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Dear Foreign Exchange Professional:

As part of our continuing effort to monitor developments affecting market structure, enclosed please find a copy of the Foreign Exchange Committee's *Survey Assessing the Impact of Electronic Broking on the Foreign Exchange Market.* The Committee envisions this paper as the first in a series of publications that will address the ongoing effects of technology on the marketplace.

This survey evaluates the impact of electronic broking on market structure, particularly the effect on interbank spreads, market liquidity, price transparency, and interbank cost structure. It also considers the implications of electronic broking as a source of competition for voice brokers, the impact on potential industry consolidation, and the affect on risk management practices. The survey also highlights an ongoing need to establish standard market practices and ethics related to electronic trading; the Committee intends to address this subject as part of its next revision to *Guidelines for Foreign Exchange Trading Activities*, last published in January 1996.

Also attached is a copy of the Committee's Document of Organization and a list of its 1997 membership. Please do not hesitate to contact me or other members of the Committee with questions or comments regarding the Committee's work. Copies of this paper and the Committee's other publications may be viewed online or downloaded for later viewing from the Federal Reserve Bank of New York's world wide web site at *www.ny.frb.org/fxc/fxc.html*.

Sincerely yours,

John J. Finigan, Jr.
Chairman

Enclosures (3)

# A SURVEY

# ASSESSING THE IMPACT OF ELECTRONIC BROKING

# ON THE FOREIGN EXCHANGE MARKET

**The New York Foreign Exchange Committee**

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## I. INTRODUCTION

One of the most significant developments to affect the foreign exchange market in recent years has been the growth of electronic broking. Since its introduction in 1992, electronic broking has helped accelerate the pace of change in the industry, and its increasing market penetration has important ramifications for the future structure of the market. This paper reviews and assesses the recent impact of electronic broking on foreign exchange trading. The Foreign Exchange Committee envisions it as the first in a series of publications that will address the ongoing effects of technology on the marketplace. While the paper discusses specific technologies and/or products, such discussion indicates no endorsement of any particular technology or product. Likewise, although the paper makes observations about recent market developments brought about by electronic broking, it expresses no view on the desirability of those developments.

In order to gather empirical data on electronic broking, Committee members completed a survey on their use of these systems. The survey was augmented by conversations with a small group of chief dealers. Based on the survey and the ensuing conversations, this paper evaluates the impact of electronic broking on market structure, particularly the effect on interbank spreads, market liquidity, price transparency, and interbank cost structures. It also considers the implications of electronic broking as a source of competition for the voice brokers, as well as its impact on potential industry consolidation. Finally, the study addresses electronic broking's potential implications for risk-management practices.

## II. OVERVIEW OF SURVEY RESULTS

The survey addressed the use and reliability of electronic broking systems, the effects of electronic trading on market structure, and future prospects. It was completed by the members of the Committee: representatives of money center banks, foreign banks, regional banks, and investment banks. A list of participating institutions can be found in appendix A; the survey results can be found in appendix B.

All of the survey respondents subscribe to Reuters Dealing 2002-2 and/or EBS. The number of electronic terminals they used varied widely, but averaged thirty stations per institution at the time of the survey (many firms indicated that over the following eighteen months they planned to install additional terminals). The volume of transactions conducted via electronic systems averaged 40 percent of total brokered transactions, although in terms of total notional value the volume averaged only 33 percent. This disparity suggests that respondents are using electronic systems to execute lower value deals with relatively higher frequency. Not surprisingly, the most actively traded currency pairs (dollar-mark and dollar-yen) also represented the greatest share of electronically broked transactions.

The respondents rated the overall reliability of electronic systems as “good” or “satisfactory”, although the majority had experienced some technical or operational problems. The two most frequently encountered problems were down time and response time. Discussions with the chief dealers suggested that the frequency of these problems is very low, but the magnitude of the problems when they do occur is very large. A majority of respondents stated that they had never experienced a counterparty dispute over a deal struck on an electronic system. The minority that had experienced a dispute said that the resolution with the counterparty was “satisfactory” or “very good.”

Although the majority of respondents expressed concerns about security issues, particularly with respect to unauthorized access and unauthorized trading, the chief dealers suggested that these risks could be minimized if traders made better use of the security features already available within the systems. The survey also identified the integration of electronic trading systems with other proprietary dealing and operations systems as a potential problem area. Fewer than half of the respondents presently operate in an integrated environment, although several indicated that they are still integrating their systems; others suggested that the integration expense was too high to justify.

One of the more immediate issues related to systems integration involves the allocation of credit lines among multiple electronic brokers. Several respondents raised this as a potentially serious problem if the sharing of information between systems does not occur. For example, with many respondents subscribing to both major electronic services, current practice dictates that separate credit facilities be provided for each service. The chief dealers suggested that this duplication conceivably could result in the expansion of overall credit facilities beyond prudent limits.

All but one respondent felt that electronic broking would expand to other products. The majority felt that the forward and forward rate agreement markets were the most likely candidates for trading via an electronic medium. Money market instruments were the most common write-in prediction for future electronically traded instruments, although other respondents also highlighted options and exotic currencies. Several respondents suggested that central banks were the most likely candidates to join the current community of electronic broking users.

The survey also highlighted an ongoing need to establish standard market practices and ethics related to electronic trading. The Committee intends to address this subject in a follow-up paper.

## III. EFFECTS OF ELECTRONIC BROKING ON MARKET STRUCTURE

Three recurring themes regarding market structure were observed in both the survey responses and follow-up interviews. They relate to increased market accessibility, the effect on interbank market making, and enhanced cost efficiency. Access to electronic broking systems enables smaller institutions to deal at the same favorable spreads as larger firms. This increased participation may, at the margin, be eroding incentives to engage in traditional market-making activities since second- and third-tier participants no longer need to quote interbank prices to access liquidity directly from the larger institutions. Meanwhile, the downward pressure on traditional market-making profitability and the perceived efficiency of electronic broking as a cost-reducing vehicle have important ramifications for industry consolidation.

Changes in the price discovery process have typically followed the introduction of technologies. The early improvements in telephone communications reduced bid-offer spreads and led to the rapid growth in brokered transactions worldwide. Likewise, the introduction of conversational trading systems (for example, Reuters 2000-1) and the broader use of options pricing models increased market efficiency and, inadvertently, were factors in attracting new participants to the market. However, those same factors narrowed spreads for market makers and reduced profit opportunities for those dealers that did not adapt their product mix and cost structure to the changed environment. Electronic broking may be the latest technological advance to affect market structure. The remainder of this section elaborates on electronic broking's consequences on market structure and convention based on the survey results and follow-up discussions with the chief dealers.

**Liquidity and the Narrowing of Spreads**

Respondents were asked if the advent of electronic broking has had a material impact on market liquidity. The survey results suggest that market making firms have generally experienced moderate to significant improvements in liquidity, but that nonmarket making firms have experienced the most significant improvements. The chief dealers attributed this development primarily to the increase in price transparency, which effectively places the smaller firms on a par with the larger institutions, encouraging broader participation in the market. Moreover, the survey results strongly suggest that electronic broking has reduced the spreads available for market making activities. The chief dealers noted that a continued erosion in bid-offer spreads would prompt firms to place less emphasis on their market making activities. They also stressed that former providers of liquidity, to remain profitable, must adapt by emphasizing value-added services such as timely advice, structured products, cross-market insights, and other tailored services.

**Performance in Volatile Markets**

If the number of institutions willing to make two-way markets declined, concerns may mount about liquidity in an electronic environment during periods of market volatility. To address this issue, the survey contained three questions about system performance under varying degrees of stress (high, medium, and low). While the satisfaction level decreased as the volatility increased, under all scenarios the majority of respondents felt that the performance of electronic broking systems was at least satisfactory during volatile market conditions.

Nevertheless, the chief dealers suggested that electronic broking could have a detrimental effect on market liquidity under particularly volatile conditions if, in an electronic environment, a smaller number of banks was willing to make two-way markets. As such, they suggested that

maintaining a viable interbank direct dealing market was prudent to ensure sufficient liquidity to handle large trades during periods of stress.

Subsequent to the survey, isolated incidents have further highlighted the importance of market performance under volatile market conditions. For instance, in swiftly moving markets, when prices gap quickly, electronic broking systems may show an "old" reference price ("big figure") at which other participants may inadvertently deal. This situation occurs when traders become accustomed to inputting only the last two digits of a bid or offer and rely upon electronic systems to identify the reference price based on the last sale price. However, under volatile conditions, when the market gaps quickly between reference rates, electronic systems may not recognize that the big figure has changed. As such, when traders fail to input the entire price of a bid or offer, electronic systems may post an "off-market" price. Such examples have served to underscore the newer risks to which market participants must adapt, particularly during volatile market conditions. An important element of this process is the need for proper training at the user level. In addition, firms subscribing to electronic broking services must know their obligations and liabilities--and those of the electronic brokers--when the system posts a price that proves to be off-market.

**Cost Structure**

In assessing the benefits of electronic broking on the foreign exchange market's business cost structure, the survey respondents identified three primary advantages: lower brokerage expenses, improved market data, and automation of trade processing. The chief dealers emphasized that direct feeds into foreign exchange trading blotters and through the back office have reduced error rates and have increased efficiency. As firms exploit the operational efficiencies of an electronic environment, the average cost per trade, including the price of the electronic system, reportedly continues to decline. Meanwhile, the downward pressure on

market-making activity, according to the chief dealers, has forced institutions to focus on the cost side of the revenue equation in an effort to maintain profitability.

The introduction of electronic broking has also led to a broad reassessment of how active market makers access liquidity, and the associated costs of that liquidity. Most survey respondents identified the desire to reduce brokerage costs as the most compelling feature explaining the rapid growth of electronic trading. Discussions with the chief dealers confirmed the perceived cost benefits of electronic broking, but one counter argument raised by the group was that electronic broking may give customers the appearance of efficiency, but in the final analysis may prove more costly. Although the cost per electronic transaction may decline, overall costs may increase if electronic systems result in lower value deals with relatively higher frequency than conventional voice brokered transactions.

Nevertheless, respondents observed that electronic trading has served as a catalyst for consolidation of spot foreign exchange voice brokerage services, with some firms merging or reducing brokerage fees to remain competitive. Most survey respondents suggested that the target market for voice brokerage services would migrate toward the less liquid and/or exotic currencies, which currently have lower levels of transparency. A major issue, according to the chief dealers, remains whether the market share of both the voice brokerage and direct market-making businesses will continue to contract equally, or whether one will experience steeper declines in usage and liquidity. Several chief dealers suggested that the voice brokers may need to develop their own electronic confirmation and matching processes to remain competitive. Subsequent to the survey, a group of voice brokerage firms announced that they will shortly establish a joint company to develop a direct deal notification service (DDN). The service will aim to provide more timely delivery of deal information from voice brokers to customers.

**Internal Corporate Consolidation**

The chief dealers added that the effects of electronic brokerage have extended beyond the voice brokers to transform the economic structure of all trading rooms. As the contribution of market making activities has diminished, full service banks have responded by downsizing staff or consolidating operations in major trading centers. Indeed, the chief dealers highlighted notable instances in which institutions have centralized their trading in a single center and maintained regional sales staffs to service clients. Increases in hardware costs, the dealers asserted, may make it prohibitively expensive for full service banks to operate multiple trading rooms in the future, and may provide management with another rationale for centralizing trading activities.

**Risk Management**

The chief dealers indicated that electronic broking is likely to affect risk-management conventions as some institutions attempt to offset the loss of "spread" profitability by taking larger proprietary positions. Increased proprietary trading itself requires more attention to risk management. In addition, under volatile circumstances, an electronic marketplace may be less liquid than a voice marketplace. This potentially reduced liquidity requires firms to reevaluate their underlying assumptions and risk-reduction techniques, regardless of whether their electronic trading is proprietary or for customers.

In addition, the chief dealers emphasized that system controls will become of paramount importance as the number of currencies traded primarily on electronic systems increases. The magnitude of potential disruption arising from system failure due to hardware or human error could be enormous, particularly if the market no longer has the capacity to shift to alternative trading media. Improving system controls may become an industry wide issue that requires

extensive interaction with the providers of electronic broking services. Additionally, contingency plans and disaster-recovery procedures must also be assessed and adapted before an electronic market would be considered as a reliable sole, or primary, provider of liquidity. If procedures and policies are established that cross international borders, the potential for chaotic situations can be minimized. Finally, options for banks and electronic brokers to settle disputed trades and compensate for trade differences must be fully understood by all parties.

## IV. CONCLUSION

Electronic broking has become a catalyst for change in the foreign exchange market. The rapid proliferation of electronic trading has affected virtually every major area of the market, from liquidity and risk management to industry consolidation. Moreover, electronic broking promises to result in equally dramatic transformations in the future as its use becomes more prevalent and it expands into new product areas. Achieving success in this rapidly changing environment will require effective allocation of resources and the ability to adapt current strategies to meet new demands. The Committee is publishing this paper on electronic broking in the belief that the paper's discussion will help foster a better understanding of these issues in the foreign exchange market.

# Appendix A

## Participating Institutions

The following institutions participated in this survey assessing the impact of electronic broking on the foreign exchange market:

AIG Trading Group
Bank of America
The Bank of Boston
Bank of Montreal
The Bank of New York
Bank of Tokyo-Mitsubishi
Bankers Trust
Chase Manhattan Bank
CIBC--Wood Gundy
Citibank
Deutsche Bank
First Bank
First Chicago
Goldman, Sachs & Co.
Manufacturers & Traders Bank
Merrill Lynch & Co., Inc.
Midland Bank
JP Morgan
Morgan Stanley & Co., Inc.
NationsBanc--CRT
Republic National Bank
Royal Bank of Canada
Swiss Bank Corporation

## Appendix B

## Survey Questions and Responses

### Federal Reserve Bank of New York
### The Foreign Exchange Committee
### Electronic Broking System Questionnaire[1]

**Availability**

1. Which electronic broking systems are currently in use for FX spot transactions in your organization?

   Reuters Dealing 2002-2 19 EBS 18 Other, please specify 0

2. Are these systems being used in all your locations where trading activities are transacted?

   Yes 13 No 7

   Please list the locations that are currently using the electronic broking systems, the number of terminals, and the volume of transactions (in number of transactions and notional value as a percentage of total brokered foreign exchange trading activity for the three months ended March 31, 1996).

   Summary Statistics:

| | Number of Terminals | | % of Brokered Transactions | | % of Brokered Notional Value | |
|---|---|---|---|---|---|---|
| | Reuters | EBS | Reuters | EBS | Reuters | EBS |
| Mean | 35 | 24 | 18.3 | 22.1 | 13.9 | 19.3 |

3. Which systems are used primarily for specific currency pairs?

| Currency Pair | Reuters | EBS | Other |
|---|---|---|---|
| USD/DEM | 12 | 17 | |
| USD/JPY | 12 | 15 | |
| USD/CHF | 8 | 13 | |
| GBP/USD | 9 | 8 | |
| DEM/FRF | 5 | 17 | |
| DEM/CHF | 4 | 14 | |
| DEM/ITL | 11 | 7 | |
| GBP/DEM | 3 | 6 | |

[1]Responses to questions soliciting comments have been incorporated in the main body of the text.

**Reliability**

4. How do you rate the overall reliability of your electronic broking systems?

   16 Good
   5 Satisfactory
   0 Marginally satisfactory
   0 Unsatisfactory
   0 Not acceptable
   Comments _____

5. Have you experienced any technical or operational problems with the systems?

   Yes 13 No 7

   If yes, what are the problems with the systems? Please specify by type.
   (Please rate the problems using a scale of 1 to 5, with 5 being the most frequent/serious problem.)
   1.3 Capturing the trade information
   2.2 System response time
   2.5 System down time
   1.0 Confirmation
   1.9 Disputed trades (uniformity of market convention)
   2.8 User error (counterparty or otherwise)
   0.0 Other, please specify _____

6. Have you experienced any disputes with your counterparties on trades because of electronic broking system failure or inadequacy?

   Yes 9 No 11

   If yes, how would you characterize the resolution process? (Please choose one.)

   4 Very good
   4 Satisfactory
   0 Marginally satisfactory
   1 Unsatisfactory
   0 Not acceptable

   Comments on potential improvements _____

7. How was the performance of the systems during the following assumed levels of market volatility?

| | Low Market Volatility | Average Market Volatility | High Market Volatility |
|---|---|---|---|
| Good | 18 | 16 | 0 |
| Satisfactory | 2 | 3 | 11 |
| Marginally satisfactory | 0 | 1 | 5 |
| Unsatisfactory | 0 | 0 | 4 |
| Not acceptable | | | |

8. Do you have any security concerns using these systems? If yes, what are your concerns?

| | Reuters | EBS | Others |
|---|---|---|---|
| Yes or No | 12Y/7N | 8Y/8N | |

(Please rate your concerns using a scale of 0 to 5, with 5 being the most concern)

| | | | |
|---|---|---|---|
| Unauthorized access | 3.2 | 3 | |
| Unauthorized trades/changes | 2.9 | 3.1 | |
| Trading Objectives | 1.2 | 1.3 | |

Others, please specify _____

**Adaptability**

9. Are these systems easy to use?

| | Reuters | EBS | Others |
|---|---|---|---|
| Yes or No | 17Y/1N | 17Y | 1N |

Comments _____

10. Are there adequate error prevention controls built in the systems?

Yes 17 No 2

Comments _____

11. Are trade information and messages standardized among systems?

Yes 12 No 6

Comments _____

12. Do your electronic broking systems interface with your dealing and operating systems? If not, why not?

Yes 9 No 11

Reasons for not interfacing _____

13. Who are the primary users of the electronic broking systems in your organization?

(Please rank the frequency of usage using a scale of 0 to 5, with 5 being the most frequent user.)

3.1 Junior trader
4.6 Senior trader
2.8 Chief trader
0.5 Trading administration
0.6 Operations
0.0 Others, please specify_____

14. In your opinion, what topics should be included in the development of the "Best Practices in the Utilization of Electronic Broking Systems"?

(Please rank the importance of each topic using a scale of 0 to 5, with 5 being the most important.)

4.1 Ethics rules
3.9 Deal/trade capture
3.5 Confirmation
3.1 Reconciliation
3.1 Accounting/financial control
3.1 Audit
0.0 Others, please specify_____

**Effect on the Market**

15. In your opinion, what are the effects on the following areas in the event of increasing usage of the electronic broking systems in the foreign exchange market?

Market Convention (Trading Desk and Operations)

| | Trading Desk | Operations |
|---|---|---|
| Significant change | 14 | 7 |
| Moderate change | 6 | 9 |
| Little or no change | 0 | 3 |

Comments on type of changes that electronic broking systems may bring to the foreign exchange market.

_____

_____

Efficiency and Liquidity

| | Market Maker | Non-Market Maker |
|---|---|---|
| Significant improvement in efficiency and liquidity | 8 | 18 |
| Moderate improvement in efficiency and liquidity 10 | | 1 |
| Little or no improvement in efficiency and liquidity | 2 | 0 |

Comments _____

Spread/Margin for Market Makers

__3__ Significant improvement in spread/margin
__4__ Moderate improvement in spread/margin
__0__ Little or no change in spread/margin
__1__ Moderate reduction in spread/margin
__12__ Significant reduction in spread/margin

Comments _____

Central Bank Foreign Currency Activities

__2__ Significant impact
__4__ Moderate impact
__12__ Little or no impact

Comments _____

Existing Brokerage Structure

__16__ Significant impact
__4__ Moderate impact
__0__ Little or no impact

Comments _____

**Cost**

16. Do you think the initial cost of implementing an electronic broking system will prohibit smaller organizations from entering the market as users?

    Yes __6__ No __13__

    Comments _____

17. Please assess the appeal of electronic broking systems to market participants.

    (Please rate the appeals of electronic broking systems using a scale of 1 to 5, with 5 being the most appealing to you.)

    __3.7__ Lower brokerage expenses
    __3.5__ Improve the awareness of market conditions
    __3.4__ Automation of trade processing
    __2.4__ Reconciliation
    __0.0__ Others, please specify_____

18. In your opinion, what are the effects on market makers' future salary and benefit expenses, assuming an increasing usage of electronic broking systems?

1 Significantly higher
1 Moderately higher
10 Little or no change
7 Moderately lower
0 Significantly lower

Comments _____

**Future Expansion**

19. Currently, the electronic broking systems are primarily used for FX spot transactions. Do you see any future product extension potential of electronic broking activities?

Yes 18 No 1

Products:
17 Forwards
14 FRAs
13 Others, please specify_____

20. Who are the future potential users of electronic broking systems?

7 Corporates
9 Fund managers
13 Central banks
1 Home PC users
3 Others, please specify_____

**Advantages and Disadvantages**

21. In addition to the above, please discuss any other advantages and/or disadvantages of using electronic broking systems.

22. Please list other general comments.

## Acknowledgments

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