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**CHAPTER 5: FOREIGN CURRENCY DERIVATIVES**

- 1. Options versus Futures. Explain the difference between foreign currency *options* and *futures* and when either might be most appropriately used.**

An option is a contract giving the buyer the right but not the obligation to buy or sell a given amount of foreign exchange at a fixed price for a specified time period. A *future* is an exchange-traded contract calling for future delivery of a standard amount of foreign currency at a fixed time, place, and price.

The essence of the difference is that an option leaves the buyer with the choice of exercising or not exercising. The *future* requires a mandatory delivery. The *future* is a standardized exchange-traded contract often used as an alternative to a forward foreign exchange agreement.

- 2. Trading location for futures. Check the *Wall Street Journal* to find where in the United States foreign exchange future contracts are traded.**

*The Wall Street Journal* reports on foreign exchange futures trading for the International Monetary Market in Chicago and for the Philadelphia Stock Exchange. These are the two major U.S. markets for foreign exchange futures.

- 3. Futures terminology. Explain the meaning and probable significance for international business of the following contract specifications:**

*Specific-sized contract.* Trading may be conducted only in pre-established multiples of currency units. This means that a firm wishing to hedge some aspect of its foreign exchange risk is not able to match the contract size with the size of the risk.

*Standard method of stating exchange rates.* Rates are stated in “American terms,” meaning the U.S. dollar value of the foreign currency, rather than in the more generally accepted “European terms,” meaning the foreign currency price of a U.S. dollar. This has no conceptual significance, although financial managers used to viewing exposure in European terms will find it necessary to convert to reciprocals.

*Standard maturity date.* All contracts mature at a pre-established date, being on the third Wednesday of eight specified months. This means that a firm wishing to use foreign exchange futures to cover exchange risk will not be able to match the contract maturity with the risk maturity.

*Collateral and maintenance margins.* An initial “margin,” meaning a cash deposit made at the time a futures contract is purchased, is required. This is an inconvenience to most firms doing international business because it means some of their cash is tied up in a non-productive manner. Forward contracts made through banks for existing business clients do not normally require an initial margin. A *maintenance margin* is also required, meaning that if the value of the contract is marked to market every day and if the existing margin on deposit falls below a mandatory percentage of the contract, additional margin must be deposited. This constitutes a big nuisance to a business firm because it must be prepared for a daily outflow of cash than cannot be anticipated. (Of course, on some days the cash flow would be in to the firm.)

*Counterparty.* All futures contracts are with the clearing house of the exchange where they are traded. Consequently a firm or individual engaged in buying or selling futures contracts need not worry about the credit risk of the opposite party.

4. **A futures trade.** A newspaper shows the following prices for the previous day's trading in U.S. dollar-euro currency futures:

This data reports that 29,763 contracts, each contract being for €125,000, were traded for settlement on the third Wednesday of the following December. The total euro value of all contracts traded on the day for which data is reported is the product of the two numbers:  $29,763 \times €125,000 = €3,720,375,000$ . The highest price during the day at which euro futures traded was \$0.9147/€. The lowest price was \$0.9098/€. The first trade of the day was at \$0.9124/€ and the last trade, called "settlement," was at \$0.9136/€. This closing price was 0.0027 above the previous day's close, from which one can determine that on the previous day euro contracts closed at  $\$0.9136/\text{€} - \$0.0027/\text{€} = \$0.9109/\text{€}$ . The closing "settlement" price is the price used by futures exchanges to determine margin calls. Open interest is the sum of all long (buying futures) and short (selling futures) contracts outstanding.

5. **Puts and calls.** What is the basic difference between a *put* on British pounds sterling and a *call* on sterling?

A *put* on pounds sterling is a contract giving the owner (buyer) the right but not the obligation to sell pounds sterling for dollars at the exchange rate stated in the put. A *call* on pounds sterling is a contract giving the owner (buyer) the right but not the obligation to buy pounds sterling for dollars at the exchange rate stated in the call.

6. **Call contract elements.** You read that exchange-traded American call options on pounds sterling having a strike price of 1.460 and a maturity of next March are now quoted at 3.67. What does this mean if you are a potential buyer?

If you buy such an option, you may if you wish order the writer (opposite party) of the option to deliver pounds sterling to you and you will pay \$1.460 for each pound. \$1.460/£ is called the "strike price." You have this right (this "option") until next March, and for this right you will pay 3.67¢ per pound. The information provided to you does not tell you the size of each option contract, which you would have to know from general experience or from asking your broker. The contract size for pounds sterling on the IMM is £62,500 per contract, meaning that the option will cost you  $£62,500 \times \$0.0367 = \$2,293.75$ .

7. **The option cost.** What happens to the premium you paid for the above option in the event you decide to let the option expire unexercised? What happens to this amount in the event you do decide to exercise the option?

The amount you pay for the option is gone forever, whether or not you exercise the option. This is the amount paid to the writer of the option, who undertakes the open-ended obligation to deliver pounds to you should you so wish. If you do not exercise the option, this is the sunk cost of buying options. If you in fact do exercise the option, your direct profit on the option is reduced by this amount which has already been paid out.

8. **Buying a European option.** You have the same information as in question 4 above, except that the pricing is for a European option. What is different?

The only difference is that you may exercise the option *only* on the day that it matures. Of course, you may sell the option to another investor at any time, and that subsequent owner then must hold until maturity – or sell to yet another investors, and so forth.

9. **Writing options.** Why would anyone write an option, knowing that the gain from receiving the option premium is fixed but the loss if the underlying price goes in the wrong direction can be extremely large?

From the option writer's point of view, only two events can take place:

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- a) *The option is not exercised.* In this case the writer gains the option premium and still has the underlying stock.
- b) *The option is exercised.* If the option writer owns the stock and the option is exercised, the option writer (a) gains the premium and (b) experiences only an *opportunity cost* loss. In other words, the loss is not a cash loss, but rather the opportunity cost loss of having foregone the potential of making even more profit had the underlying shares been sold at a more advantageous price. This is somewhat equivalent of having sold (call option writer) or bought (put option writer) at a price better than current market, only to have the market price move even further in a beneficial direction.

If the option writer does not own the underlying shares, the option is written “naked.” Only in this instance can the cash loss to the option writer be a very large amount.

**10. Option valuation. The value of an option is stated to be the sum of its *intrinsic value* and its *time value*. Explain what is meant by these terms.**

- a) *Intrinsic value* for a call option is the amount of gain that would be made today if the option were exercised today and the underlying shares sold immediately. For a put, *intrinsic value* is the amount of gain that would be made if the underlying shares were purchased today and delivered immediately against the option. Intrinsic value can be zero, as when the option is not worth exercising today. However if a gain could be made by exercising the option today, the intrinsic value is positive because intrinsic value can never be less than what can be gained from an immediate exercise of the option. Note that gain is not the same as net profit because in all cases the option buyer has already paid the premium.
- b) Time value of an option is related to what one will pay above intrinsic value because of the chance that between today and the maturity of the option intrinsic value will become positive (option with no intrinsic value) or greater than today (option having some positive intrinsic value today.) In effect, intrinsic value is the worth of the speculative component of the option.

**MINI-CASE: ROGUE TRADER, NICHOLAS LEESON**

This mini-case is based on “Baring Brothers & Company,” by Professor Mark Griffiths, Thunderbird Case #E06-99-0021. Used with the permission of the Thunderbird Case Series.

**1. What was Nick Leeson’s strategy to earn trading profits on derivatives?**

Nick Leeson was trading futures and options on the Nikkei 225, an index of Japanese securities. He was long Nikkei 225 futures, short Japanese government bond futures, and short both put and call options on the Nikkei Index. He was betting that the Nikkei index would rise, but instead, it fell, causing him to lose \$1.39 billion.

**2. What went wrong that caused his strategy to fail?**

Nick Leeson’s strategy failed because the Nikkei 225 index kept falling while he continued to bet that it would rise.

**3. Why did Nick Leeson establish a bogus error account (88888) when a legitimate account (99002) already existed?**

Nick Leeson established a bogus error account (88888) when a legitimate account (99002) already existed in order to conceal his unauthorized trading activities. While the legitimate error account was known to Barings Securities in London, the bogus account was not. However, the bogus account was known to SIMEX as a customer account, not as an error account. In this way Leeson could hide his balances and losses from London – but not Singapore. One the other hand, SIMEX thought the bogus error account, 88888, was a legitimate customer account rather than a proprietary Barings account.

**4. Why did Barings and its auditors not discover that the error account was used by Leeson for unauthorized trading?**

Internal Reasons. Leeson engaged in unauthorized trading, as well as fraud. However, it is clear that he was hidden in the organized chaos that characterized Barings. “There were no clearly laid down reporting lines with regard to Leeson, through the management chain to Ron Baker [Head of Financial Products Group for Barings]” (Bank of England, p. 235). In fact, it seems there were several people responsible for monitoring Leeson’s performance, each of whom assumed the other was watching more closely than he.

In August 1994, James Baker completed an internal audit of the Singapore office. He made several recommendations that should have alerted Barings executives to the potential for unauthorized trading: 1) segregation of front and back office activities—a fundamental principle in the industry, 2) a comprehensive review of Leeson’s funding requirements, and 3) position limits on Leeson’s activities. None of these had been acted upon by the time of the bank’s collapse.

With regard to the first concern, Simon Jones, Director of BFS and Finance Director of BSS, in Singapore, offered assurances that he would address the segregation issue. However, he never took action to segregate Leeson’s front and back office activities. Tony Hawes, Barings Treasurer in London agreed to complete a review of the funding requirements within the coming year. Ian Hopkins, Director and Head of Treasury and Risk in London, placed the issue of position limits on the risk committee’s agenda, but it had not been decided when the collapse occurred.

According to the Bank of England report, senior management in London considered Jones a poor communicator and were concerned that he was not as involved as he should have been in the affairs of BFS. In fact, Peter Norris, the chief executive officer for Baring Securities Limited wanted to replace Jones. Jones,

however, was protected by James Bax, Managing Director of Baring Securities Singapore, who was well liked in London.

The Bank of England also found fault with the process of funding Leeson's activities from London. First, there was no clear understanding of whether the funds were needed for clients or for Baring's own accounts, making reconciliation impossible. Second, given the large amounts, credit checks should have been completed as well. The report places the responsibility for the lack of due diligence with Tony Hawes, Ian Hopkins, and the Chairman of the Barings Credit Committee.

The issue of proper reconciliation arose as early as April 1992 when Gordon Bowser, the risk manager in London, recommended that a reconciliation process be developed. Unfortunately, Bowser left Simon Jones and Tony Dickel, who had sent Leeson to Singapore, to agree on a procedure. With internal conflict over who was responsible for Leeson's activities, no agreement was reached between those two, and Leeson was left to establish reconciliation procedures for himself.

There are numerous similar examples of internal conflict benefitting Leeson's covert trading throughout the three years. But one of the late failures occurred in January 1995 when SIMEX raised concern over Barings' ability to meet its large margins. In a letter dated January 11, 1995, and addressed to Simon Jones, SIMEX officials noted that there should have been an additional \$100 million in the margin account for 88888. Jones passed the letter to Leeson to draft a response.

External Reasons. In January 1995, SIMEX was getting close to Leeson's activities, but had not yet managed to determine what was happening. In response to a second letter dated January 27, 1995 and sent to James Bax in Singapore, SIMEX expressed concerns regarding Barings' ability to fund its margin calls. Bax referred the letter to London, and SIMEX received reassurance that opposite positions were held in Japan. Unfortunately, SIMEX officials did not follow up with the Osaka Stock Exchange to verify the existence of those positions.

**5. Why did none of the regulatory authorities in Singapore, Japan, and the United Kingdom not discover the true use of the error account?**

SIMEX assumed that Barings was hedging and not speculating when it granted an exemption on the number of contracts that Barings could hold. Due to Barings' reputation for being a conservative firm, the exchange and clearing houses were operating under a false sense of security. In addition, the speculative position of Barings was hidden due to use of an omnibus account to clear trades. With an omnibus account, the identity of the broker's customers is hidden from the exchange and the clearinghouse.

Several incidents in London also made Leeson's activities easier to manage and hide. The Bank of England had a Large Exposure rule where a bank could not lend more than 25% of its capital to any one entity. However, Barings had requested that an exception be made, arguing that an exchange should not be treated as one entity. Christopher Thompson, the supervisor in charge of Barings activities, acknowledged receipt of the request and said he would review it. In the meantime, he offered an informal concession for Japan, which Barings took the liberty of also applying to Singapore and Hong Kong. Thompson did not respond for a year, and when he did on February 1, 1995, the answer was that an exception could not be made for exchanges and that the positions taken under the informal concession should be unwound.

The second incident was the solo-consolidation of Baring Securities Ltd and Baring Brothers & Co. This allowed them to be treated as one entity for capital adequacy and large exposure purposes. This meant Leeson had access to a larger amount of capital. The Bank of England found the process of solo-consolidation to have been too informal and the results to have facilitated Leeson's fraudulent activities.

**6. Why was Barings Bank willing to transfer large cash sums to Barings Futures Singapore?**

Barings Bank believed that the large cash sums transferred to Barings Futures Singapore was for loans to customers as portrayed on the Barings Futures Singapore balance sheet.

**7. Why did the attempt by the Bank of England to organize a bailout for Barings fail?**

The attempt by the Bank of England to organize a bailout for Barings failed because no one would assume the contingent risk of additional, but as yet undiscovered losses.

**8. Suggest regulatory and management reforms that might prevent a future debacle of the type that bankrupted Barings.**

Due to incidents of staggering losses to corporate and banking entities as early as 1993, calls for financial reforms, particularly in relation to derivatives, had been ongoing for quite some time. However, it took the Baring Brothers bankruptcy to finally bring about action. The Bank of England, SIMEX and the Group of Thirty all created reports on how regulators, administrators, legislators, international firms and associations could address the issues of regulating financial activities.

The Bank of England wrote a report describing how the losses occurred, why they went unnoticed within and outside Barings, and lessons learned. How the losses occurred and why they went unnoticed has already been explained. The Bank produced five lessons from the bankruptcy. They are (Bank of England Report):

- a) Management teams have a duty to understand fully the businesses they manage
- b) Responsibility for each business activity has to be clearly established and communicated;
- c) Clear segregation of duties is fundamental to any effective control system;
- d) Relevant internal controls, including independent risk management, have to be established for all business activities;
- e) Top management and the Audit Committee have to ensure that significant weaknesses, identified to them by internal audit or otherwise, are resolved quickly.

Despite these simplistic recommendations, at least one and usually several, of the points was the reason why firms lost large sums of money within the derivatives market.

SIMEX, like the other exchanges in the world, implemented changes to decrease default and counterparty risk as well as systemic risks. These changes were made as a direct result of the Barings collapse. SIMEX joined with other exchanges to share information about similar positions participants held on different exchanges. To reduce the risk of non-payment of contracts, SIMEX and other exchanges placed the resources of their entire membership behind the settlements.

The Group of Thirty based out of Washington, DC, has become particularly concerned with the risks derivatives pose. Since 1995, it has issued several publications to address these problems. The first of these was published in August 1996, and is titled "International Insolvencies in the Financial Sector, Discussion Draft." This document advances fourteen ideas to reduce the risk in the financial sector particularly with regard to derivatives (see Exhibit 2 for the complete list). The second publication printed in April of 1997 is titled "International Insolvencies in the Financial Sector, Summary of Comments from Respondent Countries on Discussion Draft." This publication gives the responses and opinions of those member countries to the proposed reforms. The support for these reforms was generally very strong among all the countries that responded. Germany and other countries did mention several drawbacks to some of the reforms, but they, too, were generally supportive. Ironically,

Singapore expressed reservations or outright opposition to five of the reforms (#1, 2, 4, 6 and 9).<sup>1</sup>

A third publication dealing with the aftermath of Barings, is titled “Global Institutions, National Supervision and Systemic Risk” (1997). This discusses reforms that have already been put in place. These reforms include “expanded use of netting and collateral; improvements in measuring risk; greater disclosure of off-balance-sheet risk; substantial increases in equity capital of major financial institutions; financial sector consolidation; and the growth of securitization.”<sup>2</sup>

### Postscript

ING, a Dutch insurance company, was looking to enter the banking business, especially in Asia. It paid one pound sterling for Baring Brothers and added an additional \$1 billion to pay off the debts Baring Brothers had accumulated and restore the bank’s capital position. In addition, ING also had to pay \$677 million to the holders of subordinated debt that was issued by Barings plc, the holding company, just before the bankruptcy.<sup>3</sup> Legally, ING was not liable for the bonds, but since the bondholders were Barings best customers, ING had to make good on the notes in order to save the customer relationships.<sup>4</sup>

On February 23, 1995, Nick Leeson fled in his Mercedes across the bridge from Singapore to Malaysia. He hid out in Thailand for the next week with his wife and was caught flying into Germany one week later. He was extradited back to Singapore, stood trial and was subsequently sentenced to 6.5 years in a Singapore prison for fraud. In August 1998, Leeson underwent surgery for colon cancer and began receiving chemotherapy. Despite his condition, authorities in Singapore did not release Leeson until June 1999.

Christopher Thompson was the Bank of England supervisor in charge of Baring Brothers at the time of the bankruptcy. He was responsible for allowing Baring Brothers to invest over the legal limit of 25% of its capital in the SIMEX and OSE. The day before the Bank of England report was to be published about the Baring Brothers collapse, Thompson resigned.<sup>5</sup>

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<sup>1</sup> Group of Thirty, “International Insolvencies in the Financial Sector,” *Summary of Comments from Respondent Countries on Discussion Draft*, April 1997, pp. I-iii.

<sup>2</sup> Group of Thirty, *Global Institutions, National Supervision and Systemic Risk*, 1997, p.v.

<sup>3</sup> Hans R. Stoll, “Lost Barings: A Tale in Three Parts Concluding with a Lesson,” *The Journal of Derivatives*, Fall 1995, Vol. 3, No.1.

<sup>4</sup> Mayer, *The Bankers*.

<sup>5</sup> Fay, *Collapse*.