

**GUIDELINES FOR
FOREIGN EXCHANGE SETTLEMENT
NETTING**

The New York Foreign Exchange Committee
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I. Executive Summary

One of the most effective means of reducing settlement risk is the netting of payments between trading counterparties. In its October 1994 paper, *Reducing Foreign Exchange Settlement Risk*, the New York Foreign Exchange Committee demonstrated that the bilateral netting of payments due between foreign exchange counterparties could reduce settlement exposures by as much as 60 percent.¹ Although the idea of limiting foreign exchange settlement risk by netting payments appears to be a desirable risk management tool, it has only in recent years gained wider acceptance among market participants. Although many firms have implemented settlement netting capabilities, the majority of active foreign exchange market participants still do not net payments.

Responses to the Committee's paper, (which was presented in seminars in New York, London, Frankfurt and Tokyo after its publication) indicated that although market participants were very interested in reducing their settlement exposures through netting, they needed practical advice on how to go about developing netting capabilities.

Accordingly, the Committee is pleased to present this follow-up paper on foreign exchange settlement netting. Based on a survey of and interviews with its members, this study presents an overview of the different forms of netting recognized in the market and discusses the legal framework for netting domestically and cross-border. The paper also reviews the various operational means of settlement netting currently employed by market participants, the costs and benefits of converting from a gross to a net settlement system, and the factors that a firm must consider in determining which approach best suits its needs. Finally, the Committee addresses initiatives in the areas of bilateral and multilateral netting that offer prospects for even greater reductions of settlement risk.

The March 1996 publication of the Bank for International Settlements' (BIS) report, *Settlement Risk in Foreign Exchange Transactions* confirmed the need for our review. The report highlighted the Group of Ten (G-10) central banks' concern with the magnitude of settlement exposures occurring in the global foreign exchange markets, and outlined several options available to market participants for reducing both the size

¹ *Settlement risk* is a general term used to describe the risk that settlement in a transfer system will not take place as expected. Foreign exchange settlement risk arises from temporal differences in the settlement of foreign exchange transactions. For example, if a firm sells yen and buys dollars, the yen will settle before the dollars, in other words, the firm must pay the yen in Tokyo well in advance of receiving its dollars later that day in New York. If the counterparty to the transaction defaults on its dollar payment obligation, the firm will lose the full amount of dollars it expected to receive, with questionable ability to recover the yen already paid out.

Settlement exposure refers to the value of funds at risk in the settlement process. The amount of settlement exposure a firm incurs is equal to the full value of the currency it has purchased. The exposure is ongoing: it begins when the irrevocable payment instructions are made for the currency sold and ends only when the purchased currency is received with finality. Because of the timing of these operations processes and information flows, this period can last as long as three days.

For a further discussion of foreign exchange settlement risk, see *Reducing Foreign Exchange Settlement Risk*, the New York Foreign Exchange Committee, October 1994.

and duration of their individual foreign exchange settlement exposures. Prominent among these options is settlement netting.

The BIS paper also addressed an initiative by the Group of Twenty (G-20) to develop a system of secured settlement for foreign exchange transactions, commonly referred to as Payment versus Payment (PVP). Although a PVP system could effectively eliminate settlement exposure from the trade settlement process, the exact form of such a system is still being determined, and therefore the time to completion can not be estimated. It also does not follow conclusively that a PVP system would eliminate the need for settlement netting. Significant reductions in liquidity risk, systemic risk and cost would still be achieved by netting payments before they were submitted to a PVP system.

The concern expressed by regulators worldwide over the magnitude of daily foreign exchange settlement exposures may ultimately translate into additional regulatory capital requirements and higher transaction costs for market participants who do not endeavor to reduce their settlement risk. As firms' own methods for quantifying settlement risk become integrated into the overall risk measurement processes, settlement netting will also likely become an internal mandate among market participants.

The Committee strongly urges market participants to net foreign exchange settlements whenever possible and to take all necessary steps to develop and maximize netting capability.

II. Netting Survey and Interview Results

In order to gain insight into current settlement netting practices among foreign exchange market participants and to better understand the motivations and disincentives that factor into a firm's decision to net, the Committee surveyed its members and conducted a series of follow-up interviews. The members were questioned on the effectiveness of their netting activities, the netting methods they use and difficulties they encounter.²

All of the Committee members reported that they currently net foreign exchange settlements. The majority indicated that settlement netting as a means of reducing settlement risk was considered "very important" in their organization. The firms that were interviewed provided further insight into the motivation for the initial decision to develop netting capabilities. In some cases the credit group provided the impetus. In others, the decision was operations-driven with the goal of reducing overhead and clearing costs. At some firms, senior management led the initiative by focusing on increased concern by regulators over foreign exchange settlement exposure.

Interestingly, 80 percent of all respondents reported using internally developed netting systems. Most commonly, respondents use a combination of two or more netting methods, including in-house systems, manual calculations, subscription to a bilateral netting service or participation in a multilateral netting scheme. By using more than one method, the Committee members reported they were generally able to reduce settlement volume from 35 percent to 60 percent.

Respondents who netted solely on a manual basis netted with only 2 percent of their counterparties and were only able to reduce settlement volumes by 3 percent to 4 percent.

More than 50 percent reported that there were no, or no major, internal impediments to settlement netting. Where internal obstacles to netting did exist, the most frequently encountered was that a cost/benefit analysis of either internal system changes or subscription to a netting service did not justify the expense. Among the firms that used internal netting systems, relatively few encountered difficulties in developing their systems. These firms generally viewed their internal netting systems as efficient and cost effective.

The most frequently encountered difficulty among members initiating settlement netting arrangements with their dealing counterparties, was that counterparties were operationally unable to net. Members also reported that a still considerable number of dealing counterparties did not want to net. Frequently, the counterparty indicated that settlement netting was not perceived to be cost effective. Systems incompatibility between counterparties also contributed to an inability to net settlements.

Although the sample size makes it difficult to draw conclusions, the results of the survey and interview responses do highlight several important issues that firms must address when considering how they will implement settlement netting. A firm must first decide what goal or goals it seeks to accomplish, i.e., reduction of settlement volumes and

² The survey questions appear in Appendix K.

associated costs, reduction of credit risk, or response to regulatory concerns. Then it must determine with which counterparties netting would have the greatest impact and if those counterparties can in fact net settlements. Finally, it must ensure that its method or methods are compatible with those of its counterparties, and can be implemented successfully and cost-effectively.

The survey results also suggest that use of internally developed netting systems either alone or in combination with participation in a bilateral or multilateral system can have considerable impact in terms of enabling netting with the maximum number of counterparties and reducing settlement volumes.

As a result of its review, the Committee members concluded that no single method can ensure the best results in terms of settlement volume and exposure reduction; rather, depending on the mix of counterparties and volumes of business done with them, one firm can accomplish as much through an internally developed netting system as another through participation in a multilateral netting scheme.

III. Introduction to Netting

Foreign exchange settlement netting between two counterparties, also referred to as bilateral settlement netting (multilateral netting will be discussed later in this paper), can take one of two forms, payment netting or novation netting.³ Often, one of these two methods will be found in combination with close-out netting in master agreements between trading counterparties. Close-out netting, as distinct from payment or novation netting, provides for contract liquidation procedures in the event that one of the parties defaults under a contract or become bankrupt.⁴ Payment and novation netting describe the day-to-day processes of calculating and paying net amounts.

Although most inter-bank netting arrangements are documented as provisions of a master agreement, settlement netting can be accomplished under a less comprehensive document. To assure enforceability of settlement netting, a contractual agreement, or reliance on favorable netting law in the jurisdiction where it is to be effected is advisable.

In the remainder of this section, both forms of settlement netting as well as multilateral netting will be described in greater detail. A discussion of a recent development in the area of bilateral netting, Netting+, is also included.

³ The terms "settlement netting" and "payment netting" are often used interchangeably. For the purposes of this section, "settlement netting" will be used in the general sense to refer to the various means of netting foreign exchange settlements and "payment netting" will refer to the mode of settlement netting that occurs just prior to value date.

⁴ For a discussion of close-out netting see Appendix E.

Payment Netting

Payment netting is defined as the arrangement between two counterparties to net all payments in a single currency owed between them on a given value date. For each value date and for each traded currency, the parties will aggregate and net all payments owed between them to arrive at a single currency obligation for each currency payable between the parties. The parties calculate net payments at some pre-agreed time, typically the day before value date (although it is possible to agree net payments on the value date, depending on the currency and time zone).⁵

Netting by Novation

Novation netting contemplates that for each value date and for each currency, the parties agree that all existing contracts will be canceled (discharged and extinguished) and simultaneously replaced by a new contract that aggregates and nets all of the payment obligations of the original contracts. Novation netting occurs immediately when a nettable transaction is entered into. In contrast, payment netting occurs just prior to settlement. On value date no difference exists between the payment amounts that would be calculated under novation netting versus the amounts calculated under payment netting. In addition to causing settlement netting to be effected on trade date rather than on value date, in jurisdictions where legally enforceable, novation netting removes any chance of "cherry-picking" in a bankruptcy, because all of the remaining net payment obligations constitute a single contract. ("Cherry-picking" occurs when the liquidator of a bankrupt company selects only the profitable transactions for performance and defaults on the unprofitable transactions, forcing the non-defaulting party to pay in gross.)⁶

The 1988 Capital Accord of the BIS permitted recognition of the benefits of netting by novation of foreign exchange contracts having a term of more than fourteen days and governed by a master agreement. As more fully discussed in "Regulatory and Financial Reporting" Appendix J, the July 1994 amendment to the Capital Accord permitted banks that met all of the criteria contained in the Capital Accord, and any additional conditions required by their local supervisors, to recognize the benefits of close-out netting for capital reporting purposes. Accordingly, where close-out netting is enforceable and cherry picking is no longer a risk, netting by novation is less important as a means of netting pre-settlement exposures.

Variations to Settlement Netting

For both forms of bilateral settlement netting, involving banks, netting usually takes place between pairs of branches. For example, Bank A's London Branch might net with

⁵ For an example of bilateral payment netting see Appendix A.

⁶ For an example of novation netting see Appendix B.

Bank B's London branch and with Bank B's New York branch, however the netting operations are carried out independently of each other. The reason for this constraint is largely operational; settlement operations in different branches of the same bank often operate to such an autonomous degree that an aggregation of settlement and netting activities is impossible in the absence of major systems revisions. Some banks are able to surmount this problem by booking all trades in the name of a single branch. A bank that can overcome the operational constraints and aggregate and net payments across its branches ("multi-branch" netting) can usually achieve far greater reductions of settlement exposure.

Under the most commonly practiced form of settlement netting, all trades for the same value date are nettable, regardless of the currency pairings. However, both payment and novation netting may be limited to netting of currency pairs, also referred to as "matched pair" netting. In this form of netting, rather than aggregating and netting all payments in a single currency, only trades involving the same pairs of currencies are netted. For example, under matched pair netting a USD-DEM trade could be netted with another DEM-USD trade but could not be netted with a JPY-USD trade. Under normal settlement netting the USD leg of each trade in the example above could be netted against each other. A firm typically uses matched pair novation netting because internal systems constraints render it unable to calculate net amounts involving multiple currency pairings.

Maximum exposure reductions from bilateral settlement netting (both payment and novation) are achieved by firms that actively buy and sell the same currencies with the same counterparties, netting all currencies.

Netting+

A recently proposed technique to further reduce bilateral settlement exposures has generated a great deal of interest among dealers in New York and London. Through the use of tom-next swaps, two counterparties can offset an existing currency payment obligation just prior to settlement, and roll the position to the next day (effectively pushing forward the value date to the following day.) By repeating this process, the counterparties can continue to 'postpone' the settlement risk associated with that position. Pilot tests have been conducted of this technique which has been given the name "Netting+", and many of the market participants interviewed for this paper are in the process of reviewing and evaluating Netting+. As yet, none have begun to incorporate it into their daily settlement operations.⁷

⁷ For a discussion of the Netting+ process see appendix C

Multilateral Settlement Netting

Multilateral netting is an arrangement whereby three or more counterparties agree to aggregate and net their foreign exchange payments, generally through a clearinghouse structure. Such an arrangement will result in only a single payment or receipt in each traded currency to be made by each of the counterparties on any given day.

The clearinghouse not only becomes the repository of all transaction detail, performing aggregation and netting calculations for the participants, but it is actually substituted as counterparty to each deal. All of a participant's payments and receipts in each currency are then aggregated and netted to an amount due to, or from the clearinghouse.

The minimum standards of a multilateral netting system were laid out in the BIS's 1990 paper, *Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten Countries*, also known as the Lamfalussy Report. These standards include operational soundness, legal certainty, fair and open access, clearly defined procedures for managing credit and liquidity risk and ability to withstand default of the participant with the largest exposure.⁸

The following grid illustrates where in the trading cycle each type of netting occurs and what type of risk it addresses:

Pre-settlement	Settlement Risk		Counterparty
Netting of Mark-to Market exposures as permitted by regulators	Netting occurs on trade date	Netting occurs on settlement date	Netting occurs after default
<i>Close-out Netting Novation Netting</i>	<i>Novation Netting</i>	<i>Payment Netting</i>	<i>Close-out Netting invoked</i>

IV. Legal Documentation for Settlement Netting

Bilateral Master Agreements for Foreign Exchange Transactions

The dramatic growth over the last several years in the use of bilateral master agreements to document foreign exchange trading arrangements has paralleled the increased recognition of the benefits of close-out netting for regulatory and financial reporting purposes and for credit risk management, and the benefits of payment and novation netting to reduce settlement risk. As a result, the market has widely accepted the following industry standard master agreements:

⁸ For a discussion of multilateral netting, see Appendix D.

IFEMA: The International Foreign Exchange Master Agreement is a product-specific master agreement intended to reflect best market practice and to provide a standard agreement for participants in the foreign exchange markets. The IFEMA was published jointly by the British Bankers' Association and The Foreign Exchange Committee of the Federal Reserve Bank of New York in 1993 (an amended version was published in 1995). Foreign exchange associations in each of Japan, Canada and Hong Kong have published local versions. The IFEMA includes provisions for election of novation netting or payment netting and contemplates post-default global close-out of all transactions between the parties. Local counsel in many jurisdictions have given, or are being asked to give, legal opinions on the enforceability of the netting provisions in the event of default, including the insolvency of a local counterparty.

FEOMA: The Foreign Exchange Committee of the Federal Reserve Bank of New York has approved and authorized publication of the Foreign Exchange and Options Master Agreement to cover foreign exchange spot and forward transactions as well as currency options. The FEOMA combines the IFEMA with the International Currency Options Market Master Agreement (ICOM), which covers currency options transactions on virtually the same terms as the IFEMA.

ISDA: The ISDA Master Agreement (Multicurrency-Cross Border version published in 1992) enables trading counterparties to include foreign exchange transactions under a global cross-product close-out netting master agreement. Because there are significant differences in market practices between the derivatives markets and the international foreign exchange spot and forward markets, parties to the ISDA frequently incorporate the ISDA FX and Currency Options Definitions and further tailor the ISDA Schedule to reflect standard market practice for the foreign exchange products. The ISDA contains optional payment netting provisions but does not provide for novation netting. Legal opinions of local counsel on the enforceability of netting after default, including insolvency, have been or are being obtained on the ISDA.

Customized Settlement Netting Agreements

The master agreements discussed above are the most commonly used documentation for settlement netting arrangements. Firms may also agree, however, to net settlements under a shorter letter agreement or under their own form of agreement (such as business "terms and conditions"). These documents can be limited to an agreement of operational procedures or may include close-out netting provisions. Although there are no legal impediments to settlement netting under a simple operational agreement, a firm must be careful in its credit-risk assessment to treat pre-settlement exposure on a gross basis. A firm using its own form of close-out netting agreement should consider obtaining legal opinions on enforceability in the jurisdictions where the agreement will be in effect.

V. The Decision to Net

Effectiveness as a Risk-Reduction Mechanism

The effectiveness of foreign exchange netting as a means of settlement risk reduction must be weighed by each firm individually. The cost-benefit analysis is important because of the wide array of alternatives available to develop netting capability, ranging from manual net calculations with minimal systems modification, to subscription to a bilateral or multilateral netting service with extensive systems integration and start-up costs.

A number of factors must be considered in the risk reduction analysis, including transaction flow, (e.g., how many transactions with trading counterparties are nettable), the degree of reduction in settlement exposure accomplished by netting, the ability and willingness of counterparties to net settlements and compatibility of a firm's netting systems with those of its counterparties (a counterparty might only be able to net using a netting service that the firm does not wish to join). Other considerations may be the inclusion or exclusion of spot or tom-next (settling the following business day) trades, and netting across borders or across time zones.

As mentioned earlier, the most dramatic impact of bilateral netting on reduction of settlement exposure can be seen between counterparties actively trading (both buying and selling) the same currencies for the same value date. The impact is not necessarily less material if trading is done on a smaller scale; as long as there are nettable transactions, the potential for risk reduction exists.

Multilateral netting can result in even greater reductions of settlement risk, however its effectiveness is more dependent on payment volumes, the number of counterparties involved, and the currencies transacted. If, for example, counterparties enter into a large number of deutschemark/Italian lira trades, but the Italian lira is not a currency handled by the multilateral netting service, those transactions would not be nettable on a multilateral basis. Any deutschemark payment obligations created by US dollar/deutschemark trades submitted to the netting service, could not be netted against Deutschemark obligations that resulted from the deutschemark/lira crosses.

The reduction of the duration of settlement risk is unique to multilateral netting. Because the clearinghouse centralizes and consolidates the settlement operations of its participants, it can time payments and monitor receipts to effect payment versus payment wherever possible, and minimize the duration of unsecured exposure when PVP is not possible. Reducing the duration of settlement risk is generally perceived to be one of the most difficult elements contributing to settlement risk for an individual firm to control.

In the case of multilateral netting, a firm must assess the impact of transferring a portion of its overall risk to a counterparty into a clearinghouse on the aggregate bilateral risk it

has to that counterparty. Additionally, a firm must consider its potential liability should one or more members, a payment agent, custodian or the clearinghouse default.

As a participant in a multilateral netting service a firm will also need to consider that in the event of a counterparty default, it will relinquish control of its risk management alternatives and their timing to the risk management function of the clearinghouse.

Benefits

Beyond the obvious benefit of settlement exposure reduction, the operational cost savings attributable to netting can be substantial in terms of reduced message and confirmation costs, reduction in errors, and reduction in personnel-related costs. For example, in the absence of bilateral payment netting, if a firm and its counterparty did thirty trades involving the dollar and the yen, each of the thirty trades would have to be settled separately, an arrangement that would require both a firm and its counterparty to make thirty payments and to process thirty receipts. Under a netting arrangement, a firm would simply make or receive a single dollar payment and make or receive a single yen payment, resulting in a substantial reduction in payment and receipt messages and correspondent charges. Such reductions across enough counterparties can result in substantial savings. If the process of confirmation-matching is automated, a firm will also benefit from greater accuracy of transaction detail, resulting in fewer man-hours needed to reconcile trade mismatches and fewer payment errors. In the case of multilateral netting, these cost reductions may be even more dramatic.

In addition to operational cost savings, another benefit of settlement netting is the potential for increased trading opportunity without the need to reallocate existing credit facilities. When transactions are settled on a gross basis each new trade decreases availability. When the settlement limit for a counterparty is reached, there is no possibility for additional business for the value date in question without extending further credit. In the case where counterparties settle trades on a net basis, traders would also be able to increase availability under approved settlement limits by offsetting existing positions.

As firms become more sophisticated in their ability quantify their settlement exposures, and incorporate these measurements into their risk/return analyses, the direct benefit that reducing settlement volumes has on profitability becomes more apparent. At the same time, the increased concern of regulatory authorities may ultimately result in a mandate of additional capital charges and more rigorous standards for measurement and control of settlement risk. The imposition of intraday overdraft charges by central banks may become more widespread. If either market participants or regulators move toward assigning costs to settlement exposures, and those costs becomes integrated into the pricing structure of the foreign exchange markets, firms that do not net settlements to reduce their exposures will find themselves at a competitive disadvantage.

Cost Considerations

The extensive changes that may be necessary to back and mid-office systems to accommodate netting may result in significant capital outlays. The amount of capital a firm wishes to allocate to development of netting capability must be considered in the context of its risk reduction objectives, both in the short and long term. In some cases a modest amount of internal systems development might be all that is necessary for a firm to realize its netting goals. On one hand, the larger capital outlays needed to integrate internal systems with one of the commercially available netting systems may be perceived as unjustifiably high. On the other hand, a firm's internal risk profile might indicate that up-front integration and modification costs would be considered well justified and compatible with long-term goals.

In addition to the cost of modifying trade processing systems, a firm will need to determine the extent to which changes to risk management systems and processes will be required to calculate and monitor bilaterally and/or multilaterally netted exposures.

Another operational cost to be considered is the per transaction fee typically charged by commercial netting services versus the operational savings afforded by those services. Finally, in the case of multilateral netting, firms must consider additional costs related to the posting of collateral.

VI. Internal Processes

Advantages of developing an in-house netting capability may be ease and speed of implementation and minimal hardware investment. Such a system may be relatively inexpensive to develop and operate.

The following list describes the steps of the netting process, either manual or automated:

1. identify counterparties that offer the best opportunity for netting and negotiate and sign appropriate documents,
2. agree with counterparties on the currencies to be netted, netting cutoff time and standard instructions for settlements,
3. ensure that each deal has been individually confirmed,
4. at the netting cut-off time, identify all transactions to be netted for settlement,
5. compute net amounts by currency, or by currency pair based on the contractual arrangement with the counterparty,
6. confirm net amounts to be settled with the counterparty (by phone, fax, or S.W.I.F.T.),

7. confirm any gross amounts to be settled (for example, for transactions done after the netting cutoff time),
8. generate payment and receipt (payment advice) messages for net amounts,
9. monitor net (and gross) payments and receipts and reconcile Nostro accounts. (This step could involve matching gross information from the FX system and net information generated manually.), and
10. generate accounting entries as needed.

Manual Netting

For firms netting a small volume of transactions with few counterparties, bilaterally payment netting on a manual basis is possible. The process detailed above, though labor-intensive when done manually, can be controlled with the appropriate checks and balances and with a strong trade confirmation system with the counterparty. Reconciliation of net amounts calculated manually, with system generated gross amounts, may be difficult.

Automated Systems

As suggested by the survey results, many firms make use of self-contained, automated systems to net either alone or in addition to participation in a netting service or association. Whether developed in-house, or purchased from a vendor, these systems interface with, or are integrated into the foreign exchange processing system and allow a firm to calculate and process net payments. The actual agreement of net payments and receipts with the counterparty takes place outside of the system.

An in-house system will require either manual or automated data feeds of transactions from the front-end dealing system and to the back office. Netting in this case would require a program for adding and subtracting the payments and receipts for each counterparty by currency and value date. If the internal systems are adaptable, and/or the manual process can be slightly altered, this method is relatively straightforward.

Most of the steps noted above can be automated via a PC application (or will be present in a vendor package) which can run in tandem with an existing processing system. At the agreed upon cut-off time, such an application takes in a download of all transactions eligible for netting, computes the net amounts, and generates a statement of net settlement amounts to be used for confirming with the counterparty. This information can then be input to the processing system, superseding the gross payment and receipt messages.

Several firms have built their own fully automated, bilateral netting functions within their FX processing systems. This level of automation requires the system to segregate deals to be netted, compute net amounts, generate both individual trade confirmations

on trade date and netted confirmations just after the cut-off time, generate net payment and receipt messages, and generate appropriate Nostro and accounting entries.

Vendor Packages

Commercially available software packages are an alternative to in-house systems development. Such a choice may prove useful to a firm that has systems with a high degree of manual intervention or a firm that does not have the appropriate technical expertise in-house. Even if a firm does have sufficient technical expertise, however, a vendor package may be chosen as a matter of cost consideration.

The advantages of this alternative include ease and speed of implementation, access to the vendor's professional staff for questions and problems, and minimal hardware investment. Disadvantages may include difficulties in adapting to the internal processes and/or systems, expense, and speed of obsolescence.

VII. NETTING SERVICES

Netting Associations

A number of netting associations have arisen in which members share a commonality such as country of domicile, type of institution, payment system or type of transactions to be netted. For example, in France and Switzerland many banks have agreed to bilaterally net with each other. These intra-country arrangements have been especially useful in reducing participants' home currency settlement exposures. Such an arrangement may facilitate netting on a limited basis for firms that would otherwise find netting on a larger scale difficult or impossible.

Commercially Available Netting Services

A netting alternative that has become increasingly popular among members of the dealing community is participation in one of the commercially available netting services. Examples include bilateral netting systems such as FXNET and S.W.I.F.T. Accord, or multilateral systems such as ECHO and Multinet International Bank ("Multinet").

The advantages of such services are that they generally offer a comprehensive package of services, including gross confirmation matching, on-line reporting and netting, and payment message generation. Importantly, a netting service creates a standardized process, which allows any participant in the service to net with any other participant. These services also bring a firm into direct contact with potential netting counterparties already using the service, and thus facilitate the initial netting discussion and documentation negotiation.

The disadvantages of these services generally include the cost of the extensive adaptation of existing front-office and back-office processes and systems and additional

transaction fees. Following are brief descriptions of each of the existing netting schemes.

Advisory Netting

S.W.I.F.T. ACCORD

Accord, a product of S.W.I.F.T., is a confirmation-matching facility as well as a netting facility. A bank that confirms through S.W.I.F.T. can select Accord as its netting tool and accomplish settlement netting with counterparties which do not subscribe to the service. S.W.I.F.T. Accord will copy MT300 (foreign exchange confirmation) messages to a separate database and match the transactions with the counterparty's. Accord then computes the net at the agreed cut-off time. Information from Accord is sent to the Accord user via special separate S.W.I.F.T. messages. Actual settlement, Nostro reconciliation, and accounting processes are unaltered by use of S.W.I.F.T. Accord.

Accord, which has been operational since 1990, currently has 420 Accord Matching subscribers in 52 countries and 29 Accord Netting subscribers in 10 countries.⁹

Bilateral Novation Netting

FXNET

FXNET is a bilateral netting service originally developed by a consortium of banks operating in the London foreign exchange market. Using this service requires that each party install an FXNET "black box" to run the netting and communications software. For netting to take place, both parties must be users of the service. FXNET enables users to do cross-border netting with counterparties in thirteen cities worldwide. As of October 1996, FXNET has fifty-seven live users and an additional thirty-five signed and in the process of going live.

In its most basic form, FXNET can be used as a netting calculator (like the PC system described above). Deals can be input manually to FXNET. To facilitate speed and accuracy, a link can be developed to pass MT300's for nettable transactions automatically from the FX processing system to FXNET. FXNET stores and matches all deal confirmations received from its members and sends real time messages confirming deal matching. Upon matching, FXNET immediately novates the deal canceling the original transactions and replacing them with the netted payment obligations of the original transactions. A running account is kept of balances due between members on each value date until the pre-established cut-off time. FXNET sends a message to each counterparty detailing the final net settlement amounts. These messages must be fed automatically or manually to the system which generates payment and receipt messages and accounting entries. Participants' actual settlement,

⁹ For a full description of the Accord service see Appendix F.

Nostro reconciliation and accounting processes are not altered by use of the FXNET system.¹⁰

Multinet's Bilateral Netting Service

Multinet currently offers a service to provide for the bilateral netting of foreign exchange obligations. This service features deal matching, confirmation, on-line inquiries, and reporting of net positions for settlement risk management purposes. Currently, seventeen subscribers from ten institutions use Multinet's bilateral netting service.

Subscribers send completed foreign currency trading information to Multinet as soon as possible after trade execution. They can make inquiries and receive reports via a variety of communication options. Firms may choose between S.W.I.F.T. message capability, host-to-host communication links, and PC input. The use of the S.W.I.F.T. network's Financial Trading Messages allows Multinet subscribers to use existing bank interfaces to S.W.I.F.T. and eliminate duplication of message traffic. The host-to-host communication link supports either batch transmission on a scheduled basis, a real-time link over dedicated leased lines, or via a network carrier. A PC link-up can also be the primary method for submitting trades and receiving reports.

After input, deals are matched and currency payment obligations are netted bilaterally on a real-time basis. The bilateral netting function is applied on currency cash flows rather than currency pairs to ensure that a subscriber only has one receive or deliver obligation per currency, per counterparty, per value date. Each subscriber is then responsible for effecting settlement on the net balance owed under its bilateral netting agreement with each counterparty.

Multilateral Netting

ECHO

ECHO is the only multilateral foreign exchange netting vehicle that is operational today. ECHO began multilateral netting of eleven major currencies in August 1995. It now handles thirteen. By the end of 1997, it will be netting at least twenty currencies. To date, fourteen banks are using ECHO's multilateral netting system, and ten more have signed letters of intent. Eligibility to participate in ECHO is based on specific criteria.

A user must:

- be a bank or regulated investment bank,
- be incorporated in an eligible jurisdiction, and
- have a long term debt rating of at least BBB+ by a recognized rating agency.

Users must also demonstrate operational controls and timely processing of

¹⁰ For a full description of FXNET's operations, see Appendix G.

transactions. Specifically, they must send transactions to ECHO by a pre-designated cutoff time, maintain active control over a variety of clearinghouse determined limits, place collateral as required by the clearinghouse, and reconcile payments and receipts on time.¹¹

Multinet

Multinet is based in the United States, and sponsored by eight North American banks. Multinet recently received final approval from the Board of Governors of the Federal Reserve System to operate as a multilateral clearinghouse, however as of this writing, those activities have not yet commenced. The Federal Reserve and the New York State Banking Department will supervise its operations.

Participants must meet the following criteria to join:

- be a regulated financial institution,
- have a minimum of \$1 billion in Tier 1 capital,
- have a minimum credit rating of A3,
- be domiciled in an OECD country,
- have an active trading position in the FX Markets with clear netting opportunities with other participants, and
- have an established record for high operational standards.

Initially, Multinet plans to handle seven major currencies, but it intends to expand that number based on user requirements.¹²

VIII. Conclusion

The importance of netting as a means of reducing settlement risk was clearly demonstrated in the New York Foreign Exchange Committee's paper *Reducing Foreign Exchange Settlement Risk* and again in the BIS paper *Settlement Risk in Foreign Exchange Transactions*. The Committee hopes that in putting forth this paper, some of the issues perceived as preventing market participants from netting their foreign exchange settlements, have been clarified and that awareness has been raised as to the implementation alternatives available.

Below, we outline the benefits of and considerations for both bilateral and multilateral netting.

BILATERAL NETTING

I. Benefits

1. Average settlement exposure reduction of 50 percent possible

¹¹ For a description of ECHO's operations and risk management procedures, see Appendix H.

¹² For a detailed description of Multinet's operations and risk management structure see Appendix I.

- counterparty to counterparty
- 2. Variety of methods available
- 3. No additional credit risk is assumed (risk remains with counterparties with which you transacted on a bilateral basis)
- 4. Cost reductions and processing efficiencies possible
- 5. Reduces number of payment and receipt messages
- 6. Reduces funds paid out
- 7. Reduces number of reconciliations

II. Considerations

- 1. Modification of risk measurement systems to enable the measurement of settlement risk on a net basis
- 2. Cost and complexity of operations systems linkage to external services
- 3. Willingness/ability of counterparties to net
- 4. Compatibility with netting methods used by counterparties

MULTILATERAL NETTING

I. Benefits

- 1. Simulation suggests up to a 95 percent reduction of settlement exposure possible
- 2. The transfer of settlement exposure from the counterparty to the clearinghouse
- 3. Cost reductions & processing efficiencies
- 4. Reduces the number of payment and receipt messages
- 5. Reduces the amount of funds paid out
- 6. Reduces the number of reconciliations
- 7. Reduces the duration of settlement risk to 24 hours or less
- 8. Facilitates "multibranch" netting

II. Considerations

- 1. Membership
- 2. Collateral requirements and associated costs
- 3. Clearinghouse-imposed limits
- 4. Integration and/or modification of risk systems
- 5. Currencies eligible for netting
- 6. Transactions not eligible for netting
- 7. Risk management procedures controlled by the clearinghouse
- 8. Loss allocation procedures
- 9. Treatment of exposure put through the clearinghouse as distinct from all other bilateral exposure to a counterparty

IX. Appendices

Appendix A

Bilateral Payment Netting Example

The following example is based upon a portfolio of trades between two market maker firms, ABC Bank and XYZ Bank, for three consecutive value dates—January 22, 23, and 24. The example illustrates how ABC and XYZ would calculate the net settlement amounts for each of those value dates. The trade detail is presented in its entirety at the end of this Appendix.

For each value date,

1. trades are grouped first by each currency that ABC Bank is obligated to buy (will receive) for each of the value dates and then again by each currency ABC is obligated to sell (will pay) for each of the value dates,
2. in the following section, all of the buy amounts (positive) and all of the sell (negative) amounts are then aggregated by currency,
3. the buys and sells for each currency are then netted against one another to determine how much, by currency, ABC is due to pay to or receive from XYZ (net settlement amount).

For January 22, ABC has purchased currencies having a U.S. dollar value of \$425,928,200 from XYZ. This amount represents the value of its settlement risk to XYZ for January 22 on a gross basis. ABC has settlement risk of USD 507,739,035 for January 23 and \$394,976,135 for January 24.

After the netting process described above, for value January 22 ABC is obligated to pay JPY 1,160,250,000 and to pay USD 288,729,200. ABC is due to receive GBP 68,000,000, XEU 92,000,000 and DEM 106,365,750 from XYZ.

Converting the net receivable amounts to USD results in net settlement risk of USD 299,729,200. Bilateral payment netting, for January 22, results in a USD 126,199,000 reduction in settlement risk. Comparing the USD equivalent of buys before netting and after netting:

Date	Gross Buys	Net Buys	Settlement Risk Reduction
22/1/96	\$425,928,200	\$299,729,200	\$126,199,000 (30 %)
23/1/96	\$507,739,035	\$262,507,784	\$245,231,251 (48 %)
24/1/96	\$394,976,135	\$273,360,303	\$121,615,832 (31 %)

To take the analysis further, we can look at how much the bilateral payment netting arrangement between ABC and XYZ reduces the amount of payments made on each

value date. To do that, we look at the total that ABC and XYZ are obligated to pay on each of the three value dates without netting and then with netting.

<u>Date</u>	<u>Gross Payments Between ABC and XYZ</u>	<u>Reduction effect of Netting</u>	<u>Net Payments between ABC & XYZ</u>
22/1/96	\$851,856,400	\$599,458,000	\$252,398,400
23/1/96	\$1,015,478,070	\$525,015,569	\$490,462,501
24/1/96	\$789,952,270	\$546,720,606	\$243,231,664

From an operational point of view, payment netting reduces the number of payments each party has to make. The table below shows how many payments each party would make on a gross and net basis for each value date.

<u>Date</u>	<u>ABC Gross/Net</u>	<u>XYZ Gross/Net</u>
22/1/96	26/2	26/3
23/1/96	32/5	32/2
24/1/96	19/2	19/4

Trade Detail

<u>Bank</u>	<u>Counterparty</u>	<u>Buy</u>	<u>AMT1</u>	<u>VALUE DATE</u>	<u>Sell</u>	<u>AMT2</u>
ABC BANK	XYZ BANK	DEM	7,352,500	19960122	USD	(5,000,000)
ABC BANK	XYZ BANK	DEM	7,353,500	19960122	USD	(5,000,000)
ABC BANK	XYZ BANK	DEM	9,256,000	19960122	XEU	(5,000,000)
ABC BANK	XYZ BANK	DEM	9,257,000	19960122	XEU	(5,000,000)
ABC BANK	XYZ BANK	DEM	10,297,000	19960122	USD	(7,000,000)
ABC BANK	XYZ BANK	DEM	103,511,250	19960122	USD	(75,000,000)
Total DEM			147,027,250			
ABC BANK	XYZ BANK	GBP	2,000,000	19960122	USD	(3,043,600)
ABC BANK	XYZ BANK	GBP	3,000,000	19960122	USD	(4,571,100)
ABC BANK	XYZ BANK	GBP	5,000,000	19960122	USD	(7,611,500)
ABC BANK	XYZ BANK	GBP	5,000,000	19960122	USD	(7,607,500)
ABC BANK	XYZ BANK	GBP	5,000,000	19960122	USD	(7,607,500)
ABC BANK	XYZ BANK	GBP	50,000,000	19960122	USD	(75,700,000)
Total GBP			70,000,000			
ABC BANK	XYZ BANK	JPY	526,050,000	19960122	USD	(5,000,000)
ABC BANK	XYZ BANK	JPY	736,190,000	19960122	USD	(7,000,000)
ABC BANK	XYZ BANK	JPY	1,052,000,000	19960122	USD	(10,000,000)
Total JPY			2,314,240,000			
ABC BANK	XYZ BANK	USD	3,000,000	19960122	JPY	(315,690,000)
ABC BANK	XYZ BANK	USD	3,042,000	19960122	GBP	(2,000,000)
ABC BANK	XYZ BANK	USD	5,000,000	19960122	JPY	(526,550,000)
ABC BANK	XYZ BANK	USD	5,000,000	19960122	JPY	(526,550,000)
ABC BANK	XYZ BANK	USD	5,000,000	19960122	JPY	(526,400,000)
ABC BANK	XYZ BANK	USD	5,000,000	19960122	JPY	(526,300,000)
ABC BANK	XYZ BANK	USD	10,000,000	19960122	JPY	(1,053,000,000)
ABC BANK	XYZ BANK	USD	25,000,000	19960122	DEM	(36,962,500)
Total USD			61,042,000			
ABC BANK	XYZ BANK	XEU	2,000,000	19960122	DEM	(3,699,000)
ABC BANK	XYZ BANK	XEU	50,000,000	19960122	USD	(64,815,000)
ABC BANK	XYZ BANK	XEU	50,000,000	19960122	USD	(64,815,000)
Total XEU			102,000,000			
ABC BANK	XYZ BANK	DEM	1,000,000	19960123	FRF	(3,416,700)
ABC BANK	XYZ BANK	DEM	2,000,000	19960123	ESP	(168,460,000)
ABC BANK	XYZ BANK	DEM	7,386,500	19960123	USD	(5,000,000)

ABC BANK	XYZ BANK	DEM	9,000,000	19960123	FRF	(30,750,300)
ABC BANK	XYZ BANK	DEM	14,762,000	19960123	USD	(10,000,000)
ABC BANK	XYZ BANK	DEM	14,773,000	19960123	USD	(10,000,000)
Total DEM			48,921,500			
ABC BANK	XYZ BANK	ESP	6,236,800,000	19960123	USD	(50,000,000)
ABC BANK	XYZ BANK	ESP	6,236,800,000	19960123	USD	(50,000,000)
Total ESP			12,473,600,000			
ABC BANK	XYZ BANK	FRF	448,470,000	19960123	USD	(90,000,000)
Total FRF			448,470,000			
ABC BANK	XYZ BANK	GBP	2,000,000	19960123	USD	(3,027,600)
ABC BANK	XYZ BANK	GBP	5,000,000	19960123	USD	(7,565,500)
ABC BANK	XYZ BANK	GBP	50,000,000	19960123	USD	(78,400,000)
Total GBP			57,000,000			
ABC BANK	XYZ BANK	GRD	2,500,000,000	19960123	USD	(10,260,620)
Total GRD			2,500,000,000			
ABC BANK	XYZ BANK	USD	1,000,000	19960123	DEM	(1,478,900)
ABC BANK	XYZ BANK	USD	1,000,000	19960123	DEM	(1,478,600)
ABC BANK	XYZ BANK	USD	1,000,000	19960123	ZAR	(3,649,500)
ABC BANK	XYZ BANK	USD	2,000,000	19960123	DEM	(2,953,600)
ABC BANK	XYZ BANK	USD	2,000,000	19960123	DEM	(2,961,800)
ABC BANK	XYZ BANK	USD	3,000,000	19960123	CHF	(3,582,900)
ABC BANK	XYZ BANK	USD	5,000,000	19960123	DEM	(7,384,000)
ABC BANK	XYZ BANK	USD	5,000,000	19960123	DEM	(7,379,000)
ABC BANK	XYZ BANK	USD	5,000,000	19960123	DEM	(7,404,500)
ABC BANK	XYZ BANK	USD	5,000,000	19960123	JPY	(527,000,000)
ABC BANK	XYZ BANK	USD	5,000,000	19960123	JPY	(527,400,000)
ABC BANK	XYZ BANK	USD	7,000,000	19960123	DEM	(10,342,500)
ABC BANK	XYZ BANK	USD	8,322,050	19960123	GBP	(5,500,000)
ABC BANK	XYZ BANK	USD	10,000,000	19960123	DEM	(14,756,000)
ABC BANK	XYZ BANK	USD	10,000,000	19960123	JPY	(1,054,700,000)
ABC BANK	XYZ BANK	USD	15,000,000	19960123	DEM	(22,143,000)
ABC BANK	XYZ BANK	USD	20,000,000	19960123	DEM	(29,515,000)
ABC BANK	XYZ BANK	USD	30,000,000	19960123	JPY	(3,165,420,000)
ABC BANK	XYZ BANK	USD	50,000,000	19960123	DEM	(73,870,000)
Total USD			185,322,050			
ABC BANK	XYZ BANK	CHF	26,754,750	19960124	DEM	(33,000,000)
Total CHF			26,754,750			
ABC BANK	XYZ BANK	DEM	2,960,800	19960124	USD	(2,000,000)
ABC BANK	XYZ BANK	DEM	7,412,500	19960124	USD	(5,000,000)
ABC BANK	XYZ BANK	DEM	9,254,500	19960124	XEU	(5,000,000)
ABC BANK	XYZ BANK	DEM	14,832,000	19960124	USD	(10,000,000)
ABC BANK	XYZ BANK	DEM	75,000,000	19960124	USD	(52,155,772)
Total DEM			109,459,800			
ABC BANK	XYZ BANK	JPY	105,760,000	19960124	USD	(1,000,000)
ABC BANK	XYZ BANK	JPY	316,920,000	19960124	USD	(3,000,000)
ABC BANK	XYZ BANK	JPY	338,240,000	19960124	USD	(3,200,000)
ABC BANK	XYZ BANK	JPY	528,200,000	19960124	USD	(5,000,000)
ABC BANK	XYZ BANK	JPY	528,800,000	19960124	USD	(5,000,000)
ABC BANK	XYZ BANK	JPY	528,800,000	19960124	USD	(5,000,000)
ABC BANK	XYZ BANK	JPY	10,000,000,000	19960124	USD	(99,770,528)
ABC BANK	XYZ BANK	JPY	10,445,000,000	19960124	USD	(100,000,000)
Total JPY			22,791,720,000			
ABC BANK	XYZ BANK	USD	1,000,000	19960124	DEM	(1,482,300)
ABC BANK	XYZ BANK	USD	5,000,000	19960124	DEM	(7,411,500)
ABC BANK	XYZ BANK	USD	10,000,000	19960124	JPY	(1,057,300,000)
ABC BANK	XYZ BANK	USD	33,659,267	19960124	DEM	(50,000,000)
Total USD			49,659,267			
ABC BANK	XYZ BANK	ZAR	100,744,600	19960124	USD	(25,693,271)
Total ZAR			100,744,600			

<u>Bank</u>	<u>Counterparty</u>	<u>Sell</u>	<u>AMT2</u>	<u>VALUE</u>	<u>DATE</u>	<u>Buy</u>	<u>AMT1</u>
ABC BANK	XYZ BANK	DEM	(36,962,500)		19960122	USD	25,000,000
ABC BANK	XYZ BANK	DEM	(3,699,000)		19960122	XEU	2,000,000
Total DEM			(40,661,500)				
ABC BANK	XYZ BANK	GBP	(2,000,000)		19960122	USD	3,042,000
Total GBP			(2,000,000)				
ABC BANK	XYZ BANK	JPY	(1,053,000,000)		19960122	USD	10,000,000
ABC BANK	XYZ BANK	JPY	(526,550,000)		19960122	USD	5,000,000
ABC BANK	XYZ BANK	JPY	(526,550,000)		19960122	USD	5,000,000
ABC BANK	XYZ BANK	JPY	(526,400,000)		19960122	USD	5,000,000
ABC BANK	XYZ BANK	JPY	(526,300,000)		19960122	USD	5,000,000
ABC BANK	XYZ BANK	JPY	(315,690,000)		19960122	USD	3,000,000
Total JPY			(3,474,490,000)				
ABC BANK	XYZ BANK	USD	(75,700,000)		19960122	GBP	50,000,000
ABC BANK	XYZ BANK	USD	(75,000,000)		19960122	DEM	103,511,250
ABC BANK	XYZ BANK	USD	(64,815,000)		19960122	XEU	50,000,000
ABC BANK	XYZ BANK	USD	(64,815,000)		19960122	XEU	50,000,000
ABC BANK	XYZ BANK	USD	(10,000,000)		19960122	JPY	1,052,000,000
ABC BANK	XYZ BANK	USD	(7,611,500)		19960122	GBP	5,000,000
ABC BANK	XYZ BANK	USD	(7,607,500)		19960122	GBP	5,000,000
ABC BANK	XYZ BANK	USD	(7,607,500)		19960122	GBP	5,000,000
ABC BANK	XYZ BANK	USD	(7,000,000)		19960122	DEM	10,297,000
ABC BANK	XYZ BANK	USD	(7,000,000)		19960122	JPY	736,190,000
ABC BANK	XYZ BANK	USD	(5,000,000)		19960122	DEM	7,352,500
ABC BANK	XYZ BANK	USD	(5,000,000)		19960122	DEM	7,353,500
ABC BANK	XYZ BANK	USD	(5,000,000)		19960122	JPY	526,050,000
ABC BANK	XYZ BANK	USD	(4,571,100)		19960122	GBP	3,000,000
ABC BANK	XYZ BANK	USD	(3,043,600)		19960122	GBP	2,000,000
Total USD			(349,771,200)				
ABC BANK	XYZ BANK	XEU	(5,000,000)		19960122	DEM	9,256,000
ABC BANK	XYZ BANK	XEU	(5,000,000)		19960122	DEM	9,257,000
Total XEU			(10,000,000)				
ABC BANK	XYZ BANK	CHF	(3,582,900)		19960123	USD	3,000,000
Total CHF			(3,582,900)				
ABC BANK	XYZ BANK	DEM	(73,870,000)		19960123	USD	50,000,000
ABC BANK	XYZ BANK	DEM	(29,515,000)		19960123	USD	20,000,000
ABC BANK	XYZ BANK	DEM	(22,143,000)		19960123	USD	15,000,000
ABC BANK	XYZ BANK	DEM	(14,756,000)		19960123	USD	10,000,000
ABC BANK	XYZ BANK	DEM	(10,342,500)		19960123	USD	7,000,000
ABC BANK	XYZ BANK	DEM	(7,404,500)		19960123	USD	5,000,000
ABC BANK	XYZ BANK	DEM	(7,384,000)		19960123	USD	5,000,000
ABC BANK	XYZ BANK	DEM	(7,379,000)		19960123	USD	5,000,000
ABC BANK	XYZ BANK	DEM	(2,961,800)		19960123	USD	2,000,000
ABC BANK	XYZ BANK	DEM	(2,953,600)		19960123	USD	2,000,000
ABC BANK	XYZ BANK	DEM	(1,478,900)		19960123	USD	1,000,000
ABC BANK	XYZ BANK	DEM	(1,478,600)		19960123	USD	1,000,000
Total DEM			(181,666,900)				
ABC BANK	XYZ BANK	ESP	(168,460,000)		19960123	DEM	2,000,000
Total ESP			(168,460,000)				
ABC BANK	XYZ BANK	FRF	(30,750,300)		19960123	DEM	9,000,000
ABC BANK	XYZ BANK	FRF	(3,416,700)		19960123	DEM	1,000,000
Total FRF			(34,167,000)				
ABC BANK	XYZ BANK	GBP	(5,500,000)		19960123	USD	8,322,050
Total GBP			(5,500,000)				
ABC BANK	XYZ BANK	JPY	(3,165,420,000)		19960123	USD	30,000,000
ABC BANK	XYZ BANK	JPY	(1,054,700,000)		19960123	USD	10,000,000
ABC BANK	XYZ BANK	JPY	(527,400,000)		19960123	USD	5,000,000
ABC BANK	XYZ BANK	JPY	(527,000,000)		19960123	USD	5,000,000
Total JPY			(5,274,520,000)				
ABC BANK	XYZ BANK	USD	(90,000,000)		19960123	FRF	448,470,000
ABC BANK	XYZ BANK	USD	(78,400,000)		19960123	GBP	50,000,000
ABC BANK	XYZ BANK	USD	(50,000,000)		19960123	ESP	6,236,800,000
ABC BANK	XYZ BANK	USD	(50,000,000)		19960123	ESP	6,236,800,000
ABC BANK	XYZ BANK	USD	(10,260,620)		19960123	GRD	2,500,000,000
ABC BANK	XYZ BANK	USD	(10,000,000)		19960123	DEM	14,762,000
ABC BANK	XYZ BANK	USD	(10,000,000)		19960123	DEM	14,773,000
ABC BANK	XYZ BANK	USD	(7,565,500)		19960123	GBP	5,000,000
ABC BANK	XYZ BANK	USD	(5,000,000)		19960123	DEM	7,386,500
ABC BANK	XYZ BANK	USD	(3,027,600)		19960123	GBP	2,000,000
Total USD			(314,253,720)				
ABC BANK	XYZ BANK	ZAR	(3,649,500)		19960123	USD	1,000,000
Total ZAR			(3,649,500)				

ABC BANK	XYZ BANK	DEM	(50,000,000)	19960124	USD	33,659,267
ABC BANK	XYZ BANK	DEM	(33,000,000)	19960124	CHF	26,754,750
ABC BANK	XYZ BANK	DEM	(7,411,500)	19960124	USD	5,000,000
ABC BANK	XYZ BANK	DEM	(1,482,300)	19960124	USD	1,000,000
Total DEM			(91,893,800)			
ABC BANK	XYZ BANK	JPY	(1,057,300,000)	19960124	USD	10,000,000
Total JPY			(1,057,300,000)			
ABC BANK	XYZ BANK	USD	(100,000,000)	19960124	JPY	10,445,000,000
ABC BANK	XYZ BANK	USD	(99,770,528)	19960124	JPY	10,000,000,000
ABC BANK	XYZ BANK	USD	(52,155,772)	19960124	DEM	75,000,000
ABC BANK	XYZ BANK	USD	(25,693,271)	19960124	ZAR	100,744,600
ABC BANK	XYZ BANK	USD	(10,000,000)	19960124	DEM	14,832,000
ABC BANK	XYZ BANK	USD	(5,000,000)	19960124	DEM	7,412,500
ABC BANK	XYZ BANK	USD	(5,000,000)	19960124	JPY	528,200,000
ABC BANK	XYZ BANK	USD	(5,000,000)	19960124	JPY	528,800,000
ABC BANK	XYZ BANK	USD	(5,000,000)	19960124	JPY	528,800,000
ABC BANK	XYZ BANK	USD	(3,200,000)	19960124	JPY	338,240,000
ABC BANK	XYZ BANK	USD	(3,000,000)	19960124	JPY	316,920,000
ABC BANK	XYZ BANK	USD	(2,000,000)	19960124	DEM	2,960,800
ABC BANK	XYZ BANK	USD	(1,000,000)	19960124	JPY	105,760,000
Total USD			(316,819,571)			
ABC BANK	XYZ BANK	XEU	(5,000,000)	19960124	DEM	9,254,500
Total XEU			(5,000,000)			
NETTING BENEFIT						

VALUE DATE: 22/1/96

CURR	BUY AMOUNT	BUY \$EQUIV	SELL AMOUNT	SELL \$EQUIV	NET SETTLEMENT AMOUNT	NET \$EQUIV
JPY	2,314,240,000	\$ 22,000,000	(3,474,490,000)	\$ (33,000,000)	(1,160,250,000)	\$ (11,000,000)
USD	61,042,000	\$ 61,042,000	(349,771,200)	\$ (349,771,200)	(288,729,200)	\$ (288,729,200)
GBP	70,000,000	\$ 106,141,200	(2,000,000)	\$ (3,042,000)	68,000,000	\$ 103,099,200
XEU	102,000,000	\$ 132,140,000	(10,000,000)	\$ (12,605,000)	92,000,000	\$ 119,535,000
DEM	147,027,250	\$ 104,605,000	(40,661,500)	\$ (27,510,000)	106,365,750	\$ 77,095,000
		\$ 425,928,200		\$ (425,928,200)		\$ 299,729,200

VALUE DATE: 23/1/96

CURR	BUY AMOUNT	BUY \$EQUIV	SELL AMOUNT	SELL \$EQUIV	NET SETTLEMENT AMOUNT	NET \$EQUIV
JPY	2,500,000,000	\$ 10,260,620	(5,274,520,000)	\$ (50,000,000)	(2,774,520,000)	\$ (39,739,380)
DEM	48,921,500	\$ 33,163,265	(181,666,900)	\$ (123,000,000)	(132,745,400)	\$ (89,836,735)
USD	185,322,050	\$ 185,322,050	(314,253,720)	\$ (314,253,720)	(128,931,670)	\$ (128,931,670)
ZAR	-	\$ -	(3,649,500)	\$ (1,000,000)	(3,649,500)	\$ (1,000,000)
CHF	-	\$ -	(3,582,900)	\$ (3,000,000)	(3,582,900)	\$ (3,000,000)
GBP	57,000,000	\$ 88,993,100	(5,500,000)	\$ (8,322,050)	51,500,000	\$ 80,671,050
FRF	448,470,000	\$ 90,000,000	(34,167,000)	\$ (6,802,721)	414,303,000	\$ 83,197,279
ESP	12,473,600,000	\$ 100,000,000	(168,460,000)	\$ (1,360,544)	12,305,140,000	\$ 98,639,456
		\$ 507,739,035		\$ (507,739,035)		\$ 262,507,785

VALUE DATE: 24/1/96

CURR	BUY AMOUNT	BUY \$EQUIV	SELL AMOUNT	SELL \$EQUIV	NET SETTLEMENT AMOUNT	NET \$EQUIV
USD	49,659,267	\$ 49,659,267	(316,819,571)	\$ (316,819,571)	(267,160,303)	\$ (267,160,303)
XEU	-	\$ -	(5,000,000)	\$ (6,200,000)	(5,000,000)	\$ (6,200,000)
DEM	109,459,800	\$ 75,355,772	(91,893,800)	\$ (61,956,565)	17,566,000	\$ 13,399,207
CHF	26,754,750	\$ 22,297,297	-	\$ -	26,754,750	\$ 22,297,297
ZAR	100,744,600	\$ 25,693,271	-	\$ -	100,744,600	\$ 25,693,271
JPY	22,791,720,000	\$ 221,970,528	(1,057,300,000)	\$ (10,000,000)	21,734,420,000	\$ 211,970,528
		\$ 394,976,135		\$ (394,976,136)		\$ 273,360,303

Appendix B

Example of Netting by Novation:

Below are five FX contracts, entered into on two different trade dates. All FX contracts are for value October 10 (Amounts are in millions).

Trade Date 8 September

XYZ: Buys USD 5.00 from ABC and Sells CHF 5.99 to ABC.
XYZ: Buys JPY 1,000.00 from ABC and Sells USD 8.93 to ABC.
XYZ: Buys DEM 5.00 from ABC and Sells USD 3.42 to ABC.

Trade Date 6 October

XYZ: Buys USD 5.00 from ABC and Sells JPY 565.00 to ABC.
XYZ: Buys USD 5.00 from ABC and Sells DEM 7.20 to ABC.

The novation netting methodology and calculations are as follows:

Running Account Netting Calculation

	USD	CHF	JPY	DEM
	+5.00	-5.99		
	-8.93		+1000.00	
End of day 9/8	<u>-3.42</u>	<u> </u>	<u> </u>	<u>+5.00</u>
	-7.35	-5.99	+1000.00	+5.00
	+5.00		-565.00	
End of day 10/6	<u>+5.00</u>	<u> </u>	<u> </u>	<u>-7.20</u>
	+2.65	-5.99	+435.00	-2.20

By the end of day on September 8, the three original contracts no longer exist, but have been replaced by a single contract consisting of a net payment in each currency for settlement October 10. XYZ will have an obligation to pay USD 7.35 million and CHF 5.99 million. ABC will have an obligation to pay JPY 1 billion and DEM 5 million.

On October 6, the two FX contracts entered into on that date have been netted against the payment obligations calculated for the end of day on September 8.

The previous payment obligations are canceled as are the individual contracts done on October 6 and replaced with the obligations for XYZ to pay CHF 5.99 million and DEM 2.20 million and for ABC to pay USD 2.65 million and JPY 435 million. Assuming that no further FX contracts will be done for value October 10, these are the only payment obligations between the parties with respect to the five original trades.

In the absence of novation netting, XYZ would have settlement exposure to ABC of an equivalent of USD 27.46 million on October 10 (assuming a USD conversion rate of 1.45 for DEM and 111.00 for JPY). With novation netting, XYZ has reduced the amount due from ABC to the equivalent of USD 6.57 million (USD 2.65 million plus the USD equivalent of JPY 435 million).

XYZ has reduced settlement risk for 10 October by the equivalent of USD 20.89 million or 76 percent. In addition, total cash flows between ABC and XYZ have been reduced from the equivalent of USD 59.84 million to USD 18.07 million and the number of payments required of each party has been reduced from 5 to 2.

Appendix C

Netting+

Pilots tests were conducted in Mid-1996 by several major FX dealers, of the use of "tom-next"¹³ swaps to further reduce bilateral settlement exposure. This mechanism, which has been given the name "Netting+" has generated considerable interest among foreign exchange dealers.

Netting+ calls for counterparties, on the day before value date, to enter into a set of tom/next swaps to offset each bilaterally netted non-USD cash flow due on value date, thus eliminating delivery of any non-USD amounts.¹⁴ The residual amount to be settled will be a single net USD amount equal to the net profit or loss on all transactions being settled via Netting+. The 'next' part of the tom/next swaps is done in order to offset the market positions created by the 'tom' sides of the swaps. Payment obligations arising from the 'next' part of the swaps will be aggregated and netted against any other payment obligations arising for the same value date and will in turn be offset by another set of tom/next swaps. Netting+ excludes regularly traded 'tom' deals as these are usually done for funding purposes and thus require delivery.

Example: At cutoff time on Dec. 1, two Netting+ counterparties determine that on Dec. 2, Party A owes DEM 500 to Party B, and Party B owes USD 322 to Party A. Netting + will require the execution of a tom/next swap between the parties under which Party A buys DEM 500 from Party B for USD for value Dec. 2, and sells DEM 500 to Party B for USD for value Dec. 3 at current market rates. The DEM cash flows for Dec. 2 are netted down to zero (no DEM delivery) and the residual USD cash flow remains to be paid by one party to the other. (If for example, the Dec. 2 leg of the tom/next swap was done at 1.5625: i.e. for USD 320, Party B will pay Party A 2.) Payments related to the 'next' part of the tom/next swap are combined with all other cash flows due Dec. 3. These combined cash flows will in turn be offset by a new set of tom/next swaps, and so on.

Prior to entering into tom/next swaps done for Netting+ purposes, the counterparties must agree a source and time for setting the rates to be used, a cut-off time for calculating the amounts to be swapped, and the currencies to be settled via Netting+. (Currencies that are infrequently traded are not appropriate for the Netting+ settlement mechanism.) The details of a Netting+ arrangement may be documented as an amendment to a master agreement or may be agreed by an operational letter agreement. Because it is possible for the size of a Netting+ swap to increase over time, it may also be desirable to agree a maximum limit which if reached, will cause the parties to close out all, or a portion of, the swap.

Netting+ appears to be a particularly attractive means to eliminate settlement risk because it requires no capital investment, collateral, counterparty substitution, third party agent or membership criteria. It may be done manually or in an automated

¹³ In a "Tom-Next" swap, the first leg of the transaction settles tomorrow and the second leg on the next following day.

¹⁴ In principle, two parties can agree to any base currency but in practice they may not be able to find liquid cross-reference rates.

environment.

Appendix D

Example of Multilateral Netting

The following three trades were executed between banks A, B and C, all to settle on the same value date (all amounts are in US dollar equivalent).

- 1 Bank A buys DEM 100, sells USD 99 with Bank B
- 2 Bank A sells DEM 85, buys USD 85 with Bank C
- 3 Bank B buys DEM 75, sells USD 74 with Bank C

The effect on each Bank's positions is shown by the table below:

Trades & Positions	Bank A		Bank B		Bank C	
	DEM	USD	DEM	USD	DEM	USD
Example Trades						
1	100.0	(99.0)	(100.0)	99.0		
2	(85.0)	85.0			85.0	(85.0)
3			75.0	(74.0)	(75.0)	74.0
Notional Bilateral Positions						
vs. Counterparty						
Bank A			(100.0)	99.0	85.0	(85.0)
Bank B	100.0	(99.0)			(75.0)	74.0
Bank C	(85.0)	85.0	75.0	(74.0)		
Multilateral Positions	15.0	(14.0)	(25.0)	25.0	10.0	(11.0)

In this example, each bank does one trade with each of its counterparties. Therefore the notional bilateral positions that would have existed under a bilateral netting arrangement are identical to the gross positions.

However, because multilateral netting allows banks to net across all of their counterparties, the resulting positions that have to be settled are lower. In this example, the total payments that all the banks would make under bilateral netting is USD 518. Under multilateral netting this figure is reduced to USD 50.

Appendix E

Close-out Netting

Close-out netting serves as a credit risk management tool in the event of default by a party to a trading arrangement. Should one party under a bilateral master netting agreement default in a payment or other performance obligation or becomes bankrupt, the non-defaulting party has the legal right to liquidate and set off all outstanding transactions between the parties in accordance with agreed upon close-out terms and timing and pricing methodology. Close-out methodology generally mandates calculating the replacement value of each outstanding transaction by the non-defaulting party, converting those amounts into a single currency pre-selected by the non-defaulting party, and netting the amounts calculated as due by one party against the amounts calculated as due by the other party to determine a single net amount due by one party to the other. Close-out netting is effected on a global basis to the extent legally enforceable in relevant jurisdictions.

Close-out netting provisions are standard in such commonly used master agreements as the ISDA Master Agreement and the IFEMA. These agreements have gained in popularity among foreign exchange market participants, particularly because of the regulatory relief that the close-out provisions provide and the recognition of netting benefits for financial reporting and the calculation of capital requirements.

Close-Out Netting Example

Four foreign exchange contracts have been transacted between ABC Bank and XYZ Bank and are covered under a master agreement that provides for close-out netting.

Contract 1

ABC sells US \$5 million to XYZ
ABC buys DEM 7.303 million from XYZ
Value Date: September 5
Rate: 1.4606

Contract 2

ABC sells JPY 1 billion to XYZ
ABC buys US \$10,277,492 from XYZ
Value Date: September 18
Rate: 97.3

Contract 3

ABC sells US \$5 million to XYZ
ABC buys CHF 5,990,000 from XYZ
Value Date: October 3
Rate: 1.1980

Contract 4

ABC sells GBP 5 million to XYZ
ABC buys US \$7,763,000 from XYZ
Value Date: October 6
Rate: 1.5526

Assume that XYZ defaults on September 3, before any of these contracts mature. According to the close-out provisions contained in the master agreement, ABC (or a defined calculation agent) can calculate the replacement value of each of the FX contracts it has outstanding with XYZ, convert such amounts into its (pre-agreed) base currency and then aggregate and net such amounts against each other to arrive at a single net payment amount owing by one party. The sole remaining obligation between the parties under the agreements and the FX contracts is the payment by the party owing the net amount.

The replacement value for each contract is defined as the amount that would have to be paid to enter into a contract having the same economic value as the original contract.

ABC has to enter into contracts that are equal and offsetting to the original contracts for the same value dates as the original contracts:

Contract 1

Assuming DEM has appreciated against the USD to 1.43, ABC will need to sell DEM 7,150,000 to buy back USD 5 million.

DEM 7,303,000
- 7,150,000
DEM 153,000/1.43 = USD 106,993

Contract 2

Assuming JPY has appreciated against the USD to 96.5, ABC will now need to sell USD 10,362,694 to buy back JPY 1 billion.

USD 10,277,492
- 10,362,694
USD -85,202

Contract 3

Assuming CHF has appreciated against the USD to 1.17, ABC will now need to sell CHF 5,850,000 to buy back USD 5 million.

CHF 5,990,000
- 5,850,000
CHF 140,000/1.17 = USD 119,658

Contract 4

Assuming GBP has appreciated against the USD to 1.57, ABC will now need to sell USD 7,850,000 to buy back GBP 5 million.

USD 7,763,000
- 7,850,000
USD -87,000

In order to arrive at the replacement value of each contract, the amounts calculated above are then discounted to present value (assuming a discount rate of 6 percent for this example). The net positive and negative replacement values are netted to a single net close-out amount due to ABC from XYZ.

Contract 1 +106,957
Contract 2 -84,989
Contract 3 +119,062
Contract 4 -86,524
USD +54,506

Giving effect to close-out netting, ABC Bank has only USD 54,506 in credit risk to XYZ

Bank at the time of default. Close-out netting has reduced ABC's credit exposure to XYZ at the time of default by USD 171,513. Without the benefit close-out netting, ABC would have USD 226,020 at risk (the sum of the contracts yielding ABC a profit after close-out).

Appendix F

S.W.I.F.T. Accord

Scope

Accord is a centralized confirmation matching and bilateral netting service for foreign exchange, money market, and derivative confirmations.

Description

Message Copying and Central Database

Accord's matching and netting processes are based on the exchange of S.W.I.F.T. confirmation messages between counterparties. Confirmation messages (both sent and received) are copied to Accord automatically and directly from the S.W.I.F.T. network. Upon receipt, Accord validates each incoming message and maintains it on file for future reference. Processing appropriate to the confirmation's function code is performed before an attempt is made to match it. Confirmations are copied, validated and processed only if the sender and/or the receiver are Accord subscribers. Subscribers receive complete reporting on the results of matching their confirmations. Non-subscribers do not receive reports from Accord.

Matching Functionality

Confirmations are classified as matched if their contents follow the message-specific matching criteria in Accord. Confirmations are classified as mismatched if they nearly, but don't quite, match. Confirmations for which corresponding confirmations cannot be found are classified as unmatched. The matching status of confirmation messages is continuously updated in Accord as new confirmations are copied into the centralized database.

Accord Reports

All information related to the matching status of confirmation is reported to subscribers through the use of a proprietary message. Netting statements and cut-off reports are similarly sent to subscribers over the S.W.I.F.T. network.

Additional Features

Reporting – Accord reporting times are customized by the subscriber. Reports can be scheduled to arrive immediately, hourly, daily, or upon request (or any combination of these frequencies).

Matching Settlement Database – Accord keeps a database of matching settlement instruction information that allows previously mismatched items to be treated (in the future) as matched.

Confirmation Status Update – Accord provides a status update capability for mismatched items so that subscribers can tell Accord to either “match” or “unmatch” items. This feature also helps increase subscriber match ratios.

AccordWorkstation

The centralized functionality of Accord is paired with a local workstation that presents Accord reports in a local database environment that runs on a PC. AccordWorkstation allows subscribers to import all their Accord matching and netting reports and view them on-screen. The AccordWorkstation contains local pairing functionality and search facilities to facilitate investigation and exception handling.

Accord Netting

Accord provides bilateral advisory netting information to subscribers. Details of netted transactions and final closing balances are provided by counterparty and by currency at the agreed upon cut-off time. If both counterparties to a transaction are Accord Netting subscribers, they both receive the exact same information regarding netted transactions and closing balances at the same time each day. Accord also allows one-sided reporting if a single counterparty would like to evaluate the benefits of netting as a preparation or test for full bilateral netting with their counterparties.

Performance

Accord currently runs on a fault-tolerant system and is available twenty-four hours a day, seven days a week. Accord has complete system and database redundancy which would allow recoverability of database information in case of hardware failure as well as site recoverability in case of disaster. Subscribers receive near real-time information on the matching/netting status of all their confirmations and have query capabilities that allow complete re-synchronization of their local database.

Status

Accord, which has been operational since 1990, currently has 420 Accord Matching subscribers in 52 countries and 29 Accord Netting subscribers in 10 countries. Daily processing volume in Accord now averages 140,000 transactions per day.

Appendix G

FXNET

FXNET, Ltd. was formed in 1986 by a consortium of twelve U.S., British and European banks. The FXNET System, which went live in 1987, is a bilateral foreign exchange novation netting system. It is managed by EBS Dealing Resources, Inc., which provides technical support, customer service and management of the private telecommunications network.

The FXNET application allows for foreign exchange transactions (both spot and forward) between pairs of bank branches connected to the service (within a single jurisdiction and cross-border), to be matched, confirmed and netted at the time the deal is executed (using MT300 format messages). Net payment messages (which have also been matched and confirmed for amount, deal numbers and settlement instructions) are automatically produced for each currency and for each counterparty to effect timely settlement of all payment obligations. The payment messages are also in S.W.I.F.T. format (MT202 and MT210 representing message-pay and receive, respectively).

Trade capture is via an electronic bank interface; however, manual deal input is an option. Deals are transmitted into the FXNET application, normally real-time, creating an initial deal status. After a series of automated message exchanges between counterparties, the deal reaches a "matched and confirmed" status and resides in the database until payment time.

At a specified time before value date (the cut-off time), FXNET confirms the net amount due or owed and sends the appropriate payment or receipt message in SWIFT message format (MT202, MT 210). In other words, FXNET provides two levels of confirmation: real-time on deal date, to confirm individual trade details; and just prior to value date, to confirm net payment amounts and delivery instructions.

Communications between counterparties are transmitted over a secure distributed network.

As of October 1996, FXNET had 57 live users and an additional 35 signed and in the process of going live. This total of 92 customers includes 36 institutions and their branches, located in 13 cities worldwide.

Appendix H

Exchange Clearing House (ECHO)

ECHO is an inter-bank multilateral foreign exchange netting system that nets a user's forward positions and settlements in a currency, even if they are due to different counterparties.

ECHO obtained regulatory approval and commenced live operation on August 18, 1995 netting eleven major currencies: AUD, BEF, CHF, DEM, FRF, GBP, HKD, ITL, NLG, SEK, and USD. ECHO presently nets thirteen currencies and intends to net at least twenty currencies by the end of 1997. To date, fourteen banks are using ECHO's multilateral netting system, and ten more have expressed in writing their intent to use the system. Each user must be a bank or regulated investment bank incorporated in an authorized jurisdiction with a credit rating of at least BBB+.

The ECHO Business Day

Contract Initiation and Confirmation

Foreign exchange trades are made in the normal way. ECHO accepts valid trades between ECHO users in eligible currencies up to two years forward. Trades must be confirmed within two hours by standard S.W.I.F.T. MT300 confirmation messages across the S.W.I.F.T. network. The messages are copied automatically to the S.W.I.F.T. Accord system, which matches the foreign exchange confirmations. Accord advises users of the matching and passes trades to ECHO for netting the settlement.

Cut-off Times

ECHO continually nets any new contracts with other trades for each of the users in rolling accounts to give net positions for each currency and value date. The first netting cut-off time is at 23.00 CET two days before the value date. There are two more cut-off times, at 6.30 CET and 12.30 CET on the day before value date. (The ECHO board approved the shift of the final cut-off time from 11:30 CET to 12:30 CET effective November 4, 1996, with a view to making the cut-off time still later). No further trades are accepted after the final cut-off for value the next business day.

Calculation of Settlements and Margin

At the final cut-off, ECHO calculates and reports to each user:

- the multilateral settlements between ECHO and each user for value the next ECHO business day. This is calculated as one amount per user per currency across all the user's participating offices;
- the exposures each user gives to ECHO and the exposures each takes on its counterparties.

The Settlement Process

In addition to conducting multilateral netting, ECHO also performs the settlement process for its users. ECHO direct debits a user's account when funds are due to be paid to the Clearing House. ECHO also initiates the instruction to pay where a user is due to receive from the Clearing House. The timing of the release of these instructions has been set to ensure that ECHO does not release irrevocable instructions to pay users until funds received on the previous day have been confirmed as final, that is, a maximum of one day's settlement risk.

Settlements Monitoring

ECHO monitors receipt of funds throughout its twenty-four-hour operation. ECHO Nostro agents provide intra-day advice of credits to ECHO's accounts. To ensure that ECHO has sufficient time to generate replacement liquidity when there is a failure to make a payment, ECHO has set two deadlines in each currency for the receipt of funds. At the first deadline ECHO begins to investigate any missing payment with ECHO's Nostro agent, the user's Nostro agent and as appropriate, the user, to determine its status. If it has not been received by the final deadline, ECHO assumes that the payment will not be made and generates replacement liquidity for the Clearing House in the relevant currency.

ECHO operates a three-time-zone PVP approach. The effect is that if a user fails to pay in Far-East currencies, ECHO can withhold payments to the user in European or North American currencies. If a user fails to pay in European currencies, ECHO can withhold payments to the user in North American currencies.

However, to avoid causing unnecessary systemic problems, ECHO does not withhold payments if the failure to pay is for purely technical reasons.

ECHO's Risk Management

Collateral and Liquidity Management

ECHO maintains sufficient stand-by liquidity to cover the settlement failure of the largest user paying to ECHO on any given day. Local currency liquidity is generated using committed same-day foreign exchange swaps facilities traded against U.S. dollars. This transfers any liquidity requirements into U.S. dollars where ECHO has committed collateralized borrowing facilities.

The total value of the collateral available to ECHO is U.S. \$778 million. The collateral that has been provided to ECHO is composed of two elements:

- an asset pool of U.S. Treasury bills, lodged by each user with ECHO's custodian in New York, to a value of 2.5 percent of their respective direct exposure limits;
- additional collateral provided by the shareholders under a committed standby facility.

Limits

A major part of ECHO's approach to managing risk is the proactive management of each user's exposures by means of a set of prudential limits. These are free trading limits under which ECHO does not require full collateralization of exposures. When exposures exceed limits, ECHO will call margin for the full amount of the excess.

There are Four Limits:

1. The Direct Exposure Limit

ECHO's direct exposure limit is applied to the total risk a user gives to the Clearing House, that is, for each user the sum of all payments due to the Clearing House plus any volatility-adjusted forward book loss. A user's direct exposure limit is calculated as a percentage of that user's Tier 1 capital. The percentage varies according to a user's long-term debt rating (see attached table). The direct exposure limit for any user is subject to an absolute cap, initially set at USD 700 million. This enables ECHO to fund the default of its largest user through use of the standby liquidity facilities mentioned above.

In addition to the limit on overall exposure, there is a sub-limit (direct NPV sub-limit) that restricts the amount of forward book loss a user may have uncollateralized within ECHO.

2. Indirect Exposure Limit

To ensure that a user does not build up too great an exposure to a single counterparty, limits will be placed on its indirect exposure (that is, the contribution it might have to pay in the event of the failure of its single largest counterparty). This limit is based on the Tier 1 capital and credit rating of the user taking the risk, not of the notional counterparty (see attached table). An absolute cap of USD 875 million is established for the indirect exposure limit.

3. Currency Liquidity Limits

Currency liquidity limits (set for each currency individually) restrict the amount a user may be due to pay in a particular currency on a given day. The restriction is a local currency amount, irrespective of the size of the user, and is related to the availability of liquidity to ECHO in that currency.

Loss Allocation

ECHO's approach to loss allocation is based on the credit risk discipline normally practiced by trading banks. The methodology used combines several principles. The "defaulter pays" approach is observed to the extent that losses are covered first by the collateral and margin lodged by a defaulting user.

A user does not, however, fully collateralize its position. Remaining losses are shared on a variation of the “survivor pays” principle, but only amongst those users trading with the defaulting user. Normal in-house credit risk disciplines are, therefore, still applied to the selection of trading counterparties.

Upon the default of a user, ECHO realizes the defaulting user’s asset pool and (if applicable) its margin. These funds, less administrative costs, are offset against losses. Any net loss remaining is then shared amongst the concerned users. The losses on unmatured contracts (forward book) is shared separately from settlement losses.

Forward Book Allocation

Where the defaulting User has made an overall loss on its unmatured trades with ECHO, the loss is allocated to those concerned users that have a profit on their outstanding trades with the defaulting user. The loss is allocated pro rata to the level of these profits.

Settlement Loss Allocation

ECHO allocates the net loss to those users that had dealt with the defaulting user for the value day of the loss. Settlement losses are allocated pro rata to the concerned users that were notionally due to receive from the defaulting user.

Legal Structure

The Clearing House’s netting structure operates under English law. ECHO has obtained recognition of its legal status under Part VII of the Companies Act of 1989.

“Open Offer”

Under this arrangement, ECHO makes an Open Offer to users to enter into eligible foreign exchange contracts, and this Offer is accepted by users entering into eligible transactions with the Clearing House. In other words, the contract is accepted by conduct and does not require any immediate communication with ECHO. There is no requirement for any subsequent novation procedure.

Regulatory Supervision

The Bank of England as the banking regulator in the United Kingdom is the lead overseer of ECHO. The central banks and other relevant authorities in other countries are also involved in the oversight of ECHO as the supervisors of banks or payment systems that ECHO uses.

Analysis of ECHO’s Limits

Credit Rating	Direct Exposure Limit	Indirect Exposure Limit
AAA	35 %	15%
AA+ to AA-	30 %	12.5%
A+ to A-	25 %	10 %
BBB+	20 %	7.5 %

Appendix I

Multinet International Bank

Background

Eight North American banks, together with International Clearing Systems, Inc., have formed Multinet International Bank as a clearinghouse for foreign exchange transactions. The Founding banks and International Clearing Systems ("ICSI," a wholly owned subsidiary of the Options Clearing Corporation or "OCC") have cooperated since 1987 in the development of Multinet's risk design, systems and operations. Since September 1992, the Founding Banks and other financial institutions have netted foreign exchange transactions on a bilateral basis in more than forty currencies through the deal matching, confirmation, netting and risk management system that Multinet will use for purposes of multilateral netting.

Through a recent agreement made with FXNET, Multinet plans to make its service available to FXNET users for further multilateral netting of amounts bilaterally netted through FXNET.

Organizational and Legal Structure

Multinet is chartered in New York as a limited-purpose trust company and is a member of the Federal Reserve System. As a consequence, Multinet:

- is subject to direct supervision by the Federal Reserve and the New York State Banking Department;
- may hold U.S. dollar-denominated cash and U.S. Treasury securities that are pledged to Multinet by its participants in book-entry accounts at the Federal Reserve Bank of New York (similar arrangements will be sought in other jurisdictions as other currencies and OECD government securities become eligible for use as collateral).

Multinet becomes the substituted counterparty to a matched deal that is submitted for multilateral netting only after determining that acceptance of the deal would not cause risk limits to be exceeded. Once a deal is accepted, the original bilateral contract between the counterparties is automatically discharged and replaced, by the legal process known as "novation," with separate contractual obligations between Multinet and each of the counterparties. The effect is:

- risk reductions are achieved on a multilateral basis; but
- close-out and netting operates bilaterally (between Multinet and its participants).

Multinet initially will be owned by the Founding Banks or their affiliates. Financial institutions, initially all banks, that meet certain membership criteria and that are active in the inter-bank foreign exchange markets are eligible for admission as participants in the clearinghouse. Multinet's affairs will be governed by its Board of Directors, which will include representatives of the Founding Banks, other Multinet participants and

representatives of ICSI and OCC. Under Multinet's by-laws, the Board will act through Executive, Risk Management, Audit and Membership Committees.

Risk Design and Collateral Requirements

Multinet will reject deals that would, if accepted, cause a participant to exceed pre-established risk limits. As a result:

- Multinet is able to identify, measure and control the risks that it assumes by recognizing the risks involved in becoming the substituted counterparty to accepted transactions before substitution occurs;
- normally, rejected deals will remain bilateral obligations and the counterparties' "trading position" will not be affected.

Multinet participants may choose whether or not to submit forward transactions for replacement cost netting. Participants that choose not to submit forward transactions:

- can utilize Multinet to obtain the benefits of multilateral settlement netting, as well as the benefits of Multinet's delivery versus payment procedures; and
- will not be subject to loss allocations with respect to losses resulting from the close-out of forward cash flows. Such losses will be allocated only to those participants that choose to net on a forward basis with the defaulter and that would have had forward exposure on a bilateral basis to the defaulter.

Multinet requires all participants that choose to submit deals for forward (replacement cost) netting to collateralize 100 percent of the mark-to-market risk, as well as a five-day volatility factor.

Collateral efficiency is achieved by:

- calculating, based upon simulation data, the number and value of settlements that can be supported by a given amount of standing collateral;
- withholding payments, where feasible, from participants that do not meet their settlement obligations on a timely basis and using such funds to collateralize loans needed to permit Multinet to complete its settlements with other participants; and
- requiring participants to separately collateralize settlements that are not supported by standing collateral or funds that can be withheld from them if they do not meet their settlement obligations on a timely basis.

Operations

Multinet allows deal input by means of S.W.I.F.T. , host-to-host links or proprietary batch input. These communications links have proved reliable over three years of operations on a bilateral basis. In addition:

- all systems functionality -- from deal processing and risk evaluation through the calculation of collateral requirements, allocation exposure, and settlement obligations -- is provided by a single, centralized system operated by a single facilities manager; and
- all system components, including hardware, communications links, and software, are fully redundant, permitting the clearinghouse to continue processing at a back-up location in the event of a business interruption at the primary site.

Appendix J

Regulatory and Financial Reporting

Since 1994 a growing number of countries have agreed to recognize the reporting of net amounts (instead of gross amounts) of exposure under close-out netting contracts for purposes of calculating regulatory capital requirements and on financial statements, in each case solely where specific criteria have been met. As a result of recent regulatory developments, banks in the United States are now required to report various derivative product-related transactions, including foreign exchange spot and forward transactions, on their balance sheets. To qualify for such recognition and achieve netting benefits for regulatory and financial reporting, firms must ensure that all documentary, capital and risk oversight requirements are met in all relevant jurisdictions.

Amendment to Capital Accord

On July 15, 1994, the BIS announced the adoption of an amendment to the Capital Accord (the “Amendment”), that broadened the recognition of close-out netting of credit risks in certain financial instruments for purposes of bank capital regulations in the Group of Ten countries. The criteria for recognizing the benefits of close-out netting for the purpose of calculating capital requirements include, *inter alia*, (i) that transactions must be governed by a “valid” master netting agreement; (ii) that agreements containing “walkaway” clauses (allowing the non-defaulting party to retain amounts owing to the defaulting party in a close-out situation) will not be eligible for netting; (iii) that a bank has procedures in place for ongoing monitoring of its netting arrangements; and (iv) that a bank has obtained reasoned legal opinions that the close-out netting provisions of a master netting agreement would be enforceable in insolvency in each “relevant jurisdiction” under that master agreement.

When a counterparty transacts through multiple branches designated in the agreement (a “multi-branch party”), the Amendment mandates the obtaining of opinions referred to in (iv) above from each jurisdiction where a branch of that multi branch party has entered into one or more transactions. Each local supervisor must be satisfied as to the enforceability in insolvency of netting or the recognition of netting will be disallowed for both counterparties. Several industry groups (most significantly ISDA and the IFEMA sponsors) have obtained, and are continuing to obtain, appropriate legal opinions on their respective agreement forms as to the enforceability of close-out netting in insolvency and the multi branch issues as set forth in the Amendment.

The Amendment requires banking regulators in each of the Group of Ten countries to implement various aspects of close-out netting for capital purposes. In the United States for example, the Board of Governors of the Federal Reserve System published on December 2, 1994 Amendments to its Risk-Based Guidelines with regard to the Treatment of Derivatives Contracts (the “Guidelines”) implementing the expanded recognition of close-out netting. The Guidelines, like the Amendment, place the primary burden on banks to demonstrate to their local supervisors the legal enforceability of netting arrangements and compliance with other criteria.

Financial Reporting Changes in the United States

FASB Interpretation No. 39 “Offsetting of Amounts Related to Certain Contracts” issued

in March 1992 (interpreting FASB Statement No. 105, "Disclosure of Information about Financial Instruments with Off-Balance Sheet Risk and Financial Instruments with Concentration of Credit Risk") addresses the right of set-off in certain financial instruments under master netting contracts. When the criteria of FIN 39 are met, a reporting entity is permitted to report a net amount only under such contracts in its statement of financial position for all required financial statements issued after December 15, 1993.

Appendix K

Survey Questions

As a logical next step in the Risk Management Subcommittee's study and paper as detailed in the paper entitled Reducing Foreign Exchange Settlement Risk, the Subcommittee is undertaking a more focused study of settlement netting practices. (By settlement netting, is meant the actual physical netting of foreign exchange payments between counterparties). It is the Subcommittee's objective to produce a paper outlining the tasks involved in the implementation of settlement netting schemes. As a starting point we have designed this survey so that we may assess how and to what extent settlement netting is practiced in the foreign exchange markets. Please complete this survey and return it by _____, 199_.

1. Do you net foreign exchange settlements? yes no

2. If no, do you anticipate netting foreign exchange settlements within the next six months? (please go directly to question 7. and complete the survey) yes no

3. a If you do net foreign exchange settlements, by how much does netting reduce your total daily settlement volume (U.S. dollar terms) _____ percent

b. How do you net? (indicate percentage of netting accomplished through each method if more than one is used)

Manually Bilateral netting service (FXNET, S.W.I.F.T. Accord) Multilateral netting service (ECHO, Multinet)

In-house systems Other (please specify)_____

4. With what percentage of your counterparties do you net? _____ percent

5. Within the next six months do you plan to increase the number of counterparties with which you settlement net foreign exchange transactions? yes no

6. Rank by frequency the major obstacles encountered to agreeing settlement netting arrangements with your counterparties (5 being most frequently encountered, 1 being least)

Counterparty unable to net settlements
 Counterparty unwilling
 Counterparty could/would not net cross-border
 Counterparty did not perceive settlement netting to be cost-effective

- Differences on documentation could not be reconciled
- Differences on operational details could not be reconciled
- Existing netting systems incompatible
- Netting is not legally supported in the jurisdiction of the counterparty
- Other (please describe)_____

7. Rank by order of importance, the major impediments found within your own organization to effecting settlement netting with your counterparties (five being most significant impediment, 1 being least).

- Existing systems cannot net settlements
- Internal cost/benefit analysis does not justify extensive systems revisions
- Cost benefit analysis does not justify subscription to a netting service
- Firm can/will not net cross-border
- Settlement netting not legally supported in jurisdictions in which we operate
- Reduction of settlement risk not considered a high priority at this time
- Other (please describe)_____

8. Have you signed netting agreements (such as ISDA, IFEMA, etc.)? yes no

9. What is your primary purpose for signing netting agreements?

- | | | |
|---|--|--|
| <input type="checkbox"/> Close-out netting | <input type="checkbox"/> Reduction of settlement volumes | <input type="checkbox"/> Reduction of credit exposures |
| <input type="checkbox"/> FASB Balance sheet reporting | <input type="checkbox"/> Risk-based capital | <input type="checkbox"/> Other (please specify)_____ |

10. How important is settlement netting as a means to reducing settlement risk considered in your organization?

- very important somewhat important not important don't know

Additional comments_____

X. Risk Management Subcommittee

This Foreign Exchange Committee report was prepared by the Risk Management Subcommittee, chaired by Paul Kimball from Morgan Stanley & Co. and Lewis W. Teel from Bank of America. The following members of the Subcommittee provided invaluable support for this project:

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