

THE
FOREIGN EXCHANGE COMMITTEE

ANNUAL REPORT

1984

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CHAIRMAN'S REPORT

Change is a very natural characteristic of the foreign exchange and related international financial markets. But there are dramatic differences in how these markets are changing in the 1980s in contrast to the prior decade. The hallmarks of change in the volatile exchange rate environment of the 1970s were rapid growth in transaction volume and in the number of currencies traded, as well as the geographic spreading of international financial centers around the globe.

The hallmarks of change for this decade are of a new dimension. While the geographic and currency characteristics of the marketplace evolve at a slower pace, we are seeing the rapid introduction of foreign currency options, interest rate swaps, and a variety of financial futures products on organized exchanges. In other words, the underlying instruments are now changing. Previously segmented financial markets are becoming integrated and are assimilating techniques from one another at increasing speed.

New risk management vehicles are creating new and difficult issues for financial institutions and the regulating authorities. Unlike the changes of the 1970s, today's changes require a reappraisal of accounting, reporting, and management techniques. Also, the newly developing markets lack uniform terminology or technical standards. In such an environment it is particularly important that a forum such as the Foreign Exchange Committee exists.

The Committee had a particularly active and productive year in 1984. In its advisory role to the Federal Reserve Bank of New York and the marketplace, the Committee focused its attention on two broad areas in order to improve the identification of risk and the smooth functioning of the marketplace.

First, the Committee addressed ways of coping with various risks from the large volume of interbank foreign exchange trading. It completed its study on bilateral foreign exchange contract netting initiated last year, producing a model netting agreement. It also discussed methods of controlling the cross-border risks that result from foreign exchange as well as deposit trading between financial centers in different countries.

Second, the Committee discussed many of the new instruments that are gaining considerable popularity. Included among these were interest rate swaps, forward interest rate agreements, and foreign currency option contracts. For 1985, the Committee established a foreign exchange options task force to address a wide range of issues raised in this year's discussions of options.

Throughout 1984, the Committee continued to provide the Federal Reserve with current market information and discussion of events affecting market performance. These discussions confirmed that the only thing routine about the international financial markets is change.

The Committee has been very successful in a most challenging environment. Its membership has a balance in its U.S. geographic representation and excellent technical skills. The Committee's achievements resulted from active participation by all its members within the effective sponsorship and support of the Federal Reserve Bank of New York.


Raymond R. Peters

THE COMMITTEE'S DELIBERATIONS ON MATTERS OF MARKET PRACTICE

Pursuing its role of providing guidance to participants in the U.S. foreign exchange market, the Committee addressed several aspects of market practice.

Bilateral Netting of Foreign Exchange Contracts

The Foreign Exchange Committee made considerable progress in its consideration of how netting of foreign exchange transactions might be introduced to the U.S. interbank market. With the rapid growth of foreign exchange business, many institutions had sought to net offsetting transactions with individual counterparties to evaluate credit risk, to make payments, or both. Some banks in the United States had already developed mechanisms for bilateral netting of transactions with customers. But in the interbank market, bilateral netting was not yet commonplace.

The Committee had concluded that, if bilateral netting were to be established in the United States, a mechanism would need to be found to replace the underlying offsetting transactions between any two counterparties with one contract for the net amount. The Committee was not sure how such a netting procedure might be formulated or how it would work in the event of the bankruptcy of one of the counterparties.

Development of Bilateral Netting Agreement

To assist in thinking through these ideas, the Committee had established, late in 1983, a study group of lawyers representing institutions on the Committee. That group concluded that a bilateral netting arrangement could be established if two counterparties first entered into a master agreement providing that future transactions between them be netted automatically. The group drafted a model agreement to demonstrate how a netting arrangement between two banks located in the United States might be structured. A draft of this model agreement was circulated to all market participants for comments and suggestions during the summer of 1984. It was subsequently revised and presented to the Committee in final form late in the year.

The model netting agreement provides that two banks agree in advance to the automatic and continuous netting of their foreign exchange contracts for the same value date in selected pairs of currencies. It assumes that the two banks will wish to include currencies in which they normally trade substantial amounts regularly. When a covered contract is concluded, each party's obligation to deliver and right to receive the specified currencies for the specified value date are legally netted.

The agreement also provides for the mandatory acceleration and closing-out of the covered obligations between counterparties in the event one of the parties becomes insolvent. Close-out is accomplished by the solvent party's determining each contract's current market value, computing its gain or loss on each contract, discounting the gain or loss amount to present value, and then netting these present values first among themselves and then against other obligations between the parties. The resulting amount would be due and payable immediately.

Advantage of Bilateral Netting Agreement

The Committee considered that use of a netting contract along the lines of this model would improve a bank's position in two ways. It limits risk by reducing contract and payment obligations. It also attempts to clarify the legal status of outstanding foreign exchange contracts in the event of a counterparty's insolvency.

The Committee therefore decided to recommend that banks wishing to enter into netting agreements with other banks might consider this agreement as a model. The Committee believed that each institution would find it easier to implement netting, the more similar were the specific provisions of their netting agreements with each counterparty. At the same time, the Committee recognized that specific provisions may be varied to suit the particular needs and operational capabilities of the banks involved.

In the Committee's many discussions of this issue, members noted the tendency for banks to set limits for their largest interbank counterparties at a size disproportionate with most measures of bank size. This tendency stems from the perceived need to accommodate growing transaction volumes. Members of the Committee noted that netting along the lines of the model agreement could relieve pressure on banks' credit limits with their biggest interbank counterparties and permit a reappraisal of the size of the limits. The Federal Reserve Bank of New York strongly urged banks using netting to lower limits with their netting counterparties.

During the year, a number of the largest foreign exchange trading banks in the United States began to discuss netting arrangements with their counterparties. A number of these institutions used the Committee's model agreement as a starting point for their discussions.

The Committee acknowledged that not all banks may be interested in netting at this time. Certain operational systems and procedures have to be changed to accommodate netting. These changes

entail costs which could be justified only by banks that can substantially reduce their exposures and their payment obligations by netting

Cross-Border Risk

Several times during the year the Committee discussed the various types of risk to which market participants are exposed when placing funds on deposit or engaging in foreign exchange transactions. The discussion was initiated in response to developments taking place early in the year in the Philippines. But the Committee quickly recognized that the discussion broached several concepts that were important regardless of the particular country or the particular institution involved.

Some of the commentary dealt with the actions of national monetary authorities. A few Committee members expressed the view that monetary authorities should display greater consideration for the needs of the markets, particularly since their economies benefit from smoothly functioning markets to finance the transfer of goods, services, and capital.

The prevailing view, however, was that governments frequently find themselves in situations in which they need to take actions that are not fully consistent with needs of market participants. Institutions in one country must therefore be duly aware of the risks they incur when deciding to establish branches and subsidiaries abroad or to engage in banking transactions with institutions in another country.

In these discussions, concern was frequently expressed that the nature and extent of the risks may often be underestimated by bankers. Banks operating in these markets frequently deal with a large number of counterparties, rendering it difficult to maintain sufficient contacts and to keep up to date with the large number of institutions with whom they deal.

Monitoring Cross-Border Risks

The Committee therefore concluded it would be appropriate to restate the principal types of risks banks typically incur when participating in these markets. In preparing this statement, members of the Committee benefited from an exchange of views on how different institutions evaluate credit risk and implement internal controls on country and cross-border exposures. The Committee felt that other market participants might also obtain some useful insights from a description of the general approaches banks use to monitor their exposures to these risks. It therefore prepared a paper, "Risk in Interbank Cross-Border Transactions," for general circulation in the hope of drawing attention anew to this important subject.

In drafting this paper, Committee members were impressed by the extent that major banks operating in this country have recently reexamined and tightened their mechanisms for monitoring risk exposures. A number of banks have also moved in the direction of including their foreign exchange trading transactions in the same monitoring systems that apply to their deposit activities.

Comments on Market Trends

A number of observations made by Committee members suggested that market participation shifted considerably in the past year. Several noted a reduction in direct dealing, not only with other banks in the United States but also with banks abroad. US banks received fewer telephone calls from their foreign correspondents, and they called abroad less frequently. Banks here found there is enough domestic foreign exchange business to keep them busy. International information systems made it unnecessary to telephone banks in other financial centers to find out about developments there. Also, brokers now provide an international service.

Participation Changing

Within the United States, also, there was evidence of changes in market participation among banks. Some representatives on the Committee indicated that they had chosen to reduce their presence in the market—in some cases even curtailing the number of banks with which they dealt directly—because of staffing, cost, and other considerations.

Broker members indicated that, while overall transaction turnover has been maintained, the distribution of their business among the banks they service changed considerably. Many of the banks that were among their largest customers five years ago are no longer on the list of their top ten customers. Newly established foreign banks are an important source of daily volume on a regular basis as well as other banks that have decided to increase their foreign exchange trading activity.

Regional bankers on the Committee did not appear to find these developments detrimental to their foreign exchange business. They said their institutions were able to make foreign exchange quotations to other regional institutions consistently throughout the day. They also felt they continued to obtain adequate service from larger banks.

Some members observed a growing concentration in the currencies traded in this market. Currencies which provided adequate liquidity to dealers remained heavily traded. In this connection, the German mark served as a vehicle for trading the dollar against all continental currencies, with the result that trading in the other

currencies subsided. Trading in Canadian dollars also dropped off sharply, partly because a lack of variability against the U.S. dollar reduced interest in the currency.

Some members expressed the view that the brokers may have to curtail service in some of the more lightly traded currencies. Brokers' costs have escalated as they assumed the overhead to provide confirmation and communication facilities in support of foreign exchange trading. If this trend continues, competitive forces might force more brokers to specialize and to curtail services in currencies with low volume.

New Instruments

The Committee continued to be impressed with the proliferation of new products and the popularity of these products with their customers. In an effort to improve their understanding of these instruments, the Committee organized two panel discussions during the year.

Interest-Rate Swaps and Fixed Rate Agreements

The first focused on credit risk in fixed rate agreements or forward interest rate contracts (FIRC), and in interest rate swaps or interest rate conversion agreements (IRCA). The presentation prepared by three Committee members (see p. 18) drew attention to the existence of both counterparty and settlement risk in both of these instruments. It stressed that the exact magnitude of any exposure arising from these instruments is difficult to determine at the time the agreements are put in place. The size of exposures depends upon differences in interest rates that are not known until some future date. Accordingly, credit assessments are evaluated on the basis of approximate, and perhaps arbitrary, procedures—procedures that warrant regular review to take into account current and prospective market conditions.

Terminology was a problem in discussing these issues. Many institutions have apparently adopted different names or definitions for essentially similar products. Several Committee members expressed the view that the Committee might wish, in the future, to

consider what role it might play in establishing more standardization in terminology and in improving the understanding of trading practices for these instruments.

Foreign Exchange Options

The second panel discussion was aimed at improving the Committee's understanding of the foreign currency option as a financial instrument. The panel, including both members and other specialists in options, reviewed recent experience with options, questions arising out of the current regulatory environment, and issues concerning management of an options book (see pp. 21-29).

Prior to the panel discussion, participants in the options market had initiated a meeting at the Federal Reserve Bank of New York to discuss the development of this market and the problems it faced. The Committee's discussion several months later revealed that there remained a desire on the part of market participants to find a forum in which such a discussion might continue.

Three topics were specifically singled out as warranting further discussion and review. These were:

TRADING PRACTICES. Would it be useful to develop common definitions for terminology and to set examples of good market practice for over-the-counter options?

MARKET AWARENESS. Do the current and prospective participants in this market have an adequate appreciation of their exposures to credit and market risks?

REGULATORY ISSUES. How does market practice relate to the requirements and guidelines imposed by the various regulatory and governmental agencies that have jurisdiction for this type of instrument?

Members unanimously agreed that the Committee was well suited to discuss these matters. This topic fits within the Committee's charter to serve as a forum of discussion of market issues and a channel of communication between the market and the Federal Reserve. Many of its members participate in the options market. Consequently, the Committee decided to establish an *ad hoc* task force, comprised of Committee members and others, to investigate and discuss these issues.

PROCEDURAL MATTERS OF THE FOREIGN EXCHANGE COMMITTEE

Formal meetings of the Committee generally were held the first Friday of alternate months. The meetings for two months were pushed back one week, however, to accommodate scheduling conflicts with meetings of other professional organizations or to take account of a holiday.

On May 4, the Committee hosted an informal meeting and invited Mac Northam, Examiner in the Investment Division of the National Office of the Office of the Comptroller of the Currency, and Frederick C. Schadrack, then Vice President in Bank Supervision of the Federal Reserve Bank of New York, responsible for the Bank Analysis and Bank Examinations Departments. The topic of this meeting was the regulatory requirements relating to financial futures.

On November 2, the Committee hosted another informal meeting featuring a panel discussion on foreign exchange options. Guests invited to participate on the panel were Scott Dillman (Marine Midland), William Lipschutz (Salomon Brothers), Thomas A. Russo (Cadwalader, Wickersham and Taft), Gary Seevers (Goldman Sachs), and Arnold Staloff (Philadelphia Board of Trade).

The Committee completed two major documents during the course of the year. The first was a model contract to be considered by banks wishing to net foreign exchange contracts with one another. The second was a report concerning risk that banks assume in their cross-border operations. Both of these documents were circulated to market participants in January 1985.

For the first time the Committee chose to circulate one of its papers in draft form to generate comment from the market at large prior to issuing a recommendation. During the summer of 1984, it solicited comments on its model netting agreement. A variety of institutions not represented on the Committee came forward with

comments and suggestions which the Committee found most helpful.

The Committee solicited papers from its members and others on a variety of issues concerning interest rate swaps, fixed interest rate agreements, and foreign exchange options. These papers are reprinted in this report.

At the end of the year, the Committee decided to establish a task force to study foreign exchange options. This task force consists of members of the Committee and other individuals chosen either for particular expertise in this area or as representatives of major market participants in options. The task force is chaired by S. Waite Rawls (Chemical Bank) and includes Jay Pomeranze (Bankers Trust), Bruce Krastinz (Citibank), Scott Dillman (Marine Midland), William Lipschutz (Salomon Brothers), Varick Martin (Merrill Lynch), and Allan Griffiths (Bierbaum). It is being assisted by Franklin Feldman (Strook and Strook and Levan), David Harrington (Brooklyn Law School), Ernest Patrikis (Federal Reserve Bank of New York), and Thomas A. Russo (Cadwalader, Wickersham and Taft). The mandate of the task force is to study and prepare recommendations on foreign currency options for the Committee on issues of trading practices, market integrity, and public policy.

In all of its actions or suggestions, the Committee—in accordance with its charter—does not attempt to issue rules and regulations. Rather, it recognizes that the force of its recommendations is dependent on the persuasiveness of its suggestions and on the Committee's ability to effectively convey its views to the market.

In this connection, the Committee believes its views might gain greater currency if it increased the circulation of its documents and encouraged broader discussion of the issues it considers.

FOREIGN EXCHANGE COMMITTEE Foreign Currency Options Task Force

Assignment

The Ad Hoc Foreign Currency Options Task Force will study and prepare recommendations for the Committee on foreign currency options.

Task Force Membership

The Task Force should be composed of seven members representing institutions that are market-makers in the foreign currency options market. The Task Force may seek the assistance of other individuals with legal and technical expertise in this area.

Areas of Responsibility

I Recommendations regarding trading practices

- Variation/standardization of contract terms
- settlement
- delivery
- payment of premium
- Terminology and quotations
- price increments
- volume increments
- time increments

II Recommendations regarding market integrity

- Education
 - for established market users
 - for recent entrants into the market
 - for foreign market users
- Counterparty credit risk
 - measurement
 - monitoring and control
- Disclosure
- Institutional control mechanisms
- Accounting practices

III Recommendations to the Federal Reserve Bank of New York

- Issues regarding bank supervision
- Issues regarding the role and jurisdiction of Federal and State regulatory agencies

COMMITTEE'S ADVISORY ROLE TO THE FEDERAL RESERVE BANK OF NEW YORK

The Committee again served as a forum for exchanging views between market participants on the one hand and the Federal Reserve and other monetary authorities on the other.

Financial Futures

One of the Committee's agenda items for 1984 was to discuss the regulatory requirements relating to the use of financial futures.

Banking Circular No. 79, issued in revised form on April 19, 1983 by the Office of the Comptroller of the Currency (OCC), outlines

To assist in the discussion of this matter, the Committee invited Mac Northam, Examiner in the Investment Division of the National Office of the OCC, and Frederick C. Schadrack, Vice President of the Federal Reserve Bank of New York, to a special meeting in May.

Mr. Northam presented the views of the OCC, indicating that banks' use of financial futures was permissible to the extent that their use was explicitly authorized by bank management and necessary to support commercial banking operations. The intent is that these instruments be used to reduce the risk of loss on actual or anticipated positions in cash instruments. They are not viewed as

SUMMARY OF U.S. REGULATORY REQUIREMENTS FOR FINANCIAL FUTURES								
	Institutions Affected	Instruments Permitted	Permissible Use	Position Limits	Option Contracts	Written Policy	Accounting Procedures	Option Fee
Federal Reserve	state member banks; bank holding companies (not accounting procedures)	financial futures, forwards, options for U.S. Government and agency securities and domestic certificates of deposit	must reduce risk; must generally hedge interest rate exposure	established by institution consistent with safe and sound banking	only for period less than 150 days	required	mark-to-market; expense losses	deferred until option exercised or option exercise period runs
OCC	national banks (Federally licensed branches and agencies of foreign banks)	"	"	"	"	"	"	"
FDIC	state nonmember banks	"	"	"	"	"	"	"
FHLBB	FSLIC-insured thrift institutions	any financial futures contract, including option contract, approved by CFTC or SEC, involving instrument in which institution authorized to invest	must reduce net interest rate risk exposure	non-off-setting long position limited	long position unlimited; short calls unlimited; short puts limited (along with long forwards)	"	deferral; matching of hedging transactions	matched with existing asset, liability, or written commitment; divided; commitment fee; immediate exercise value

prudent policies and procedures for national banks that engage in financial futures contracts, forward placement contracts, or standby contracts in their commercial banking activities. The Board of Governors of the Federal Reserve System issued a substantially similar policy statement on March 14, 1980, relating to state member banks and later extended to bank holding companies. The Federal Deposit Insurance Corporation (FDIC) and the Federal Home Loan Bank Board (FHLBB) have also issued policy guidelines for use of these instruments. A summary of the major points of these circulars and policy statements is prepared in the chart on this page.

appropriate vehicles for speculative trading, increasing risk exposures, or as a substitute for prudent asset-liability management. Although the Banking Circular refers specifically to financial futures, he assumed they would be interpreted to apply to foreign currency futures and options as well.

Many of the Committee members expressed the view that the regulatory distinction between cash and futures instruments might be considered artificial in at least two respects. First, such a distinction could divert attention from the real risk-management issue. These members believe bank management should focus more

attention on how prudently and carefully risk positions are managed than on the instruments used to do that job. Second, the apparent assumption that futures instruments are inherently more risky than their cash equivalents may not be valid. At times, futures markets can be more liquid in that large transactions can be consummated more quickly and at lower cost. Futures can add flexibility, permitting a bank to handle larger amounts of customer business, limit losses on market exposures, or tailor products to customers' needs. In addition, the credit characteristics of futures are different to the extent that an exposure is established *vis-a-vis* a margined clearing house.

All participants in this discussion agreed that views about futures need to be explored further. The question of what constitutes hedging and what constitutes speculation is not clear-cut. The regulators and the regulated could both benefit from continued discussion.

Lengthening of Trading Hours

Some brokers on the Committee reported they were now providing brokering services in foreign exchange well after the normal close of business on the East Coast. These firms were working with management of the banks they service to identify individual traders authorized by the bank to trade after normal closing hours.

Foreign Exchange Contract Standards

Early in the year, the Foreign Exchange Committee was invited to comment on a draft report on uniform rules for foreign exchange contracts, prepared for the Commission on Banking Technique and Practice of the International Chamber of Commerce (ICC). The Committee had reviewed earlier drafts of this report in 1980 and 1981, and many of the Committee's suggestions had been incorporated in the final draft.

In making these latest drafting suggestions, the Committee was mindful of the enormous task the drafting group encountered in attempting to resolve many differences in practices and in legal requirements affecting foreign exchange contracts around the world. The Committee concluded that the result was not fully satisfying to the extent that uniform rules cannot give contracting parties the assurance, in the event of litigation, that the terms of the rules will always prevail. However, the Committee felt that the ICC initiative was significant in that it codified many of the important elements of good market practice. Therefore, it recommended that the ICC continue to pursue this project.

Fed Concern about Trading Practices

The Federal Reserve Bank of New York expressed concern on a number of occasions that complaints about dealing relationships and trading practices in the U.S. foreign exchange markets were growing in number.

In discussions that followed, several members concurred that relationships between trading banks were becoming strained as some dealers had fallen into the habit of using unprofessional tactics with other market counterparties. It was noted that there has been an above-average level of turnover among trading personnel, and some institutions' behavior might have been influenced by lack of experience. In addition, a slowdown in global trading volume, increased exchange-rate volatility, and reduced profitability resulting from rising overhead costs and other factors were cited as contributing to a more defensive attitude of banks throughout the world.

Nevertheless, Committee members reaffirmed the need to maintain a high level of professionalism and ethics in the foreign exchange trading operations in the U.S. markets.

FORMAL MEETINGS OF THE COMMITTEE

Meetings in 1984

February 3
April 6
June 15
August 3
October 12
December 7

Schedule for 1985

February 1
March 29
June 7
August 2
October 4
December 6

RECOMMENDATIONS AND PAPERS

PREPARED IN 1984

MODEL INTERBANK FOREIGN

This Agreement is made the ____ day of _____, 198__ between _____ and _____ (each referred to as a "party" and both as the "parties").

Statement of Intent and Application

Whereas the parties carry on the business of buying and selling foreign currency and in the ordinary course of such business from time to time enter into foreign currency contracts with each other; the parties conclude a substantial number of contracts in the same currencies and for the same Value Date; and the parties wish to limit their foreign currency obligations and exposure to each other by agreeing to net automatically their obligations to each other in certain currencies; the parties hereto agree as follows.

1. Except as otherwise agreed in writing, this Agreement applies to every FOREXK between the parties, except that, as to a foreign bank in the United States, this Agreement applies only to every FOREXK of the branch or agency office designated in paragraph 6.

Definitions

2 For the purposes of this Agreement:

(a) "FOREXK" means a contract under which one party agrees to purchase from or sell to the other party an agreed amount of one paired currency at a specified rate of exchange for delivery on a Value Date in exchange for the other paired currency, that must also be delivered on the same Value Date, in accordance with customs and usage generally accepted and practiced by dealers in the interbank foreign exchange market. [To be excluded, however, is any such contract for next-day delivery, or which requires dispatch of currency payment instructions on the Value Date.]^{1/}

(b) "Value Date" means the date specified for delivery of the currencies bought and sold under a FOREXK.

(c) "Insolvent" or "insolvency" means the condition of a party, marked by:

- (i) its failure to make any payment required by a FOREXK on the Value Date and, within five business days, the sending of written (including telex) notice of nonpayment by the other party;
- (ii) its declaration of insolvency under local law or the appointment of a receiver, custodian, or similar official;
- (iii) the suspension or closing of a party (other than a voluntary, routine relocation or closing of an office) or the taking of possession of its business by a governmental authority or receiver, custodian, or similar official; or
- (iv) the commencement of a case or proceeding by or against a party under the bankruptcy, insolvency, or similar laws of any jurisdiction.

(d) "Netting date" means each business day on which the parties enter into a foreign exchange transaction that is netted into a FOREXK.

3. The parties agree to designate the paired currencies for which they will enter into FOREXKs. These paired currencies

shall be named in the list appended to this Agreement, entitled "FOREXK LIST." Additions to the list and deletions from the list may be made upon mutual agreement of the parties. Any change in the pairs of currencies so designated shall not affect rights and obligations of the parties which have, before the date of the change, been fixed through the netting procedure under this Agreement, nor shall it affect contracts previously entered into in the relevant currencies.

Netting

4. (a) In the event a foreign exchange transaction is entered into by the parties in the same paired currencies and with the same Value Date as a FOREXK previously entered into and outstanding, the transaction shall automatically and without further action be netted with that FOREXK, and the sole performance required thereunder by each party with respect to that FOREXK shall be to pay to the other on the Value Date the amount, if any, of the relevant currency produced by netting the amounts of such currency to be paid and to be received by each party under that FOREXK.

(b) The parties shall confirm to each other in a mutually agreed manner by 12 00 noon Eastern Time on the business day following the Netting Date the net amounts due, if any, as a result of such netting (the "Netting Confirmation").

(c) Each Netting Confirmation shall list by Value Date and by paired currencies:

- (i) the transactions netted into FOREXKs, identified in a mutually agreed manner;
- (ii) the amounts payable and due under the netting procedure;
- (iii) the Value Dates;
- (iv) the Netting Date; and
- (v) the sending party's address

(d) If a party disputes the correctness of the Netting Confirmation, it must promptly notify the other party. The parties agree to resolve any disputes in good faith and promptly.

Insolvency

5. (a) The insolvency of a party shall constitute a repudiation and anticipatory breach of all FOREXKs between the parties and shall result in the immediate maturity of such FOREXKs, as of a time just prior to the party's insolvency.

(b) If a party becomes insolvent, the other party ("Closing-Out Party"), upon acquiring actual knowledge of the insolvency, shall promptly close out each FOREXK between them, considering its valuation of the FOREXKs to be conclusive, and shall promptly notify the insolvent party of its action.

(c) To close out the FOREXKs of the insolvent party, the Closing-Out Party shall liquidate each FOREXK between them and net out all such FOREXKs on a business day ("Close-Out Day"), as follows:

- (i) determine the market value of each FOREXK, calculated in U.S. Dollars which could be purchased on the Close-Out Day at the appropriate prevailing market rate as determined by the Closing-Out Party for foreign exchange to be delivered on the Value Date with the amount of currency which the

EXCHANGE NETTING AGREEMENT

- Closing-Out Party was due to deliver or receive on the Value Date;
- (ii) determine the "Closing Gain or Loss" for the FOREXK; "Closing Gain or Loss" shall be the difference in U.S. Dollars between the contract value of the FOREXK and its market value, determined as provided in (i) above, on the Close-Out Day;
 - (iii) discount the Closing Gain or Loss to present value, determined by discounting the Closing Gain or Loss at the appropriate Eurodollar rates assuming a year of 360 days;
 - (iv) net against each other, as appropriate, the following amounts in the following order:
 - (A) all discounted Closing Gain or Loss owed by one party to the other and,
 - (B) at the election of the Closing-Out Party, all other amounts owing and then due by one party to the other that relate to this Agreement or any other indebtedness on an obligation.

(d) The net amount owing and due after closing out all FOREXKs between the parties and netting as provided above shall be immediately due and payable, subject to any other rights one party might have against the other. Amounts not paid when due under this provision shall bear interest at a market rate determined by the Closing Out Party until paid in full.

(e) The parties agree that the amount recoverable by a party under this paragraph 5 is a reasonable estimate of the loss or gain it would have incurred or received on its FOREXKs with the other party had they matured and is not a penalty; such amount is payable as liquidated damages to the party for the loss of its bargains and neither party shall be entitled to recover additional damages in respect of such loss of the bargain.

Delivery of Notices and Statements

6. All notices, consents, requests, waivers and demands, except as otherwise specifically provided in this Agreement, will be effective only if in writing and when received by the parties at their respective addresses specified herein

_____ (Name of Party)	_____ (Name of Party)
_____ [Foreign bank branch or agency designation] ^{2/}	_____ [Foreign bank branch or agency designation]
_____ Address	_____ Address.
_____ Telex	_____ Telex

General Provisions

7 Neither party to this Agreement shall be obligated to enter into any foreign exchange contract with the other.

8 This Agreement shall continue in force until one party gives the other at least five business days' prior written notice of its intention no longer to be bound by it. In the event of this

Agreement's termination, obligations and rights between the parties as of the termination date shall be unaffected.

9. In the event of any inconsistency between this Agreement and the provisions of any FOREXK between the parties, this Agreement shall prevail to the extent of such inconsistency

10. This Agreement may only be amended by mutual written consent of the parties. Neither party may assign its rights or obligations under this Agreement without the prior written consent of the other

11. This Agreement may be executed in counterparts, each of which when executed shall be deemed to be an original.

12. This Agreement shall be governed by and construed in accordance with the laws of the State of New York

Effective Date

13 This Agreement shall become effective on ____ and shall apply to each FOREXK with a Value Date at least two business days after the effective date of this Agreement.

_____ (Name of Party)	_____ (Name of Party)
_____ [Foreign bank branch or agency designation] ^{2/}	_____ [Foreign bank branch or agency designation]
_____ By:	_____ By:

APPENDIX

FOREXK LIST

PAIRED CURRENCIES

EFFECTIVE DATE

^{1/} This bracketed provision is optional. The decision whether parties wish to exclude transactions for next-day delivery from the definition of FOREXK likely depends on their operational capabilities as well as their volume of next-day deliveries, for example, as part of "tomorrow next rollovers"

^{2/} See paragraph 1 regarding branches and agencies of foreign banks.

COMMENTARY ON THE MODEL INTERBANK FOREIGN EXCHANGE NETTING AGREEMENT

This model bilateral netting agreement has been formulated for use by any two banks located in the United States which deal in foreign exchange. Its purpose is to limit a bank's risk by reducing its payment and contract obligations resulting from its foreign exchange trading, and to clarify a bank's legal position on its foreign exchange contracts in the event of a counterparty's insolvency. The agreement is a model; its provisions may be varied to suit the parties' needs.

The agreement covers all foreign exchange contracts, spot and forward, in currencies selected by the parties, with the exception— if the parties so choose—of contracts requiring next-day delivery. Parties will wish to include currencies in which they regularly trade substantial amounts. Whether parties wish to include next-day deliveries depends on their operational capabilities.

Automatic Netting

When a covered contract is concluded, each party's obligation to deliver and right to receive the specified currencies for the specified delivery date are legally netted automatically with its prior obligation to deliver and right to receive those currencies for that delivery date.

The parties confirm the results of this netting by dispatching to each other by 12:00 noon Eastern Time the following business day "netting confirmations" which display the results of netting all the covered transactions entered into the previous day. Thus, with the receipt of up-to-date netting confirmations, the parties have schedules revised on a daily basis of amounts of currency to be paid to and received from the counterparty on a range of delivery dates. Evidently, the netted amounts could represent a large reduction in reciprocal obligations.

Close-Out Provisions

The agreement also provides for the mandatory acceleration and closing-out of the covered obligations between counterparties in the event one of the parties becomes insolvent. Insolvency is narrowly defined so that the close-out provisions will not be triggered in situations where their use is not appropriate. Other than in situations where a legal insolvency procedure has commenced, a party is considered insolvent only if the solvent party has taken specified action to trigger the agreement close-out procedures.

Close-out is accomplished under the agreement by the solvent party's determining each contract's current market value and computing its gain or loss on the contract. The difference between each contract's original contract value and its market value represents the solvent party's gain or loss on that contract. That gain or loss amount is discounted to present value, and then all such gains or losses are netted first among themselves and then against other obligations between the parties. The resulting amount is due and payable immediately. This approach should substantially reduce the uncertainty accompanying a party's insolvency which could be so harmful in foreign exchange dealing.

In conclusion, it is worth noting that this agreement in no way obligates the parties to trade foreign exchange with each other. Moreover, it expressly provides that covered contracts are generally transacted in accordance with accepted market practice. The agreement simply provides for the netting of covered foreign exchange transactions and for a closing-out procedure to be used in the event of a party's insolvency. Bankers interested in using this agreement are encouraged to consult with their counsel to ensure that the terms of the agreement meet the banks' needs.

RISKS IN INTERBANK CROSS-BORDER TRANSACTIONS

A risk evolves from the possibility that a counterparty to a contractual obligation may be unable to perform when its obligation to deliver funds matures. The counterparty's inability to perform may reflect either the financial position of the counterparty or the need to comply with legal or other provisions imposed by authorities with jurisdiction over the counterparty.

Types of Risk

Risks can be of two types. The first, *credit or counterparty risk*, relates to the counterparty or some other participant in the transaction, such as a correspondent or clearing bank. The second, *country or sovereign risk*, may pertain to the country of address, incorporation, or payment.

Counterparty risk

Placements or transactions involving a bank or any of its branches around the world are obligations of that bank; domestic and over-

seas branches serve as integral parts of a single institution. As long as the laws pertaining to that bank's head office or to the specific branch permit, the bank takes full responsibility for the timely execution of transactions. The risk of nonperformance therefore rests on the possibility that the bank's financial or economic position impairs its ability to meet its obligations.

Market participants should be aware that, when dealing with a subsidiary of a bank, they are dealing with a separate legal entity. Unlike foreign branches, foreign subsidiaries carry a separate and distinct counterparty risk except in those cases where the parent bank has guaranteed the obligation of its subsidiary.

It is a longstanding and prudent practice for banks to consider carefully the credit risk they assume directly with a counterparty as a result of placing a deposit or entering into a foreign exchange transaction. It may also be appropriate to weigh the risk incurred when relying on another institution to serve as a clearing bank to effect payment in that bank's local market.

SUMMARY OF CONTROL MECHANISMS BANKS CURRENTLY USE TO MONITOR EXPOSURES TO CROSS-BORDER RISKS

TYPE OF RISK	TYPE OF CONTROL MECHANISM	
	DEPOSIT MARKETS	FOREIGN EXCHANGE
COUNTERPARTY General case	Banks have explicit limits which frequently are the core mechanism for monitoring risks. For some, country of incorporation may be a factor taken into consideration in determining the size of a counterparty's credit limit.	Same as for deposits
Involving foreign subsidiaries	Banks have explicit limits covering these institutions that constitute either limits separate from those applicable to parent institutions or sublimits of parents' limits.	Same as for deposits
Involving correspondent banks	<p>As a means of containing the cost of funds, banks seek to minimize the level of their end-of-day <i>nostro</i> balances arising from all funding or treasury operations. From a risk-management point of view, some banks monitor end-of-day <i>nostro</i> balances on an informal basis. A few others have formal limits on end-of-day <i>nostro</i> accounts.</p> <p>Banks recognize that their credit exposures <i>vis-a-vis</i> correspondent banks are usually much larger during the day than at the end of the day, because the timing of credits and debits to their account may differ. Up to now, banks found it difficult to monitor and control these intraday exposures, they have relied instead on the fact that creditworthiness is taken into account in choosing correspondent banks. Banks' practice in this regard may be changing, however, as on-line account information becomes more generally available.</p>	Same as for deposits
COUNTRY Country of address	Banks generally have some mechanism for keeping track of, if not limiting, their total exposure to all institutions in individual countries on a selective basis. Some banks go further and have limits on all foreign countries. Sometimes these limits incorporate both country of address and country of head office.	Banks have explicit foreign exchange limits based on counterparty's country of address for at least some preselected countries.
Country of head office	Most banks have limits on their exposures to all banks incorporated in a given country, at least for a preselected group of countries. In some cases these limits are defined to include not only banks incorporated in the country but also those domiciled there.	Banks have explicit foreign exchange limits based on counterparty's country of head office for at least some preselected countries.
Country of payment	Not explicitly controlled, but banks' willingness to engage in transactions involving payment in a given country is influenced by the extent they feel confident about their ability to effect transactions there reliably.	Same as for deposits

Country Risk or Sovereign Risk

This risk derives from the authority of national governments to impose constraints or controls preventing timely payment of funds by residents in either local or foreign currency. This category includes the risks of social and economic upheaval, nationalization or expropriation, government repudiation of debts, or exchange controls. Exchange controls have been imposed in the past, for example, in response to a change in the economic or financial condition of the country, an inadequate availability of foreign exchange,* or for reasons of national interest.

Country Risk Pertaining to the Country of Address of the Counterparty

In the event that, after a transaction was entered into, a limitation were to be imposed by the local government on a counterparty located in that country, whether domestic or foreign, the counterparty may be unable to meet its obligation when due. The failure of the counterparty to perform in cases where the deposit agreement or exchange contract specifies the obligation is payable only in the country of address is less likely to constitute a breach for which either the institution as a whole or the branch is responsible.

Country Risk Pertaining to the Country of Head Office

Similar constraints or controls might be imposed by the government of the country in which the bank is incorporated or its head office is located. These controls may be applied to liabilities of the bank in the head-office country only. They may be applicable in other countries by international agreement. (For example, all nations that are members of the International Monetary Fund (IMF) have undertaken to observe the exchange-control laws of other member states, as long as those laws are deemed by the IMF to be consistent with its Articles of Agreement.) Or, exchange controls may be unilaterally imposed on transactions outside its borders. There have been recent examples in which governments have tried to bind their banks from paying obligations extraterritorially, i.e., those liabilities of banks booked in branches located in other countries. Commentators disagree about the validity of such a unilateral action. But as a practical matter, such action might serve, at the very least, to delay payment.

Country Risk Pertaining to Country of Payment

Transactions are also subject to sovereign risk in the country of payment or clearing. To date most clearing systems are located

*The possibility that an asset cannot be serviced in the currency of payment because of a lack of foreign exchange needed for payment by the obligor is sometimes referred to as "transfer risk."

nationally—that is, in the country of issue of the currency. Thus, if a government imposes controls or constraints on the flows of funds across the books of banks within its borders, these controls could apply through the clearing process even to transactions between two non-residents. Governments might impose such constraints to control the use of their currency abroad and thereby influence the exchange rate. In the past, on occasions when this type of sovereign risk was perceived to be significant, efforts to establish offshore clearing operations sometimes developed. But experience with off-shore clearing operations so far has been limited.

Mechanisms for Monitoring Cross-Border Exposure

All major banks have internal procedures for identifying and controlling their exposures to counterparty and country risk. These procedures are usually quite intricate in order to monitor the various risks in each transaction.

It quickly becomes evident that most cross-border transactions entail more than one risk. As a practical matter, therefore, banks focus their attention first on that part of the transaction judged to carry the greatest risk of nonperformance. Thus, a transaction between two large, internationally-known banks, headquartered in major industrialized countries but involving a branch of one of these banks located in and requiring payment in a third country with a weak financial position might be evaluated, in the first instance, from the point of view of the country of address. Similarly, a transaction between a large international bank and a branch of a bank from a financially weak country, requiring payment in a major financial center, might be evaluated initially from the point of view of either the counterparty or the country of head office. Simply stated, the risks will be judged as being as great as the weakest link identified by the bank's evaluation process.

In detail, systems for monitoring cross-border exposures differ considerably from one institution to another. These differences reflect in part differences in the way day-to-day operations are conducted. They also reflect different assessments about the priorities to be attached to a risk monitoring system.

Each institution evaluates the benefit of tracking a particular type of exposure against the costs of administering a system that adds another dimension of complexity. Each one also makes judgments about the timeliness of the data it requires to monitor its risk positions and the frequency with which its positions should be reviewed.

In general terms, however, similarities do emerge from the risk-control systems used by the major banks. (See table on previous page).

**SELECTED OTHER DOCUMENTS
OF
THE COMMITTEE**

**PAPER ON FORWARD RATE AGREEMENTS
AND INTEREST RATE SWAPS**

**PAPERS RELATING TO
FOREIGN EXCHANGE OPTIONS**

DOCUMENT OF ORGANIZATION

Credit Risks in FIRCs and IRCAs

By Ron Levy, Hans Neukomm, and Heinz Riehl

This paper analyzes the credit risks associated with Forward Interest Rate Contracts (FIRC) and Interest Rate Conversion Agreements (IRCA).

A Forward Interest Rate Contract, also known as a Forward Rate Agreement, guarantees the interest rate on a deposit or a loan for a specific future time period (see Chart 1). It is not a commitment of either party to accept or lend the principal amount of the transaction.

A FIRC may be entered into by a lender as a way of locking in his return, or by a borrower to lock in his cost of funds. Typically, at least one of the counterparties is a bank. Analytically, a FIRC resembles a forward-forward contract in foreign exchange.

(Chart 1) EXAMPLE OF A FIRC

Party A, on January 1 the contract date, agrees to guarantee to Party B interest on a \$10,000,000 loan, with the effective dates June 30 to December 31 of the same year. Both parties agree to 12% as the interest rate on this contract. No exchange of capital takes place.

At the first due date, June 30, the pre-agreed rate of 12% is then compared with a specific market rate (settlement indicator) as stipulated in the contract. If this market rate is lower than the FIRC rate of 12%, Party B pays to Party A the difference between the FIRC rate and the market rate. If the market rate is higher than the FIRC rate of 12%, Party A pays to Party B the difference between the two rates.

The difference between the FIRC rate and the market rate is paid either in full at the second forward date of the FIRC (in this example on December 31), or on a discounted basis on the first forward date (or June 30).

An Interest Rate Conversion Agreement, also known as an Interest Rate Swap, provides for a one-time exchange of interest payment obligations (see Chart 2). Unlike a foreign exchange swap, there is no pre-agreed reversal at a later date. There is also no exchange of principal repayment obligations. Each party continues to service its own debt.

Borrowers enter into IRCA's for a variety of reasons. A typical motivation is that both parties are able to reduce their borrowing costs because a) one enjoys a substantially higher credit rating and b) the difference between their cost of funds is much greater in one market than another. In addition, the two parties may have different expectations about interest rate trends. Or they may have different hedging needs because of the different structures of their balance sheets. In the example in Chart 2, both parties lower the cost of their preferred type of debt.

The credit risks of FIRCs and IRCA's can be divided into counterparty and settlement risks.

Counterparty Risks

Counterparty risk is the risk to one party that the other party to an agreement may be unable or unwilling to honor the agreement. In a FIRC, the counterparty risk is realized when the trading partner fails or is unable or unwilling to honor the contract before the settlement of the difference between the contract rate and the market rate. Should this be the case, the other party has to find a substitute for the failing partner.

If there has been an adverse market movement, a new partner would substitute only at the market rate in effect on the day the substitution takes place, leaving the original performing party with a worse agreement than the one previously agreed to. If the market moves in favor of the performing party, a substitution of a new party for the non-performing one may be beneficial.

In a FIRC each party has a counterparty risk beginning on the contract date, i.e. on January 1 in the example in Chart 1. The nature of the risk depends on the term of the contract and the agreed time for payment of the interest difference. Not until the first forward date can the counterparties determine the actual size of the exposure, for it is then that the contracted rate can be compared to the market rate. If payment is made on the first forward date, then the risk is terminated. However, if the original agreement provided for payment on the second forward date, the risk continues until maturity of the contract. Moreover, the exact risk is then defined.

The counterparty risk of an IRCA is similar to that of a FIRC. If a party to an IRCA fails before the last exchange of payments takes

(Chart 2) EXAMPLE OF AN IRCA:

Party C has a cheaper access to both fixed-rate and floating-rate funds than party D, but party C's cost advantage is greater in the fixed-rate market. Party C has a \$10,000,000 outstanding debt on which a fixed rate must be paid for the next two years. Party D has a \$10,000,000 outstanding debt on which interest for the next two years is revised every three months at the then prevailing LIBOR rate plus 1/2% per annum.

In this agreement, party C agrees to exchange the respective interest payments for the next two years with party D. Specifically, party D will pay the fixed rate to party C, servicing party C's debt completely. Party C will pay to party D LIBOR minus 1/4%, thereby servicing less than all of party D's debt. Party D, then, has to pay the difference between what he receives from C and his floating rate payment of LIBOR plus 1/2% in addition to paying the fixed rate of party C. These obligations are to be met on payment dates specified in the agreement.

This arrangement remains in effect for two years whereupon Party C and D each repay the principal sum of \$10,000,000 to their respective creditors. In addition to obligations arising from the IRCA, Party C has to pay interest calculated at the fixed rate to its creditor; Party D has to pay interest calculated at LIBOR plus 1/2% to its creditor every three months.

place, the other party has to find a substitute counterparty for the remaining period of the whole contract. If an adverse market movement has taken place, a new partner would substitute only at the new market rate, leaving the original performing party with a worse agreement than the one previously concluded. Of course, if markets move in favor of the performing party, a substitution of a new party for the non-performing one may be beneficial.

In the example of an IRCA given in Chart 2, each party has a counterparty risk for two years. If one party fails on any one day during the two years of the IRCA, the other one will have to find a substitute at the then prevailing market rate for the remaining period of the IRCA. If, for instance, Party C failed after 18 months, Party D would have to find a substitute for Party C for 6 months at the then prevailing market rate.

FORWARD INTEREST RATE CONTRACT (FIRC)		
FIRC For Borrower		12%
Actual Rate	13%	
Customer Collects Diff.	1%	
NET BORROWING COST		12%
FIRC For Borrower		12%
Actual Rate	11%	
Customer Pays Diff.	1%	
NET BORROWING COST		12%

Settlement Risks

In addition to counterparty risks business partners in FIRCs and IRCAs are subject to settlement risks. In the case of an IRCA, settlement risk means the risk to one party that the other party to an agreement may fail to make its agreed interest payment after the first party has already made its interest payment. This would be the case if a party failed on the day the payment is due or shortly thereafter. At risk is the full amount of each interest payment.

In a FIRC, settlement risk arises once the amount of the net interest payment has been determined. After that the obligation to pay is then on one side only, and the party scheduled to receive payment is at risk for the entire amount due. This risk exists only for one or a few days at the time payment is due.

Some Considerations in Setting Limits for Credit Risk

In principle, the exposure resulting from an individual FIRC or IRCA is equal to the present discounted value of the stream of interest payments committed over the life of the agreement. When a floating interest rate is involved, the size of these future payments is unknown. As a result, the theoretically appropriate measure of exposure is difficult to calculate. Under these circumstances, man-

agement is faced with a choice as to whether it is more comfortable with simple guidelines for estimating the exposure on individual instruments, or whether it prefers a more detailed approach. If only a few transactions are contemplated, detail and a careful review of each transaction may be preferable. However, if active involvement in these instruments is contemplated, more standardized methods of risk measurement may be chosen.

As one example of a simple rule of thumb in use, a "risk factor" may be calculated as a certain percentage of the principal amount associated with the contract, and for each period of the contract's life. For instance, if this factor were set arbitrarily at 10% for the first year and 5% for each later year, then the example of a FIRC given in Chart 1 would require a risk allocation of \$1,000,000 (10% of \$10,000,000), and the IRCA example given in Chart 2 would require \$1,500,000 (10% of \$10,000,000 for the first year and 5% of \$10,000,000 for the second year).

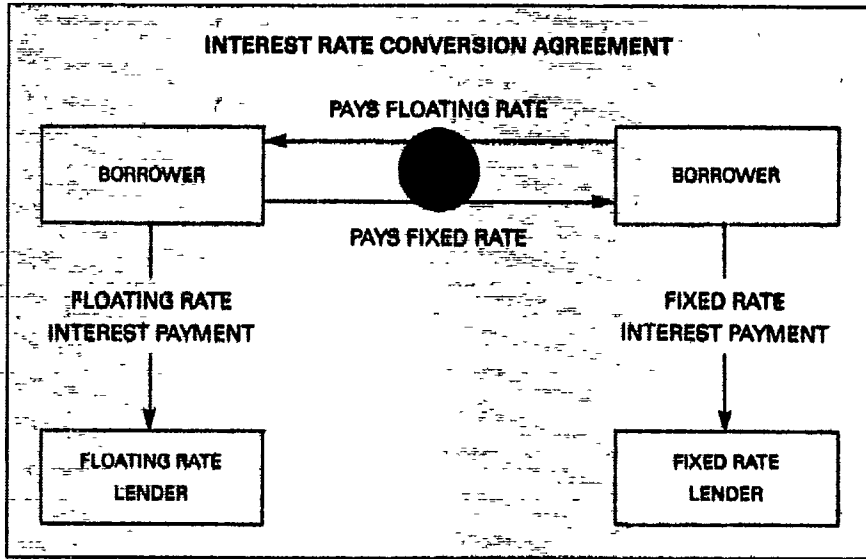
A procedure of this sort might also be adjusted for other factors which are believed to affect the level of risk. As an example, management may wish to consider the duration of the agreements and the level of interest rates. High interest rates and long interest periods translate into a higher amount of interest than low interest rates and short interest periods. Risk is thus higher in the former case than in the latter. In addition, if interest rates are at historically high levels, management may consider that the probability of rates decreasing is enhanced. Under these conditions it may be riskier than usual to guarantee interest rates for deposits. Conversely, if interest rates are at historically low levels, it may be riskier to guarantee interest rates for loans.

Management may also limit its risks by defining minimum standards for the quality of business partners, the amount and duration of contracts, and profit margins. In addition, it may provide that agreements whose amounts or maturities are over a certain level will be examined on a case-by-case basis.

A conceptual issue that arises in setting exposure limits is whether management wants to set limits to protect the institution from potential *actual loss*, or whether the limit should also protect the bank from potential *opportunity loss*. To illustrate this difference, assume a forward interest rate deposit contract for three years of 10% and a forward interest rate loan contract for the same three year period of 11%. At the end of the first year the counterparty to the forward interest rate contract fails and the then prevailing market rate for two years is 8%. In this case the actual loss is 2% per annum — i.e., the difference between the bank's earnings at 8% on the new 2-year placement and its payments at 10% on the still-outstanding deposit contract. But its opportunity loss is 3% per annum — representing the difference between this 2% actual net loss and the 1% net gain that it would have received if the original loan contract, entered at a time of higher interest rates, had been done with a credit-worthy party.

In order to reduce the degree of settlement risk, parties to an IRCA may wish to agree to compensate interest to be received and paid. Thus, one party would pay the difference due the other one. This would reduce the settlement risk to the amount of that difference. However, experience of several banks indicates that it is easier to market IRCAs on the basis of two way interest payments.

Bank management may also consider setting interest rate maturities of FIRCAs and IRCAs on days other than the last day of a business week. The reason for this is that businesses fail more often on the last day of a business week than on any other day.



History and Definitions of Foreign Exchange Options

by Arnold Staloff

Options are among the oldest and most pervasive of all financial instruments. Organized trading in stock options can be traced back at least to the 1600s in Amsterdam and considerably predates the familiar spot and forward transactions in foreign exchange. In the United States, put and call options on stocks have been available for nearly as long as stocks themselves have been traded. Other types of options have been written on an *ad hoc* basis for nearly as long as stock options. For example, options on real estate or the services of sports figures.

Experience with Stock Options

Trading of options on organized exchanges in the United States has centered on stocks. Prior to 1929 there were numerous cases of securities fraud involving stock options, leading Congress in 1933 to give the Securities and Exchange Commission (SEC) plenary authority to control options trading. The SEC initially permitted the Put and Call Broker Dealers Association in New York, a longstanding trade association of options dealers, to self-regulate stock options trading under SEC surveillance. Traders published prices on options in the newspaper, and at the outset there was no standardization of contract terms.

For many years thereafter there were continuing efforts to formalize and standardize stock options trading. These efforts culminated in 1973 and 1974 with the initiation of options contract trading on the Chicago Board Options Exchange (CBOE), the American Stock Exchange (Amex), and the Philadelphia and Pacific stock exchanges. The standardization of the stock options contract led to an explosion in trading of listed options and the creation of new stock options business opportunities.

The growth of interest in options as an instrument is likely to lead to the development of a wider variety of options. Recently, commodities exchanges were given permission by the CFTC to trade options on agricultural products. Thus, it is appropriate for the Foreign Exchange Committee to study and assess foreign currency options.

Lessons for Currency Options

As with stock options, the development of an active foreign currency options market will depend on standardization of contract terms and pricing arrangements. At present the currency options over-the-counter (OTC) market is rather like the wholesale market for diamonds, where each contract has a different expiration date and different terms. It is thus difficult to create an order flow or market liquidity, to price contracts, and to publish prices. Standardization of trading among market makers helps to overcome these obstacles. However, it by no means obviates the need for, or role of, "customized" transactions. Customized deals are options where contract terms and pricing are tailored to the needs of an individual customer, generally a corporation.

Definitions

It may be helpful to review the definitions of terms widely used in the options market. A *call option* is the right to purchase something in the future; a *put option* is the right to sell something in the future. For each option there is a *buyer* and a *seller*, the latter being referred to as a *writer* of the option. Prior to development of exchange-traded options, the public had little opportunity to be writers of options. Even today, most customers dealing in OTC foreign exchange options come to a market maker to buy options.

The purchaser of an option takes on risk—a risk limited to the

amount of the premium, similar to an insurance policy. The writer of an option assumes a much larger risk, just as an underwriter of the insurance policy does, and that individual or organization should be prepared to assume those risks.

Exchange-Traded Options

The development of exchange-traded foreign currency options opens up a new dimension of options to the public. On an exchange, any market participant can be on the sell side, or be a writer. To sell an option amounts to "going naked"—taking on a market risk—by taking a short position on a call or on a put. When a market participant assumes a short position on a call option in currencies, at least in the case of a Philadelphia type of option, the purchaser of the call has the right to buy from the writer a quantity of a foreign currency against U.S. dollars on or before a certain date. A short position on a put provides the opportunity for someone to sell to the writer, or to "put", the foreign exchange in return for dollars. This distinction is important because it determines who assumes the major risk.

A very important aspect of the Philadelphia options market is the clearance and settlement process. The settlement process is handled entirely by the Options Clearing Corporation (OCC), which is owned equally by five options exchanges in the United States. The exchanges are responsible for the exercise and the settlement of each currency option traded. They stand in the middle of every trade so that a buyer or writer of an option will look to the OCC in Chicago as the counterparty.

The OCC is regulated by the SEC as part of the regulation of the securities markets rather than the commodity markets. This means that the OCC is guaranteed by the billions of dollars of reserves and margins that the member firms put up. If for some reason the OCC cannot fulfill an obligation, each of the member firms of the OCC would be called upon to fulfill the obligation. Regulation by the SEC also means that the options contracts include one of the strongest risk disclosure statements in the United States.

Growth of Options

Although standardization of the stock option served as a catalyst to market growth, sustained development of the market depended on the development of various trading strategies that provided opportunities not available in regular cash or forward markets. Much the same is true with currency options. The Committee will later hear discussion of some of the myriad of possible combinations of puts and calls, or combinations utilizing the underlying currencies in the cash market.

The possibilities for complicated combinations of contracts have helped provide liquidity in what might otherwise be a thin market. For example, one can create a synthetic forward position in foreign exchange by the use of options. The liquidity of the forward foreign exchange market thereby provides liquidity for the options market. But since an option can exist only where there is a market in the underlying commodity, it is clear that an options market can never replace or displace an underlying market.

A final point regards the volume of foreign currency contracts and turnover. Open interest on the Philadelphia Exchange is in excess of 170,000 contracts, which is nearly \$4 billion, a 70 percent increase in the past three months. On a recent morning, we traded about 10,000 contracts, equivalent to about \$200 million.

Legal and Regulatory Issues of Foreign Currency Options

by Thomas A. Russo

In order to understand the current legal and regulatory framework for foreign currency options trading, it is necessary to review some history. The first watershed occurred in 1974 when Congress adopted legislation which amended the Commodity Exchange Act and created the Commodity Futures Trading Commission (CFTC) to regulate commodities trading. The CFTC is similar in many ways to the Securities and Exchange Commission (SEC) and has many of the same powers.

Definition of a Commodity

A significant aspect of the 1974 amendments was a broadening of the Act's definition of the term *commodity*. Prior to 1974, only the commodities enumerated in the Act were subject to federal jurisdiction. These were largely agricultural products, such as wheat and corn. Other commodities, such as gold, silver and foreign currencies, were not enumerated in legislation; futures trading in these instruments, therefore, was not subject to federal regulation. However, the 1974 amendments defined commodity to include *anything* that is the subject of futures trading. As a result, foreign currencies became a commodity because futures contracts on foreign currencies had been trading since 1973. Similarly, Government National Mortgage Association or Ginny Mae securities and Treasury bills legally became commodities when futures trading in those instruments began in 1975.

At the same time, a provision referred to as the "Treasury Amendment" was included in the Commodity Exchange Act which somewhat narrowed the very inclusive definition of a commodity. The Treasury Amendment says that the Commodity Exchange Act does not govern transactions in foreign currencies or government securities unless those transactions involve sales for future delivery conducted on a board of trade. As a result, most people thought that the Act excluded all trading of foreign currencies and government securities except actual futures transactions on an organized market.

The CFTC and the Trade Options Exemption

Another significant feature of the 1974 amendments was the broad power accorded to the CFTC to regulate commodity options. A primary reason for the creation of the CFTC was to deal with rampant fraudulent practices in the commodity options area. The CFTC soon discovered, however, that its small enforcement staff was unable to contain the surge of commodity options scams.

In 1978 the CFTC, therefore, adopted a regulation banning virtually all trading in commodity options. Shortly thereafter, the Congress ratified this regulation with legislation. In 1978 the Congress banned all commodity options sold in the United States, with only two exceptions. One involved options on physical commodities

granted by certain grandfathered firms and is not relevant to this discussion. The second exception, which is relevant, allowed options to be sold to "producers, processors or commercial users" of the commodity underlying the option. These were called *trade options* because they involve the commercial needs of an enterprise.

When the trade option exemption was enacted in 1978, most felt it was meant to apply only to industrial producers. No legislators spoke at that time about its possible applicability to foreign currency options, because such options were virtually unheard of at that time.

Foreign Currency—A Commodity?

The next major event in the history of the regulation of foreign currency options occurred in February 1981 when the Philadelphia Stock Exchange filed an application with the SEC to begin trading options in foreign currencies. That initiative squarely raised the question of whether options on foreign currency were subject to the jurisdiction of the CFTC—and thus barred by the statutory and regulatory options bans (with the exception of those that could fall within the trade option exemption)—or whether those options were exempted from the CFTC's regulatory net by the Treasury Amendment.

Only a few days after Philadelphia filed its application, the SEC approved an application by the Chicago Board Options Exchange (CBOE) to trade options on the Ginny Maes. That approval raised the same legal questions as the Philadelphia proposal, and the Chicago Board of Trade (CBOT)—which trades futures contracts on Ginny Maes—filed suit in the Seventh Circuit Court of Appeals to prevent the CBOE from proceeding. The CBOT argued, quite correctly, that because futures contracts are traded on Ginny Maes, Ginny Maes are a "commodity" for purposes of the Commodity Exchange Act. The CBOT then argued that, because most options on commodities were banned, the CBOE could not lawfully establish a Ginny Mae options market. In a two-to-one decision, the Seventh Circuit ruled in favor of the CBOT.

In its decision, the Seventh Circuit concluded that options on government securities were not exempted from the CFTC's jurisdiction by the Treasury Amendment because such an option is not a *transaction* in a government security but only *involves* a government security. Shortly before this decision two U.S. district courts had reached the same conclusion concerning options on foreign currencies. It thus became clear that the Treasury Amendment could not be used to argue that government security or foreign currency options were exempt from the option ban contained in the Commodity Exchange Act. This meant, presumably, that any option on foreign exchange or a government security traded in the over-the-counter market (OTC) was null and void unless the trade option exemption could be used.

Status of Exchange-Traded Currency Options Resolved

Even before the Seventh Circuit's decision was rendered, however, the SEC and the CFTC had reached a "Jurisdictional Accord" that gave the SEC, rather than the CFTC, jurisdiction over the options on *all* government securities and over options on foreign currency traded and registered on national securities exchanges. The Accord was enacted into law by the Congress in January 1983 and thus overruled, in large part, the Seventh Circuit's decision in the Ginny Mae case. However, the Accord also made clear that the CFTC did have jurisdiction over foreign currency options traded *anywhere other than* a securities exchange. The reasoning of the Seventh Circuit on the inapplicability of the Treasury Amendment and the applicability of the commodities laws and regulations should apply to those decisions.

Because of the enactment of the Accord, an option traded on a national securities exchange (such as the Philadelphia Stock Exchange) is clearly a security, is regulated by the SEC, and is subject to the entire body of the securities laws. Options traded anywhere but on a national securities exchange, however, will be regulated by the CFTC and subject to the Commodity Exchange Act and its regulations.

Status of OTC Currency Options Unresolved

The Jurisdictional Accord thus cleared up the basic legal and regulatory uncertainties on exchange-traded options, but raised the question of how OTC options on foreign currency could be legally traded if they are subject to the commodity laws. In light of the commodity options ban discussed earlier, it currently appears that OTC options must be traded pursuant to the trade option exemption. This means the option must be offered to a producer, processor, or commercial user or merchant handling the particular commodity who is purchasing the option solely for purposes related to his business. Foreign currency options cannot be lawfully granted to or purchased by entities that merely wish to speculate on the future direction of currency price movements. A corporation wishing to buy an option on a commodity or foreign currency to speculate cannot do so under the trade option exemption.

An interpretive letter was issued by the CFTC on February 22, 1984 dealing with foreign currency options. This interpretive letter is extremely restrictive. The letter in effect says that representations from an options buyer that he is a commercial organization using the option solely for his business "would not be sufficient." Realistically, this means that the writer must have a reasonable basis to believe that the buyer is as he represents himself and is not speculating. In any regulatory action, the facts presumably will speak for themselves.

There is an important apparent anomaly underlying the trade option exemption. Ironically, the exemption enumerates only the characteristics of a purchaser of an option even though his risk is limited to the amount of premium. The exemption imposes no limitation on the activity of the writer, who faces far greater financial

risk. The purchaser of options must be a commercial entity, while the grantor of options can be anybody as far as the CFTC trade option exemption is concerned.

Other Regulatory Issues

Another question concerns who can write options under existing law. The CFTC Rule 1.19 says that a futures commission merchant can only write an option on a commodity on an exchange. That rule was enacted in mid-1973, before the CFTC was created, to regulate writing of gold and silver options. The CFTC kept the rule to prevent its registrants from incurring the risks of option writing. A brokerage firm may indirectly write options, however, through a subsidiary.

The CFTC issued another interpretive letter on July 3, 1984 which provides some additional detail on the trade option exemption and the question of trading foreign currency options in overseas markets. The main thrust of that letter is that a U.S. option writer cannot write on an overseas exchange because the grantor has no way of knowing if the purchaser is a commercial entity buying the option for purely commercial purposes.

A question often arises on the consequences, if any, of a violation of the trade option exemption. There are potential civil actions and CFTC enforcement procedures. A broker/dealer in options is subject to suit for damages by a purchaser under the Commodity Exchange Act if the broker/dealer has in any way failed to operate according to regulatory rules. On the other side of that coin, there is a real question whether a purchaser would be able to successfully press a suit for damages if the purchaser had fraudulently represented himself to be a commercial entity using the option in the course of his normal business. But it is also clear that arguments of this kind do not protect the futures commission merchant from enforcement actions by the CFTC.

In summary, the legal rules that apply to foreign currency options that are traded as securities are markedly different from the rules that apply to foreign currency options traded on commodities markets or in the OTC market. The trade option exemption and the CFTC's anti-fraud rules are about the only rules which apply to OTC foreign currency options. In the case of options traded under SEC jurisdiction, however, the standard rules from that regulatory framework apply, such as time-stamping and suitability.

Looking ahead, it is clear that the Chicago Mercantile Exchange (CME) is proceeding aggressively in foreign currency options. The CFTC continues to study the area and I believe there are many questions still to be addressed, such as what is meant by "hedging" for purposes of the trade option exemption. My belief is that the trade option exemption was probably intended to cover the sort of situation frequently encountered in the OTC options market, in which serious-minded people truly try to hedge volatile foreign exchange rates. Of course, at the time the Commodity Exchange Act was adopted, no one envisioned the world we are in today.

Who Buys Options and Why

by Gary SeEVERS

Goldman Sachs is active in currency options traded on the Philadelphia Stock Exchange (PSE) on behalf of its customers. Our J. Aaron Division is also active on PSE as principal, and has been a writer of over-the-counter (OTC) currency options for clients who qualify under the Commodity Futures Trading Commission (CFTC) trade option exemption.

Currency options have come of age in a short period of time. I view the rapid growth as encouraging, because the growth springs from demand by the final customer. Options are not a product invented by banks or Wall Street to be marketed to investors or customers. The customer demand we have seen, especially for OTC options, comes primarily from corporations purchasing options for business purposes.

Based on our experience, we believe that banks also are writing options mainly in response to customer interest. In fact, many banks appear to have begun options programs only grudgingly, in effect forced into the market by customer interest.

I believe that the catalyst to corporate interest was the development of exchange-traded options, in Philadelphia and on the International Money Market (IMM). When the PSE started the options contracts, there was an initial unwillingness among corporations to trade on the exchange, and at that time there was little underlying demand for OTC options either. However, corporations quickly began to express an interest in the new instrument as a strategic vehicle different from the forward or futures market.

Reasons for Corporate Interest

Corporations seem to use options for at least two reasons. One is that a currency option is a suitable hedge for many specific business risks such as bidding on a contract in another country. For example, a firm may bid on a contract to supply engineering equipment to Europe or the United Kingdom in six months, but not know whether the bid will be accepted. An option can be the appropriate hedge for the currency risk associated with such a bid. Even if the bid is lost, the firm does not necessarily lose the entire premium. The option could be sold, or it could be exercised and the currency sold to reduce the cost.

The second reason is that an option allows corporations to adopt a stance on future currency values in a way different than forward or futures contracts. Options in effect offer insurance; the corporation pays an initial fee to buy one-way price protection. Therefore, the option offers an intermediate approach between the decision to hedge 100 percent in the forward market or not to hedge at all.

The growing interest among corporations to buy options reflects

an increasing sophistication among corporate foreign exchange risk managers. Many are capable of understanding options and the basic options trading strategies. In fact, the use of currency options has grown much more quickly among corporate treasurers than the use of financial futures as a hedging vehicle. This is probably due to the tendency of those with foreign exchange background to be more comfortable with risk hedging than those managing interest rate risk, even though the people may be in the same corporation and department.

Corporate Use of Options

Corporate activity in currency options is not limited to pure hedging. Corporations sometimes write options to generate income on foreign exchange balances or expected income. This activity is analogous to the "covered write" of stock options. Corporations also buy options to take a position in anticipation of exchange rate changes. There is a question whether the latter use of options qualifies under the trade option exemption, a question which needs to be answered.

OTC options clearly are more popular with corporations than exchange traded options, although corporations do use exchange options to a degree. OTC options can be tailored to the specific needs of corporations on strike price and other details. Buying an exchange-traded option involves opening a securities account for the PSE or a commodities account for the IMM, and the associated margining and daily monitoring of positions. In addition, larger amounts can be done in OTC options. On the PSE, trades for \$1 million or \$2 million are normal for the three major currencies, but smaller amounts are usually traded for Canadian dollars or the yen. On the IMM, Deutsche mark options normally trade at about twice that size or more. In the OTC market it is common to trade up to \$5 million or \$10 million at one price, and banks are prepared to make quotes in options for amounts up to \$50 million.

OTC options are still far from being fully developed. It is difficult for those writing options to offset positions by buying similar options, especially for those who write options in large amounts. And a two-sided market has still not developed; sometimes quotes are uneven. A savings and loan association wanting to buy a put option on a three-year Treasury security may go to five financial institutions that sell such options and get quotes that are virtually identical. Quotes on OTC currency options are not yet this consistent. In fact we had one customer that ended up buying an option from someone else and selling it to us.

Given the underlying need for and demand for currency options, the potential growth for the currency options market appears to be very substantial over the next few years—if the market develops properly.

Technical Aspects of Foreign Exchange Options

by Scott Dillman and William Lipschutz

This presentation has two objectives. The first is to provide a better understanding of currency options markets. The second is to point out some of the pitfalls commonly encountered in trading currency options.

Marketing Options

Let us begin by discussing the marketing and sales of OTC currency options to the corporate customer. Most customers start with an educational process of one to four months. The customer is visited and shown slides, wall charts, and given an extensive verbal explanation of the technical features of options, including the hedging of currency exposures. The corporate treasurer then formulates a proposal for the firm's board of directors to get tentative approval to trade currency options.

The initial approval process usually takes a month or longer. The customer then calls frequently for indicative quotes without intending to trade. It is necessary to make realistic quotes just as if the customer did intend to trade. A customer frequently asks for up to eight or ten different quotes for different options, mainly to take back to the board for their perusal. This part of options marketing/sales is time consuming with no immediate profit potential. Only after this lengthy process is a customer likely to call with any intention of dealing. When ready to deal, the customer usually calls several other commercial banks or investment banks to obtain prices, and he will often end up doing business with a competitor.

The customer will generally deal with the institution that offers the lowest price. In today's OTC options market, it seems that someone is always prepared to offer an option below the theoretical or "fair market" value. For example, if our pricing model showed an option to be worth a 2 percent premium, it is not uncommon for the customer to be offered the same option at 1½ percent or 1¾ percent. In such cases, the business will be lost to the competitor despite the earlier expenditure of resources on the education effort.

THE EVOLUTION OF AN OTC CURRENCY OPTION DEAL

- Educate Customer (1 to 4 Months)
- Customer's Board Approval (1 Month)
- Indicate Quotes (1 Month)
- Customer Calls to Deal
- Customer Deals

The ticket which documents a currency option is much more complicated than for a spot or forward foreign exchange deal. There normally are at least six different specifications on the ticket indicating currency, whether the deal is a put or a call, the amount of the transaction either in dollars or foreign currency, the expiration date, the strike price, the premium amount, whether the deal is an American or a European option, and the notification date.

The premium can be quoted in several ways. It is most common to quote in a percent of the strike price. It is also possible to quote in cents per dollar or cents per unit of foreign currency. The exercise of the currency option is normally limited to a U.S. working day between certain hours, say 8:30 a.m. and 2:00 p.m.

Frequently, the option seller requires exercise notification prior to expiration of the option. Thus, there is a separate place on the ticket to indicate the last day before expiration that it can be exercised. Normally notification precedes expiration by two business days, corresponding to normal spot delivery.

It is also important to distinguish between American and European options, since both are sold in the U.S. market. A European option can only be exercised on the expiration day, with notification on or before the notification day. An American option can be exercised any time on or before notification day.

Development of an Options Trading Operation

Most banks began to offer options in response to customer demand as part of a full foreign exchange customer service. Salomon Brothers came into the market as a trading organization, seeking to initiate trading strategies in options for its own account. Customer business grew and provided a trading base for the product. It is this legitimate customer demand which is driving the options market.

An option is a complex instrument, and pricing is of critical importance. Many early market participants began by thinking they could price options "by the seat of the pants;" that is, using a market sense which is commonly used in the spot foreign exchange market. Such approaches do not work, for reasons which can be made clear through analogy to an insurance company. A company which writes life insurance actively over many years and charges less than is implied by the actuarial tables will lose money. Sooner or later, by the laws of probability, it will lose money.

Options function in exactly the same way. If one writes options over a long period of time at a price that is cheap in relation to the probable volatility of the underlying currency, one will lose money. The loss is certain in the same way as it is for an insurance company. Hence, the ability to price options correctly over the long term is critical.

For this reason, any institution that actively writes options must devote considerable resources to computing capability. The first priority is for in-house computer pricing models, but much goes into developing systems for accounting and risk control as well.

Pricing Options

Pricing models are mathematically complex, but the procedures for pricing can be discussed in general terms. There are several

basic pricing formulas, all containing generally the same variables: the strike price, the exercise date, the current spot rate, interest rates in both currencies, and a measure of exchange rate volatility.

In general, option maturities range from a few weeks to a year or so. There are longer-dated deals in the market, but they are not common. The exercise date is the final day on which the option can be exercised. The spot rate is required since the option must be priced relative to where the underlying currency is trading.

BASIC MODEL VARIABLES

- Strike Price
- Maturity Date
- Spot Rate
- Interest Rates or Forward Differential
- Future Volatility Forecast
- Supply/Demand Factors

There are two interest rates and therefore an interest rate differential is involved in the case of foreign currencies. Some option pricing models use two interest rates and explicitly calculate the differential, while other models use the differential under the assumption of triangular arbitrage.

All the variables discussed up to this point are known before the option is priced: the strike price, because it is set; the maturity date, because it is agreed upon; and the spot rate and interest rates, because they are available from the market.

Volatility, the Key Variable

The key variable is exchange rate volatility. Here we should define terms. It might be said that "the Deutsche mark over the last three months had a volatility of 14." This means that the annualized, standard deviation of the Deutsche mark has been 14 percent calculated over the most recent three-month period.

The important notion for pricing options is that the "fair market value" depends upon an estimate of *future* exchange rate volatility over the life of the option, which is unknown. Development of statistical measures of past volatility provides an empirical base for making such estimates. But a statistical measure of the past may not provide a reliable forecast for the future. Clearly, a good argument can be made to base the volatility forecast on recent experience, but these estimates constitute no more than a forecast.

An example might help clarify why, in general, it is inappropriate simply to plug in past volatility data in options pricing formulas. Consider the example of Deutsche mark volatility in recent months, using the December 1984 futures contract. Several months ago, options on the December mark future were trading at prices implying 9-10 percent volatility. Shortly thereafter, the implied volatility jumped to 11-12 percent, and then to 15 percent.

Early in November prices both in Philadelphia and the OTC market implied volatility of about 17 percent, even though historic data indicated volatility should be around 15 percent. Why did this occur? Because traders have seen an unanticipated, rapid increase in volatility and therefore shaded prices of current quotes upward until more normal relationships between past and future volatility

reestablished themselves. People routinely do considerable mathematical and statistical tests on models to improve volatility forecasts, but at times trader judgment is more appropriate.

The idea that options pricing depends heavily on uncertain forecasts of future exchange rate volatility is frequently difficult to explain to customers. They find it difficult to accept that forecasting exchange rate volatility is as uncertain as predicting interest rates and that the prices of options will vary depending on the writer's specific forecast.

The same considerations affect how an options market maker will trade. If he believes options are cheap because events will cause sharply increased volatility, then he may buy options. If he thinks the market is pricing options with too high a predicted volatility, he would sell. As in all instruments, the divergence of opinion makes the market.

Finally, traders must take supply and demand factors into account in pricing options, even though most models do not. In practice, traders will shade price quotes according to the balance of bids and offers at any moment in time.

Pricing Formulas

The five or six factors which influence option prices are combined and interrelated in an algorithm. There are several algorithms, sometimes called models or formulas, available that will calculate a "fair value" or "theoretical value."

The best-known formula is called the *modified Black model*. It is a version of a formula most often used to price stock options that has been adjusted to the requirements of foreign currency options. Other versions are the Black-Scholes model, the Cox-Rubenstein model, and the Garman-Kohlhagen model.

Each model is slightly different, and computer programs to estimate option prices using all of these models can be purchased from software vendors. Some programs also provide the accounting for options. Some market participants write their own programs, however.

The Black-Scholes pricing model was developed in the late 1960s for stock options and was in vogue when options began trading on exchanges in the 1970s. The formula uses a single interest rate and was frequently the first formula adopted by people moving beyond the "seat of the pants" approach to options pricing. The Garman-Kohlhagen model is an extension of Black-Scholes, it deals with the two interest rates which arise in currency options. The Cox-Rubenstein model uses an approach known as the *binomial jump method*. Finally, there are "smart models" which adjust prices according to the pattern of past trades.

Salomon Brothers has developed a Black-Scholes, binomial jump and some other models. It trades by utilizing a subjective mix of these. Prices based on two or three different models are generally close, and prices are modified according to market experience.

Volatility is the major ingredient in options pricing, whatever the formula used. An example can demonstrate the numerical effect of changes on prices in volatility. Consider the results of our models on a British pound March 1985 call option with a strike price of \$1.20. We assumed a volatility of 14.25 percent and the model calculated an options premium of 3.58 percent. The same sterling call with an assumed volatility of 12¼ percent yields an implied premium of 3.01 percent, a difference of over half a percentage point.

Hedging of Options Exposures

The next major topic is the hedging of options exposures, for which the concept of delta and the hedge ratio need to be defined.

Delta is the change in the price (value) of an option relative to the change in the price of the underlying commodity. The ratio is always between zero and one. The ratio is one only in the rare case of an option which is deep in the money because it is certain to be exercised. The potential profit from the option goes up in exactly the same amount as any increase in the exchange rate. Otherwise, the value of an option always changes by less than the spot rate for the underlying currency in percentage terms.

DELTA (Hedge Ratio)

Defined as change in the price of an option divided by change in the price of the underlying

Concept as the underlying moves in price the option will move to a lesser extent. This difference is measured by delta.

The delta is used to suggest a hedge ratio in managing a portfolio of written options since the ratio expresses the amount of the underlying needed in a portfolio to balance exactly the profit or loss of the written options. For example, if the value of an option falls ½ percent when the underlying falls 1 percent, then the delta is 0.5. If the option, say a

call, is for £100 and the portfolio is long £50, then any gain or loss from a change in the spot price will be exactly offset by a change in value of the option. The notion of *delta neutral hedging* is to own the underlying in proportion to the option according to the delta.

Methods of Managing Options Exposures

With these definitions in mind, let us discuss the tactics of managing currency option exposure from the perspective of a commercial or investment bank that writes options. For example, assume we sell a DM2.85 call on a Deutsche mark to XYZ corporation. Without hedging, the writer faces an array of risks and profit opportunities. If the Deutsche mark remains below DM2.85 relative to the dollar, the writer will profit to the extent of the premium received. If the Deutsche mark strengthens, then the writer loses money, probably by an amount which significantly exceeds the premium amount. In the early days of currency options trading, some writers did just this: sell the option and put the ticket in the desk.

Presently, few write options and forget about them, but everyone generally has some portion of their book unhedged. For example,

one might sell a December Deutsche mark call at a DM2.60 strike price when the current spot is DM2.95. The seller may not think the mark will go to DM2.60 by December, and therefore quite intentionally refrains from hedging that exposure. It is a calculated risk, and if the mark were to strengthen toward, say, DM2.70, the seller might change tactics and begin to hedge the exposure. This approach to managing exposure differs from simply putting the contract in the drawer, because the exposure is constantly monitored and the decision to hedge or remain "naked" depends on the writer's view of where the exchange rate for the underlying currency is likely to go.

Delta Hedging

The second method of managing exposure is *delta hedging*, which is more mechanical and has considerably lower risk. If the pricing formulas are correct and based on an accurate forecast of volatility, then the cost of hedging will consume a substantial part of the premium charged on the option. The profit will be much smaller than if the option is left unhedged and stays out of the money. At the same time, the risk of substantial loss is far less than with unhedged options, the main risk coming from substantially underestimating future volatility.

The third approach to managing options risk is to offset written options with purchased options. The simplest example is purchasing an option identical in maturity and strike price to the one sold. Assume, for example, a corporate customer buys a December sterling call option from a bank at a strike price of \$1.23 with a premium of three cents. The bank may then look in the market for a December \$1.23 sterling call at less than three cents and will buy one if available. The bank would be hedging or offsetting the sold option with an identical December \$1.23 purchased call, earning the difference in premiums. The two contracts remain on the books, but the risks of gain or loss from price change are completely hedged.

Mismatched Hedging

Most hedging of written options with purchased options is far more complex, however. An active option trader often offsets one option with another that is different, either in strike price, maturity, or both. These intentional "mismatches" create a wide variety of "spreads", where risk is tightly limited compared to writing "naked" options but where final profit is determined by price movement in the market.

Consider again the December \$1.23 sterling call. Instead of seeking an identical option to buy, the bank might buy a December \$1.20 sterling call as a hedge. This is known as a *bull spread* since the spread will be exercised if the currency strengthens. If sterling strengthens and the holder of the written option exercises at a rate above \$1.23, the bank can in turn exercise the option it owns to buy sterling at \$1.20, earning the difference less any difference in premium. Since the written option is hedged with a purchased option, there is limited exposure to loss. There are many such combinations, each appropriate to a particular expectation of future market developments.

To summarize, we have set out three categories of options exposure management: writing unhedged options with a view on the underlying currency, writing options against cash, and writing options against purchased options. Which strategy, if any, is preferable? Each carries different risks, and different implications. Active market participants employ a mix of the three approaches. However, the mix changes depending upon market outlook, trends in volatility, and the trader's performance relative to his objective.

It should be noted that the scope of any major market participant to hedge written options with purchased options is limited by the liquidity of the options market. Most major participants wish to write options mainly to corporate customers. They therefore prefer not to fill lines with options written to their direct competitors. It is far easier to hedge options in the cash markets because of the greater liquidity of those markets.

Credit Risk

The credit implications of OTC options are different from forward contracts. The credit risk of a forward is the same whether a currency is purchased or sold. For options, however, the buyer has the credit risk that the writer will not perform. Conversely, the seller has the risk that the premium will not be paid. Once the premium is transferred, that risk disappears.

These generalities can be defined more precisely. The option buyer has a forward commitment, which will be charged against a forward line until exercised. If exercised, the forward commitment becomes a spot commitment. Normally, OTC option deals are for spot settlement, both for premium and principal amounts. An option writer incurs a spot risk for the amount of the premium when striking the deal. That is a comparatively small delivery risk. The larger risk incurred by a writer occurs if the option is exercised. It is a spot risk, but for the principal amount of the contract.

The credit risks of options can be handled in several ways. Many institutions currently do not make the distinction between buying and selling options, but are simply booking them against existing spot and forward lines. Others are creating new credit lines for options separate from their existing spot and forward limits, and some are subdividing their existing spot and forward allocation to provide a subcategory for options. In any case, it is clear that the appropriate approach is to consider the credit risks of buying and selling options asymmetrically.

The inclusion of options under existing spot and forward lines threatens to limit growth of options or inhibit existing trading in the cash markets. If, for example, two active market participants sell one-year options to each other and both include the full amount of the options in existing credit lines, the lines will be tied up the entire year, leaving limited space for other options or for spot and forward transactions.

There are probably few cases as yet where trading has been impeded by limit considerations. But the potential for a problem grows as more OTC options are written.

Market participants are not yet trying to solve credit limit problems by simply creating new lines. In most cases, existing limits are probably large enough to accommodate an individual counterparty. A near-term solution would be to fold options into existing credit lines but to allow for the difference between purchased and written options. That is, written options should be charged against credit lines at some fraction of face value, while purchased options appropriately carry a credit risk on the face amount.

Measuring Exposures and Accounting for Profitability

The next topic is measuring and accounting for the profitability of written but unexercised and unexpired options.

Some methods have major drawbacks. One is to record premium as profit on a pro rata basis over the life of the option. For example, if a bank sells a one-year option which carries a premium of \$120,000, it posts \$10,000 to profit each month regardless of how the spot price moves in relation to the strike price. Another is to post the entire premium to profit when the deal is consummated. Surprisingly, a few major options players are known to do this, and some even sell options at the end of the month to influence the profit account. Neither of these approaches should be considered sound.

Several better methods are available to account for profits and are especially appropriate for those who actively hedge option portfolios. The first is to delay posting to the profit and loss account until the option is exercised or expires, but track the ongoing potential gain or loss of the option against the (offsetting) gain or loss on the corresponding hedge. The hedge may of course be another option, a futures or forward contract, or the spot at maturity.

A second approach is to use options prices from the exchanges to mark the OTC options portfolio to market periodically. The problem with this procedure is that OTC options in general do not correspond precisely to exchange-traded options in strike price or maturity. Many use this approach nevertheless, interpolating between the maturity dates and strike prices of the exchange-traded options.

Another approach is to revalue the option regularly using a theoretical pricing model. This approach has obvious appeal and is simple to execute. But the pricing model may yield a price different from that prevailing in the market. The model may say the \$1.20 sterling December call is worth 1½ cents, but on the PSE the contract may be trading at one cent. Common sense suggests that, in this instance, the market price is a better estimate of value.

Daily Marking to Market

To account for profits, the fundamental practice is to mark all options positions to market daily. Those who mark to market less frequently will eventually give management an unhappy surprise.

Positions in exchange-traded options are easy to revalue, since they have a visible market price. Exchange prices are used in these cases.

Positions in OTC options are more complex to revalue. First, the fair value or theoretical value models can be used to calculate implied values of volatility, using prices on comparable exchange-traded options. For example, the prices on Philadelphia options in sterling can be used to calculate the market's estimate of volatility in sterling for various maturities. Using those estimates of volatility, all OTC options then can be revalued each day. Salomon Brothers examines the market-based estimate of volatility and allows the traders some leeway in evaluation, particularly on positions in longer dated options. However, there are checks to make sure that traders' estimates of volatility are within a reasonable range compared to the maturity date for the longest exchange-traded option. This approach is complex but seems least prone to abuse.

Various techniques are used to report options exposures to management. Marine Midland uses an approach of calculating the net in terms of future contracts. For example, suppose the portfolio consisted entirely of bull spreads, long December \$1.20 sterling calls and short December \$1.23 sterling calls. Suppose also that this position is fully hedged in terms of principal amount, leaving nevertheless some residual market risk. In rough terms, this position is similar to the gap risk in a forward book which is flat in a position sense but with unmatched maturities.

The separate sides of the options bull spread are converted to what might be called a "cash equivalent," according to the pricing formulas. The \$1.20 call may have a theoretical delta of 0.6, and the \$1.23 call a delta of 0.4. If the spread position consisted of \$10 million on each side, the long side would have a theoretical delta value of long \$6 million and the short side, a theoretical delta value

of short \$4 million. The value of the position is then recorded as a "delta position \$2 million long." All options and associated hedges can be described in this way and thereby reduced to a common denominator, delta equivalent.

Salomon Brothers' Approach

Salomon Brothers has a similar approach, based on a scenario analysis on the entire position every night. All the deltas are calculated and profits simulated for a plausible range of movement in the underlying spot exchange rates by currency and for a plausible range of changes in interest rate differentials. The resulting matrices show management what will happen to profits under different exchange rate and interest rate movements, by currency. This procedure is only an approximation of what really would happen if one of the scenarios were to occur. Although these calculations take adequate account of the position on the books, the deltas, and thus the net position at a given point in time, change with any movement of the spot rate.

Salomon also has been experimenting with the creation of index numbers to bridge somehow different movements in various currencies. Of course currencies tend to move together against the dollar and that makes it difficult to translate all currency exposures back into dollars independently. It would be easier to produce one number which tells management how much risk is being taken, even though a single index number is probably meaningless in the abstract. Over time, however, a manager would develop a feeling for how such a number moves and what risk that index number represents. With respect to options, such a number can be just as informative as saying the firm is short \$10 million.

Document of Organization

CONCLUSION OF FEASIBILITY STUDY TO ESTABLISH FOREIGN EXCHANGE COMMITTEE (June 1978)

It was generally agreed that any new forum for discussing matters of mutual concern in the foreign exchange market (and where appropriate off-shore deposit markets) should be organized as an independent body under sponsorship of the Federal Reserve Bank of New York. Such a Committee should:

1. be representative of institutions participating in the market rather than individuals;
2. be composed of individuals with a broad knowledge of the foreign exchange markets and in a position to speak for their respective institutions;
3. have sufficient stature in the market to engender respect for its views, even though the Committee would have no enforcement authority;
4. be constituted in such a manner as to ensure at all times fair presentation and consideration of all points of view and interests in the market, and
5. notwithstanding the need for representation of all interests, be small enough to deal effectively with issues that come before this group

The objectives of the Committee would be:

To provide a forum for discussing technical issues in the foreign exchange market, as well as the related international money markets

To serve as a channel of information between the market and the Federal Reserve and, possibly, other official institutions within the United States and abroad.

It is understood that the Committee would seek to work closely with the FOREX Association of North America (FANA).

The Committee may consider the possibility of formulating recommendations for uniform terminology and technical standards for use in the foreign exchange market. It will not concern itself with the evaluation of individual market participants, nor will it attempt to set requirements, qualifications, or terms for participation in the market

The Committee

In response to the results of the study, the Federal Reserve Bank of New York agreed to sponsor the establishment of a Foreign Exchange Committee. It was agreed that:

1. The Committee should consist of no more than 14 members and an equal number of alternates. In addition, the President of FANA would be invited to participate
2. Institutions participating in the Committee should be chosen in consideration of their participation in the exchange market here as well as of the size and general importance of the institution. Selection of participants should remain flexible to reflect changes as they occur in the foreign exchange market.

3. Responsibility for choosing member institutions and alternates rests with the Federal Reserve Bank of New York. The Federal Reserve may solicit the advice of current Committee members.
4. Initially, the terms of half of the members will be for two years and half for three. Thereafter, to provide for maximum participation in the Committee by institutions eligible for membership, the term of membership would be two years. It is envisaged that, at the expiration of each member's term, the alternate would succeed to full membership.

The composition of the Committee should be as follows:

- | | |
|-----|---|
| 5-6 | East Coast banks (possibly including one New York Edge Act corporation) |
| 2-3 | regional banks |
| 2-3 | foreign banks |
| 1-2 | brokers (preferably to represent both foreign exchange and Euro-depositors) |

the president of the FOREX Association of North America
the Federal Reserve Bank of New York

Committee Procedures

At the outset, there would be a meeting of the Committee—with a specified agenda of items—at least every alternate month (January, March, May, July, September, November). The format of the discussion, however, would be informal.

In the event that a member is unable to attend a meeting, his alternate may attend.

Any recommendation the Committee wishes to make on items coming to its attention can be discussed and decided upon only at its meetings. Any such recommendation would be distributed not only to member institutions and their alternates, but to every senior officer in charge of the international money desks of every participating institution in the United States.

The Committee may designate *ad hoc* working groups to focus on specific issues.

Depending on the agenda of items to be discussed, the Committee may choose to invite other institutions to participate in its discussions and deliberations.

Summaries of discussions at each meeting would be prepared and distributed to market participants generally by the Federal Reserve Bank of New York on behalf of the Committee.

Meetings of the Committee would be held at the Federal Reserve Bank of New York.

In addition to the meetings provided for above, a meeting of the Committee may be requested at any time by two or more members.

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AND
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FOREIGN EXCHANGE COMMITTEE MEMBERS AND ALTERNATES

(JANUARY, 1985)

MEMBERS	ALTERNATES	MEMBERS	ALTERNATES
I. East Coast Banks		III. Foreign Banks	
<p>Heinz Riehl Senior Vice President Citibank, N.A. 399 Park Avenue New York, N.Y. 10043 (212) 559-0864</p> <p>James P. Borden Senior Vice President The Chase Manhattan Bank One Chase Manhattan Plaza New York, N.Y. 10081 (212) 552-7543</p> <p>Horst Duseberg Executive Vice President European-American Bank and Trust Co. 77 Water Street New York, N.Y. 10015 (212) 437-4561</p> <p>Ron Levy Senior Vice President Marine Midland Bank 140 Broadway New York, N.Y. 10015 (212) 440-5718</p> <p>Peter J. Niosi Senior Vice President Shawmut Bank of Boston One Federal Street Boston, MA 02211 (617) 292-2343</p>	<p>Bruno Eberli Senior Vice President Morgan Guaranty Trust Co 23 Wall Street New York, N.Y. 10015 (212) 483-2912</p> <p>Jay Pomeranze Senior Vice President Bankers Trust Company One Bankers Trust Plaza New York, N.Y. 10015 (212) 775-3375</p> <p>S. Waite Rawls III Senior Vice President Chemical Bank 277 Park Avenue New York, N.Y. 10017 (212) 310-5233</p> <p>Christine Patton Senior Vice President Manufacturers Hanover Trust 270 Park Avenue New York, N.Y. 10017 (212) 286-7707</p> <p>Timothy Summerfield Vice President Continental Bank 520 Madison Avenue New York, N.Y. 10022 (212) 607-4068</p>	<p>Gerhard Stejskal Vice President and Treasurer Deutsche Bank 9 West 57th Street New York, N.Y. 10019 (212) 940-8040</p> <p>Terry Joyce Agent, Foreign Exchange The Toronto-Dominion Bank 42 Wall Street New York, N.Y. 10005 (212) 820-2105</p> <p>Peter Stevens Treasurer and Executive Vice President National Westminster Bank PLC 175 Water Street, 20th floor New York, N.Y. 10038 (212) 602-1000</p>	<p>Michael Snow Senior Vice President Union Bank of Switzerland 299 Park Avenue New York, N.Y. 10171 (212) 715-3100</p> <p>Yoshihiko Nagaya Deputy General Manager The Bank of Tokyo, Ltd New York Agency 100 Broadway New York, N.Y. 10005 (212) 766-3432</p> <p>Jean-Philippe Frignat First Vice President and Treasurer Banque Indo-Suez 1230 Sixth Avenue New York, N.Y. 10020 (212) 408-5820</p>
II. Other Reserve City and Regional Banks		IV. Brokers	
<p>William Rappolt Executive Vice President Manufacturers and Traders Bank One M and T Plaza Buffalo, N.Y. 14240 (716) 842-5553</p> <p>Robert Goetter Senior Vice President Harris Trust and Savings Bank 111 West Monroe Street Chicago, IL 60690 (312) 461-3386</p> <p>Raymond R. Peters Senior Vice President Bank of America, N.T. & S.A. Flow of Funds Management No. 3170 555 California Street, 11F San Francisco, CA 94137 (415) 953-9574</p>	<p>Barry L. Kaufman Vice President and Manager, Foreign Exchange Northern Trust Company 50 South LaSalle Street, B-12 Chicago, IL 60675 (312) 630-6204</p> <p>Timothy Gallagher Senior Vice President First National Bank of Chicago One First National Plaza Chicago, IL 60670 (312) 732-5304</p> <p>Robert LaBien Senior Vice President Security Pacific National Bank International Banking Group 333 South Hope Street Los Angeles, CA 90071 (213) 613-5757</p>	<p>Stephen E. Moore Senior Executive Vice President Lasser Marshall, Inc 76 William Street New York, N.Y. 10005 (212) 943-0923</p> <p>Alan Griffiths President Bierbaum, Inc One Whitehall Street New York, N.Y. 10004 (212) 635-4269</p>	<p>Anthony Calvello President Noonan, Astley and Pearce, Inc. Wall Street Plaza New York, N.Y. 10005 (212) 483-8297</p> <p>Richard M. McGee Managing Director Tullatt and Tokyo Forex, Inc 80 Pine Street New York, N.Y. 10005 (212) 208-2006</p>
		V. Forex USA, Inc. (observer)	
		<p>David Palmer Senior Vice President and Treasurer First American Bank of New York 350 Park Avenue New York, N.Y. 10022 (212) 759-9898 ext. 752</p>	
		VI. Federal Reserve Bank of New York (ex officio)	
		<p>Sam Y. Cross Executive Vice President Federal Reserve Bank of New York 33 Liberty Street New York, N.Y. 10045 (212) 791-6180</p> <p>Margaret L. Greene Senior Vice President Federal Reserve Bank of New York 33 Liberty Street New York, N.Y. 10045 (212) 791-6688</p>	