U.S. Department of Justice

Office of Legislative Affairs

Office of the Assistant Attorney General

Washington, D.C. 20530

September 17, 1998

The Honorable John Dingell
Ranking Minority Member
Committee on Commerce
U.S. House of Representatives
Washington, DC 20515

Dear Congressman Dingell:

As requested in your letter to the Attorney General and Chairman Levitt of the Securities and Exchange Commission, I am transmitting herewith the Department's report on the status and effectiveness of the remedial actions implemented as a result of the government's civil antitrust proceedings against certain stock dealers who operated as market makers in Nasdaq Stock Market, Inc. ("Nasdaq") securities. I apologize for the delay in our response.

The report responds to your request for the Department's assessment of remedial actions taken pursuant to settlements agreed to by the defendants in *United States v. Alex. Brown & Sons, Inc.,* et al (S.D.N.Y. 1996). Please let me know if you have questions about the report or its findings.

If the Department can assist you further on this or any other matter, please do not hesitate to contact me.

Sincerely,

L. Anthony Sutin
Acting Assistant Attorney General

cc: The Honorable Tom Bliley, Chairman
Committee on Commerce

The Honorable Michael Oxley, Chairman
Subcommittee on Finance and Hazardous Materials
Committee on Commerce

The Honorable Thomas J. Manton, Ranking Minority Member
Subcommittee on Finance and Hazardous Materials
Committee on Commerce

The Honorable Arthur Levitt, Jr., Chairman
Securities and Exchange Commission

REPORT OF THE DEPARTMENT OF JUSTICE ON THE STATUS OF THE ANTITRUST CASE AND CONSENT ORDER AGAINST NASDAQ MARKET MAKERS

I. BACKGROUND

This Report presents an overview of the government's antitrust enforcement action against certain stock dealers who operated as market makers on the Nasdaq Stock Market, Inc. ("Nasdaq"). It describes the current status of that action and reports on the substantial benefits that consumers have already received as a direct result of the government's enforcement efforts.

The most immediate measure of these benefits is the substantial reduction in investor transaction costs for buying and selling Nasdaq stocks. In early 1994, the cost to an investor of trading even the most liquid Nasdaq stocks was, on average, over 40 cents per share in market maker charges, over and above any broker commissions. By December of 1996, these market maker charges had fallen, on average, by almost 40% as a direct result of the government's enforcement activity. Subsequent regulatory reforms implemented by Nasdaq in 1997 at the behest of the Securities and Exchange Commission (the "SEC") have reduced these charges even further.

A. The Complaint

On July 17, 1996, the Department of Justice (the "Department") filed a complaint on behalf of the United States against 24 corporate defendants (the "Complaint"). The Complaint alleged that the defendants had violated Section 1 of the Sherman Act, 15 U.S.C. § 1, by engaging in price fixing in providing stock trading services. On the same day, the United States and the defendants filed a Stipulation and Order ("Consent Order") to resolve the allegations in the Complaint.

The Complaint asserted that the defendants had violated Section 1 by agreeing to quote Nasdaq stocks in a collusive manner defined by a "quoting convention." The Complaint alleged that the purpose and effect of this "quoting convention" had been to reduce price competition among the defendants and their co-conspirators in their trading of Nasdaq stocks with the general public. As a result, public investors had been deprived of the benefits of free and open competition in the trading of Nasdaq stocks and had paid more than they would have in the absence of the conspiracy.

B. Background To The Allegations In The Complaint

Nasdaq provides a computerized public market for investors to buy and sell stocks quickly and at minimum expense. An investor seeking to buy shares in a particular company cannot easily find another investor seeking to sell the same shares in a like amount unless there is as a pre-existing institutional arrangement for bringing many such buyers and sellers together in an organized fashion. Nasdaq provides such an institutional arrangement by organizing stock trading professionals to "make markets" in Nasdaq stocks. To "make a market" means simultaneously to quote a price at which the market maker is willing to buy the stock and to quote another price at which the market maker is willing to sell the same stock.

The organized system of market makers that Nasdaq has arranged is often referred to generically as a "dealer market," and the market makers who operate through Nasdaq are sometimes referred to as "dealers." The service provided to the investing public by the Nasdaq market makers is often referred to as "immediacy" for buying and selling stocks, or more generally, as providing "liquidity" to the investing public.

The market makers on the Nasdaq "dealer market" are supposed to provide the investing public with "immediacy" or "liquidity" in competition with each other. Thus, in principle, the orders of the investing public are supposed to be able to find the best available prices to buy or sell from many different market makers, who are supposed to be using their competing prices to attract these orders. To the extent that these market makers do not compete in this fashion, the investing public is injured.

1. Dealer Quotes and the Dealer Spread

Nasdaq market makers publicize the prices at which they are willing to buy or sell a stock by entering those "quotes" for display on the Nasdaq computerized system. The price at which a market maker is willing to buy a security is called its "bid" or "bid price." The price at which a market maker is willing to sell a security is called its "ask" or "ask price" (or its "offer" or "offer price"). Each market maker must simultaneously quote both a bid and an ask price in each security for which it makes a market.

The difference between an individual market maker's bid price and its offer price in a specific security is known as its "dealer spread." Thus, for example, if a market maker's bid price in a stock (the price it is willing to pay to buy stock from a customer) is $20 and its offer price (the price at which it is willing to sell stock to a customer) is $20 3/4, the market maker has a dealer spread *in that stock* of 3/4 point (75 cents per share).

2. Inside Quotes and the Inside Spread

There are typically many market makers in each Nasdaq stock. The Nasdaq computer screen collects and displays the bid and offer prices of all the market makers that are posting quotes in each stock. There are usually a variety of such quotes from different market makers. The highest bid and the lowest offer from among the quotes of all the market makers in a stock are called the "inside bid" and the "inside ask," or the "inside quotes." The difference between the inside bid and the inside ask in a stock is called the "inside spread."

For example, suppose there are three market makers in a stock displaying the following bid and ask prices at a particular point in time:

	Bid	Ask
Market Maker No. 1:	19 ½	- 20 1/4
Market Maker No. 2:	19 3/4	- 20 1/2
Market Maker No. 3:	20	- 20 3/4

The inside spread in this stock at that time would be 1/4 (25 cents), based upon the difference between Market Maker No. 3's high bid of 20 and Market Maker No. 1's low offer of 20-1/4.

3. The Importance of the Inside Spread

Customer orders for a Nasdaq market maker can come from brokers who route orders from retail customers seeking to buy (or sell) a small quantity of stock, or from large institutional investors such as mutual or pension funds seeking to buy (or sell) many thousands of shares. In executing orders on behalf of retail customers, market makers historically bought from the customer at the inside bid and sold to the customer at the inside ask. This execution by the market maker supposedly satisfied the retail broker's obligation of securing a "best execution" for its retail customers. Thus, for retail customers, the inside Nasdaq quote has always been the effective price.

The size of the inside spread also affects institutional trades. While large institutional customers could perhaps negotiate prices that are better than the inside spread, the inside spread directly influences those negotiations.

Market makers thus have a significant interest in each other's quotes because these quotes, by setting the inside spread, can directly affect the actual transaction prices for all market makers. This creates an incentive for market makers to discourage bid and ask price competition that may have the effect of narrowing the inside spread. (The inside spread represents the dealer's potential gross profit on a trade.) The evidence obtained during the Department's investigation showed that the market makers had discouraged competition, to great effect, through the adoption and enforcement of a quoting convention.

C. The Quoting Convention Pleaded In The Department's Complaint

The Department's investigation uncovered the existence of a long-standing commitment among market makers to adhere to a two-part "quoting convention" that dictated the price increments a market maker should use to adjust its quotes on the Nasdaq system. Under the first part of the quoting convention, if a market maker's dealer spread in a stock was 3/4 point (75 cents) or wider, the market maker was required to quote its bid and ask prices in even-eighth increments (*e.g.,* 1/4 (25 cents), 1/2 (50 cents), 3/4 (75 cents) or 4/4 ($1). This practice insured that the inside spread in those stocks was maintained at 1/4 point (25 cents), or greater.

Under the second part of the quoting convention, market makers could quote bid and ask prices on Nasdaq in odd-eighth increments, *e.g.*, 1/8 (12.5 cents), 3/8 (37.5 cents), 5/8 (62.5 cents) or 7/8 (87.5 cents), but only if they had a dealer spread of less than 3/4 point. This requirement had deterred market makers from quoting bid and ask prices in odd-eighth increments because a narrower dealer spread was likely to create a greater economic risk to the market maker in trading that stock. When the difference between a market maker's bid and ask quotes was 1/2 rather than 3/4, a market maker could be called upon to buy (or sell) more stock than the market maker wanted, or buy stock when the market maker wanted to sell (or *vice versa*).

D. The Terms Of The Consent Order

Prohibited Conduct. The Consent Order entered by the court is designed to deter the recurrence of anticompetitive conduct discovered by the Department in its investigation. Specifically, the Consent Order bars each of the defendants, unless otherwise specifically permitted, in connection with its market making activities in OTC stocks, from agreeing with any other market maker:

(1) to fix, raise, lower, or maintain quotes or prices for any Nasdaq security;

(2) to fix, increase, decrease, or maintain any dealer spread, inside spread, or the size of any quote increment (or any relationship between or among dealer spreads, inside spreads, or the size of any quote increment), for any Nasdaq security;

(3) to adhere to a quoting convention whereby Nasdaq securities with a three-quarter (3/4) point or greater dealer spread are quoted on Nasdaq in even-eighths and are updated in quarter-point (even-eighth) quote increments, and

(4) to adhere to any understanding or agreement (other than an agreement on one or a series of related trades) requiring a market maker to trade at its quotes in quantities of shares greater than either the Nasdaq minimum or the size actually displayed or otherwise communicated by that market;[1]

In addition, the Consent Order bars each of the defendants from engaging in any harassment or intimidation of any other market maker because such market maker:

(1) decreased its dealer spread or the inside spread in any Nasdaq security;

[1] The reference to agreements "other than an agreement on one or a series of related trades" is intended to make clear that a market maker is not prohibited from agreeing to buy or sell a specific quantity of stock, and that agreeing to buy or sell a quantity of shares greater than the amount initially specified in a series of related trades also does not violate the Consent Order.

(2) refused to trade at its quoted prices in quantities of shares greater than either the Nasdaq minimum or the size actually displayed or otherwise communicated by that market maker; or

(3) displayed a quantity of shares on Nasdaq greater than either the Nasdaq minimum or the size actually displayed or otherwise communicated by that market maker.

Finally, paragraph (8), Section IV of the Consent Order bars the defendants from refusing or threatening to refuse to trade (or agreeing with or encouraging any other market maker to refuse to trade) with any market maker at defendants' published Nasdaq quotes in amounts up to the published quotation size because such market maker decreased its dealer spread, decreased the inside spread in any Nasdaq security, or refused to trade at its quoted prices in a quantity of shares greater than either the Nasdaq minimum or the size actually displayed or otherwise communicated by that market maker.

Required Conduct. The Consent Order contains numerous provisions designed to ensure compliance with its terms and with the federal antitrust laws. Significantly, it requires that each defendant initiate and maintain an antitrust compliance program. Under the compliance program, an Antitrust Compliance Officer, to be appointed by each defendant, is required to distribute copies of the Consent Order to certain personnel, including members of the defendant's board of directors and its Nasdaq traders; to brief traders semi-annually on the meaning and requirements of both the federal antitrust laws and the Consent Order; and to obtain from specified persons, including traders, certifications that they have read and agree to abide by the terms of the Consent Order, and that they have been advised and understand that a violation of the Consent Order by them may result in their being found in civil or criminal contempt of court.

The Consent Order also requires each defendant to undertake a significant program of monitoring and recording trader conversations so as to discourage conduct violative of the Consent Order and the federal antitrust laws generally. Under the Consent Order, each defendant will install taping systems capable of monitoring and recording any conversation on the telephones on its OTC desk that are used in market making. Not less than 3.5% of all trader conversations will be monitored and recorded, unless such percentage would exceed 70 hours per week. Between 35,000-40,000 hours of tape will be required to be recorded annually to meet these requirements of the Consent Order. The taping methodology to be employed by each defendant is subject to Department approval. If the Antitrust Compliance Officer discovers a conversation he/she believes may violate the Consent Order, he/she is required to retain a recording of the conversation, and, within ten business days, to furnish the tape, along with any explanation of the conversation the defendant may care to offer, to the Department. The Department estimates that defendants will have to employ approximately thirty (30) persons full time to fulfill the monitoring requirement of the Consent Order.

Tapes made pursuant to the Consent Order must be retained by each defendant for at least 30 days from the date of recording. The tapes made pursuant to the Consent Order are not subject to civil process except for process issued by the Antitrust Division, the SEC, the NASD, or any other self-regulatory organization. Section IV.C.(6) of the Consent Order directs that such tapes are not admissible in evidence in civil proceedings, except in actions, proceedings, investigations, or examinations commenced by the Antitrust Division, the SEC, the NASD, or any other self-regulatory organization. The tapes will be subject to process and use in criminal proceedings under the terms of the Consent Order.

The Consent Order grants the Department the right to visit any defendant's place of business unannounced and to monitor trader conversations as they are occurring. Upon request of the Department, a defendant must identify all tape recordings made pursuant to the Consent Order that are in its possession or control, provide the Department with the opportunity to listen to any tape recording made pursuant to the Consent Order, and produce to the Department such tapes as the Department may request. The Department may receive complaints or referrals concerning asserted possible violations of the Consent Order and may, based upon such complaints or referrals, or for the purpose of monitoring or enforcing compliance with the Consent Order, require the Antitrust Compliance Officer to tape the conversations of particular traders, up to the limits previously specified.

Additional Relief. Each Antitrust Compliance Officer is required by the Consent Order to report quarterly to the Antitrust Division concerning activities undertaken to ensure the defendant's compliance with the Consent Order. Such reports must detail the precise times when conversations were monitored by the Antitrust Compliance Officer pursuant to the requirements of the Consent Order and the name of each person employed by the defendant whose conversations were recorded during such times. The Consent Order also requires that each defendant certify the designation of an Antitrust Compliance Officer and that the defendant has complied with certain specified requirements of the Consent Order.

The Consent Order gives the Department certain "visitation" rights, including the right to demand copies of documents, excluding individual customer records, which relate to compliance with the Consent Order; and to interview officers, employees, or agents of each defendant regarding compliance with the Consent Order. In addition, upon written request of the Attorney General or the Assistant Attorney General in charge of the Antitrust Division, a defendant may be required to prepare and submit written reports, under oath, relating to defendant's compliance with the Consent Order.

E. Current Status Of The Consent Order

The Department filed the Complaint and proposed Consent Order in the U.S. District Court for the Southern District of New York on July 17, 1996. The Department published the text of the proposed Consent Order and its Competitive Impact Statement in the Federal Register on August 2, 1996.

On August 28, 1996, the private plaintiffs in a class action against many of the same market makers named in the Department's suit moved to intervene in the Consent Order proceeding. The private plaintiffs sought to challenge a specific part of the Consent Order, Section IV(C), which required the defendants to set up and maintain a system for taping their employees who traded Nasdaq stocks. The private plaintiffs objected to that part of the taping provision that limited the discovery and use of the tapes by private parties. They also sought to require the Department to disclose to them a Settlement Memorandum (and all evidentiary materials expressly referenced therein) that the Department had prepared in connection with the negotiation of the Consent Order. That Settlement Memorandum outlined the evidence collected by the Department in the course of its investigation, set forth the violations uncovered, and explained the Department's legal theory. The private plaintiffs sought this Settlement Memorandum in order to make use of the Department's evidence and its "road map" of the case.

On November 26, 1996, the District Court granted the motion to intervene, but denied the discovery motion. The court rejected the private plaintiffs' contention that the Settlement Memorandum was a "determinative document" requiring disclosure under the Tunney Act, 15 U.S.C. § 16.

Following further briefing and a hearing, the District Court concluded that the Consent Order was in the public interest. The court entered the Consent Order on April 22, 1997. The private plaintiff-intervenors filed a notice of appeal on May 21, 1997.

Because the appeal was likely to challenge the taping provision, the defendants asked that the taping obligation, which will be quite expensive to implement, be stayed pending the end of the appellate process. The Department agreed with this request, and the District Court entered a stay of that provision.

The appeal was argued on March 16, 1998 before the Second Circuit Court of Appeals. On August 6, 1998, the Court of Appeals ruled in the Department's favor and affirmed the District Court's decision. Taping can begin after the appellate review process is complete. If the private plaintiffs seeks review by the Court of Appeals *en banc*, or by the Supreme Court, taping will remain stayed until those appeals are complete.

All provisions of the Consent Order (except those related to taping) are in force. The Department has investigated several claimed violations, including one recent allegation that remains pending, but so far, all indications are that the defendants are in compliance with the Consent Order. Defendants have filed all reports required by the Consent Order.

II. IMPACT OF THE DOJ ANTITRUST CHALLENGE AND THE SEC REFORMS

The Department has undertaken a statistical review of the effects that the government's enforcement actions have had on the Nasdaq market. This review is an independent analysis based on data made available to the Department by the National Association of Securities Dealers, Inc. (the "NASD"). As described below, the Department used the NASD data to extend the analysis we had previously done in connection with our investigation. The NASD has done its own analysis and its results are similar to the Department's. The NASD analysis appears on its "Market Quality Monitoring" report published on the NASD's Internet Web Page. The NASD's analysis also tracks the effect of several NASD reform initiatives on investor trading costs instituted after the Department had filed its suit and the SEC had issued a censure order against the NASD.

Using the available data, the Department was able to track quite accurately the quotes and prices facing the investing public when they trade Nasdaq stocks. Analysis of this data shows that the Department's investigation, culminating in the Department's Consent Order, and the concurrent investigation of the SEC, resulting in a censure order of the NASD, had the desired effect of stimulating competition in the market for Nasdaq dealer services. Additional analysis of the same data shows the further beneficial effect of the new "order-handling rules" implemented by the NASD beginning in January of 1997, as well as several other reforms implemented subsequently by the NASD during 1997.

A. The Department's Data Set And Analysis

In its original investigation, the Department had full access to the NASD's sizeable archive of data on the quoting and trading of Nasdaq stocks. The Department had monthly data from December of 1993 through July of 1995 and quarterly data from September of 1995 through March of 1996. From this data assemblage, the Department selected the 250 largest stocks (by dollar trading volume) that traded continuously on Nasdaq between December of 1993 and March of 1996. Of these 250 stocks, 26 had to be dropped because at some point in the period their share prices fell too low for adequate comparison purposes. The remaining 224 stocks formed the basis for the data analysis reported in the Department's Competitive Impact Statement ("CIS").

For this Status Report, the Department requested more current data from the NASD. The Department received quarterly data from June of 1996 through December of 1997, although for June and September of 1996, the NASD was only able to supply data for one day per week (Thursday). By merging the original data with the more current data, the Department has been able to extend the analysis reported in the CIS through the end of 1997.

To undertake this analysis on the same design as the original, the Department identified the 400 largest Nasdaq stocks (by dollar trading volume) during December of 1997. This new list of stocks included 118 from the original group of 224 discussed in the CIS. These 118 Nasdaq stocks have traded continuously in large dollar volume between December of 1993 and December of 1997. The Department used this group of 118 stocks to review and extend its original CIS analysis.

B. The Department's Analysis Supports The Conclusion That The Challenged Quoting Convention Is No Longer In Use

The Department's Complaint alleged that the quoting convention, which placed a restriction on the use of odd-eighths in quoting certain stocks, was a violation of the antitrust laws. For stocks with dealer spreads of three-quarters of a dollar or more, the defendant firms routinely refused to quote in odd-eighths. This practice kept inside spreads at a quarter or more.

Exhibit A shows that this behavior has changed dramatically. This chart looks only at the quotes of defendant firms named in the Department's Complaint and looks only at the quotes entered by those firms when they had dealer spreads of three quarters or a dollar in one of the Department's sample stocks. Exhibit A shows that the defendant firms adhered closely to the quoting convention during the early part of the 1993-97 period. Indeed, as late as March of 1996, the last month for which the Department had data before it filed suit, the defendant firms were using odd-eighths less than 10% of the time in quotes with dealer spreads of three quarters or a dollar. But shortly after that, the defendant firms abruptly changed their behavior. By March of 1997, these same firms were using odd-eighths almost 35% of the time when quoting dealer spreads of three quarters or a dollar. By December of 1997, the defendant firms were using odd-eighths or odd-sixteenths almost 42% of the time with dealer spreads of three quarters or a dollar.

The data supports the conclusion that adherence to the quoting convention has declined sharply since the Department filed suit. The dramatic decline in adherence to the quoting convention appears to have taken place in a steady progression throughout the 1996-97 period, beginning shortly before the Department filed its Complaint and continuing right through December 1997.

C. The Department's Analysis Shows That Increased Competition Among Dealers Has Lowered Trading Costs

The decline in adherence to the quoting convention has lead to a sharp reduction in inside spreads. The Department's analysis of a sample of 118 stocks shows that the average inside spread was 42.5 cents in December of 1993. That average had fallen to 27 cents, a decline of over 37%, by December 1996.

Exhibit B illustrates this decline. This remarkable fall in inside spreads preceded the adoption of the new order-handling rules in January of 1997. Indeed, 57% of the total decline in the average inside spread recorded between December 1993 and December 1997 took place before the new order-handling rules came into effect.

D. The SEC's New Order Handling Rules Have Further Lowered Trading Costs

On January 20, 1997, the NASD began to implement the SEC's new order-handling rules. The details concerning how these rules work can be intricate, but the bottom-line effect is easy to describe: market makers no longer have exclusive control over the inside spreads on Nasdaq stocks. Additional competition in driving the inside spread can now come from (1) customer limit orders, and (2) so-called "Electronic Communications Networks" ("ECNs"), basically private electronic trading systems. Customer limit orders are orders to buy a stock at or below a particular price or to sell it at or above a particular price, rather than at the market price. A customer sends a limit order to his broker, who in turn sends it to a market maker. The market maker generally must either execute the limit order or see to its being displayed to the market as a whole. If the limit order improves the price in the stock, then it is the new inside quote in that stock. Similarly, if a market maker chooses to route an order to an ECN, and that order is the best market maker order in that ECN, then that order will generally show up as a quote on the Nasdaq market screen. If the ECN quote improves the price in the stock, then it is the new inside quote. These changes have significantly improved the Nasdaq market. The rules were phased in over time between January 20 and October 13, 1997, and they now cover 2,900 stocks.

Analysis of the Department's sample of 118 large volume stocks indicated that the combined impact of the Department's suit and the new order handling rules was significant. In December of 1996, before the order handling rules took effect, the average inside spread for the sample stocks was 27 cents. In March of 1997, after the initiation of the phase-in of the order handling rules, the average inside spread for the sample stocks had fallen to 24 cents. A further decline in the average inside spread took place in the sample stocks between March and July of 1997, although attributing that effect solely to the new order-handling rules is difficult because of the NASD's June 2, 1997 introduction of the use of sixteenths in quoting these same stocks. Overall, however, the average inside spread for the Department's sample of stocks declined from 27 cents in December of 1996 to just over 15 cents in December of 1997.

The NASD has reported similar findings for the entire group of 2,900 stocks affected by these market reforms. The "Market Quality Monitoring" analysis on the NASD's Web Page contains an elaborate "before and after" comparison of the quoting patterns of these stocks. The NASD's data presentation includes both the effect of the order-handling rules and the effect of separate rule changes concerning the increased availability of a sixteenth as a trading increment, requirements for posting the size of a trade offered at each price, and rules restricting the size of dealer spreads.

The basic conclusion of the NASD's analysis is the same as that of the Department. From January of 1997 to January of 1998, there has been a substantial decline (41.4%) in quoted inside spreads. The NASD also reports a substantial decline (24.3%) in realized "effective spreads" (a measure of spreads in terms of actual transaction prices). In addition, the NASD analysis shows an overall increase in the average number of market makers per stock and only a slight decrease in the average trade size.

E. Academic Economists Have Confirmed The Decline In Use Of The Quoting Convention And The Reduction In Inside Spreads

A new study by a group of academic economists supports the Department's findings and independently demonstrates the improvements in dealer pricing on Nasdaq due to the enforcement actions of the Department and the SEC. See Michael J. Barclay et al., *The Effects of Market Reforms on the Trading Costs and Depths of Nasdaq Stocks*, J. FINANCE (forthcoming 1998). This study, among other things, measures the decline in inside spreads and the increased usage of odd-eighth quotes in a group of 68 stock issues that traded continuously on Nasdaq between January 1, 1994 and February 28, 1997. By focusing on a sample of stocks that traded throughout this period, the Barclay group was able to isolate average inside spreads and the usage of odd-eighth quotes in three separate time periods. The first period, January 1, 1994 through April 30, 1994, was a period that preceded the opening of the investigations by the Department and the SEC. The second period, November 1, 1996 through January 19, 1997, was a period that came after the Department had completed its investigation and filed its case, and after the SEC's censure of the NASD, but before the SEC's new order-handling rules had taken effect. The third period, February 10, 1997 to February 28, 1997, was a period following the implementation of the SEC's new order-handling rules.

The authors presented their findings in two tabular exhibits (Exhibits C and D, hereto, reproduced with permission). Exhibit C, Figure 3 from Barclay, et al., shows the usage of odd-eighths in the quoting of the 66 stocks during each of the 3 periods. As the authors described this Figure:

> Panel A [for the January 1, 1994 through April 30, 1994 period] shows a bi-modal distribution with almost 65% of the stocks quoted exclusively in even-eighths. . . . Panel B presents the fraction of odd-eighth quotes at the inside market between November 1, 1996 and January 19, 1997. Despite the similarity in market structure between these two periods, the pattern of odd-eighth avoidance changes dramatically, with most stocks quoted using all price fractions by late 1996. The avoidance of odd-eighth quotes remains intact for a small fraction of issues relative to the levels measured in 1994. Finally, Panel C displays the frequency of odd-eighths quotes across stocks under the new SEC rules. Over 50% of the stocks are quoted on odd-eighths between 45% and 50% of the time, and no stock is quoted with fewer than 10% odd-eighths. . . .

Barclay, et al., at 10 (quoted with permission).

The authors also examined the effect of this change in odd-eighth usage on the inside spreads facing consumers. Exhibit D, Table II from Barclay, et al., shows the decline in inside spreads. As the authors noted:

We compute the average time-weighed inside spread for each of the 68 issues that trade on Nasdaq between January 1, 1994 and February 28, 1997. For these 68 issues, average spreads decline from 42.4 cents per share in the 1994 sample period to 30.5 cents per share during the months preceding the implementation of the SEC rule changes. This reduction in average spreads can be directly traced to those stocks that are quoted exclusively in even-eighths in 1994. Specifically, the average inside spread for the 44 stocks that are not quoted in odd-eighths in 1994 declines from 52.6 to 33.6 cents per share between 1994 and the months immediately prior to the new SEC rules. In contrast, the average inside spread for the mixed-eighth stocks in 1994 is virtually unchanged over the same 30-month period. Thus, the decline in the avoidance of odd-eighth quotes has a significant and dramatic impact on the width of average inside spreads. . . .

Barclay, et al., at 10-11 (quoted with permission).

F. The Available Evidence Suggests No New Quoting Convention Has Developed Related To Odd-Sixteenths

Before June 2, 1997, Nasdaq rules did not allow market makers to quote in increments of less than one-eighth, except for stocks that they quoted at prices of less than $10 a share. The NASD changed this rule effective June 2, 1997 to allow universal quotes in sixteenths.

This would appear to be a beneficial reform. Nonetheless, a recent study has questioned the reform's effectiveness. See Yusif Simaan and David K. Whitcomb, "The Quotation Behavior of ECNs and Nasdaq Market Makers," Working Paper 98-01, Rutgers University, Faculty of Management. This study concludes that market makers are avoiding the use of "odd-sixteenths" in their public quotes. The Department, therefore, undertook an analysis of its data set to determine whether there was evidence of an agreement related to the use of odd-sixteenths.

In evaluating the use of odd-sixteenths, the Department looked for evidence of their appearance in inside spreads. The inside quote (bid or ask) is what matters to public investors and competition among market makers for the best inside quote is how the Nasdaq market delivers the best prices to the public. The evidence available to the Department suggests that odd-sixteenths are, in fact, showing up with great frequency in the inside spreads for Nasdaq stocks. Odd-sixteenths appeared 50% of the time in the inside spread by December 1997 for the 118 large-volume stocks in the Department's sample. This appears significant given the short time that had elapsed since the rule change.

For certain stocks, the use of odd-sixteenths was striking. In December of 1997, Novell had an inside spread of one-sixteenth almost 96% of the time. That means that either the inside bid or the inside ask was an odd-sixteenth almost 96% of the time.

Next, the Department looked to see whether there was evidence to suggest that odd-sixteenths were avoided for certain stocks or categories of stock. Our samples showed a variation in use of odd-sixteenths across stocks that was quite different from the pattern of use of odd-eighths that lead to the Department's initial investigation and subsequent suit. Under the challenged convention, a large number of stocks were rarely or never quoted in odd-eighths. Market makers used odd-eighths less than 1% of the time in December 1993 in 78 of the stocks in the Department's sample of 118. By contrast, in the same sample for December 1997, there was only one stock in which odd-sixteenths were used less than 1% of the time. In addition, the data on the odd-eighth convention showed a sharp distinction between stocks quoted in odd-eighths and those that were not. Generally, market makers rarely used odd-eighths for certain stocks and used them 50% or more of the time for others. Review of the sample of 118 stocks in December 1997 showed no similar distinction among stocks in the use of odd-sixteenths.

Finally, it should be noted that the Simaan/Whitcomb study expresses concern about the lack of use of odd-sixteenths on public quotes, not on ECN quotes. Prior to the adoption of new order-handling rules, market makers could benefit by hiding better quotes on an ECN, as that quote did not affect the publicly-displayed inside spread. Under the new order-handling rules, better quotes on an ECN end up determining the inside spread. Hence, an odd-sixteenth quote on an ECN that improves the inside spread cannot be hidden. All market makers must use that inside spread to execute retail orders and to negotiate institutional trades.

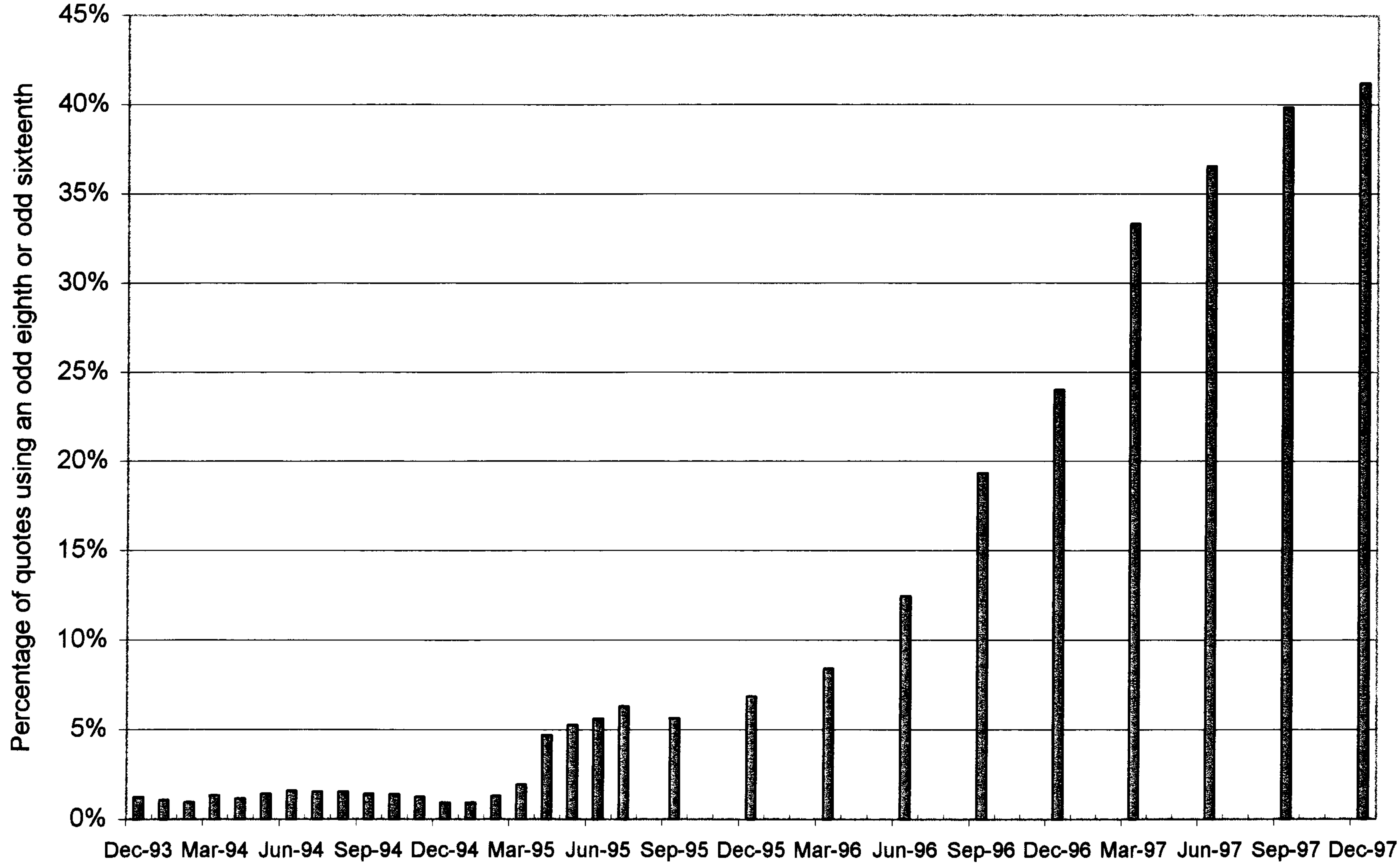
III. CONCLUSION

In truth, the best measure of the change in the Nasdaq market from 1993 to the present is the dramatic difference in the distribution of the inside spread between the two periods. In December of 1993, the inside spread of the Department's sample of large volume stocks equaled an eighth less than 10% of the time, equaled three-eighths less than 5% of the time, and equaled five-eighths almost never. This sample had inside spreads equal to a quarter 34% of the time, equal to a half 38% of the time, and equal to three quarters 13% of the time. The only explanation for this pattern is a rigid adherence to a quoting convention that caused the systematic avoidance of odd-eighths in a very large number of stocks.

In contrast, in December of 1997, this same sample of stocks had an inside spread distribution as follows: an inside spread of one-sixteenth or less, 38% of the time; an inside spread of an eighth, 29% of the time; an inside spread of three-sixteenths, 10% of the time; an inside spread of a quarter, 13% of the time; and an inside spread of more than a quarter less than 10% of the time.

In sum, the Nasdaq market has gone from a pattern of stock quoting that involved an inexplicable avoidance of odd-eighths to a pattern of stock quoting that involves the aggressive use of all quote increments. The benefits of this change have been broad and substantial. Public investors are paying much less to buy and sell Nasdaq stocks. The Department is proud to have played a leading role in achieving this result.

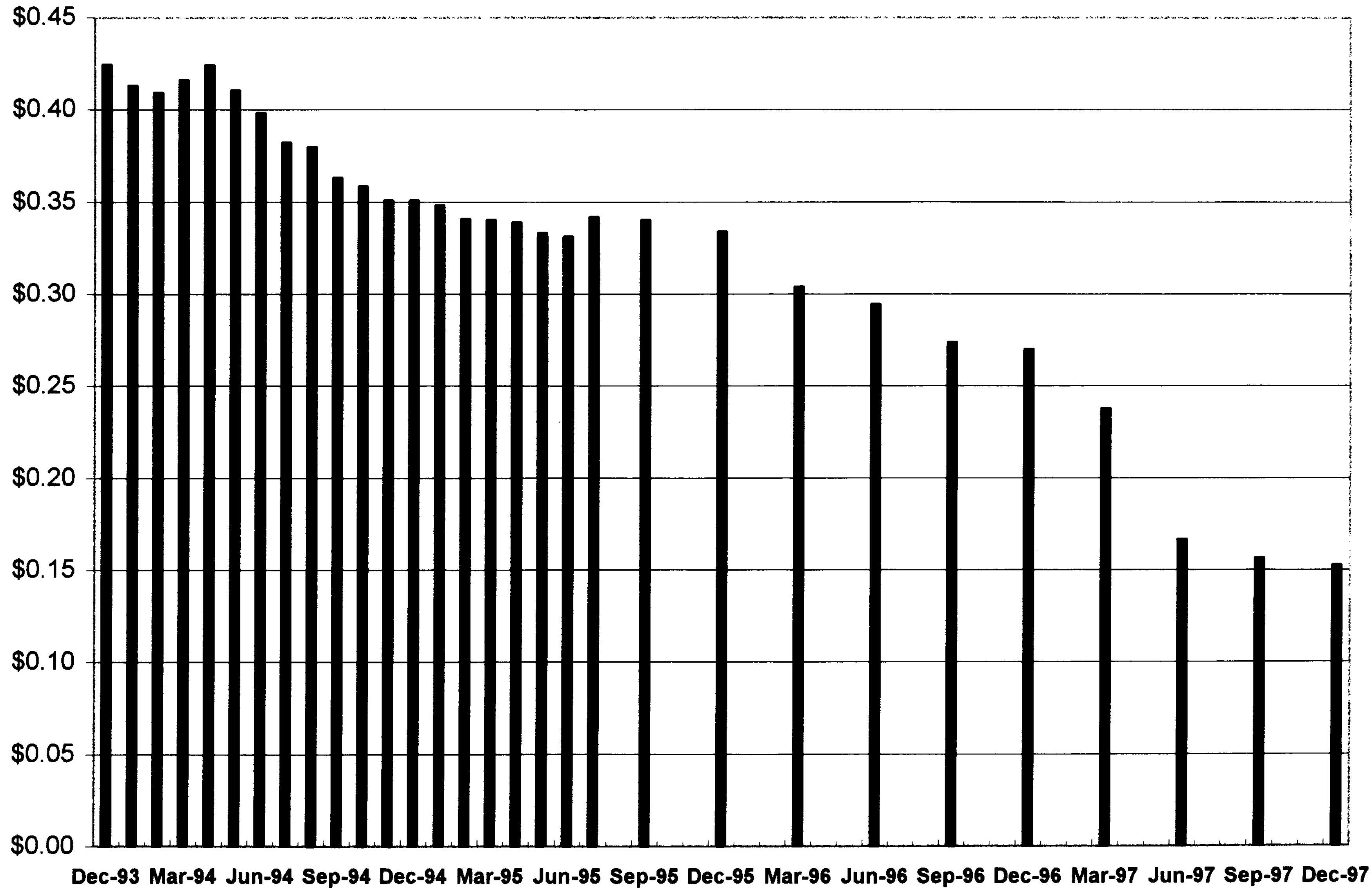
Defendants' Use of Odd Eighths and Odd Sixteenths with a Dealer Spread of $3/4 or $1



Source: NASD data on 118 leading Nasdaq stocks.

Quote percentages are time weighted.

Average Inside Spread

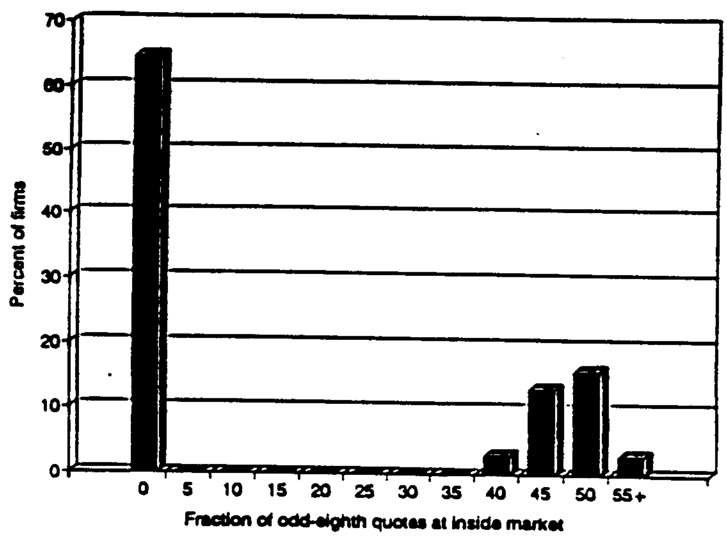


Source: NASD data on 118 leading Nasdaq stocks

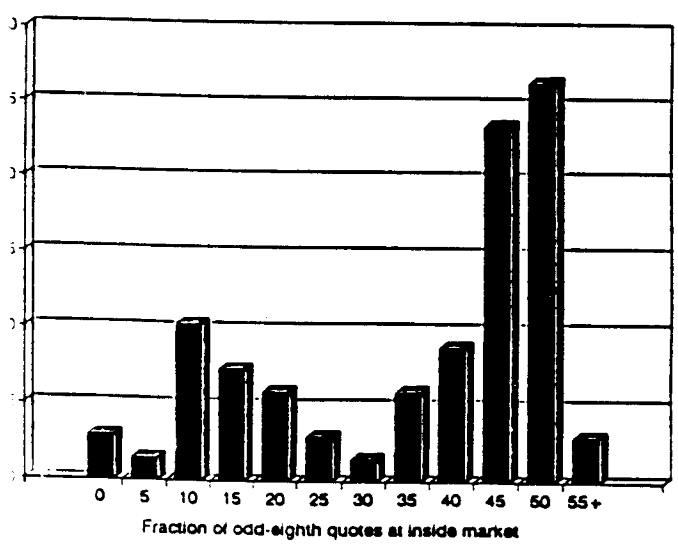
Averages are time-weighted.

Figure 3: A comparison of the frequency of inside quotes using odd-eighth price fractions between January 1994 and February 1997. We compute the average frequency of odd-eighth quotes at the inside market for the 68 phase-in stocks that trade continuously between January 1994 and February 1997 during three periods: (1) January 1 to April 30, 1994, (2) November 1, 1996 to January 19, 1997 and (3) February 10 to 28, 1997. We then plot the number of issues with a specific fraction of odd-eighth quotes. Panel A presents the 1994 results. Panel B reports the use of odd-eighth quotes between November 1, 1996 and January 19, 1997. Panel C reports the use of odd-eighth quotes between February 10 and February 28, 1997.

Panel A: Frequency of odd-eighth use between January 1 and April 30, 1994.



Panel B: Frequency of odd-eighth use between November 1, 1996 and January 17, 1997.



Panel C: Frequency of odd-eighth use between February 10 and February 28, 1997.

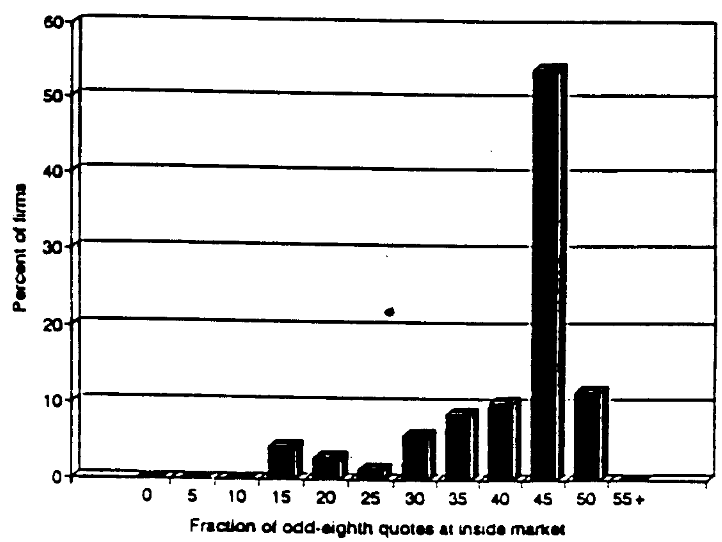


Table II

A comparison of average time-weighted inside spreads between 1994 and 1997 for stocks that were phased-in under the SEC order handling rules.

For each stock, we compute the daily time-weighted inside spread for three time intervals: (1) January 1 through May 1, 1994, (2) November 1, 1996 through January 17, 1997, and (3) February 10 through February 28, 1997. The first time interval corresponds to the period preceding the negative publicity surrounding the Christie and Schultz (1994) study. The second time interval immediately precedes the introduction of the new SEC order handling rules for the first of our two samples of Nasdaq stocks. The final time interval corresponds to the period when each of the two Nasdaq samples are traded under the new SEC rules. The reported figures are equally-weighted averages of the daily time-weighted inside spreads, measured in cents-per-share. The results are computed for the 68 stocks that are traded on Nasdaq throughout the period between January 1, 1994 and February 28, 1997. We further differentiate between the 44 stocks that are quoted solely in even-eighths in 1994 and the 24 stocks that are quoted in mixed-eighths in 1994.

Sample Criterion	1/1/94 – 5/1/94	11/1/96 – 1/19/97	2/10/97 – 2/28/97
All Sample stocks	42.4	30.5**	22.3**
Quoted in Even-eighths in 1994	52.6	33.6**	22.6**
Quoted in Mixed-eighths in 1994	23.8	24.2	21.6**

** indicates that the value is statistically different at the 1% level than the preceding value in the same row.