International Financial Reporting Standards (IFRS) or previously International Accounting Standards (IAS)). A key concept is fair value accounting which is based on MTM accounting.

A key issue for the accounting treatment of the single name CDS under the IAS (IFRS) is whether they qualify as a financial guarantee or whether they are considered a financial instrument. If the CDS is classified as a financial guarantee then IAS 37 (IFRS 4) is applicable; otherwise the product is classified as a financial instrument and IAS 39 applies. (Felsenheimer, Gisdakis, Zaiser, 2006, Pg. 521-522)

The discussion of whether a CDS should be accounted for under IAS 39 or IAS 37 is being revisited. The IASB intends on classifying all CDSs as financial instruments and hence they would all be accounted for using IAS 39. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 254-256)

6.3 Other Aspects

Aside from the integration in the organizational structure and processes, the single name CDS needs to be incorporated into the IT workflow of the bank. The CDS must be input into the relevant front- and back-end IT systems. The systems should be able generate a market value for the bond or the loan position that the CDS hedges.

If the bank has implemented derivatives, the front-end system can generally be adjusted to incorporate the CDS. Processes such as deal input, deal adjustments and deal ticket generation are usually supported by the front-end system. The deal needs to be transferred to the back office system where further processes such as setting-up the counterparty, interest rate fixings, confirmation matching and the generation of information for accounting is completed. CDS specific features such as credit event monitoring and the settlement process will need to be defined and incorporated in the back office system. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 506-507) Given that in general there is limited straight through processing and deficits in the IT systems, the bank will need to define a number of manual processes and ensure that the staff can manage the workflow.

The front-end or back-end systems often have interfaces to other systems in the bank such as regulatory reporting, risk management and control, accounting, client management, market data (e.g. interest rates and credit spreads) and collateral management. All of these interfaces will need to be analyzed in order to ensure that the CDS is transferred properly. (Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 507) This may require the use of manual workaround solutions until appropriate changes to the interfaces have been made.

7. Conclusion

Section 7 is divided into two sections. Section 7.1 summarizes the key results of the study and section 7.2 provides an outlook for the next steps.

7.1 Key Results of the Thesis

The thesis examined the risk analysis and assessment of the implications for risk management and risk control of a single name CDS for a new product concept. In order to complete an accurate risk analysis, the bank must first define the context in which the CDS will be used and all relevant parameters. Different parameters will have an impact on the risk assessment. For example if the CDS is used as a trading instrument, the focus will be more on market risk as opposed to counterparty risk. If the CDS is a part of a structure, the analysis will be significantly more complex. As well, if the underlying is an ABS as opposed to a rated company, a different pricing methodology will be required. In this case the single name CDS was to be used to hedge bond exposure or credit exposure to large rated investment grade companies. Secondly, the bank intended on using the CDS to manage credit concentration risk.

The implementation of a single name CDS as a hedge or risk management instrument means significant changes to the risk profile of the bank. Aside from the main risk categories that are defined in the MaRisk, counterparty risk, operational risk and liquidity risk, the bank needs to consider new risk types such as double default risk, basis risk and portfolio credit risk when implementing a single name CDS as a new product. As well, the bank requires a new pricing methodology in order to be able to calculate the MTM value of the new product.

There are significant implications for risk management and risk control from the implementation of the single name CDS. The new product requires the bank to develop new methodologies (e.g. for the calculation of double default risk) and adjust current methodologies (e.g. for the calculation of pre settlement risk). Credit portfolio calculations need to be changed in order to incorporate the single name CDS.

The example of a single name CDS demonstrates very clearly the importance and the complexity of completing a thorough risk content analysis and assessing the implications for risk management and risk control before commencing business activities in a new product. From a business perspective, if this process is not completed accurately, the bank's financial figures may be grossly misrepresented in that the bank's reserves for expected losses, capital charges, ROE and risk-return calculations may be incorrect.

In spite of its importance, the process for risk content analysis of a new product is not clearly defined in the MaRisk or related literature. Hence, a bank should develop this in accordance with their NPP and risk management and risk control processes.

Aside from risk content analysis, the bank needs to consider several other aspects for the NPP. The regulatory requirements show that there will be a difference in the economic capital and the regulatory capital since the regulators take a more simplistic view on the risks inherent in a single name CDS. Accounting considerations also need to be analyzed in order to ensure that financial statements are accurate. The CDS needs to be integrated into the bank's IT systems and processes. This may involve the development of a number of workaround solutions.

The new product concept is only one element of the NPP. Other components incorporate the identification of a new product, product categorization, new product concept and test phase (incl. final report). These are well defined in the MaRisk and related literature.

Overall, the thesis not only provides a basis for understanding the NPP and the risk content analysis, the example of a single name CDS serves to demonstrate the significance of this process. Through this product, it can be seen that the NPP is not merely an administrative requirement, but can add significant value to a bank.

7.2 Outlook – Next Steps

As a next step, the bank needs to research the remaining areas of the NPP concept and determine how it intends on integrating the single name CDS into the systems and processes of the bank. Once the NPP concept has been completed and quality assured, approval must be obtained from the Board to enter into the test phase. After successfully completing the test phase, the Board can approve the commencement of business activities in the single name CDS based on the final report.

Given that the bank's strategy is to use credit derivatives for hedging purposes and to manage concentration risk, other credit derivative products such as first-to-default baskets should be researched.

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III. Appendix 1

The following general (Table 1) and specific (Table 2) requirements are applicable to a single name CDS and need to be considered when implementing them as a new product.

Table 1: MaRisk: General Requirements Relevant for Credit Derivatives

Requirement	Description
Overall responsibility of the management (MaRisk AT 3)	<ul style="list-style-type: none"> All managers are irrespective of their internal roles, responsible for the proper business organization and developments. This incorporates appropriate strategies and the implementation of reasonable internal controls. Hence, they are responsible for all of the key elements of risk management and control.
Strategies (MaRisk AT 4.2)	<ul style="list-style-type: none"> The use of credit derivatives needs to be taken into account for the business strategy and specifically incorporated in the credit strategy.
Risk-bearing capacity (MaRisk AT 4.1)	<ul style="list-style-type: none"> Risk strategy, risk capital and risk management and controlling need to incorporate credit derivatives.
Internal control system (MaRisk AT 4.3)	<ul style="list-style-type: none"> The organizational structure, risk control and risk management processes must take the complexity of the products into consideration. Credit derivatives must be incorporated in the processes and workflows of the bank. Specifically they need to be incorporated in risk, reporting and IT.
Organizational and operational structure (MaRisk AT 4.3.1)	<ul style="list-style-type: none"> Risk management and control need to be segregated organizationally from those units entering into the transactions whether these are the underlying transactions or the credit derivative transactions.
Processes for identifying, assessing, treating, monitoring and communicating risks (MaRisk AT 4.3.2)	<ul style="list-style-type: none"> The risk control and monitoring system of the bank, scenario analysis and risk reports will need to be changed to reflect the impact of credit derivatives on the bank's risk profile.
Internal audit (MaRisk AT 4.4)	<ul style="list-style-type: none"> Internal audit must use a risk oriented approach. They must be risk focussed and independent. Specifically they must judge the effectiveness and appropriateness of risk management and control in the bank.

Requirement	Description
Organizational guidelines (MaRisk AT 5)	<ul style="list-style-type: none"> • Business in credit derivatives must be conducted on the basis of organizational guidelines which include organizational and operational structure, processes for the identification, assessment, reporting and communication of risk, rules for internal audit and other relevant workflows and manuals. • Organizational guidelines must also ensure that all legal aspects are followed.
Requirements for trading business processes (MaRisk BTO 2.2)	<ul style="list-style-type: none"> • Credit derivatives must be closed at fair market prices. Exceptions must be clearly documented.

Source: Burghof, Henke, Rudolph, Schönbucher, Sommer, (Hrsg.), 2005, Pg. 431-432, 450-451

Table 2: MaRisk: Specific Requirements Relevant for Credit Derivatives

Requirement	Description
<i>Credit Process</i>	
Procedure for the early detection of risks (MaRisk BTO 1.3)	<ul style="list-style-type: none"> • The bank is required to implement an early warning system for risks. The goal of the process is to enable management to apply countermeasures at the earliest stage. Early warning indicators should be used to identify the risks based on quantitative and qualitative risk features.
Further processing of loans (MaRisk BTO 1.2.2)	<ul style="list-style-type: none"> • A key requirement is the regular assessment of counterparty risk and the regular control of the valuation and legal validity of collateral.
<i>Credit Portfolio</i>	
Requirements for lending business processes (MaRisk BTO 1.2)	<ul style="list-style-type: none"> • This section must be applied and covers the assessment of the risk content of the loans. This process utilizes the risk classification or risk scoring procedure as a part of the lending procedure or ad hoc evaluation. • This enables the analysis of the credit portfolio structure.
Counterparty risks (MaRisk BTR 1)	<ul style="list-style-type: none"> • Concentration risk must be analyzed and monitored.
<i>Individual Transaction Risk</i>	
Risk classification procedure (MaRisk BTO 1.4)	<ul style="list-style-type: none"> • The risk classification process must incorporate quantitative and where possible qualitative indicators.

Requirement	Description
Intensified loan management, treatment of problem loans and risk provisioning (MaRisk BTO 1.2.4, BTO 1.2.5, BTO 1.2.6)	<ul style="list-style-type: none"> • The risk classification system must incorporate criteria for determining when a loan requires intensive management and when a loan should be transferred to an area that specialises in restructuring and winding up the loan. • As well, the system must develop criteria to identify when risk provisions for expected losses need to be taken.
Monitoring of loan processing and requirements for lending business processes (MaRisk BTO 1.2.3 BTO 1.2)	<ul style="list-style-type: none"> • There should be a process for monitoring loan documentation clauses and the timely submission of required lending documents to enable an assessment of the risk. • As well, there should be a process for monitoring overdue documents.
Strategies and counterparty risks (MaRisk AT 4.2, BTR 1)	<ul style="list-style-type: none"> • Credit risk information concerning the credit portfolio and individual transactions should be incorporated in a risk report that enables management to understand the characteristics and the risks of the loan portfolio in regular intervals. • Key information concerning the risk of the bank should be delivered to the management, the key responsible staff and the internal audit as soon as significant changes occur in order to ensure that decisions can be taken in a timely manner. • Depending on the significance and types of changes, strategies may need to be adjusted.

Source: Hannemann, Schneider, Hanenber, 2006, Pg. 437-438

IV. Eidesstattliche Erklärung

Ich erkläre hiermit an Eides Statt, daß ich die vorliegende MBA-Thesis selbstständig und ohne unerlaubte fremde Hilfe angefertigt, andere als die angegebenen Quellen und Hilfsmittel nicht benutzt und die den benutzten Quellen wörtlich oder inhaltlich entnommenen Stellen als solche kenntlich gemacht habe.

Ort, Datum

(Unterschrift)