

## **DO DERIVATIVES MARKETS CONSTITUTE A POTENTIAL THREAT TO THE STABILITY OF THE GLOBAL FINANCIAL SYSTEM?**

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### **Abstract**

The most distinguishing developments in the last 25-30 years of global financial markets have been the increase in uncertainty and huge price fluctuations and as a consequence, the derivatives markets have grown as a natural outcome of these trends. In fact, at the beginning of 1970's, derivatives markets appeared as an inevitable component of the efforts to improve the financial deepening process of the countries at a certain economic growth level and have shown great progress since the beginning of 1980's. In this study, the development and importance of the derivatives markets is reviewed, the dramatic incidents leading to huge losses in the financial markets are analyzed case by case and the general factors causing these dramatic events to occur are discussed in a general context. As a conclusion, derivatives markets do not seem to create new financial risks, but change the type, structure and nature of existing risks. Therefore, it is quite obvious that a mature derivatives market on an organized exchange with a sound trading and clearing structure leads to a better risk management and better allocation of resources in the economy.

### **I. Introduction**

The most distinguishing developments in the last 25-30 years of global money and capital markets have been the increase in uncertainty and huge price fluctuations. As a consequence, the derivatives markets have grown as a natural outcome of these trends and have shown great progress in recent years. Although the derivatives markets on agricultural products and other commodities have been around, in some form, for centuries, the introduction of derivatives markets on financial instruments has reduced their significance in the market since then. The main reason is the fact that the spot market transactions in financial markets have a higher trading volume and also appeal to more sophisticated market participants than do spot market transactions in the commodities markets.

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The financial derivatives markets which began to develop at the beginning of 1970's, have accelerated rapidly after the introduction of the futures contracts on equity index and the initiation of the option markets. Especially, the investors' need to hedge their positions in spot markets against price fluctuations has pushed the development of the derivatives markets on financial instruments since the beginning of 1980's. On the other hand, the uncertainty in the financial markets produced interest rate fluctuations in the market and this gave rise to the development of a variety of interest rate derivative instruments and subsequently, the trading volume of such instruments increased significantly. Today, the estimated total value of the derivatives markets, as listed in the off-balance sheet items of credit institutions and investment firms, represents approximately 10 to 15 times the balance sheet total<sup>1</sup>.

The derivatives markets, in fact, appear as an inevitable component of the efforts to improve the financial deepening process of the countries at a certain economic growth level. The instruments traded on the derivatives markets meet the needs of investors, companies and brokerage firms facing increasingly sophisticated financial markets in the world. The consequence of this trend is that the derivatives markets have an important and positive impact on the countries' monetary policies, the development of the financial system, the security of investors and the financing of firms.

The derivative instruments offer a wide variety of alternatives to market participants in terms of risk management. However, the large losses experienced by some large industrial companies, commercial firms, financial institutions and municipal administrations in the last years reveal the fact that even the professional investors can incur large losses if they do not carefully use the derivatives markets by choosing appropriate trading strategies compatible with their investment objectives and establishing an effective internal control system in the company (such as in the case of Bankers Trust, Metallgesellschaft, Orange County, Barings, Sumitomo and Long Term Capital Management). However, when the cases heavily discussed in the last years are carefully analyzed, it is noted that most of the transactions were executed in over-the-counter (OTC) market where there is no effective market supervision mechanism and highly complicated trading strategies are used.

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<sup>1</sup> Economic and Social Committee, "Opinion on Derivatives", Official Journal No. C 18, 1996, p. 1

"Economic and Social Committee" expressed this statement as "10 times" in the Report of 1996. But due to astonishing increase in derivatives trading volume between 1997-1999, this rate is anticipated to reach 15 times.

On the other hand, the financial problems of a company due to ineffective risk management and the lack of internal control mechanism can not be attributed solely to derivative instruments. For example, the number of banks facing bankruptcy and the amount of losses incurred because of bad debts due to mismanagement of unexpected risks has grown enormously in the last decade. Besides, it is a reality that some Central Banks experienced huge losses, some reaching to billions of dollars in their efforts to stop speculative transactions against their home currencies. It should also be remembered that in the near past, one of the fundamental causes of the Asian crisis was the inefficient expansion of loans by banks to illiquid sectors such as real estate investments. Hence, the misuse of investment and credit tools would always have a negative impact on firms, countries and even world economies and would lead to incurable and serial bankruptcies in the financial markets. Therefore, it would really be an unfair and misleading assumption to blame the derivatives as a cause of every negative incident occurring in the financial markets.

Despite large losses and bankruptcies that stemmed from financial instruments other than the derivatives, the derivatives markets have still been highly criticized probably because they are newly introduced tools in the financial markets and are not well known by the old finance generation. The negative impact of the serial huge losses in the last years has unfortunately contributed to this negative approach. The tone of the discussion has evolved, however, from calls to suppress trading in markets that are asserted to be too speculative, like the union futures market that was closed down by act of Congress in 1958, to a more constructive recognition that these instruments are now a permanent feature of the financial markets and that it is necessary to find ways to assess and manage the risks they entail (Figlewski, 1997).

In the first part of this paper, the development and importance of the derivatives markets is studied. In the second part, the dramatic incidents leading to huge losses in the financial markets are analyzed case by case, and the general factors that cause these events to occur are discussed in a general context.

## **II. The Development and Importance of the Derivatives Markets**

To begin with, derivatives markets contribute to the development of the capital markets of a country by serving as an efficient platform between the investors wishing to manage and control risk arising from unanticipated price fluctuations in the spot market and the speculators who are willing to bear those risks in the market. In capital markets where deriva-

tives markets operate through organized exchanges, it is observed that the prices are determined effectively, the liquidity has increased and the speed at which the prices adjust to new information is improved (Akgiray, 1998). However, derivatives markets should not be considered as a substitute for the financial and commodity markets, so they do not have a negative impact on the liquidity of the spot market.

Furthermore, the derivative instrument, being one of the most important profit sources of the banks and the brokerage houses, now becomes an inevitable investment tool for them in providing new and alternative services to their customers.

According to the Bank for International Settlements (BIS), at the end of 1996, the notional principle outstanding of financial derivatives approached US\$ 60 trillion, of which approximately US\$ 10 trillion was in exchange-traded instruments and the rest in over-the-counter market (Tsetsekos and Varangis, 1997). The trading volume in exchange-traded instruments continued to grow both in 1997 and 1998 and reached to US\$ 14 trillion by the end of 1998.

Table 1 shows the notional principle outstanding of derivatives financial instruments traded on organized exchanges between 1990-1998 and Table 2 illustrates the number of contracts traded in the same period.

**Table 1: Notional Principle Outstanding of Derivatives Financial Instruments Traded on Organized Exchanges (\$ Billion)**

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Interest Rate Futures	1,454.5	2,156.7	2,913.0	4,958.7	5,777.6	5,863.4	5,931.1	7,489.2	7,702.2
Interest Rate Options*	599.5	1,072.6	1,385.4	2,362.4	2,623.6	2,741.7	3,277.3	3,639.9	4,602.8
Currency Futures	17.0	18.3	26.5	34.7	40.1	37.9	50.3	51.9	38.1
Currency Options*	56.5	62.9	71.1	75.6	55.6	43.2	46.5	33.2	18.7
Index Futures	69.1	76.0	79.8	110.0	127.3	172.2	198.6	216.6	321.0
Index Options*	93.7	132.8	158.6	229.7	238.3	326.9	380.2	776.5	866.5
Total	2,290.4	3,519.3	4,634.4	7,771.1	8,862.5	9,185.3	9,884.7	12,207.3	13,549.3

\* Includes Call and Put Options.

Source: Bank for International Settlements

**Table 2: The Number of Derivative Financial Instruments Contracts  
Traded on Organized Exchanges by instrument and Location  
(Million Contracts)**

	1990	1991	1992	1993	1994	1995	1996	1997	1998**
Interest Rate Futures	219.1	230.9	330.1	427.1	627.8	561.0	612.2	701.8	389.6
Interest Rate Options*	52.0	50.8	64.8	82.9	114.5	225.5	151.1	116.7	61.0
Currency Futures	29.7	30.0	31.3	39.0	69.7	98.3	73.7	73.6	29.2
Currency Options*	18.9	22.9	23.4	23.8	21.3	23.2	26.3	21.1	7.0
Index Futures	39.4	54.6	52.0	71.2	109.0	114.8	119.9	115.9	73.8
Index Options*	119.1	121.4	133.9	144.1	197.9	187.3	178.7	177.8	84.0
<b>Total</b>	<b>478.3</b>	<b>510.5</b>	<b>635.6</b>	<b>788.0</b>	<b>1,142.2</b>	<b>1,210.1</b>	<b>1,161.9</b>	<b>1,206.9</b>	<b>644.6</b>
<b>USA</b>	<b>312.7</b>	<b>302.7</b>	<b>341.4</b>	<b>387.3</b>	<b>513.5</b>	<b>455.0</b>	<b>428.2</b>	<b>463.5</b>	<b>255.0</b>
<b>Europe</b>	<b>83.0</b>	<b>110.5</b>	<b>185.0</b>	<b>263.5</b>	<b>397.3</b>	<b>353.3</b>	<b>425.8</b>	<b>482.4</b>	<b>259.0</b>
<b>Asia Pacific</b>	<b>79.2</b>	<b>85.8</b>	<b>82.8</b>	<b>98.4</b>	<b>131.9</b>	<b>126.5</b>	<b>115.2</b>	<b>127.0</b>	<b>74.5</b>
<b>Other</b>	<b>3.9</b>	<b>11.6</b>	<b>26.3</b>	<b>43.7</b>	<b>99.4</b>	<b>275.4</b>	<b>192.7</b>	<b>134.0</b>	<b>56.1</b>

\* Includes Call and Put Options.

\*\* The data is given by the end of June 1998.

Source: Bank for International Settlements

The overview of the derivatives markets in terms of instruments traded on them reveals that while historically, exchanges first introduced derivative instruments on agricultural commodities, more recently, they first introduce financial derivatives. In fact, the introduction of derivatives markets on agricultural products and commodities was a result of the significance of that sector that contributed to economic development at that time. However, thanks to the rapid development in financial markets, the commodity markets lost its popularity in terms of trading volume and number of market participants, and most of the derivative instruments have begun to be traded on interest rate products, index based and equity instruments and other financial indicators in newly introduced derivatives exchanges.

As a result of the fast growth in the global economic and commercial activities as well as the abolition of the cross border barriers among countries throughout the world, a liberalization process has been initiated in

the commodity markets. Commodity market liberalization has increased the pass-through of international commodity price movements to domestic commodity prices making the use of existing commodity derivative contracts feasible for domestic hedgers. For example today, Mexican wheat producers may now find that using Chicago Board of Trade (CBOT) wheat futures contract will be very appropriate for hedging Mexican wheat price risk. As commodities such as wheat, cotton etc. are all traded in each country and subject to export and import transactions; they are in fact easily tradable instruments on the existing derivatives markets by all market participants. As these commodities are not special products of a specific country, it should not be surprising to see them traded on the derivatives markets of developed countries and not having domestic characteristics.

On the other hand, the country-specific nature of financial markets and the demand for derivative instruments from domestic users and foreign investors who take position in this country, make the launching of financial derivatives instruments feasible in local markets. Since the shares of a company which is domiciled in another country can not be delivered instead of the stocks of another company operating in the local market, equity based derivatives are usually based on the equities traded in the local stock market. The same fact also applies to debentures in the sense that the government bond of a country is not a substitute for another country's bonds in the delivery process. So, financial products have more local characteristics than commodities or agricultural products.

Besides, experience has shown that financial derivatives attract relatively higher liquidity compared to the commodity derivative contracts since spot market trading volume of financial instruments is higher than spot market trading volume of commodities. For example, the Budapest Commodity Exchange experienced a dramatic increase (400 %) in the volume traded when it introduced financial derivative contracts (mainly currency) in addition to its commodity derivative contracts in 1996. Again in the Sao Paulo Commodities and Futures Exchange (BM&F), the turnover of all agricultural contracts traded was about US\$ 3.5 billion for 1996, representing only one percent of the total value of contracts traded which amounted to no less than US\$ 4.2 trillion. Similarly, at the two Chicago exchanges, namely CBOT and Chicago Mercantile Exchange (CME), agricultural trading volumes were less than 30 % and 5 % of the total trading volumes, respectively. (Tsetsekos and Varangis, 1997).

The survey conducted by Tsetsekos and Varangis (1997) to 75

exchanges located in 29 countries concluded that derivatives based on a domestic stock index have the highest potential for success, and this is followed by derivatives based on local interest rates and currencies.

In the same survey, it is also concluded that those differences between emerging and developed derivatives markets can not be explained by differences in economic and capital market conditions of these countries. That is, there are no conclusive indicators for the degree of market readiness for developing a derivative exchange in any country. This conclusion is quite important for Turkey as it points out the fact that there is no measurable degree of market readiness in terms of the size and maturity of capital markets to be achieved for developing a derivative exchange in Turkey.

### **III. Derivatives Market - Spot Market Relationship**

The concern over how trading in derivatives markets affects the spot market for the underlying assets has been an interesting and highly debatable subject for investors, academicians and regulators all over the world.

Generally speaking, derivatives markets have a positive impact on the spot market in that it helps to have a better price discovery in the spot market for the underlying instruments. However, the interaction between the two markets is clearly quite complex so as to make simple statements nearly impossible (Aydoğan, 1998). Mainly there are two contrasting arguments in the literature regarding to the impact of derivatives markets upon the spot market.

One viewpoint suggests that introduction of derivatives markets has a positive impact on the spot market by decreasing price volatility, increasing informational efficiency and narrowing bid-ask spread and tends to stabilize the cash market. An opposing view suggests that introduction of derivatives markets has a negative impact on the spot market by increasing price volatility and having an unfavorable impact on liquidity and destabilizes the cash market. Perhaps another viewpoint that can be accounted for is a mixture of these two viewpoints. It argues that introduction of derivatives markets has increased price volatility, but at the same time has also improved informational efficiency (Antonius, Holmes and Priestley, 1998).

Damodaran and Subrahmanyam (1992) gathered the main findings of the empirical studies on derivatives and market microstructure and prepared the following summary table (Table 3). These findings in Table 3 are to be interpreted as improvements in market microstructure (Akgiray, 1998).

**Table 3: Impact of Derivatives Market on Spot Market**

	Options on Stocks	Futures on Stock Indexes	Futures on Bonds	Futures on Commodities
Price Volatility	Decrease	Decrease	Decrease	Decrease
Spread of Adjustment	Increase			
Bid-Ask Spread	Decrease			
Trading Volume	?	?		

In fact, to measure the impact of derivatives market on the spot market volatility effectively, one should examine stock market volatility before and after the introduction of derivatives trading. Gülen and Mayhew (1998) conducted one of the last empirical studies on this subject. They analyzed the impact of the stock index futures listings, which is planned to be introduced as the first product in the Derivatives Market of the Istanbul Stock Exchange, on spot market volatility by measuring the annualized standard deviation of daily index returns before and after stock index futures listing. An up (down) arrow indicates a statistically significant increase (decrease) at the .05 level. As seen from Table 4, the volatility has shown an increase in 6 countries and a decrease in 17 countries after the introduction of stock index futures. Plusses and minuses indicate changes that were not statistically significant.



**Table 4: Annualized Standard Deviation of Daily Index Returns Before and  
After Stock Index Futures Listing**

Country	Volatility Before	Volatility After	Decrease/Increase
United States	0,1444	0,1521	↑
Australia	0,1557	0,1581	+
United Kingdom	0,1890	0,1321	↓
Canada	0,1328	0,1084	↓
Hong Kong	0,3385	0,2747	↓
Sweden	0,2037	0,1986	↓
Japan (SIMEX)	0,1126	0,2146	↑
Finland	0,1823	0,1735	-
Netherlands	0,2262	0,1441	↓
France	0,2728	0,1742	↓
Denmark	0,1635	0,1349	↓
South Africa	0,2755	0,1429	↓
Switzerland	0,1814	0,1450	↓
Germany	0,1766	0,1658	↓
Chile	0,2567	0,1988	↓
Spain	0,1879	0,1665	↓
Austria	0,2242	0,1605	↓
Norway	0,2005	0,1450	↓
Belgium	0,1380	0,1171	↓
Italy	0,1896	0,1841	↓
Hungary	0,1853	0,2817	↑
Israel	0,2633	0,2270	↓
Malaysia	0,2171	0,2726	↑
Korea	0,2315	0,3400	↑
Portugal	0,1108	0,1501	↑

Source: Gülen and Mayhew (1998).

Based upon this brief summary, it is hard to claim the dominance of any of the two basic arguments. It is clear that there are specific factors for each country influencing spot market price volatility experienced in those countries. Some of those factors are risk-neutrality of speculators, price stabilization mechanism, trading mechanism, liquidity constraints, transaction costs and other country-specific macroeconomic conditions. When viewed from this perspective, it should not be surprising to see changes on the impact of derivatives market on spot market volatility

from one country to another and to find different results in the empirical studies. However, in general, the above analysis suggests that the introduction of futures trading tends to increase informational efficiency, decrease volatility and increase the depth of financial markets. For example, Bologna (1999) reveals that the spot market volatility has not increased, but slightly decreased after the introduction of stock index futures in Italy. In this study, it is also claimed that spot market efficiency and depth has also increased in Italy after the introduction of stock index futures contracts.

In addition, empirical evidence on the lead-lag relationship between the futures market and the spot market supports the view that the futures markets lead cash markets due to market imperfections (Aydoğan, 1998).

#### **IV. Dramatic Cases in Derivatives Markets**

The airplane accidents rarely occur, but usually cause many people to die all at once. Although the airplane accidents frighten people, the airplane travel is actually safer and faster than most other modes of transportation. Similarly, much like airplane disasters, derivatives have created much anxiety because of the spectacular losses reaching huge amounts as well as considerable debate that prevail among investors and regulatory authorities. The most important point that should not be overlooked by anyone interested in this subject, however, is that the risks attributed to derivatives in the past have, in fact, increased in parallel to the high trading volume executed in over-the-counter markets<sup>2</sup>. Table 5 provides a regional distribution of outstanding OTC contracts as at the end of March 1995 in terms of their outstanding notional values. In another report published by the Bank for International Settlements (BIS) in August 1997, it is stated that while the total of notional outstanding value of derivatives on organized exchanges (futures and options) has increased by 331%, the swaps traded in over-the-counter markets have grown by 638 % (Steinherr, 1998).

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<sup>2</sup> Over-the-counter markets, contrary to organized exchanges, are the markets where the trades are executed through tailor-made agreements between the contracting parties without being subject to any regulation. The most important risk in these markets is the credit risk, which occurs when one of the parties does not fulfill his/her obligation properly, as there is no clearing house guarantee for any parties in such a transaction.

**Table 5: Notional Amounts Outstanding and Market Value of OTC  
Derivatives (US\$ Million)**

	Total	US	UK/France/Germany	Japan
Interest Rate Futures	35,621	8,146	16,468	5,100
Currency Futures	17,700	2,644	4,278	3,211
Stock and Index Futures	630	123	278	100

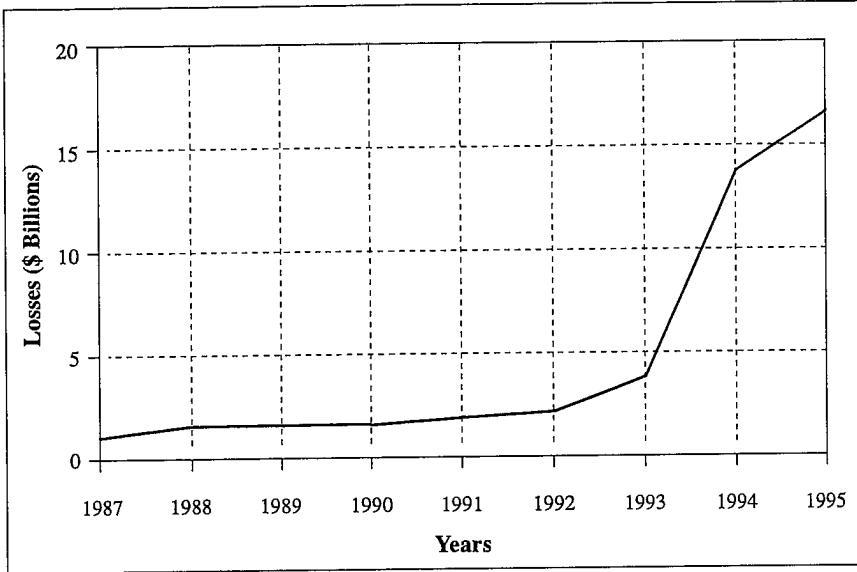
Source: BIS (May 1996)

According to the data published by the BIS, the daily average values of notional amounts in April 1998 stood at US\$ 362 billion, 85 % higher than US\$ 196 billion in April 1995 in the OTC derivatives markets, which include foreign exchange derivatives and all interest rate derivatives contracts<sup>3</sup>. Another interesting point to note is that interest rate products continued to outweigh forex instruments accounting for 73 % of the total turnover and attract a growing proportion of end-users. It is this growth rate that is highly debated at the meetings held and papers prepared by different market participants and academicians who express their concern on systemic risk that may affect financial markets. Essentially, as the trading volume and number of investors in the organized derivatives exchanges increase faster than over-the-counter markets, it is regarded as a preferred development in controlling the systemic risk all over the world.

Figure 1 displays the sum of losses publicly attributed (rightly or wrongly) to derivatives from 1987 to 1995. These market losses grew sharply starting from 1994 due to interest rate fluctuations, which created volatility in the bond markets, and increase in trading volume realized in over-the-counter market. From 1987 to 1995, such losses totaled US\$ 16.7 billion.

<sup>3</sup> Outright forwards and foreign exchange swaps are not included in these figures.

**Figure 1: Cumulative Losses Attributed to Derivatives (1987-1995) (US\$ Billion)**



Source: Jorion (1997).

Although the above figure seems to be appalling at first glance, the amount of losses represents only a small portion, 0.03 %, of the total notional amount of the market which is US\$ 60 trillion.

Since derivative instruments carry out an important function in the market, only a few fund managers have taken the extreme step of eliminating all derivatives from their portfolio in spite of all negative rumors expressed in the marketplace. The most remarkable example of this can be observed in the US, where although several states have enacted laws that prohibit derivatives to be invested in local governments' portfolios, they actively use derivatives to lower their funding costs (Jorion, 1997).

Recent dramatic cases that led to large corporate losses involving derivatives are examined, and the factors that have caused such losses to occur as well as the lessons that can be drawn from them have been discussed below in all perspectives.

#### 4.1. Barings<sup>4</sup>

Barings PLC, the oldest merchant banking group in the United Kingdom, suffered losses on February 26, 1995 from large unhedged positions in futures contracts and options on Nikkei 225 index traded on SIMEX and Japanese exchanges -exceeding the entire equity capital of the firm estimated at US\$ 860 million at the time. The final total loss was US\$ 1.47 billion. A single trader, 28-year-old Nicholas Leeson, general manager of Baring Futures (Singapore) BFS, which is a subsidiary of Barings PLC, was claimed to be responsible for the trading strategies and losses of BFS. The fact that a relatively junior trader bankrupted a household name in banking attracted worldwide attention (Steinherr, 1998).

While Barings's notional positions on the Singapore and Osaka Exchanges added up to approximately US\$ 7 billion, these losses became worse by the sale of options. As losses mounted, the firm became unable to meet margin calls and make the cash payments required by the Exchanges and eventually faced bankruptcy.

The most important tool playing a vital role in Leeson's strategy is the short "straddle" strategy used to benefit from the price volatility. A straddle is constructed by selling a call option and a put option with the same strike price at the same time. The strikes will normally be at a level that corresponds to the price at which the underlying market is trading at the time the trade is executed. In Leeson case, so long as Nikkei 225 index remains within the range defined by the premium received, Barings would make a profit. However, if Nikkei 225 index either increases or decreases significantly, the firm would loose money. Furthermore, those pursuing this strategy should not leave the straddle position "naked", which means that they should take long position in the spot market of the underlying instrument by using risk measurement tools such as delta and gamma<sup>5</sup>. It appears that Leeson did not attempt to follow this approach i.e. he did not hedge its portfolio. When the Kobe earthquake caused an 11 % decline in the Nikkei 225, the put options sold by Leeson became "in the money" for the buyers and all of the put option holders exercised their rights. That, at

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<sup>4</sup> When analyzing the Barings case, the investigation report prepared by Michael Lim Choo San and Nicky Tan Ng Kuang, the inspectors of the Singapore Ministry of Finance, is heavily used.

<sup>5</sup> "Delta" is the ratio of the change in an option's price to a given change in the price of the underlying instrument provided that other variables stay constant. It is also called as "hedge ratio". "Gamma", is the rate of change of an option's delta with respect to a change in the price of the underlying instrument provided that other variables stay constant.

the last stage, led to an important loss for Barings. In fact, the strategy followed by Leeson is not inherently complex and is one with which experienced options professionals would be familiar. His unique deficiency is that he did not apparently seem to have a risk management system capable of calculating the sensitivities, such as delta and gamma, to manage an exposure of that size. Moreover, to satisfy margin calls on the futures, Leeson sold additional options to collect premiums in over-the-counter market, thereby, however, leveraging his position and aggravating the losses further.

The most important point to be notified in Barings case is that the firm failed to have an appropriate risk management and internal control system. Leeson had control over both the trading desk and the "back office". Normally, however, the function of the back office is to confirm trades and check that all trading activity is within guidelines. Likewise, SIMEX, in a letter to Barings Futures (Singapore) Pte Ltd (BFS) of January 11, 1995 expressed concern that information required by the Exchange could not be provided in Leeson's absence. On the other hand, in any bank, traders have a limited amount of capital they can deal with and are subject to closely supervised "position limits". This is, however, not the case in Barings PLC. One of the reasons Leeson was so unsupervised may be his great record in previous years. It is supposed that in 1994, Leeson has made US\$ 20 million for Barings, or about one-fifth of the firm's total profits. These translated into fat bonuses for Leeson and his superiors. In 1994, Leeson drew a US\$ 150,000 salary with a US\$ 1 million bonus. At some point, the head of Barings Securities, Christopher Heath, was Britain's highest paid executive.

Another important point in Barings case is that the directors, being aware of the risks involved, did not take the necessary precautions on time. They had actually approved cash transfers of US\$ 1 billion to help Leeson make margin calls. An internal audit report drawn up in 1994 by the firm's inspectors had also been apparently ignored by Barings top management. In this report, the auditor warned the top management of "excessive concentration of power in Leeson's hands" and pointed out the danger of this situation.

It is apparent that the Exchanges were also faulty in Barings case. If Singapore (SIMEX) and Osaka Exchanges had carefully reviewed information on their hand, they might have realized the extent of the position taken by Barings PLC in the market. It is highly probable that they had deliberately avoided doing so. These Exchanges accepted their fault. On

the Osaka Exchange, Barings Futures had accumulated 20,000 contracts each worth US\$ 200,000. This was eight times the next largest position of 2,500 contracts in the market. Therefore, if such positions had attracted the attention of the Exchange much sooner and the Exchange had acted earlier by taking the necessary precautions, then it is clear that the losses could have been prevented before reaching to such big sizes.

On the other hand, in the Inquiry Report prepared by San & Kuang (1995), it is revealed that Leeson had opened a special account (error account) in July 1992 for customer trading, for trading his own positions. All losses were booked on that account, although Barings' management was unaware of its existence.

#### **4.2. Metallgesellschaft**

Metallgesellschaft (MG), which is Germany's fourteenth largest industrial company, came to the edge of bankruptcy following losses of US\$ 1.3 billion incurred by its American subsidiary, MG Refining & Marketing (MGRM) on its positions in oil futures and swaps transactions conducted in order to hedge its market risk. The losses were precipitated by MG's supervisory board's decision in December 1993 to liquidate MGRM's oil futures positions at a time when oil prices hit the bottom and to liquidate the forward-supply contracts by waiving cancellation penalties and giving up potential unrealized gains that would have offset, at least partly, its derivatives losses (Steinherr, 1998).

MGRM's problems stemmed from its idea of offering long-term contracts for oil products to its customers. By 1993, MGRM had entered into contracts to supply customers with 160 million barrels of oil products over a period of 10 years at fixed prices. These fixed prices were typically 3-5 dollars a barrel higher than prevailing spot prices at the time contracts were negotiated. The marketing of these contracts was successful because customers could lock-in fixed prices over long periods. Furthermore, forward delivery contracts contained a cash-out option (embedded option) for counterparties in case prices were to rise above the contractually fixed prices, that is MGRM counterparties could choose to sell their forward obligations back to MGRM for a cash payment of one-half of the positive difference between the prevailing near-month futures price and the contractually fixed supply price.

To hedge against the possibility of price increases, the company ideally should have entered long-term forward contracts on oil, matching the maturity of the contracts and of the commitments. In the absence of a

viable market for long-term contracts, however, MGRM turned to the short-term futures market and implemented a rolling hedge, where the long-term exposure is hedged through a series of short-term futures contracts and swaps on oil, with maturities of 1-3 months, which are rolled over into the next contract as they expire. By the fourth quarter of 1993, MGRM held long futures equivalent to 55 million barrels and had swaps of 100-110 million barrels, virtually identical to its forward-supply commitments of 160 million barrels -a hedge ratio of 1.

In the meantime, the company was exposed to basis risk, which is the risk that short-term oil prices temporarily deviate from long-term prices<sup>6</sup>. Over 1993, cash prices fell from \$ 20 to \$ 15, leading to about a billion dollars of margin calls that had to be met in cash. Some of these losses may have been offset by gains on the long-term contracts with its customers, as the company now could sell oil at locked-in higher prices. But, apparently, the German parent did not expect to have to put up such large amounts of cash, and therefore, senior executives at the US subsidiary were pushed out and a new management team flown in from Europe. The new team immediately proceeded to liquidate the remaining contracts, which led to a reported loss of US\$ 1.3 billion. Since then, the liquidation has been severely criticized by financial authorities, on the grounds that the liquidation effectively realized losses that would have decreased over time as a result of the price changes.

MG's funding needs were aggravated by actions taken by the New York Mercantile Exchange (NYMEX), doubling margin requirement demanded from MGRM, at the end of December 1993 to keep MGRM's positions open. In fact, MG did not have any financial problem to meet its funding needs. It had available a DM 1.5 billion Eurocredit line with 48 banks that it seemingly could have used to fund margin calls. Moreover, it has been reported that on December 1993, Chemical Bank (and possibly other banks) offered financing to MGRM on the basis of MGRM securitizing its forward supply contracts. Finally, MG's dominant shareholders consist of two largest German banks. In this sense, the possible non-transparency of the forward-delivery contracts could have been a problem to outside credit suppliers, but not to insiders. If, MG board of directors had provided the necessary funds to MGRM in meeting its margin requirements on time, the firm could have made an important unreal-

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<sup>6</sup> For detailed information see Chew (1996), pp. 119-123 and Culp & Miller (1994), pp. 9-14.



ized profit and have received a huge cash inflow over the derivative positions when oil prices had increased to \$ 19.40 as a result of the market turning back to the backwardation position (spot prices are greater than the derivatives prices) in August 1994. Thus, whilst MGRM's strategy was risky for any short period of time, it was defensible for a 10-year period.

The problems experienced by MGRM were also influenced because of the difference in accounting principles applied between countries in recognizing unrealized gains and losses on the forward contracts sold and on the futures and swaps contracts bought by the firm to hedge its position against market risk. Under German accounting principles, unrealized losses on open forward positions have to be recognized at the end of the financial year, but unrealized gains on open forward positions are not allowed to be recognized. Unlike German accounting principles, US "hedge-deferral" accounting principles do not require that either unrealized losses or unrealized gains on hedged positions be recognized until the maturity of the contract. The difference between these two accounting principles led to conflicting reports, prepared by these countries' supervisory authorities, on MG's financial condition, one being negative and the other being positive (Edwards, 1995).

#### **4.3. Orange County**

The Orange County affair represents perhaps the most extreme form of uncontrolled market risk experienced as a result of speculative transactions in a local government fund. Bob Citron, who was the county treasurer and responsible to manage an US\$ 7.5 billion portfolio belonging to county, effectively borrowed about US\$ 12.5 billion through reverse repurchase agreements collateralised by securities in the fund's portfolio and invested them in long-dated bonds and in structured notes with an average maturity of about four years to get a bigger profit. In an environment where short-term funding costs were lower than medium-term yields, this highly leveraged strategy worked quite well, especially as interest rates were falling.

This strategy was unraveled when the interest rate hikes started in February 1994. The main reason behind the losses incurred by Orange County is that the changes in interest rates affected the price of long-dated bonds more than short-dated bonds. All through the year, losses were incurred on long-dated bonds, but decrease in short-term financing cost was insufficient to meet these losses. Consequently, the fund did not

respond to margin calls on time. As the fund defaulted on collateral payments rising from repo agreements, the counterparties started to liquidate their collateral and Orange County declared bankruptcy. When the portfolio of Orange County were liquidated, the fund was ended with a final loss of US\$ 1.7 billion which was about 22 % of its total assets (US\$ 7.5 billion).

The most important contributing factor to the acceleration of the problem was the Citron's decision to collateralise the securities in the fund's portfolio against borrowing money from the brokerage houses through the reverse repo agreements and thus trying to benefit from the high leverage effect in the market. This was, in fact, a highly speculative and risky strategy. Another factor worsening the case was the fact that the initial losses were underestimated by the standard accounting procedure of reporting values of assets at their original purchase cost rather than at current market prices (Jorion, 1997).

On the base of the Orange County case lay the investment of the cash inflows obtained through the reverse repo agreements made in over-the-counter markets into the long-dated bonds traded in over-the-counter markets. If, Orange County had used the derivative instruments traded in the organized exchanges rather than using those traded in over-the-counter markets, the losses might have been smaller provided that there would be a close surveillance for the open positions carried out on these exchanges. Besides, the regular (on a monthly basis) and detailed disclosure (reflecting current market values) might have saved Orange County from serious damages in spite of all above developments.

As in other cases, Orange County officials were applauding Citron's track record all along when he was successful, but blamed him for undertaking risky investments and not being informed about his strategies when losses were occurred. But they conveniently forgot that the higher returns could only be earned on higher risk environment. In Orange County case, Citron's strategy was clearly one of gambling on stable or declining interest rates. Still, another important point to be notified is that the strategy initially did yield considerably larger returns than the safer alternative investment instruments until 1994. For this reason, evaluations of the overall consequences of this strategy should include the earlier gains along with the eventual losses. Furthermore, one may reach quite interesting results when he/she analyzes the extent to which earlier gains met eventual losses in this strategy. For example, in a research undertaken by Merton Miller and David Ross, it is stated that the Orange County invest-

ment pool was, in fact, neither insolvent nor illiquid at the time the county filed for bankruptcy and that the bankruptcy decision may simply have been a tactical ploy to justify the filing of damage suits against Merrill Lynch and other brokerage firms who sold the securities to the Orange County investment pool (Miller, 1997).

#### **4.4. Daiwa**

Daiwa, which was the twelfth largest bank in Japan, has confronted with an accumulated loss of US\$ 1.1 billion as a result of transactions held by one of its traders, Toshihide Igushi, by the end of 1995. The loss absorbed one-seventh of the firm's capital. Apparently, Igushi had concealed more than 30,000 trade over 11 years, starting in 1984, in US Treasury bonds. As the losses grew, the trader exceeded his position limits to make up for the losses. He eventually started selling, in the name of Daiwa, securities deposited by clients at the New York branch. The bank claims that none of these trades were reported to Daiwa and that Igushi falsified listings of securities held at the bank's custodian, Bankers Trust. Apparently, the bank failed to cross-check daily trades with monthly portfolio summaries.

It is interesting to note that Igushi had control of both the front and back offices and that unlike other Japanese workers, who were rotated regularly, he had been hired locally and had worked in the same department since the very beginning of his work life in the company.

Moreover, although Daiwa top management had been warned by regulators as a result of inspections conducted on Daiwa's offices in 1992 and 1993 about the risks in its management structure, they failed to implement major changes, even they deliberately hid records and temporarily removed bond traders in order to pass the inspection. Under pressure from regulators, Daiwa transferred Igushi to a back office function. Even so, Igushi continued to transact, hiding behind other traders. This event highlighted the poor risk-management policies of the Japanese bank, its ineffective internal cross-check mechanism and top management preference of temporary solutions to the permanent ones in solving the problems.

#### **4.5. Sumitomo**

Sumitomo Corporation, on June 1996, announced the discovery of significant losses, US\$ 2.6 billion, caused by unauthorized trading in the copper market by its former chief trader, Mr. Hamanaka, over a ten-year period.

Mr. Hamanaka was effective on 5% of world's copper market and he was known to trade off the market; selling below the market, buying above it, and selling large quantities of over-the-counter options cheaply. The prime reason people sell cheap options is to create current income to cover transactions costs arising from bad price trading (Kooi, 1996).

Furthermore, Hamanaka granted power of attorney over Sumitomo trading accounts to brokers, had the authority to create brokerage accounts, bank accounts, execute loan documents, and authorize cash payments. Normally, however, all these transactions require multiple signatures in an ordinary institution, especially if they are related to derivative instruments.

Due to ineffective internal control mechanism, Hamanaka's pattern of trade became increasingly complex, increasingly large and less transparent. Hamanaka succeeded to hide losses for a long time, especially by trading complex derivative instruments in over-the-counter market and by using unauthorized accounts at brokerage firms.

On the other hand, the authorities have pointed out that if daily margins had been settled in cash in London Metal Exchange (LME), where some of these transactions were executed, the Sumitomo affair would not have occurred<sup>7</sup>.

#### **4.6. Bankers Trust**

At the beginning of 1994, the three big companies, namely Procter and Gamble, Gibson Greetings and Mead Corporation declared that they had incurred relatively high losses due to the swap agreements made with Bankers Trust (BT). The amount of losses was US\$ 157 million, US\$ 3 million and US\$ 7.4 million, respectively. The main point of all these three cases was actually the fact that the above mentioned three companies all claimed to be misleded by Bankers Trust in these swap agreements (Steinherr, 1998).

Bankers Trust company used to have a very good reputation due to the customized products that really serve to the specific needs of its customers in the market. However, it was also criticized for its aggressive marketing of complex derivative products to its customers.

As all three cases are very similar and have all the same characteristics

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<sup>7</sup> There is no variation margining in cash at the LME. Profits and losses are not realized until the contract expires. This suits metal producers or users whose cash flows are limited to the physical market. But it creates additional risks.

in terms of the leverage effect of the swap agreements, it may suffice to concentrate on just one of them. For this reason, the case of Gibson Greetings company will be explained below.

On November 12, 1991 Gibson Greetings entered into two fixed-for-floating interest rate swap agreements that were due in June 1992. The aim of the company was to change the fixed interest rate of the loan to floating interest rate and by doing so to extend the term of its loans and to hedge its risk by benefiting from the decline in interest rates. At the first stage of the case, when interest rates had fallen, the company terminated the swap agreements and realized a profit. On October 1992, the company entered into another swap agreement, called a "ratio or replacement swap" which was again exposing the company to rises in interest rates. The expectation was the same as before, the company was expecting a further fall in interest rates. However, compared to the old swap agreements made in 1991, under the new swap agreement, the future net payments to Gibson would become negative more rapidly and would cause larger losses as interest rates increase. From this point, contrary to the Gibson's expectations, the market moved in the opposite direction and the company started to make losses due to the rise in the level of interest rates. After that, the company tried to enter into several additional more complicated and highly leveraged swap agreements until March 1994 in order to save some of the losses, but it did not help and the company faced with a relatively huge loss at the end.

After having such a huge loss, Gibson Greetings company took the case to the court and claimed that the top management of the company had been misleded by the BT professionals about the nature of the swap agreements mentioned above. The court pleaded the BT company as guilty and upon this decision, the Commodities Futures Trading Commission (CFTC) and Securities Exchange Commission (SEC) had also jointly imposed a fine on BT company.

After all these events, the BT Company entered into a "Written Agreement" with New York Federal Reserve Board regarding the future conduct of leveraged derivatives transactions. With this agreement, the BT officials formally promised to inform the counterparties about the nature and risks of the proposed derivative instruments. The agreement also raises concern about OTC derivatives and increases the relative attractiveness of exchange-traded products in the financial markets.

#### 4.7. Long Term Capital Management (LTCM)<sup>8</sup>

Long Term Capital Management (LTCM) is a hedge fund owned by a small number of rich investors and its main objective is to invest in a few sophisticated financial instruments, mostly derivatives, to get a higher return in the market. LTCM had become very famous among the financial community since 1994, because of its success in pricing and trading of financial instruments. LTCM's principals included individuals with substantial reputations in the financial markets and especially in the economic theory of financial markets, such as the distinguished academicians, Myron Scholes and Robert Merton and the ex-senior vice president of Salomon Brothers, John Meriwether. The Fund had achieved above normal returns during the first years after its foundation and thus had very good reputation in financial community. However, as the past does not repeat itself in terms of financial performance, the Fund incurred great losses due to the excessive risks and the high amount of open position in financial instruments. When the Fund had problems in meeting the margin calls, due to the possibility of systemic risk, together with the creditors and counterparties of the Fund, the Federal Reserve Board of New York decided to bail out the Fund.

In terms of historical financial performance, the LTCM Fund produced returns, net of fees, of approximately 40 % in 1995 and 1996 and 20 % in 1997. An important point to mention during these years is that at the end of 1997, LTCM distributed approximately US\$ 2.7 billion in capital to its investors, reducing the capital base of the Fund by about 30 % to US\$ 4.8 billion level. Despite this reduction in its capital base, however, the hedge fund did not liquidate any of its positions and thus did not reduce the scale of its investment positions in the market. In other words, the managers of the Fund decided to increase its balance sheet leverage by reducing its capital base rather than by increasing its positions.

By the end of July 1998, the net worth of the LTCM Fund fell to US\$ 4.1 billion, down about 15 % from the beginning of the year. The following month, the situation became worse and the LTCM Fund suffered additional losses of US\$ 1.8 billion, bringing the Fund's capital base down to US\$ 2.3 billion in August 1998. After incurring the above losses, LTCM top management informed its shareholders about the fact that the Fund

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<sup>8</sup> When analyzing LTCM case, especially the report prepared by "The President's Working Group on Financial Market" is used.

was seeking an injection of capital. During September 1998, the amount of losses suffered by LTCM Fund increased further and the Fund found it difficult to liquidate and reduce its positions because of the large size of those positions. In addition to that, the conditions in the markets deteriorated. Since the creditworthiness of the Fund had fallen, previously flexible credit arrangements became more rigid and all these factors added to the liquidity pressures facing LTCM.

On September 22, 1998 the most concerned four counterparties tried to find mutually beneficial alternative ways to save the Fund, and decided to inject capital to the LTCM Fund, a process called "recapitalisation". After lengthy and very hot discussions, on September 23, 1998 fourteen big financial institutions, including such important institutions as Merrill Lynch, J.P. Morgan and Union Bank of Switzerland, agreed to form and participate in a consortium to bail out the Fund. The Federal Reserve Bank of New York helped and encouraged the firms involved to seek the least disruptive solution that they believed was in their own collective self-interest. Under this approach, the consortium contributed US\$ 3.6 billion to the Fund and acquired 90 % ownership share in return. With this action, the share of the famous founders of the Fund fell to 10 %.

Overall, the distinguishing features of the LTCM Fund were the scale of its activities, the large size of its positions in certain markets, and the extent of its leverage. The Fund was very active in derivatives markets and reportedly had over 60,000 trades on its books. At the end of August, 1998, the gross notional amounts of the Fund's contracts on futures exchanges exceeded US\$ 500 billion, the value of the swaps contracts were more than US\$ 750 billion and the value of options and other OTC derivatives were over US\$ 150 billion. The total of all the above positions adds up to a great amount and when compared to the net worth of the Fund, it shows a substantial amount of risk. This amount of risk is too high even for a hedge fund and unbearable in the long term. As of the same date, with regard to leverage, the total assets of the LTCM Fund were US\$ 125 billion. When equity capital figure of US \$ 4.8 billion is used, this level of assets still implies a balance sheet leverage ratio of more than 25:1 which is also very large compared to the funds of similar nature. Although it is very difficult to make exact comparisons, it is likely that the LTCM Fund's exposure to certain market risks was several times greater than that of the trading portfolios typically held by major dealer firms.

In essence, the LTCM Fund's size and leverage, as well as the trading strategies that it utilized had become very critical especially after the

Russia's devaluation of the ruble and declaration of a debt moratorium on August 17, 1998.

As a general evaluation of the LTCM case, the following main points can be concluded:

- It is obvious that the investors, creditors and counterparties of LTCM did not provide an effective check or control on overall activities of the Fund. The main reason behind this may be the fact that the Fund were active in many geographically diverse markets, and took on positions not only at organized futures exchanges but also at OTC market, which is neither effectively regulated nor has an effective risk measurement system. The facts that the OTC market has not been regulated or controlled well by central authorities and that there is a lack of coordination and cooperation among countries on cross border operations prevented, in fact, the huge losses of LTCM to be notified at an earlier stage.
- Some of the risk measurement models used by LTCM, its creditors and counterparties were inefficient and underestimated the risk that the Fund was taking on positions in different markets. The sudden and sharp movements in market parameters were found to be not properly accounted for in many risk management software.
- Although individual counterparties imposed bilateral trading limits on their own activities with LTCM, none of its investors, creditors, or counterparties provided an effective check on the Fund's overall activities. The only limitation on the LTCM Fund's overall scale and leverage was that provided by its managers.
- A point whose significance was apparently missed by LTCM, its counterparties and creditors was that, while LTCM was diversified across global markets, it was not very well diversified as to strategy. The Fund was betting in general that liquidity, credit and volatility spreads would narrow from historically high levels and thus, the markets would become more liquid, less volatile and the financing cost of the positions would narrow. When the spreads widened, instead, in markets across the world, LTCM found itself at the edge of insolvency. Moreover, not only did liquidity, credit and volatility spreads widen in the financial markets, but also the liquidity of many markets dried up and the financing costs increased. This compounded the problem faced by LTCM's creditors, because a liquidation of LTCM's large positions could have had adverse effects on their positions and that of many other market participants.



In view of these findings, in a working report prepared by "The President's Working Group" about the LTCM case, the Working Group recommends a number of measures designed to prevent the occurrence of similar problems as well as to take corrective actions before the cases become so severe in the market. These measures are designed to improve transparency in the system, enhance private sector risk management practices, develop more risk-sensitive approaches to capital adequacy, support financial contract netting in the event of bankruptcy, and encourage off-shore financial centers to comply with international standards.

Finally, in this report, where concerns about close supervision of risks arising from OTC market transactions have been expressed, referring to a number of independent studies undertaken so far by different institutions, it is suggested that although derivative instruments are highly leveraged financial investment instruments, the activities of highly leveraged institutions using these financial instruments do not appear to have played a significant role in precipitating the financial market crises over the past few years.

## **V. Derivatives Markets and East Asia Financial Crisis**

Although many studies have been undertaken on the causes, effects and consequences of the East Asian financial crisis, a few of them are directly related with the effects of derivatives markets on this crisis. In the reports prepared by the IMF, the main causes of the crisis are stated as short-term capital inflow, misallocation of loans to non-liquid real estate investments, adjustment in foreign currency and unnecessary panick created by market participants. It is also pointed out that the absence of generalized hedging in foreign exchange markets infers that financial derivative contracts played no role in the crisis - a view reinforced by references to the IMF study that global hedge funds were not active catalysts in the Asian crisis (Chakravarthi, 1998).

However, some people do not accept this view and claim that OTC derivatives (forward and swap transactions) played an important role in the Asian crisis. For example, Kregel (1998) points out that the quarterly reports (fourth quarter of 1997 and the first quarter of 1998) of US money center banks suggest that most of their initial losses have been related to derivatives-related credit swap contracts and thus OTC derivatives, and have a negative impact on efficient capital allocation and prudent risk assessment in Asia crisis. Table 6 shows the figures for total amounts lent by country of borrower, net of derivatives and the cross border exposure resulting from revaluation on foreign exchange and derivatives markets.

**Table 6: Country Exposure of US Money Center Banks: Loans and Derivatives (31.12.1997) (\$ Million)**

Country	Total Amount Owed By Country of Borrower Except Derivatives	Cross Border Exposure From Foreign Exchange Revaluation and Derivatives
<b>Indonesia</b>	\$ 3,000	\$ 2,266
<b>Korea</b>	\$ 9,791	\$ 4,633
<b>Malaysia</b>	\$ 1,543	\$ 555
<b>Philippine</b>	\$ 1,533	\$ 40
<b>Thailand</b>	\$ 1,771	\$ 2,509

Source: Kregel (1998).

As can be seen from Table 6, the amount of derivative exposure of US banks is relatively high in Indonesia, Korea and Thailand, all of which have actually applied for IMF support. However, it is important to note that Thailand, which is the country where the Asian crisis had first started and Indonesia do not have exchange traded derivatives markets.

In fact, when studies undertaken on financial crisis are carefully examined, no evidence has been found regarding the role of organized exchanges on the initiation or acceleration of the financial crisis as all transactions conducted in these exchanges have been handled by a central clearing house. Most of the studies conclude that the main reason that triggered the crisis is the unlimited and rapid inflow of short term capital from developed countries and extension of these funds as credits to the illiquid investments such as real estate.

Finally, it can be concluded that derivatives markets, in particular, in terms of the transactions executed on organized exchanges, did not have a negative impact on the East Asia crisis. On the other hand, short-term capital inflow through swap and forward agreements in over-the-counter market by banks operating in Europe and US might have had a partial effect on the crisis. In fact, this result is also parallel to the overall conclusion of this study.

By their very nature, derivative instruments traded on the organized exchanges are more secure than over-the-counter market transactions as they are controlled both by the Exchanges and clearing houses. In over-the-counter market, on the other hand, the control and audit is quite difficult and market participants should assess each other's credit risk. In the case where transactions are carried out through the Exchange, when a

problem is experienced by any market participant, it is immediately handled by either the Exchange or the clearing house without being reflected to the counterparties and, thus this mechanism plays a vital role in the proper functioning of the market preventing “domino effect” in the financial system. In this sense, despite the fluctuations experienced by the East Asia crisis, no major problem has been noted neither in organized exchanges, where derivative instruments are traded, nor in central clearing houses where all trades are cleared.

## **VI. Risks Originated from Derivatives Markets**

The main point in evaluating the bankruptcies experienced in derivatives markets and their systematic risks is to analyze and assess organized exchanges and over-the-counter markets separately.

Recent losses experienced by some corporations and government funds using very complex trading strategies, especially in the over-the-counter market, make derivative instruments look particularly dangerous and thus, fund managers should be very careful in effective risk management process.

Although derivative instruments traded over-the-counter market seem to be more flexible, usually they do not have a liquid and transparent market, and therefore, it is difficult to measure their market prices on a daily basis. For this reason, market participants that have positions in the OTC market try to present them in a better position and use different valuation techniques. In this case, however, clients who have difficulties in assessing the progress of their positions are obliged to rely on the advice of dealers on pricing and risk management.

Despite large losses experienced in the market, many market participants continue trading in the derivatives markets by increasing their trading volume. Thus, these losses do not actually create an interruption in these markets that may further lead to a global financial crisis or a series of bankruptcies. But the main point that should be noted herewith is that over-the-counter market transactions are not subject to central clearing house guarantee and that the counterparties may well be encountered with credit risk. Therefore, the probability of systemic risk is higher in over-the-counter market compared to organized exchanges. As derivative transactions are carefully checked and supervised by exchanges and clearing houses, the losses that may arise out of these transactions will be smaller and not lead to a serious financial crisis in the market.

On the other hand, the size of the losses originated from derivative

transactions is also debatable. It should be remembered that in some cases losses are exaggerated and some bankruptcies are seemingly fraudulent. For example, in Metallgesellschaft case, some of the losses were partially compensated by the increase in the value of the customer agreements. In Orange County case, on the other hand, many doubts were raised about the filing of bankruptcy of the company. For this reason, it is important to notify whether the losses are experienced from an outright speculation position or hedging program and whether the reported losses were actually incurred or not.

### **VII. Main Causes of Dramatic Losses/Bankruptcies**

As can be noted from the cases examined above, large losses experienced in the derivatives markets are related to a variety of factors:

- Ineffective internal control mechanism: The key factor in controlling risks lays in detailed internal risk control procedures followed, in particular, by the board of management and increased monitoring of them by relevant departments responsible to check their effectiveness. This is not only true for the institutions trading in derivatives markets, but also for all institutions operating in financial markets. However, this mechanism becomes especially important in corporations dealing with complex derivative instruments, which may involve a higher degree of risk.
- Lack of an effective risk management system: In corporations dealing with derivative instruments, it is important to establish an effective risk management system, comprising risk limits, effective risk measurement techniques and information flow system, on-going risk monitoring and regular reporting to top management.
- Segregation of back office and trading desk transactions: Internal accounting controls for firms should separate front and back office functions. The back office transactions should be conducted by personnel who are independent of the trading and the revenue side of the business. Large losses revealed the fact that in corporations that do not follow this principle, the traders have hidden trading losses from unauthorized transactions by playing the books and records on the back office side.
- Top management that do not understand and properly evaluate market risks and trading strategies: Top management must have a clear understanding of the nature and size of the risks inherent in derivatives trading and must not rely exclusively on the decisions of specialists. This

may help them accomplish their overall objectives in the market as well as increase the effectiveness of risk management by monitoring the responsibility of the operating personnel.

- Aggressiveness of the personnel trading in derivatives markets: Unless corporations establish a proper scheme for the corporate culture in terms of human behavior, the specialists who deal with customers may well be aggressive in trading activities because of the high premium that they may gain from these transactions and be eager to bear unnecessary risks. For this reason, traders' pay schemes must take into account not only the size of profits, but also their regularity over time, the volume of the risks assumed and the type of funds used.
- Lack of coordination among regulatory authorities for the transactions executed in different countries: The supervision of derivatives is a worldwide task. Therefore, overall risk of a firm can be properly measured only by taking into account all the transactions executed in different countries together. Large losses incurred in derivatives markets in recent years once again drew attention of the regulatory authorities to the coordination and information sharing issues. Especially Barings and Sumitomo cases are good examples to point out this coordination. Therefore, it would be beneficial to establish a global worldwide risk measurement, management and supervision system for the entire world. In this sense, the efforts to decrease systemic risk in financial system have gained pace in recent years.

### **VIII. Conclusion**

Financial derivative instruments lead to a revolutionary change in understanding, correctly measuring and effectively managing the risks encountered in the markets by offering new instruments and become an integral part of the financial system.

When the functions of the financial derivative instruments are carefully evaluated, it is obvious that these instruments respond to the needs of many market participants and therefore, the market participants do not support the limitations imposed by the regulatory authorities on the usage of these instruments. On the other hand, blaming derivatives markets for the problems and the crises experienced in the financial markets is somewhat losing the forest while looking at the trees. In fact, bankruptcies and big losses have been experienced in the past as well prior to the widespread popularity of the derivatives markets. The reasons behind these losses are usually mismanagement, ignorance, lack of internal control

rather than the complex nature of these instruments and their inherent riskiness. When the events leading to the Asia crisis experienced in the near future are carefully analyzed, one can see that Thailand, which does not have a developed capital market and organized derivatives market, experienced a series of bankruptcies and almost in all cases the problem was the expansion of unlimited credits in the market to finance illiquid assets.

Most of the studies undertaken on derivatives markets reveal their necessity. For example, the "Hannoun Report" conducted by Standing Eurocurrency Committee, significantly, emphasizes the impact of derivatives on monetary policy. In addition to this, in the same report it is pointed out that derivatives are one of a number of innovations, which have changed the way in which financial markets operate in recent years and are probably a consequence rather than a cause of increased interest and exchange rate volatility.

In fact, the effect of derivatives markets on the economy and on the monetary policy is difficult to isolate. They help allocate resources more efficiently and tend to strengthen the economy's capacity to resist shocks. Moreover, in the same report, it is argued that derivatives markets provide central banks with new information for conducting monetary policy and additional tools for implementing it and thus serve as an important platform for them in improving their control over national markets. In this context, derivatives markets help central banks pursue anti-inflationary policies more comfortably, and take corrective action in advance for preserving the stability of the local financial system. Another example depicting the importance of derivatives markets within the financial system may be the famous incident in US in which a Treasury bond auction was scheduled for a day on which the futures market was to be closed. The US public authorities had canceled the Treasury bond auction, since it was considered that the dealers could not hedge their positions. Beneath this approach lay the assumption that the proper functioning of derivatives markets reduces the uncertainty and thus decreases the cost of the public borrowing in the market (Miller, 1997).

In summary, derivatives markets do not create new financial risks, but change the type, structure and nature of existing risks. Therefore, it is quite obvious that a mature derivatives market with a sound trading and clearing structure leads to a better risk management and better allocation of resources in the economy.

In this framework, especially derivative transactions executed on

organized exchanges are much more secure and liquid than those executed in over-the-counter market because of centralized risk control process pursued by the clearing houses and regulatory authorities. For this reason, the main aim of the regulatory authorities should be to encourage the establishment of a derivatives market in an organized exchange where there is an effective risk management, supervision and control mechanism. In this process, the training of market participants plays a vital role. As a last word, the market participants will certainly be eager to support the public authorities in their efforts to regulate the market, unless regulations are too restrictive, because the investors are well aware of the fact that a properly regulated market provides effective tools for risk management and the regulatory framework is put into use for their own sake.

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