DEVELOPMENT OF CREDIT DERIVATIVE MARKETS: IMPLICATIONS ON MONETARY POLICY AND FINANCIAL STABILITY OF DEVELOPING ECONOMIES LIKE INDIA

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Abstract

In recent times the issue of credit risk management has been attracting a great deal of attention globally. Despite various structural developments risk-management practitioners and regulators are still overtly concerned about risk exposure and the issues related to credit default. The issue of the effects of distribution of credit in the economy and how it affects the role of the central banks as the lender of the last resort is addressed. Similarly, the use of credit derivatives may reduce the transparency within the financial system regarding allocation of risks and at the same time reduce the effect of money policy transmission. The problem of designing an appropriate regulatory structure are becoming more difficult with derivatives and off-balance sheet items, and are more difficult for developing countries, both because they are likely to face a shortage of good regulators and because they face greater risks Furman and Stiglz (1998).). In India, for instance, the Central Bank, has issued draft guidelines for banks and dealers to begin trading credit default swaps in the country to mitigate risks emerging due to such trading means. In the light of theses development, it is imperative to understand the impact of such credit derivatives instruments on monetary policy and the resultant financial stability, mostly for a developing economy like India. Against this backdrop, the present paper aims to analyze the development of credit derivative instruments as well as the aggregate effects of credit derivatives from a macro economic perspective. Significantly international experiences are used to study the implications for monetary policy operations and financial stability for a developing country like India.

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1. Introduction:

In recent times issue of credit risk management has been attracting a great deal of attention all over the world. Despite various structural developments risk-management practitioners and regulators are still overtly concerned about risk exposure and the issues related to credit default. Credit risk is defined as the loss associated with unexpected changes in credit quality, Duffe and Singleton (2003). It can be incurred through the issuance of loans, as also by taking positions in corporate bonds or transactions in over-the counter (OTC) markets, which might involve the risk of default by a counter party. However the issues of credit risk management in the Debt markets is complicated by problems related to market imperfections (i.e. adverse selection-moral hazard issues), relatively longer tenures of credit and skewed nature of credit risk. The probability of a debtor improving his credit worthiness is lower compared to the probability of deterioration in his credit worthiness. The introduction of Basel II norm has had pronounced effects on the pricing, trading and risk analysis of both private and public debt instruments. Capital ratios and regulation have been partially adjusted with derivatives in order to let them emerge in the balance sheets of banks and financial institutions. The Balance of Payments has an entry in Financial Accounts with the sum of all margins of international derivatives, which provides an idea of trading on these instruments. Many central banks have imposed further (in or off-balance) information disclosure norms on banks and financial institutions about their derivatives' investments.

The use of value at risk (VaR) model, which predicts the amount of money that a bank might loose in trading activities during a given time horizon, has prompted the introduction of more sophisticated methods to measure market risk and to implement the corresponding risk management procedures. It was in reaction to these conditions that new financial products like derivatives evolved in the last decade of the 20^{th} century. A derivative is a bilateral agreement that shifts risk from one party to another; its value is derived from the value of an underlying price, rate, or index. A credit derivative is an agreement designed explicitly to shift credit risk between the parties; its value is derived from the credit performance of one or more corporation, sovereign entity, or security. The rise of Credit derivatives can also be attributed to the demand by financial institutions, for a means of hedging and diversifying credit risks similar to those already used for interest rate and

currency risks, while at the same time provide for a low cost means for taking on credit exposure. The result has been that credit has gradually changed from an illiquid risk that was not considered suitable for trading to a risk that can be traded much the same as others. In India the Reserve Bank of India has issued draft guidelines for banks and dealers to begin trading credit default swaps in the country. In the light of these developments it is important that as we move forward we try to understand the impact of credit derivatives on monetary policy and the resultant financial stability.

The present paper aims to analyze the role of credit derivatives and its implications on monetary policy and financial stability as witnessed in the international market and draw conclusions for developing economies like India. It is maintained that use of credit derivatives may reduce the transparency within the financial system regarding allocation of risks and at the same time reduce the effect of money policy transmission. The problem of designing an appropriate regulatory structure are becoming more difficult with derivatives and off-balance sheet items, and are more difficult for developing countries, both because they are likely to face a shortage of good regulators and because they face greater risks Furman and Stiglz (1998). The remainder of this paper is structured as follows. The rest of the introductory Section contains an introduction to growth of global credit derivatives market, the credit derivative instruments and evolution of derivatives in India, the second section includes a brief review of literature on credit derivatives. In the third section an attempt is made to analyze the aggregate effects of credit derivatives from a macro economic perspective its implications for the financial system and the conduct of monetary policy is described. Section four discusses the implications for India and the last section presents a summary of the discussions.

1.1. The Growth of Global Credit Derivatives Market:

The restructuring of the world economy and a universal acceptance of “Liberalization” and “deregulation” of the financial markets including international finance has helped International trade to move from an “Increasing sum Game” to a “Zero-Sum-Game”, which can create a win-win situation for all concerned. Derivatives are prime instruments of this transition. Derivatives can be defined in broad terms as instruments that primarily derive their value from the performance of an underlying asset class. In other words a derivative is an agreement between two parties by which one party shifts its risk to another, the value

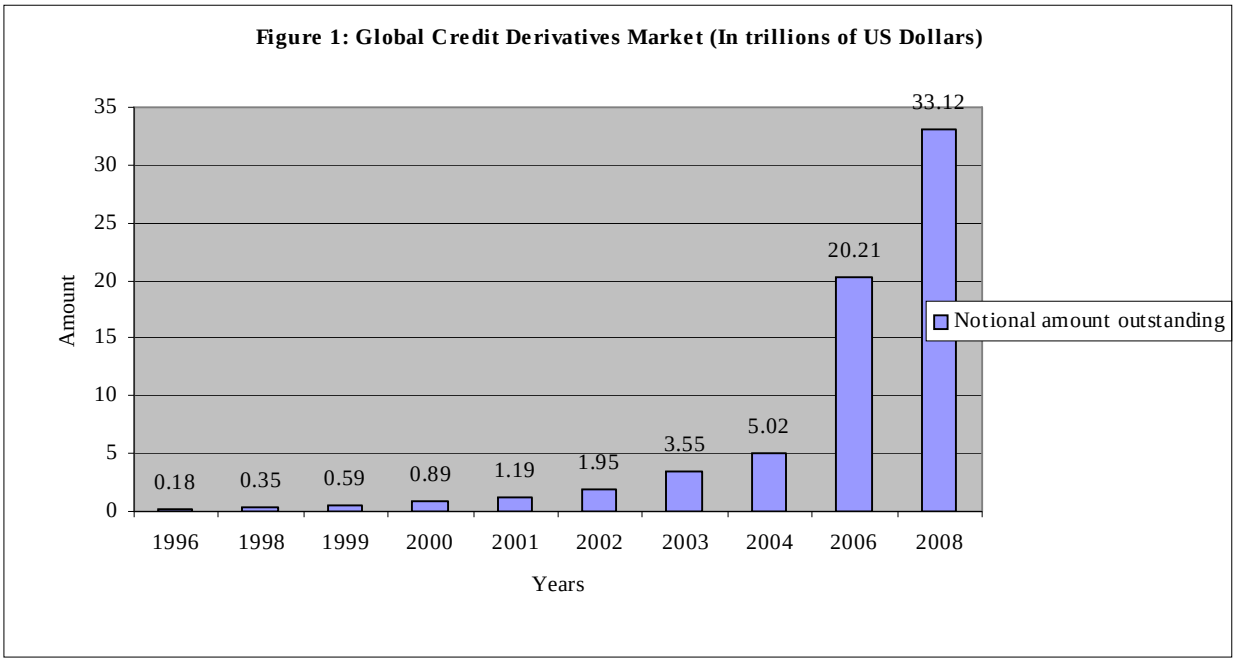
being derived from the value of an underlying asset. A credit derivative transfers the credit risk contained in a loan, interbank transaction or bond form one party to another. Credit derivative evolved in response to the need of financial institutions to hedge and diversify their credit risk. However the use of financial/credit instruments to provide protection against default is not exactly new. Letters of credit or bank guarantees have been used for sometime and today securitization is also a commonly used tool. Nevertheless credit derivatives exhibit some variations. First, they are closer to other financial derivatives as the credit derivatives trading takes place separately from the underlying asset. Second, credit derivatives are regularly traded. Third, trading take place through standardized contracts prepared by international Swaps and derivatives Association (ISDA), an association of market participants.

A vital feature of credit derivative is that they allow for trading and diversification of risk. Credit derivatives allow traders to package the risk inherent in a loan into tradable components. Thus the interest rate risk is isolated via interest rate swaps, the credit risk via credit derivatives and any exchange risk if present is mitigated via foreign exchange derivatives. As the risks can now be shifted to those who are willing to bear them, it will lead to increased allocation efficiency in the economy.

. In the credit derivatives markets bank and securities brokers-dealers generally serve as the product dealer, acting as the buyer or seller in derivative trading with end users or other dealers. The major dealers as estimated by Fitch Ratings (2005) were Morgan Stanley, Deutsche Bank, Goldman Sachs, JP Morgan Chase and UBS. End-users of credit derivatives include hedge funds, insurance companies, pension fund and mutual funds[1].

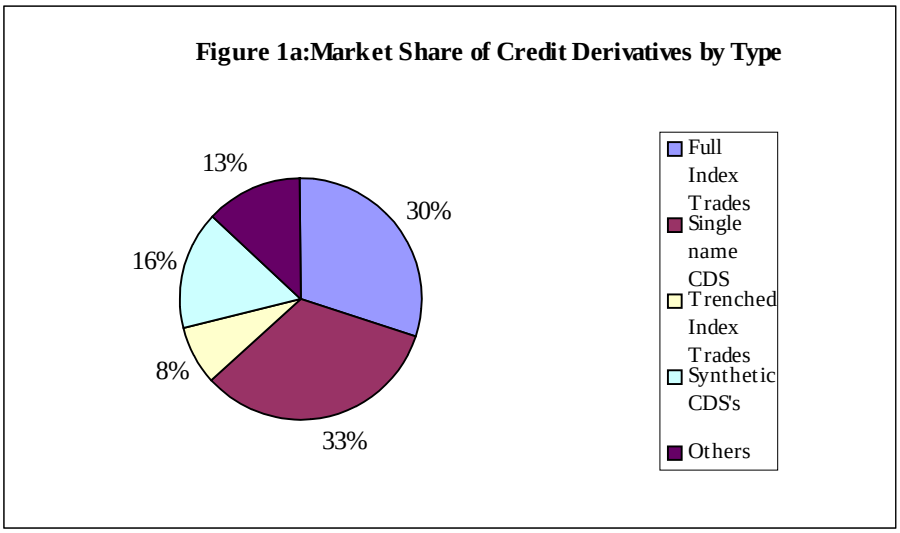
The isolation of credit as an asset class has made it highly popular among the market participants. Although it is difficult to assess the exact value of early trades the figure estimated for 1997 is in the region of USD 1801 billion, rising to USD 20.1 trillion in 2006. British Bankers Associations (BBA) estimates that the total notional value will be USD 33.1 trillion by the year 2008. Figure 1 illustrates this tremendous growth.

[1] The top five end-users of credit derivatives are banks and broker-dealers (44 percent), hedge funds (32 percent), insurers (17 percent), pension funds (4 percent), and mutual funds (3 percent). Ross Barrett and John Ewan, *BBA Credit Derivatives Report 2006* (London: British Bankers' Association, September 2006).



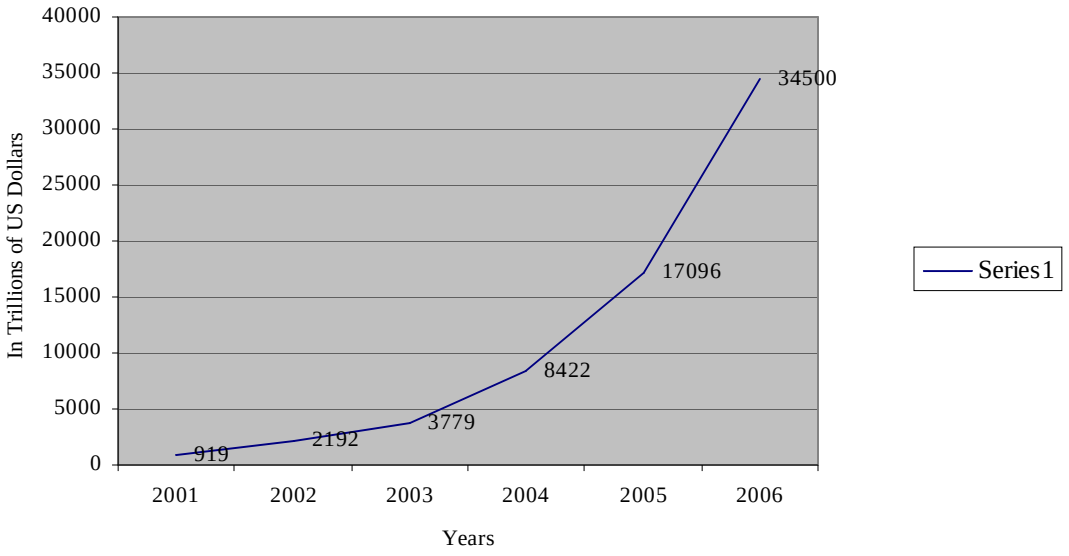
Source: BBA Credit Derivatives Report 2006

The report also points to the fact that the market share of single name CDS is the highest at 33 percent followed by full Index trades at 30 percent, Tranched Index trades (8 percent), Synthetic CDOs at 16 percent and others contribute 13 percent of the total trade.



Source: BBA Credit Derivatives Report 2006

Figure 2: Total Notional Amount of Credit Default Swaps Market, 2001-2006



Source: ISDA year end market survey, 2006

Where as the International Swaps and Derivatives Association's (ISDA) 2006 year end market survey of market participants shows that the credit derivatives market has grown increasing from an estimated total notional amount of nearly $1 trillion outstanding at year-end 2001 to over $34 trillion at year-end 2006 (see fig. 2). Part of this rapid growth has been attributed to product innovation and an increasing number of market participants, particularly hedge funds. Despite its expansion, the credit derivative market is still much smaller than the OTC interest rate derivatives market, which had a total notional amount outstanding of around $286 trillion at year-end 2006[2].

[2] The market for OTC interest-rate derivatives includes interest-rate swaps and options as well as cross-currency interest rate swaps. For example, an interest-rate swap is a transaction in which one party pays periodic amounts based on a specified fixed rate and the other party pays periodic amounts based on a specified floating rate that is reset periodically, such as the London Interbank Offered Rate, or LIBOR (the interest rate paid on interbank deposits in the international money markets).

Table 1: Credit Default Swaps Market
Notional amounts outstanding at end June 2007
(In Millions of US Dollars)

	Notional Amount of Outstanding Bought	**Notional Amount of Outstanding Sold**	**Total**
Total CDS Contracts	**32,978,816**	**32,917,150**	**32,580,424**
Reporting Dealers	23,285,488	23,345,600	23,315,544
Banks and Security Firms	4,854,748	4,737,297	9,592,045
Insurance and Financial Institutions	2,43,638	87,821	3,31,459
Others	4,133,411	4,326,409	8,459,820
Non-Financial Institutions	4,61,534	4,20,020	8,81,554
Single-name instruments	18,542,936	18,020,326	24,239,326
Multi-name instruments	14,435,880	14,896,824	18,340,948

Source: BIS Global Survey 2007Q2

BIS semi annual survey report for end June 2007 (Table 1) shows that the total CDS contracts stand at 32,580,424 billion US Dollars, while the single-name instruments have registered a total notional value of 24,239,476 billion US Dollars. The reporting dealers at 23,315,544 billion US dollars account for nearly 72 percentage of the total contracts. Other financial institutions account for the rest with banks and security firms being the major players at 9,592,045 billion US dollars. These values clearly point towards the role of market makers in efficient development of the derivatives market. As also the fact that banks as well as mutual funds, hedge funds etc are major sellers as well as buyers of protection in the international market. Single name instruments are at 24,239,476 billion US dollars but multiple name instruments are growing and stand at 18,340,948 billion US dollars. It clearly points to the evolution of the credit risk management function and the role of single and multi-name instrument in helping institutions mitigate their credit risk.

1.2. Credit Derivative Instruments:

Olivier Prato (2002) classifies use of credit derivatives as:

a) Hedging instruments, which allow an institution to hedge its risk on a counter party and at the same time, meet its capital requirements without really affecting its existing commercial interests with the counter party.

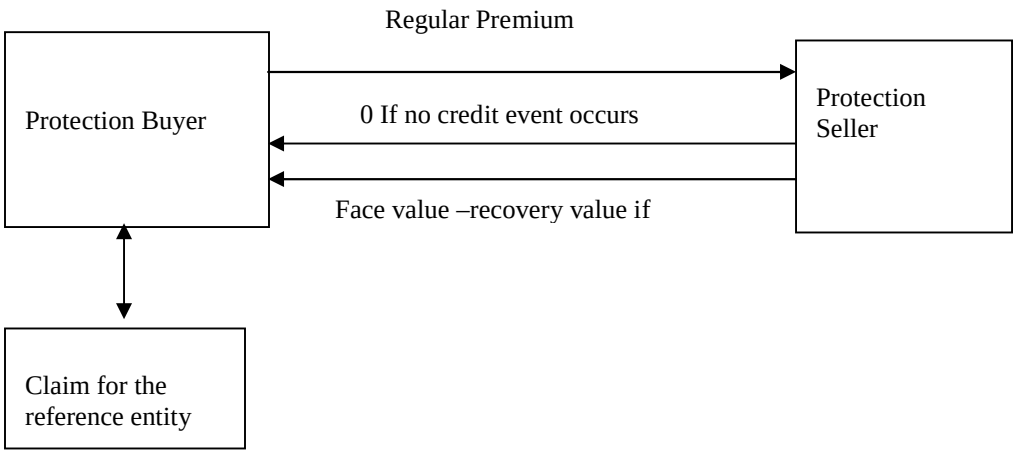
b) Investment Instruments, which permit a participant to acquire, counter party risk without having to provide funding or enter into a commercial relationship with the counter party.

c) Trading instruments, designed to generate a short-term capital gain over the expected path of credit risk.

Broadly, these instruments can be divided into two categories. **Unfunded credit derivatives**, which are purely synthetic transactions that incur no financing cost for the protection seller. And **funded credit derivatives** where the protection seller purchases a security or claim. **Unfunded credit derivatives** can be further subdivided into four types of instruments:

- **Credit Default Swaps (CDS):** Where a protection buyer agrees to pay a regular fee/premium to the protection seller, which in turn agrees to compensate the first institution for losses on the underlying asset if the reference entity experiences a credit event[3] during the contract period. A CDS carries a fee or premium that reflects the credit risk of the reference asset issuer and is usually quoted as a spread over a reference rate such as LIBOR[4] to be paid either upfront, quarterly or half yearly. If no credit event occurs during the contract period the contract is terminated at the end of the period with the protection seller receiving premium/ fee for his services as cash settlement or physical settlement as specified in the contract.

Figure 3: Credit Default Swaps

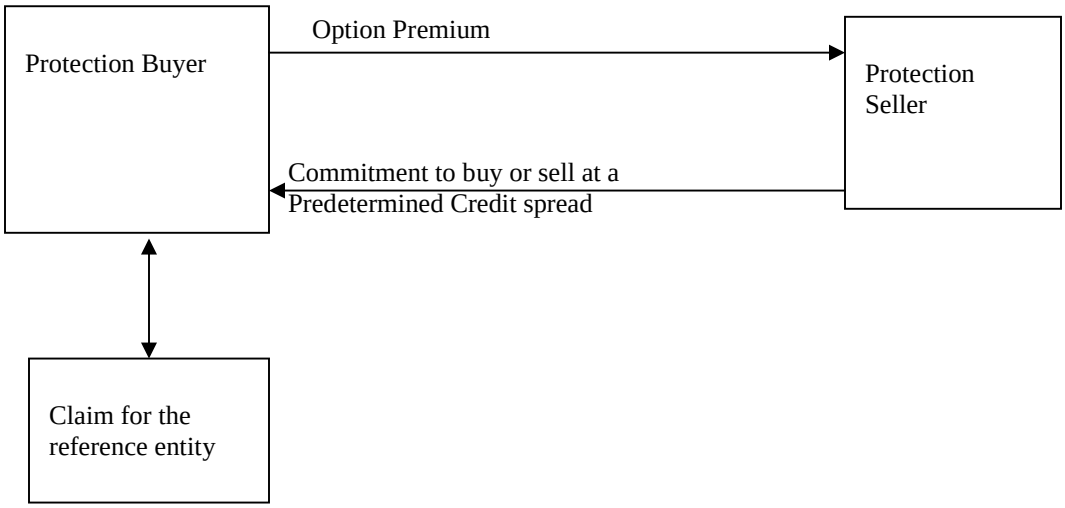


[3] Credit Events: Bankruptcy, insolvency or payment default, a stipulated price decline for the reference asset or a rating downgrade of a reference asset

[4] London interbank offered rate

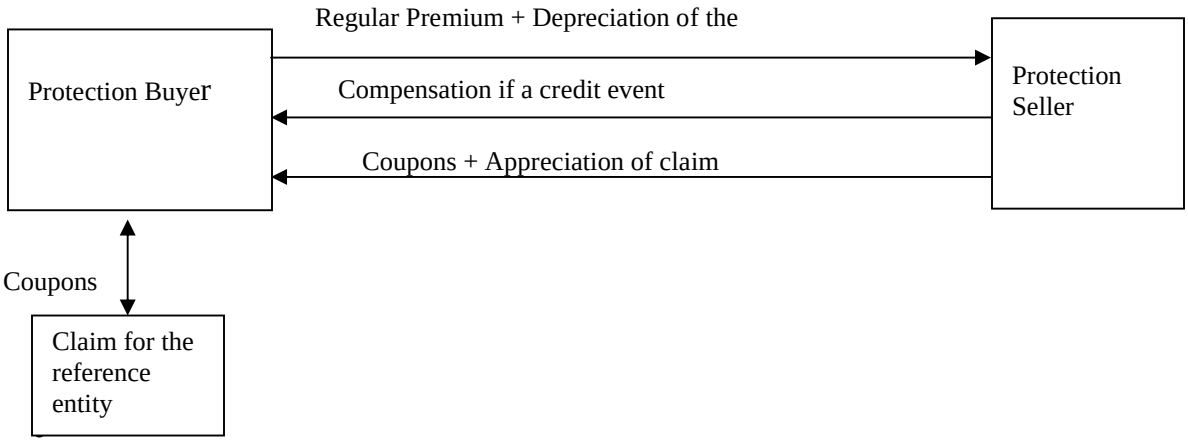
- **Credit Spread Options (CSO):** Credit spread options are designed to hedge against or capitalize on changes in credit spreads. A reference security is selected and strike spread and maturity are set. The payoff is based on whether the actual spot spread at the exercise date is over or under the spread on the reference security. The transaction may be either based on changes in a credit spread relative to a risk-free benchmark (e.g. LIBOR or U.S. Treasury) or changes in the relative spread between two credit instruments.

Figure 4: Credit Spread Options



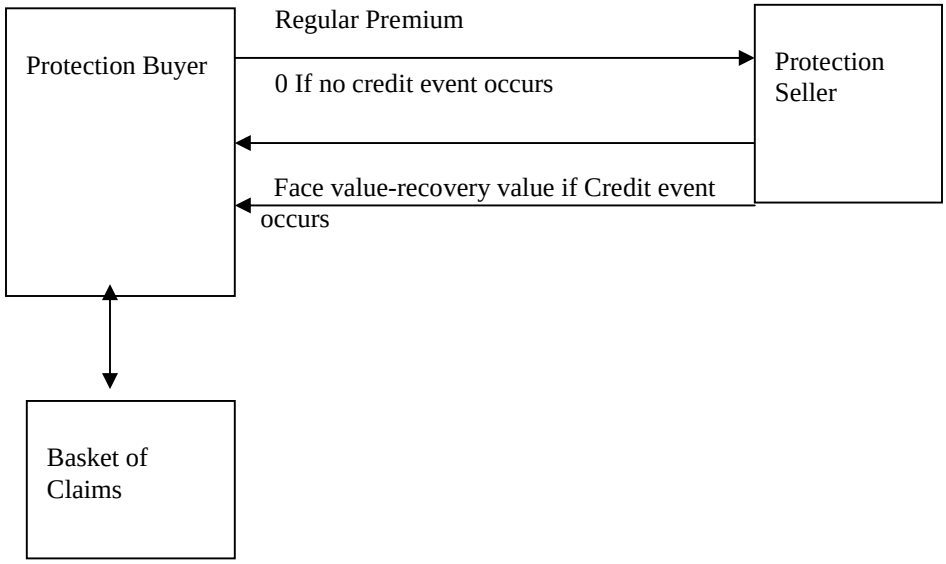
- **Total Rate of Return (TROR) swaps-** Here, the protection buyer and protection seller swaps flows, with the risk seller receiving the return on the asset plus any appreciation, and the risk buyer receiving a regular premium plus any depreciation in the asset value. Thus the protection seller takes all other risks in particular the interest rate risk.

Figure 5: **Total Rate of Return (TROR) swaps**



- **First to Default (FTD) swaps**: where risk seller agrees to pay a premium to the risk buyer, while the risk buyer undertakes to compensate the risk seller for losses on the first underlying asset of the basket which experiences a credit event.

Figure 6: **First to Default (FTD) swaps**

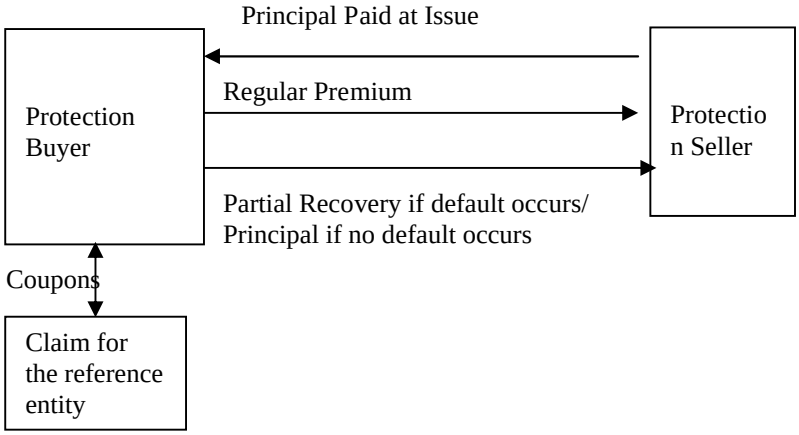


Funded Credit Derivatives:

i. **Credit Linked Notes (CLN)**: It is a synthetic security composed of individual instruments. The protection buyer issues a note whose pay off depends on the financial health of the reference entity. As CLN is based on CDS, the only risk transferred is the default risk. The protection seller

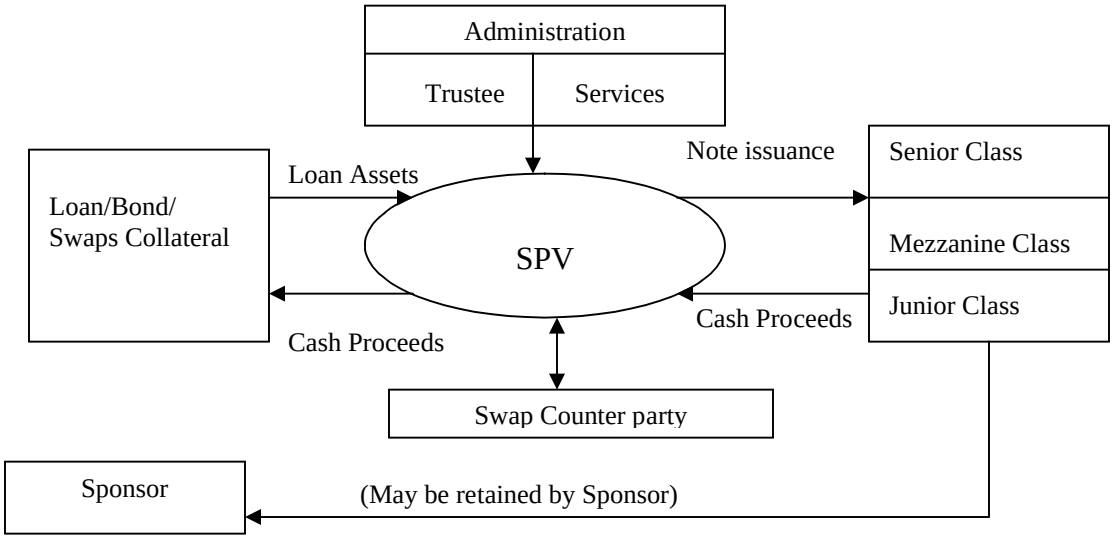
compensates the protection buyer for its loss by taking delivery of the claim in default at face value or by paying the difference between the market value and the face value of the claim in default. Hence CLN is the creation of a new bond without the involvement of the original debtor.

Figure 7: **Credit Linked Notes (CLN)**



ii. **Collateralized Debt Obligation (CDO)**: A synthetic CDO is a bond issue covered by debt, which remains on the balance sheet of the protection buyer. Depending on the form of the underlying asset, the CDO is applied in two forms, namely as "Collaterized bond obligation or a collateralized loan obligation" namely CBO or CLO. The transfer of credit risk takes place via special purpose vehicle (SPV) set up by the protection buyer. In CLO the default risk is transferred via a debt issue

Figure 8: Collateralized Debt Obligation (CDO)



and a special entity (SPV). SPV functions as the protection seller to the bank, which is why this type of security is classified as a synthetic asset. The bond issued by the SPV consists of two components (tranches) with investment grade credit quality. The two tranches differ in their exposure to default risks. From the debt issue, government bonds are bought which serve as collateral to offset losses in the underlying loan portfolio. This collateral portfolio is deposited with the SPV. The repayment to the investors at maturity (i.e. after five years) is contingent on the size and frequency of credit events in the underlying loan portfolio and on the respective component of the bond issue the investors bought. CLO constructions frequently contain an equity component that remains with the issuer and serves as the first level of protection against defaults in the underlying assets, while the subordinated and senior tranches provide the next levels of protection against defaults.

1.3. Derivatives in India:

Derivatives' trading in India was introduced after the promulgation of the securities law (amendment) ordinance, 1995, which withdrew the prohibition or options in securities. In 1998 the Securities Exchange Board of India (SEBI) set up a group under the chairmanship of Prof. J.R Varma to recommend measure for risk containment in derivative market in India. The report worked out the operational details of margining system, methodology for charging initial margins, brokers net worth, deposit requirement and real time monetary requirements. The Securities Contract Regulation Act (SCRA) was amended in December 1999 to include derivative within the ambit of 'securities' and the regulatory framework was evolved for governing derivatives trading. In June 2000 derivatives trading commenced in India after SEBI granted the final approval to this effect.

Indian forex and derivative markets have also seen activities over the years though by global standards it is still in its infancy. The exchange-traded derivatives turnover compares favorably with other emerging economies like Brazil, Russia and China (Table 2). The annual turnover of traded contract in India stood at 411 millions of US dollars at the end of the first half of the year 2007; this is more than double the corresponding figure in 2006.

Table 2: Exchange-traded derivatives turnover, based on location of exchange

Annual number of contracts traded in Millions (Dollars)				Percentage Share of contracts		
Country	**2005**	**2006**	**2007H1**	**2005**	**2006**	**2007H1**
US	3525	4573	2784	34.9	38.5	38.2
Korea	2593	2475	1459	25.7	20.8	20.0
UK	557	724	464	5.5	6.1	6.4
India	466	571	411	4.6	4.8	5.6
Brazil	204	293	210	2.0	2.5	2.9
Mexico	108	275	98	1.1	2.3	1.3
China	261	222	116	2.6	1.9	1.6
Japan	203	218	121	2.0	1.8	1.7
Netherlands	99	127	77	1.0	1.1	1.1
Other Countries	839	884	579	8.3	7.4	7.9
Total	10103	11889	7289	100	100	100

Source: Futures industry Association

Table 3: **Currency distribution of foreign exchange market turnover**
Percentage shares of average daily turnover in April 2007

Currencies	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**
US Dollar	82.0	83.3	87.3	90.3	88.7	86.3
Euro	…	…	…	37.6	37.2	37.0
Deutsche Mark	39.6	36.1	30.1			
ECU and Other Euro Currencies	11.8	15.7	17.3			
French Franc	3.8	7.9	5.1			
Pound Sterling	13.6	9.4	11.0	13.2	16.9	15.00
Japanese Yen	23.4	24.1	20.2	22.7	20.3	16.5
Mexican Peso	…	….	0.6	0.9	1.1	1.3
Russian Rouble	…	…	0.3	0.4	0.7	0.8
Indian Rupee	…	…	0.1	0.2	0.3	0.7
Chinese Renminbi	…	…	0.0	0.0	0.1	0.5
Other Currencies	25.8	23.5	28	34.7	34.7	41.9
Total All Currencies	200	200	200	200	200	200

Source: BIS: Triennial Central Bank Survey 2007

BIS Triennial global survey for 2007 (Table 3) shows that the percentage share of the rupee in total turnover covering all currencies increased from 0.3 percent in 2004 to 0.7 percent in 2007. As per geographical distribution of foreign exchange market turnover (Table 3), the survey shows the share of India at $34 billion per day to have increased from 0.4 in 2004 to 0.9 percent in 2007. The activity in the forex derivative markets can also be assessed from the positions outstanding in the books of the banking system. As of August end, 2007, total forex contracts outstanding in the banks' balance sheet amounted to USD 1100 billion (Rs.44 lakh crore), of which forwards constituted nearly 84% and the remaining were options.

Table 4: **Geographical distribution of foreign exchange market turnover1**

Daily averages in April, in billions of US dollars and percentages

Country	1995		1998		2001		2004		2007	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Argentina	…	…	2	0.1			1	0.0	1	0.0
Australia	40	2.5	47	2.4	52	3.2	81	3.4	170	4.2
Brazil	…	…	5	0.3	5.0	0.3	3	0.1	5	0.1
Canada	30	1.9	37	1.9	42	2.6	54	2.2	60	1.5
China	..	…	0	0.0	0	0.0	1	0.0	9	0.2
France	58	3.7	72	3.7	48	3.0	64	2.7	120	3.0
Germany	76	4.8	94	4.8	88	5.5	118	4.9	99	2.5
India	…	…	2	0.1	3	0.2	7	0.3	34	0.9
Japan	161	10.3	136	6.9	147	9.1	199	8.3	238	6.0
Korea	…	…	4	0.2	1.	0.6	20	0.6	33	0.6
Russia	...	…	7	0.4	10	0.6	30	1.2	50	1.3
U.K	464	29.5	637	32.4	504	31.2	753	31.3	1359	34.1
U.S	244	15.5	351	17.9	254	15.7	461	19.2	664	16.6
Others	499	71.8	575	28.9	462	28	608	25.8	1147	29
TOTAL	1572	100	1969	100	1616	100	2400	100	3989	100

Source: Triennial Central Bank Survey 2007

As regards interest rate derivatives, the inter-bank Rupee swap market turnover, has averaged around USD 4 billion (Rs. 16,000 crore) per day in notional terms. The outstanding Rupee swap contracts in banks' balance sheet, as on August 31, 2007, amounted to nearly USD 1600 billion (Rs. 64,00,000 crore) in notional terms. Outstanding notional amounts in respect of cross currency interest rate swaps in the banks' books as on August 31, 2007, amounted to USD 57 billion (Rs. 2,24,000 crore)[5]. Securitization in India

[5] Refer Keynote address delivered by Smt. Shyamala Gopinath, Deputy Governor at the Euromoney Inaugural India Derivatives Summit, 2007, Mumbai on October 24, 2007

has been in existence for over a decade confined mainly to a few banks and non-banking finance companies. The securitization market has matured over the last few years and there is now an established investor community and regular issuers. As per ICRA's estimates, the structured issuance volumes have grown from Rs. 77 billion in 2003 to Rs. 369 billion in 2006-07. Securitization of single corporate loans have accounted for nearly a third of the total volume. However, asset based securities (ABS) is the largest product class at more than 60%, with securitization of retail loans accounting for a major chunk. The growth of ABS market can be attributed to a number of factors such as the growing retail loan portfolios held by banks and other financial institutions, investors' familiarity with the underlying assets class the relatively short tenor of such issues. Growth of the mortgage based securities (MBS) market has been slower despite the growth in the underlying housing finance market primarily due to the relatively longer tenors, illiquid secondary markets and the risk associated with prepayment/repricing of the underlying loans. The Securities Contracts (Regulation) Amendment Act, 2007 has included “securitised instruments” in the definition of “securities” as defined in Securities Contract (Regulation) Act. The amendment is will allow the listing of securitised debt on stock exchanges and help to improve market liquidity in debt instruments. Reserve Bank of India (RBI) had in 2003 proposed that scheduled commercial banks might initially be permitted to use credit derivatives to a limited extend in that they were allowed only to manage their credit risks. The banks were not permitted to take long or short credit derivatives position with a trading intent. In May 2007 the RBI issued draft guidelines for introduction of credit derivative swaps (CDS) and the same was updated in October 2007. The draft regulation proposes introduction of single entity CDS instruments allowing protection selling and buying to residential financial entity. Inspite of the widely accepted belief that credit derivatives are beneficial to the financial system the Reserve Bank of India has taken a cautious approach to the whole issue particularly in the light of the sub-prime crisis.

2. Survey of Literature

The literature on credit derivatives can be separated into three groups, namely academic research, publications by market participants, and studies carried out at central banks. Academic research is at a very nascent stage and concentrates on pricing issues as if they are traded in standardized market. Credit derivatives play an increasingly important and controversial role in financial markets. Commentators have lauded them for enabling banks to hedge credit risks while others have warned of hidden dangers and systemic risks.[6] Institutions have both saved and lost fortunes using credit derivatives.[7] Meanwhile, the market for credit derivatives has grown from virtually nothing a decade ago $45.46 trillion in mid 2007.[8] The market for credit derivatives is now one of the largest markets in the world. David Mengle (2007) points out that a major source of credit derivatives growth since 2004 has been index CDS, in which the reference entity is an index of as many as 125 corporate entities. An index CDS offers protection on all entities in the index, and each entity has an equal share of the notional amount. The two main indices are the CDX index, consisting of 125 North American investment grade firms, and the iTraxx index, consisting of 125 euro-based firms, mainly investment grade. In addition, there are indices for North American sub-investment grade firms, for European firms that have been downgraded from investment grade and for regions such Japan and Asia excluding Japan. Average notional amounts for individual deals range from $10 million to $20 million for North American investment grade credits, and are about €10 million for European investment grade credits;

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[6] See, e.g., Alan Greenspan Speech (concluding that credit derivatives "appear to have effectively spread losses from defaults by Enron, Global Crossing, Rail track, WorldCom and Swissair from financial institutions with large short-term leverage to insurance firms, pension funds, or others."); Warren Buffet 2003 Letter to Berkshire Hathaway Shareholders (warning of the dangers of credit derivatives, and calling derivatives "time bombs" and "financial weapons of mass destruction"); Howard Davies, the outgoing head of Britain's Financial Services Authority (calling synthetic collateralized default obligations "the most toxic element of the financial markets").

[7] Banks used credit derivatives to hedge approximately $8 billion of risk associated with Enron debt and $10 billion of risk associated with WorldCom debt, thus avoiding massive losses when those two companies defaulted. Conversely, numerous companies have announced substantial losses on credit derivatives. See, e.g., Frank Partnoy, Infectious Greed 390-91 (describing American Express's $826 million loss on CDOs).

[8] See, e.g., ISDA 2007 Mid-Year Market Survey, available at http://www.isda.org (noting that "The annual growth rate for credit derivatives is 75% from $26.0 trillion at mid-year 2006.").

sub-investment grade credits have notionals that average about half the amounts for investment grade (JP Morgan Chase 2006). Martin Scheicher (2005) has found that banks, investment funds, hedge funds, insurance companies and corporations are the main players in the credit derivative market. The major incentives for trading credit derivates are mainly economic and partially regulatory. Trading in credit derivatives are undertaken for management of economical capital, counter party risk management, credit line management, and regulatory capital management and investment diversification. The use of credit derivatives has facilitated the distribution of credit risk across a broader group of investors, which, enhances financial stability. In the past, banks generally warehoused credit risk, seeking to provision against losses as the economy and the credit cycle evolved, often in a procyclical manner. Today, encouraged by supervisors and shareholders, banks increasingly prefer to act as credit originators, and to transfer credit exposures, particularly concentrations, to others via the capital markets. In doing so, banks are more actively managing a variety of credit risks [See Standard & Poor's (2005); and Minton, Stulz, and Williamson (2005)]. Research examining earlier credit market innovations such as loan sales and securitizations has generally found that banks have used opportunities to diversify credit risk exposures to increase lending (Cebenoyan and Strahan 2004, Franke and Krahnen 2005, Goderis et al. 2006). Nicolo and Pellizon (2005) have investigated the problem faced by banks that may not have enough capital to satisfy capital requirement for issuing new loans when outside investors do not know the true type of the protection buyer and therefore faces an adverse selection problem. They argue that credit derivative contracts can be designed in order to solve the adverse selection problem; for it to happen banks should use first-to-default basket contracts in which the underlying assets have different maturities. On the other hand De Marzo and Duffe (1999) have shown that pooling and shearing may be optimal when the protection buyer has superior information. If credit derivative trades are opaque, so that protection buyer cannot make an ex-ante commitment to a specific protection level, banks have a moral hazard incentive to hedge their exposure fully and therefore cease to monitor Morrison (2005). Hull and White (2000) analysed the effects of the assumed recovery rate on the CDS prices and found that, if the same recovery rate is used for estimating default probabilities and for pricing CDS using

probabilities, the chosen recovery rate has little impact on the implied CDS premium as long as the recovery rate is assumed to be lower than 50 percent of the bond's face value.

Rajan (2005) has suggested that the hedging opportunities afforded by credit derivatives and other risk management techniques are transforming the banking industry. Banks have begun shedding ordinary risks such as interest rate risk in order to focus on more complex, borrower specific risk that they have a particular advantage in assessing and monitoring.[9] This, too, could bring important benefits, such as more focused monitoring of corporate borrowers. Bernadette A. Minton, René Stulz, and Rohan Williamson (2006) studied the likelihood of hedging with credit derivatives being related to the type of loans a bank makes. They found that banks are more likely to be net buyers of credit protection if they have more C&I loans in their portfolio and they originate foreign-denominated loans. However, while statistically significant, the point estimates on the C&I loan variable imply small economic increases in the likelihood of hedging with credit derivatives. Since the prices on CDS represent the costs of hedging, they should have a bearing upon banks' pricing of loans. And even when banks are not able to hedge a loan, credit derivatives may still affect its price. Banks have started to calculate pseudo-prices for exposures on which credit derivatives are not traded. These prices now provide loan officers with an accurate benchmark for the pricing of loans (e.g. Kealhofer, 2002, and The Banker, 2003). Hedging theories typically predict that firms with a greater probability of costly distress are more likely to hedge Stulz (2003). (Bernadette A. Minton, René Stulz, and Rohan Williamson, 2006) found that higher profitability is associated with a lower probability of financial distress, then the likelihood of a bank using credit derivatives to hedge will be lower for more profitable firm. The dynamic nature of the credit derivative market makes definitive conclusions on the implications of credit derivatives difficult. This paper looks at two major implications, one related to financial stability and the other related with monetary policy issues.

[9] Raghuram G. Rajan, Has Financial Development Made the World Riskier? Available at http://www.kc.frb.org/PUBLICAT/SYMPOS/2005/pdf/rajan.paper.0804.pdf

3. Potential Implications:

The dynamic nature of the financial market makes it difficult to arrive at definitive conclusions regarding the potential implications of the use of credit derivatives. Nevertheless, the introduction of credit derivatives can be expected to alter the risk existing in financial markets. From a macroeconomic perspective risk can be systemic and non systemic. Systemic risk can be reduced through diversification of portfolio but non-systemic risk is immune to portfolio diversification as it is a function of the market in a country. The relationship between systemic risk and derivatives is important as the presence of systemic risk often forces the central bank to intervene in order to enhance the liquidity in the financial markets, Hunter and Marshall (1999) and Hunter and Smith (2002). The implications have been discussed from the perspective of financial stability of the underlying market and the affect on the monetary policy issues.

3.1. Implication for Financial Stability

This paper reviews the implication the credit markets have on the financial system and its stability. Credit risk management is a major area of concern for financial stability. Historically banks preferred to warehouse credit risk, seeking to provision against losses as the economy and credit cycles evolve. Due to various factors banks today prefer to originate credit and transfer credit exposures. This helps them to enhance their profitability at the same time optimize their capital base. As the transfer of risk shift credit exposures from banks to investor (e.g. Insurance companies, mutual funds, hedge funds etc.), are better positioned to hold or trade these risks. The desire to transfer credit risk creates a very dynamic primary market for them but often due to the desire of the investors to buy and hold, the secondary market liquidity might suffer. The risk warehoused on the banks balance sheet often lead to high performance volatility and failure during downturn. Such risks impact the financial system and its stability adversely.

Internationally, empirical studies have found that smaller banks, owing to their relatively less liquid balance sheet, have also suffered during stress periods, and have been a significant factor in the broader transmission of shock points out. Kashyap & Stein (2000) found that assessing the amount of risk transferred through credit derivative instruments raises methodological challenges. An indirect measure of the amount of risk transferred via a portfolio swap is the notional size of the portfolio of underlying credits that would fully

hedge the exposure (i.e. the "delta-adjusted" exposure)[10]. The amount of economic risk transferred is more than five times greater than the notional value of the swap. [Gibson (2004)]. JP Morgan and Chase has estimated that delta adjusted volume for 2005 was on average about 17 times greater than the reported notional value of the trance. The implication is that portfolio swaps may have a greater impact on dispersing risk than indicated by notional transaction values. In spite of all this information the question regarding reliability of the credit risk mitigation that banks achieve through the transfer of credit risk still remains. A study by J.P Morgan (2001) points to the fact that credit derivatives proved successful in the case of the defaults of Swissair and Rail track. In the case of Enron ISDA observed that while 800 contracts with an aggregate notional amount of $8 billion were outstanding, the settlement of open contracts proceeded without major difficulties (ISDA 2002). Bank of England further notes that there were no major disruptions in the CDS market as a result of the Enron bankruptcy. This point towards the positive effect of credit derivatives in mitigation of risk but the full effectiveness of these methods cannot be measured in the absence of substantial data on the affect for potential risk takers. Another major issue is the lack of motivation for the banks to effectively screen borrowers, as they retain no exposures to their loan portfolios and its associated risks. A systematic deterioration in lending and collateral standards would of course entail losses greater than historical experience of defaults and loss-given-default rates would indicate.

Issues of regulatory framework are pertinent given the difference that exists between banks and financial institutions. The question arises as to whether the latter's methods of valuation and management of credit risk is sufficiently well developed. In many cases, the reporting of positions held by insurers is quite difficult given their location in offshore financial centers. In the case of highly complex instruments like CDO regulators are worried about insufficient knowledge regarding pricing and hedging amongst the buyers. One of the major concerns is the need for higher number of market makers. Limited numbers of market makers leads to concerns about liquidity in the markets in case one of the players stops trading. Globally surveys have indicated that the top 8-10 dealers continue

[10] A tranche's "delta" is equal to the theoretical change in its market value with respect to a change in the credit spreads of the underlying credits. See Gibson (2004) for more detail on delta calculations. Also see Flanagan, Ahluwalia, and Schmude (2005).

to have a large and relatively stable share of the total gross positions over the last several years (Fitch 2005). The rapid growth of credit derivatives has certainly helped the banks and overall financial system to become more stable by facilitating dispersion of credit risk to a broader and more diverse group of investors. At the same time it is also true that the growth of credit derivatives has happened during a time when the international financial markets have been relatively without any great exogenous shocks. Therefore the impact of credit derivatives on financial stability during a prolonged credit downturn is yet to be fully tested.

3.2. Monetary Policy Issues:

The effect of credit risk transfer within the financial system on the transmission mechanism of monetary policy is particularly interesting. Derivatives make market much more perfect and thus it can influence monetary policy actions (Vrolijk, 1997). Financial innovation influences the both the structure and behaviour of the central bank as the developments in the financial markets often influence the practice of monetary theory and policy. The classical channels of modern monetary policy are credit and banks. The credit channel gains its influence due to market imperfections, either on the information side or the money side; use of derivatives gradually reduces its importance. Credit can be substituted by derivatives as shown by Fender (2000) and Gorton and Rosen (1995). The role of monetary authority as the lender of last resort has been tested by situations like the Long Term Capital Management (LTCM) in the United States and the more recent sub-prime crisis in the world financial markets. The LTCM crisis posed a liquidity problem for the US Federal Reserve System, as it had to intervene as a counter party to avoid a credit crunch. While economists like Kuttner and Mosser (2002) argue that the central role of banking systems in the transmission of monetary policy is under threat as, the transmission mechanism have changed due to financial innovations like growth of securitization, shifts between sources of finance for financing residential investment, or changes in the strength of wealth affects. The effect of banks assuming a role in originating, Pooling and distributing credit risk outside the banking system on the transmission mechanism is very relevant. On the other hand the recent sub prime crises has forced central banks to come out with a series of actions to counter the credit squeeze, which has imposed serious risks on the US economy in particular and the US economy in general. The G-20 Conference of Central Banks held

at Cape town decided to offer liquidity assistance to various banks, following a new procedure, viz. auction of funds at rates of interest that the bankers are willing to offer. This is an important policy decision, because banks are short of accumulation of collateral of high quality, especially in the aftermath of sub-prime crisis. Thus although it can be argued that the central banks role is diminishing in the monetary policy transmission still it is customary to expect central banks to become providers of liquidity even when the crisis is brought about by errors of speculative behaviour on the part of investment bankers. Still it is interesting to note that in most international economies securitization of bank loans is booming, and this is influencing monetary policy. Securitization which allows banks to transfer a substantial part of credit risk and reduce their capital requirement, thus allowing for further increase in loans supplied. As research at Bank of Italy and ECB point out the use of securitization tends to reduce the impact of monetary policy changes. Estrella (2001 &2002) concludes that securitization largely affect channels that are not directly related to interest rate, such as bank lending or credit channels. Credit derivatives can also impact the very fundamental information content on which the monetary policies will be based. As banks transfer default risk outside their balance sheet to protection sellers the figures related to banks actual credit exposure will not be accurate and consequently the inputs used for analysis of monetary policy will also be less than accurate. The role of derivatives on financial markets is not always disruptive as they can help to increase market efficiency provided the investment bankers look at it as a risk mitigator rather than a tool for increasing high risk profits through dubious speculative investments..

4. Implication for India

Credit derivatives are at a very nascent stage in India. As previously discussed in May 2007 the Reserve Bank of India released discussion paper on introduction of credit default swaps in India. To begin with the proposal is to allow only single entity plain vanilla CDS. However as the markets develop, it is imperative that other instruments like Total return swap, Credit Spread Option, Credit linked note and Collaterized debt obligation will be introduced to make credit risk management more efficient. Credit derivatives will help banks in India to transfer credit risk and hence free up capital resources. This is particularly relevant, as the previous attempt by RBI to move out non-priority lending out of the balance sheet of banks in India did not succeed as expected. It was found that there was

resistance from the banks as they feared that transferring assets to Special Purpose Vehicle might lead to souring of relationship with some of the clients at the same time even the banks were not willing to let go some of those clients. RBI hopes that allowing banks to transfer credit risk out of their balance sheet even as they retain the asset can enhance the share of banks in the priority sector lending. The capital freed could contribute substantially to the estimated 320 billion dollar infrastructure investment envisaged in India's Eleventh five-year plan.

While the benefits are many, recent experiences have shown the need to be alert to the downside of credit derivatives. Systemic factors have to be regulated in order to avoid crisis like the sub prime crisis witnessed in the US markets. Provisions should be made for the fact that the counter parties themselves will be risky and as such banks may be forced to allocate additional capital maintenance. The selection of counter parities and their monitoring process should be clearly defined. Similarly the definition of 'Credit Event' should be clearly defined in order to avoid any confusion. India specific aspects like restructuring of loan and their impact on CDS should be assessed. Credit Event as defined by ISDA may need some amount of modification to suit Indian situations. Similarly the bankruptcy law as practiced internationally and in India is not always compatible; the Indian bankruptcy norms should be updated to reflect international trends. A bankruptcy code delivering efficient ex-post outcomes, specially designed for large projects, is urgently needed. To have an efficient market for CDS it is important that there are a large number of market makers. In the absence of large numbers the market will be very unstable and right price realizations will be difficult. To this end insurance companies and mutual funds should be allowed to enter the credit derivatives markets. Research has shown that CDS could lead to laxity on the part of the banks in assessing the credit worthiness of borrowers it can lead to severe implications for the financial system hence a scientific risk assessment methodology should be developed and adopted by the banks as well as the regulator. There is a need to study the impact of the additional liquidity created in the system and how it affects the asset prices and general inflationary trend. Credit Derivatives can help to free up capital but it has to be harnessed in an efficient manner for the benefit of the Indian Economy.

5. Conclusions:

Credit derivative market will help to improve financial stability by facilitating the dispersion of credit risks. It allows dispersion of risk to a larger set of investors. As such it insulates the financial institutions and banks from credit shocks or at least help, to reduce the impact of the shock. Concerns have been raised that credit derivatives spreads the risk so wide that it may not always be possible to track them in the financial system. This might affect the ultimate stability, although most evidence as of now point's against it. It is argued that the ownership reduces the quantum of risk for each participant and makes it easier to absorb unless otherwise the participants are over exposed to high-risk instruments. One major area of concern among regulators is the backlog of unconfirmed trades, resulting in part from under investments in the back office capacity by major dealers. In light of these ISDA has proposed streamling of novations (reassigning trades) protocol and the industry has agreed to cooperate. In India Reserve bank of India has proposed to make cash settlement in single name CDS. This should help improve the settlement process. The question of effectiveness of credit risk transfer still exists. ISDA has been tracking outstanding notional amounts of credit derivatives for several years. However notional amounts are not sufficient to measure the economic risk transferred. As discussed earlier delta-adjusted volume is a better way to measure economic risk transfer for portfolio swaps. Regulators have to ensure that recipient of credit risk have the risk management system and skill needed to manage such exposures. In emerging markets like India the issue of institutional shortcomings like bankruptcy codes, creditor rights, clearing and settlement agencies can impede the growth of credit derivative market.

The effect of risk transfer on the monetary policy transmission mechanism is significant as evidenced from research particularly in the US markets. It has been found that it reduces the impact of the monetary transmission effect as the importance of interest rates reduces and the availability of liquidity and credit volumes become determining factors. There is a great deal of uncertainty about how critical variables – including credit aggregates, consumption, fixed investment, and inflation – will behave under the new scenario. Hence further studies on this are vital for policy makers to establish action plan to deal with it.

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