

Managing Credit Risk in Banks: A Study of Credit Default Swaps

Suresh Chandra Bihari

Abstract

Credit derivative is one kind of arrangement which allows one party to transfer, for a premium, the defined credit risk, computed with reference to a notional value, of a reference asset which may or may not owned by one or more other parties. Credit Default Swaps(CDS) have existed since the early 1990s, but its use has become increasingly popular over time. CDS is the fastest growing segment of the privately negotiated derivatives business as many firms depend on it to efficiently manage the financial market risks inherent in economic activities.

The diversification function is especially important for active CDS market participants as banks. CDS banks can achieve their loan portfolio diversification which provides them with increased capacity to expand their lending.

Keywords : Credit Risk, Credit Default Swaps, Banks

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I. Introduction

Credit derivative is one kind of arrangement which allows one party to transfer, for a premium, the defined credit risk, computed with reference to a notional value, of a reference asset which may or may not owned by one or more other parties. It includes Credit Default Swap, Total Return swap, Credit linked notes, Credit spread option etc.

Credit Default Swaps(CDS) have existed since the early 1990s, but its use has become increasingly popular over time. The market increased tremendously between 2002 and 2007, gross notional amounts outstanding grew from below \$2tr to \$62.2tr¹⁾. CDS helps whole markets because it provides an effective means to hedge and trade credit risk, CDS allows financial institutions to manage their exposures, in better way and investors benefit from a magnified investment universe.

CDS is the fastest growing segment of the privately negotiated derivatives business as many firms depend on it to efficiently manage the financial market risks inherent in economic activities, CDS have created a vibrant, liquid marketplace for trading. The development

of the CDS enables more capital to be available for financing.

II. Description

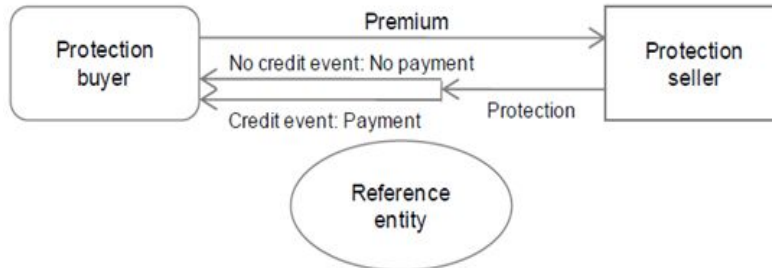
A Credit Default Swap(CDS) can be a form of insurance. In insurance there are basically two parties while in case of CDS there are mainly three parties. If a borrower of money does not repay his/her loan or defaults and lender has purchased a CDS on that from an insurance company, the lender can then use the default as a credit to swap it in exchange for a repayment from an insurance company.

CDS is a one type of contract which provides insurance against the risk of a default by a particular company, and this company is known as the reference entity and a default by the company is known as a credit event. Credit events can be any clause from a set of specified events which include the most common occasions like, bankruptcy, obligation acceleration, failure to pay, repudiation/moratorium, restructuring, obligation default etc... The buyer obtains the right to sell a particular bond issued by the company for its par value when a credit event occurs, and this bond is

1) <http://www.isda.org/statistics/pdf/ISDA-Market-Survey-annual-data.pdf>

known as the reference obligation and the total par value of the bond which

can be sold is known as the CDS' notional principal.



<Figure 1> Mechanism of Credit Default Swap

Source: CHRISTIAN WEISTROFFER(2009), Deutsche Bank Research–Credit Default Swaps: Heading towards a more stable system, p. 4.

A CDS is a bilateral contract negotiated directly between parties as shown in <Figure 1>, in which one party, known as a protection buyer agrees to pay premiums to another party, known as a protection seller over a period of time in return for compensation if a credit event occurs to a reference entity. Referred Annexure – I, Premium is calculated to cover the expected loss of reference entity. There are mainly two parameters to determine the CDS premium²⁾.

$$\text{CDS premium} = (\text{probability of default}) * (1 - \text{recovery rate})$$

Where, recovery rate is the % of the face value of our bond that we get back if credit event occurs.

Premiums, CDS Spreads are expressed in basis points per annum and are usually paid quarterly over the year to insure against default of the reference entity. CDS contracts are normally set within five years.

1. Settlement

Now whenever a credit event occurs, CDS contracts can either be physically settled or cash settled. In some situations it's also settled through Auctions.

In cash settlement:

The protection seller pays the buyer the difference between par value and the market price of a debt obligation of

2) CHRISTIAN WEISTROFFER, Deutsche Bank Research (21st December, 2009) – Credit Default Swaps: Heading towards a more stable system.

the reference entity. For an example, a fund has bought \$50mn (notional principal amount) worth of insurance/protection from a bank on the senior debt of a company. This company has defaulted and its senior bonds are now trading at 20% on the dollar (mid market price) since the market believes that senior bond holders will receive 20% of the money they are owed the company is wound up. Then after the bank must pay $\$50mn \times (100\% - 20\%) = \$40mn$.

In physical settlement:

The protection seller pays the buyer par value and in return he / she takes delivery of a debt obligation of the reference entity. For an example, a fund has bought \$50mn worth of insurance / protection from a bank on the senior debt of a company. In the credit event, the bank will pay the fund of \$50mn cash and the fund must deliver \$50mn face value of senior debt of the company.

An auction (a credit-fixing event) is held to facilitate settlement of a large number of contracts at once, at a fixed cash settlement price. During the process participating dealers submit prices at which they would buy and sell the reference entity's debt obligations, as well as net requests for physical settle-

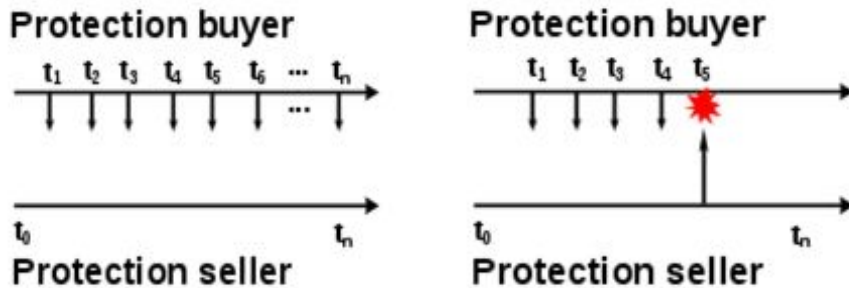
ment against par. According to the International Swaps and Derivatives Association (ISDA) – an organizer, auctions are effective tool to settle the very large volume of outstanding CDS contracts written on companies.

Until 2005, physical settlement was mostly used (with a share of 73%) and cash settlement accounted for 23%, and only 3% of contracts were settled by fixed amount according to the British Bankers Association (BBA 2006). Now days, cash settlement is becoming more widely used because of the incorporation of auction settlement procedures in standard CDS contracts.

2. Illustration

From the (Figure 2), given below we understand that the buyer purchased a CDS at time t_0 and makes regular premium payments at times t_1, t_2, t_3 and t_4 .

In the first case credit instrument suffers no credit event, so the buyer continues paying premiums at t_5, t_6 and soon until the end of the contract at time t_n . In the second case, credit instrument suffers a credit event at time t_5 , so the protection seller pays the buyer for the loss and the buyer would cease paying premiums.



<Figure 2> Process of premium payment³⁾

Assume that two parties entered into a 5 year CDS contract on 1st March, 2000, and the notional principal amount is \$10mn and the buyer agrees to pay 80 basis points annually for protection against default by the reference entity.

If credit event is not happened then the buyer receives no payoff and pays \$80,000 on 1st March of each of the years, till 2005. Now assume that credit event is happened say on the half way through the 4th year. From here there are two ways of settlements. First, if CDS contract is defined physical settlement then the buyer has the right to sell \$10mn par value of the reference obligation for \$10mn. Second, if CDS contract is defined cash settlement then according to calculation, the cash payoff would be $\$10mn \cdot (100\% - 25\%) = \$7.5mn$, where

25 is the mid market value of the reference obligation a predesignated number of days after the credit event.

3. CDS vs. Insurance

Many people believe that CDS is same as option or insurance contracts, but CDS is very handy as proxies for the general credit of the reference party. CDS trade is an easy and global market that replicates the cash bonds market. A cash bond arises only when the reference entity actually issues the same, CDS trades can take place without any actual funding.

A CDS appears a lot like an insurance contract because the protection buyer pays a premium and in return, receives a sum of money if credit event occurs.

3) http://en.wikipedia.org/wiki/Credit_default_swap

On the whole, CDS is not the equivalent of insurance policies. There are some differences and reasons which indicate that CDS and insurance are two different things.

- In the case of CDS, the protection buyer does not have to own the underlying security or other form of credit exposure. While in the case of insurance, to purchase insurance, the insured is expected to have an insurable interest like owning a debt obligation.
- The protection buyer does not have to suffer any loss in order to recover on the CDS.
- The CDS provides an equal payout to all holders, according to market-wide method. And an insurance provides an indemnity against the losses which actually suffered by the policy holder.
- The protection seller does not have to be a regulated entity.
- The protection seller is not required to maintain any reserves to pay off buyers, but the major CDS dealers are subject to bank capital requirements.
- CDS differ from insurance with regard to tax, accounting and in regulatory jurisdictions.
- There is difference in the approaches used for pricing. The ac-

tuarial analysis is used to determine the cost of insurance. CDS are derivatives whose cost is determined by financial model and by arbitrage relationships with other credit market instruments like loans and bonds.

- To cancel the insurance contract the buyer can simply stop paying premium, and in the case of CDS the protection buyer need to unwind the contract which might give profit or loss.
- Insurance contract require the disclosure of all kinds of known risks involved. And unlike insurance companies, protection sellers of CDS are not required to maintain any capital reserves to guarantee payment of claims.
- CDS does not require the protection seller to hold considerable capital reserves in order to be short on the protection.
- The majority of insurance contracts are not tradable and CDS is traded on the OTC market.

III. CDS-Diversification and Risk Reduction

“Do not put all the eggs in one basket” – is the best to reflect the concept of diversification, especially in investor environment. If an investor invests all

money to buy the stocks of the one company then there is a very high probability of losing everything in case if company goes bankrupt. On the other side if the investor holds stocks of the different companies whose economic performance is negatively correlated or you can say the risk if one company defaults does not exert any significant influence on the whole portfolio because other companies' performance will advance in the opposite direction.

As an example, a financial manager of the company ABC owns a large portfolio of bonds issued by the company XYZ and he expects that spreads on that bond will temporarily increase in the short run. If he wants to avoid or reduce this credit risk than he can sell the bonds directly and as a result this may crystallize a market to market loss.

The secondary market for the bond is relatively illiquid mainly due to the seasonal reasons and because of this transaction costs of selling a bond are very high. Moreover, such sell of bonds at a loss can severely hurt the long term investment strategy of the company ABC. So, the financial manager of the company ABC could enter into CDS contract on the side of the protection buyer for the short term investment strategy.

Now, in case if the bond spreads do increase, the value of CDS contract will also increase and then the financial manager could sell the CDS contract at a profit in the secondary market. Thus, in any case the financial manager of the company ABC will lose nothing and if the situation advances as expected even gain from selling CDS.

The diversification function is especially important for active CDS market participants as banks. CDS banks can achieve their loan portfolio diversification which provides them with increased capacity to expand their lending. As an example, a bank holding a large loan portfolio on its balance sheet which may be reluctant to further extend its loan book that sometimes can lose potential clients that could not good for the business. However, there is a way to avoid or reduce the risk of losing potential clients is that to grant the loan and to buy a CDS at the same time. So, the bank will achieve the aim of diversification without jeopardizing the relationship with clients. From the protection seller perspective CDS can be considered as an opportunity to portfolio diversification and simultaneously increasing its returns and lowering the credit risk.

In technical way you can say that, Credit default swaps(CDS) is a one kind of counterparty agreement which allows transfer of third party credit risk from one party to the other. Under it, a lender who faces credit risk from a third party, can transfer risk to a counter party who agrees to insure the risk in exchange of regular instalments. If the third party defaults, the insurer will have to purchase the defaulted asset from the insured party and inturn insurer will pay the remaining interest and the principal to the insured. Here we can say that CDS is basically a contract which is a pure credit risk transfer mechanism isolating the credit risk from the interest risk, exchange risk, and liquidity risk.

1. Arbitrage

An arbitrage is referred to the investor with the intention to profit from price difference between two markets by simultaneous establishment of short and long positions.

In the CDS transaction arbitrage relies on the fact that a company's stock price and its CDS spread should exhibit negative correlation or in other words, if company's outlook improves then its share price should go up and its CDS

spread should tighten, because it is less likely to default on its debt. And if company's outlook worsens then its CDS spread should widen and its stock price should fall.

If a company's share price has dropped by some percentage and its CDS spread has remained unchanged then investors might expect to increase the CDS spread relative to the share price. Therefore a basic strategy would be to go long on the CDS spread or start buying CDS protection while simultaneously hedging oneself by buying the underlying stock. This would benefit if the CDS spread widening relative to the equity price and lose money if the CDS spread tightened relative to its equity.

2. Hedging

This is the other way to eliminate or reduce the risk of default. The bank could sell the loan outright. However, the bank may not be viewed a lack of trust in the borrower which could damage the relationship with clients and simply may not want to sell or share the potential profits from the loan. So, by buying a CDS, the bank can lay off the default risk while still keeping the loan in portfolio. The downside to this hedge

is that without the default risk, a bank may have no motivation to actively monitor the loan and the counterparty has no relationship to the reference entity-the borrower.

Although CDS has been highly criticized for their role in the recent financial crisis, most observers conclude that using CDS as a hedging device has a useful purpose.

3. Speculation

This is opposite to hedging. A speculator takes an open position based on some forecasts in hope to gain from the future market price movements. As an example, if the speculators believe that a stock is overpriced they may short sell the stock and wait for the price of the stock to decline until a certain point at which they will buy back the stock again and gain a profit. Speculators are vulnerable to both the downside and upside movements of the market, thus you can say that speculation is extremely risky but at the same time extremely profitable.

The investor might buy CDS protection on a company to speculate that it is about to default or you can say that the investor might sell protection if it

thinks that the company's creditworthiness might improve. The investor selling the CDS can be viewed as being long-term on the CDS and the credit as if the investor owned the bond.

CDS opened up an important new broadway to speculators. Investors could go long on a bond without any advanced cost of buying a bond, just promise to pay in the credit event. As an example, assume that Corporation AAA (the reference entity) will soon default on its debt, so it buys \$100mn worth of CDS protection for two years from a bank, at a spread of 300 basis points or 3% per annum.

- If Corporation AAA defaults after, say one year then the hedge fund will have paid \$3mn to bank and then will receive \$100mn thereby making a profit. Bank and its investor will incur a \$97mn loss minus recovery unless the bank has somehow offset the position before the default.
- If Corporation AAA does not default then the CDS contract will run for two years and the hedge fund will have ended up paying \$6mn, without any return, thereby making a loss. Bank, by selling protection, has made \$6mn without any upfront investment.

The hedge fund could decide to liquidate its position after a certain period of time in an attempt to realize its gain or loss.

- Say, after one year, the market considers that Corporation AAA is more likely to default, so its CDS spread has widened from 300 to 1500 basis points (or 3% to 15%). The hedge fund may choose to sell \$100mn worth of protection for one year to bank at this higher rate. Therefore over the two years the hedge fund will pay the bank \$6mn ($2 \times 3\% \times \100mn) and receive \$15mn ($1 \times 15\% \times \100mn), giving a total profit of \$9mn.
- In other situation, after one year the market considers risky much less likely to default, so its CDS spread has tightened from 300 to 200 basis points (or 3% to 2%). The hedge fund may choose to sell \$100mn worth of protection for one year to bank at this lower spread. Therefore over the two years the hedge fund will pay the bank \$6mn ($2 \times 3\% \times \100mn) and will receive \$2mn ($1 \times 2\% \times \100mn), giving a total loss of \$4mn.

This loss is smaller than the \$6mn loss which would have occurred if the second transaction has not been entered into.

Speculators create a more competitive marketplace to keep down the prices for hedgers. A rugged market in CDS can also serve as a barometer to regulators and investors about the credit health of a company or country.

Here in short, we see that with the help of CDS allocation of credit risk (default risk) becomes more efficient in the financial market. Moreover, CDS can be considered as a low risk and low cost method to generate cash. In terms of accounting, we can say that CDS is an unfunded instrument and does not appear as a liability on the balance sheet. So, this off-balance sheet issue is an important difference between the cash and derivative instruments and enables investors to leverage up their credit risk exposure.

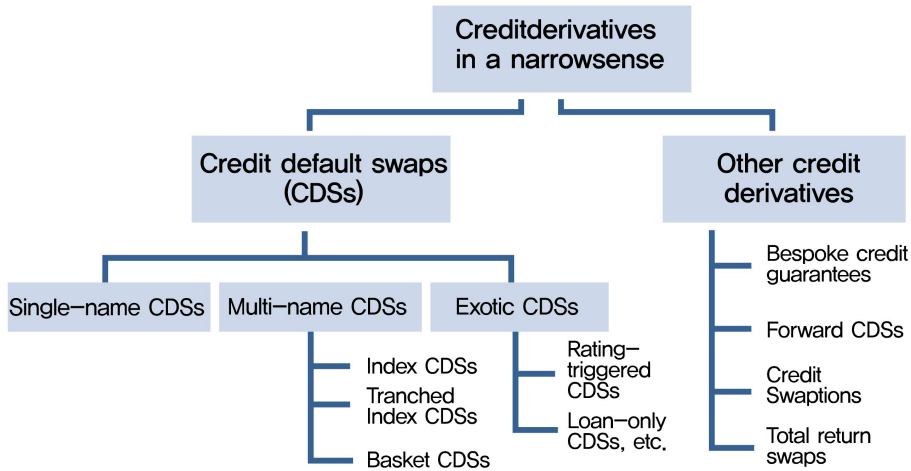
As we know that coin has two sides, same way CDS has also some drawbacks which are mostly covered by CDS positive part. According to contract the protection seller can use to assure ability to reimburse the protection buyer in case a credit event happens, but the protection buyer faces the counterparty risk from the seller side or you can say the protection buyer will suffer from so called double default if the protection seller and the reference entity both fail

to meet their obligations. Lehman Brother Case is an example of it: As fear spread in the whole market that Lehman Brothers would not be able to meet its debt obligations (the cost of debt protection), CDS went straight high. Although company tried to raise additional liquidity to cover its CDS holdings, it did not work and finally the company declared bankruptcy. As a result the market got frozen and the banks stopped lending each other, overnight lending spreads went straight high. The financial crisis officially started by that time.

According to Bloomberg, "it is believed that CDS contributed to the recent turmoil on financial markets and served as a weapon of mass destruction exaggerating the systematic risk. However, the latest attempts to control the destructive force of the credit derivative for the market by means of enhancing the regulation over the instrument, bringing it on the stock- exchange and solving the transparency issue might approve CDS in the face of investor who seeks to diminish the risk of his financial portfolio."

CDS has various forms depending on the underlying reference entity and other varying contractual definitions. The most commonly used CDS is based on single-name (corporate or sovereign borrowers) and CDS based on various entities (multi-name CDS). According to the BIS Triennial Survey 2007, single and multi-name CDS add up to 88% of the overall credit derivatives market. And according to BBA, 63% of credit derivatives are either single-name or index products. Survey of 31st December, 2010 of DTCC said that, single-name reference entities account for 57 %, indices 33% and tranches 9 % of notional amount outstanding.

IV. Types of Credit Default Swap



<Figure 3> Tree of Credit Default Swap⁴⁾

- **Single name CDS:** according to its name, the reference entity is an individual corporation, bank or government.
- **Indexed CDS:** it is linked to an index or a tranche of indices. It is issued on a multiple reference entity. For example, a number of entities consisting an index with each entity having an equal share of the notional amount of the debt outstanding. These types of CDS are characterized by a high level of standardization. It differentiates by transparency which has contributed strongly to the market growth. There are mainly two indices on the index linked CDS market: (1) CDX index: it is consisting of 125 North American investment

grade firms. (2) iTraxx index: it is containing 125 European companies which are mainly represented by those with the credit rating above BBB.

- **Basket CDS:** there is a specified group of reference entities and a payoff when the first of these reference entities defaults. This is similar to indices as they relate to portfolios of reference entities which can contain from 3 to 100 names. Moreover, it may be more customized than index CDS and more opaque in terms of their volumes and pricing.
- **Contingent CDS:** in this, the payoff requires both a credit event and an additional trigger which can be a credit event with respect to another

4) CHRISTIAN WEISTROFFER, 21st December, 2009. Deutsche Bank Research- Credit Default Swaps: Heading towards a more stable system, p. 7.

er reference entity or a specified movement in some market variable.

- **Loan CDS:** in it, the credit exposure of an underlying loan is swapped between two parties. Its structure is same as a regular CDS, except that the underlying reference entity is limited strictly to the syndicated secured loans rather than any loan or bond. It is generally trade at tighter spreads.
- **Funded CDS:** the protection seller makes an initial payment which is used to settle credit events. The main point of it is that the protection buyer is not exposed to the counterparty risk of the protection seller.
- **Dynamic CDS:** in this, the notional amount which determining the payoff linked to the mark to market value of a portfolio of swaps.
- **Binary CDS:** the payoff in the event of a default is a specific dollar amount.

V. History

CDS came into the early 1990s with early trades carried out by Bankers Trust in 1991. Then after JP Morgan & Co. came up with modern CDS in 1994 and in 1997

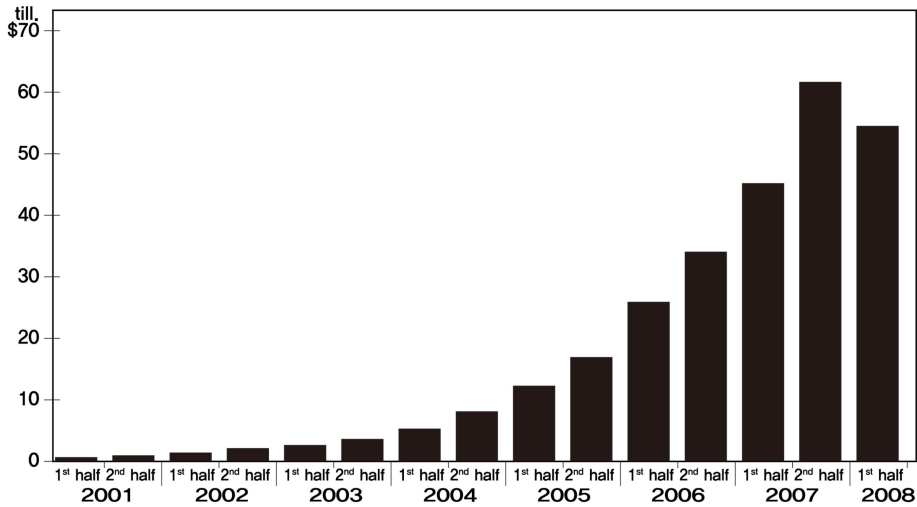
it developed a proprietary product named BISTRO-Broad Index Securitizes Trust Offering which used CDS to clean up a bank's balance sheet. The importance of BISTRO was that it used securitization to split up the credit risk into pieces which smaller investors found more absorbable because most of the investors are lacked to accept very high credit risk all at once. Now a day it is known as synthetic collateralized debt obligations(CDOs).

By March 1998, the global market for CDS was estimated at about \$300bn and JP Morgan alone accounting around \$50billion of this⁵⁾. In 2000, CDS became largely free from regulation by both the U.S. Securities and Exchange Commission(SEC) and CTFC-Commodity Futures Trading Commission. Initially the market share highly enjoyed by the banks and then more and more asset managers and hedge funds saw trading opportunities in it. By 2002, investors (as speculators) dominated the market. In USA, National banks started to use CDS in early 1996 and in that year, the size of the market around \$10bn, and at the end of year 2002 the outstanding amount was over \$2 trillion according to the

5) <http://www.ft.com/cms/s/2/51f425ac-351e-11de-940a-0144feabdc0.html?ftcamp=rss#axzz1JefsUY82>

Office of the Comptroller of the Currency measurements. The market size became doubled in size each year from \$3.7 trillion in 2003 to \$62.2 trillion by the end of 2007. To fuel the ex-

ponential growth of CDS, factors like emerging of extended market, ISDA regulations, index trading began on a large scale and grew rapidly in 2004 etc... played a major role.



<Figure 4> Credit Default Swap(Notional Amounts Outstanding)⁶⁾

Source: Bloomberg, International Swaps and Derivatives Association

According to Fitch(survey-2009) out of 26 banks which are the major players on the CDS market 5 represented by JPMorgan, the Goldman Sachs Group, Morgan Stanley, Deutsche Bank and the Barclays Group account to 88% of the total notional amount bought and sold. From the survey by the Bank of International Settlements(BIS 2007), prior to the financial meltdown, the number

of players using CDS to hedge and trade credit risk continued its breathtaking growth. With more participants jumped into the market in the last decade, the CDS market has grown enormously.

According to ISDA - Report 2009 the face value of notional amount outstanding has increased from \$10,000bn to \$60,000bn between 2005 and 2007⁷⁾.

6) October (2008), Elliot Wave International(www.elliottwave.com)

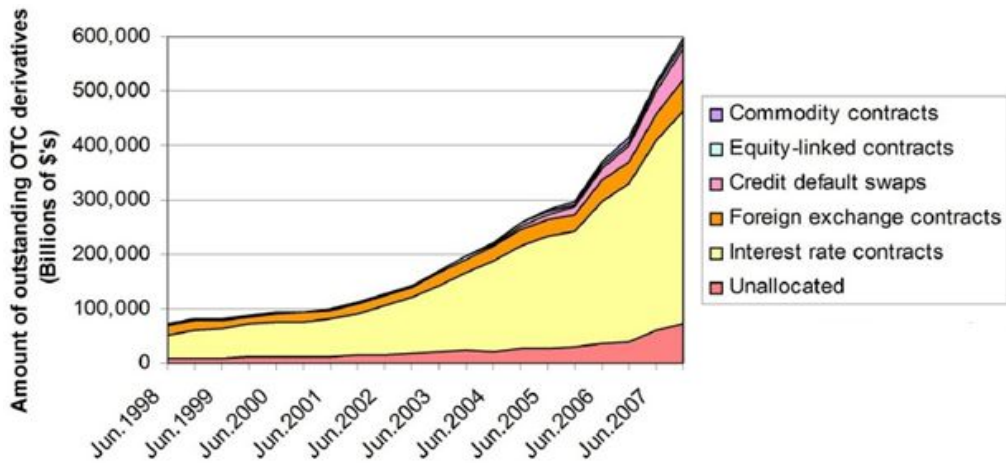
7) <http://www2.isda.org/functional-areas/research/surveys/market-surveys>

(USD billions; 31 March 2009)

Institution	Bought		Sold	
	Notional	Gross Market value	Notional	Gross Market value
JPMorgan	3,834	514	3,668	479
Goldman Sachs Group	3,430	N/A	3,170	392
Morgan Stanley	3,200	432	3,093	399
Deutsche Bank ¹⁾	6,191 ²⁾	411	N/A	363
Barclays Group ¹⁾	6,033 ²⁾	269	N/A	248

Sources: 10-Q SEC regulatory filings and annual reports.
 1) Data as at 31 December 2008.
 2) Total notional amounts bought and sold.

<Figure 5> TOP five CDS dealers⁸⁾



<Figure 6> Amount of outstanding OTC derivatives⁹⁾

In 2008 there was no exchange or clearing house for CDS transactions; they traded on over the counter(OTC). This led to recent calls for the market transparency and regulation. In November 2008, DTCC, which runs a warehouse for CDS trade confirmations accounting

for around 90% of the total market¹⁰⁾, announced that it will release weekly market data¹¹⁾ on the outstanding notional amount of CDS trades and whole details can be accessed on the DTCC's website. In early 2009, several fundamental changes to the way CDS operat-

8) European Central Bank(2009), p. 21.

9) <http://www.bis.org/statistics/derdetailed.htm>

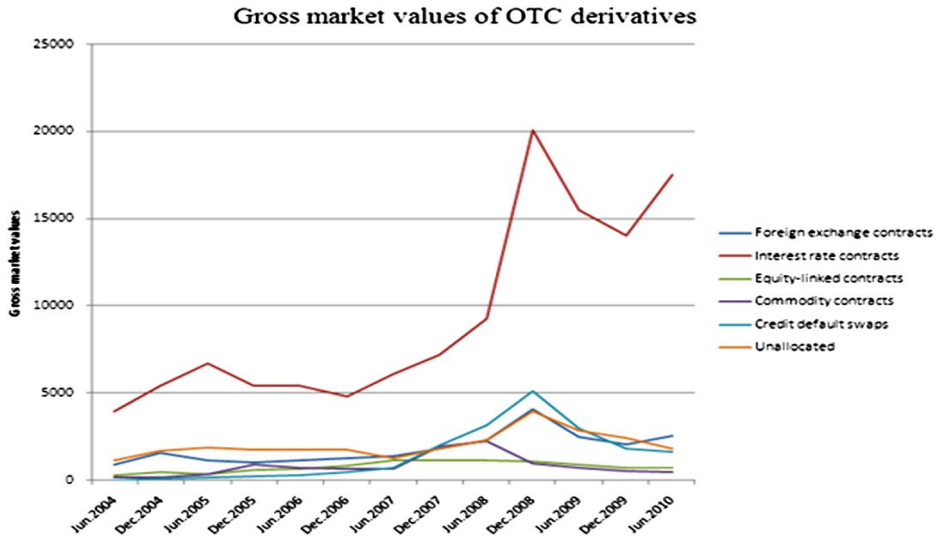
10) http://www.dtcc.com/news/newsletters/dtcc/2009/mar/tiw_transparency.php

11) <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aZYSaaTg9xJg&refer=europe>

ing and resulting from concerns over the instruments' safety after the financial crisis of 2008 (by the end of 2008 notional amount outstanding had fallen to 38 %).

From the original data¹²⁾ we analyzed the data from 2004 to 2010 and its result is given in Annexure - II. And from that we can say that the role of CDS in OTC derivatives is 2.47% (notional amount

outstanding) and 1.42% (gross market values) in 2004, and 5.20% (notional amount outstanding) and 6.75% (gross market values) in 2010. So the growth rate of notional amount outstanding and gross market values is 19.02%(avg) and 37.64%(avg) respectively from 2004 to 2010.



<Figure 7> Gross market values of OTC derivatives

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12) <http://www.bis.org/statistics/derdetailed.htm>

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