# THE EFFECT OF CME RULE 552 ON DUAL TRADERS

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## INTRODUCTION

Dual trading is the practice that allows futures floor traders to execute customer orders as well as personal trades within a certain time interval. Dual trading allows floor traders to be flexible in response to short-run demands for liquidity or broker services. At the same time, dual trading presents a potential for the misappropriation of customer information by the floor traders. In an effort to minimize the possible misappropriation of information, the Chicago Mercantile Exchange (CME) implemented Rule 552, effective as of May 20, 1991, which prohibits floor traders in high volume futures contracts from executing trades for both customers and personal accounts on the same day. Exceptions are allowed for spread traders, trading and offsetting in an error account, trading

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for customers who are exchange members, and trading for one's own account and for customers who have given explicit written permission to allow the floor trader to dual trade.

The literature related to dual trading has centered on market liquidity. Grossman (1989) asserted that restrictions on dual trading would result in a decrease in market liquidity (i.e., increase in the bid–ask spread). Smith and Whaley (1991) found an increase in the bid–ask spread in the S&P 500 index futures when dual trading was restricted via the "top step" rule in June 1989.[1] Park and Sarkar (1992) presented preliminary evidence that market depth was not affected by the top-step rule. Chang and Locke (1992) found no evidence of a market liquidity effect in the contracts affected by Rule 552. Walsh and Dinehart (1991) found some evidence linking dual trader activity with increased liquidity in Chicago Board of Trade (CBT) soybeans.

Other recent studies have examined the trading performance of dual traders and the profitability of their trading. These studies can be traced to Grossman's (1989) assertion that, due to their involvement in all market aspects, dual traders are likely superior in both personal trading (better scalpers) and order execution (lower customer trading costs). Fishman and Longstaff (1992) found that dual traders obtain better prices for themselves and their customers than do exclusive brokers or locals. The Commodity Futures Trading Commission (1989) found little evidence of superior personal trading or customer order execution by dual traders. Chang and Locke (1992) found that dual traders appear inferior to locals in personal trading, and not different than pure brokers with respect to customer order execution costs.

This study focuses on a slightly different issue, that is, on the changes in the trading behavior of the set of floor traders who are affected directly by a dual trading restriction. It sheds light on the personal costs to those traders as a result of the implementation of this rule. In addition, it investigates the extent to which those traders migrate to other pits and whether or not they increase their broker activity. The results confirm the suspicion that dual traders' personal losses associated with Rule 522 are significant.

## DATA

The data used in this analysis is derived from the Computerized Trade Reconstruction (CTR) records maintained by the Commodity Futures

[1]The "top step" rule reserves the top step of the S&P 500 pit (closest to order-flashing phone clerks) for individuals who refrain from personal trading.

Trading Commission (CFTC). Each futures transaction is represented by a record on the CTR indicating the identity of the floor trader, the price and number of contracts in the transaction, the type of trade (personal, clearing member account, other floor trader, non-member customer).[2]

As of December, 1991, five futures contracts were affected by the ban: pound sterling, Swiss franc, Japanese yen, deutsche mark, and Eurodollars. This analysis is confined to currency futures contracts.[3] Currencies are referred to as Currency A, B, C, and D, to avoid any possible inferences of individual trading. The analysis is divided into four sample periods: (1) a short-run pre-552 period, running from April 8, 1991, to May 17, 1991; (2) a long-run pre-552 period, running from November 1, 1990, to May 17, 1991; (3) a short-run post-552 period running from May 20 through July 1, 1991; (4) a long-run post-552 period, running from May 20, 1991, through November 30, 1991.

The investigation focuses on the most active traders in the four restricted currency markets. Active traders are selected conditional on their total volume in the 30-trading day period immediately preceding May 20, 1991. For the purposes of this study, an active trader is one who has transactions totaling more than 3000 contracts in the lead month of one of the currencies, that is, the trader executes an average of at least 100 contracts per day.

## FLOOR TRADER TYPES

This section presents a description of the process used to select the sample of traders most affected by rule 552. The number of contracts executed by each trader for customers and for personal accounts is noted for each of two periods, the 30 trading days prior to the restriction, and the 30 days immediately following the implementation of the restriction. In both periods each active trader is assigned to one of five categories based on their percentage of personal trading. Each trader fits into one of 25 category combinations based on their percentage of personal volume in the 30 day pre- and post-552 periods. The results of this cross-period classification of active traders are presented in Table I.

[2]The identification of various types of trades is dictated by the CFTC. These types are known as customer type indicator (CTI). CTI 1 is for personal trading, CTI 2 is when the floor trader transacts for his or her clearing firm, CTI 3 is when the floor trader transacts for another floor trader present on the floor, and CTI 4 is for any other trade (typically, a non-member customer).

[3]Eurodollar futures are rather unique. Many expirations are traded simultaneously in highly liquid mini-pits within the Eurodollar pit. However, Rule 552 only restricts dual trading within particular expirations. For example, if March and June are both restricted by 552, a floor trader can still execute customer orders in March and personal trades in June. Due to these complications, Eurodollars are not included in this study.

**TABLE I**
Floor Trader Occupational Choice and CME Rule 552

| | | *Post-552 (% Personal Trading)* | | | | |
|---|---|---|---|---|---|---|
| *Pre-552 (% Personal Trading)* | *Pre-552 Total* | *Broker (0–2%)* 93 | *Near-Broker (2%–20%)* 25 | *Mixed (20%–80%)* 13 | *Near-Local (80%–98%)* 3 | *Local (98%–100%)* 173 |
| Broker (0–2%) | 61 | 58 | 2 | 1 | 0 | 0 |
| Near-broker (2%–20%) | 57 | 32 | 18 | 4 | 0 | 3 |
| Mixed (20%–80%) | 21 | 3 | 5 | 9 | 0 | 4 |
| Near-local (80%–98%) | 9 | 0 | 0 | 0 | 2 | 7 |
| Local (98%–100%) | 160 | 0 | 0 | 0 | 1 | 159 |
| | Post-552 Total | 93 | 25 | 14 | 3 | 173 |

Floor traders are classified in each of two 30 trading-day periods, pre-552 (4/8/91–5/19/91) and post-552 (5/20/91–7/1/91), by their volume of personal trading as a percentage of the sum of their personal and customer contracts traded over the period. Floor traders with a total pre-552 contract volume in personal and customer accounts of greater than 3000 contracts in either British Pounds, Japanese Yen, Swiss Francs, or Deutsche Marks (or with an average daily volume less than 100 in these trade types) are included in the analysis.

The first five rows of Table I correspond to the pre-552 category, with the pre-552 category totals in column 1. The second through sixth columns represent the post-552 categories, with the post-552 totals in row 6. For each period, if the percentage of personal trading is (1) less than 2%, then the trader is categorized as a Broker; (2) between 2% and 20%, the trader is a Near-Broker; (3) between 20% and 80% the trader is Mixed; (4) between 80% and 98% the trader is a Near-Local; (5) above 98% the trader is classified as a Local.[4] An entry in the table is the number of active floor traders in the four currencies who fit the description for the corresponding row and column. For example, in the first row, second column, the number 58 indicates that 58 out of 61 floor traders in these currencies who had personal volume amounting to less than 2% in the pre-552 period are similarly classified in the post-552 period. In the fifth row, sixth column, the number 159 indicates that

[4]The 2% rule allows for tolerance with respect to error trading. When a broker makes a mistake in executing a customer order, the trade is placed into an error account, as a trade for the broker's personal account. The broker may then offset the error with a trade for the error account. A value of 2% for this error trading seems reasonable from conversations with CFTC and exchange staff. The decision to divide the middle of the spectrum into three cells is based on the perception that near-brokers have different trading strategies than near-locals. The values of 20% and 80% are arbitrary.

159 floor traders classified as Local in the pre-552 period are similarly classified in the post-552 period.

The numbers in both column 1 and row 6 reveal a concentration of floor traders in both sub-periods in the categories of Broker and Local. Specialization by floor traders has been noted previously in both the CFTC's 1989 study and in Chang and Locke (1992). Traders whose primary occupation is the execution of personal trades apparently shun the role of agent. On the other hand, some traders who predominantly execute customer orders tend to execute some personal trades. This propensity is more noticeable for these futures in the unrestricted pre-552 period, when there are 57 Near-Brokers, versus 25 after rule 552 is implemented. The fact that 32 of the 57 Near-Brokers switched to Broker in the post-552 period is significant. Ninety-five percent of pre-552 Brokers continued as Broker in the post-rule period. Ninety-nine percent of Locals continued as Local in the post-552 period. Using a generous expectation of a 50% attrition rate, the finding of a 68% attrition rate in the Near-Broker group has very low probability. The conclusion is that these traders who switched around the implementation of 552 are doing so for a different reason than the 5% of Brokers who switched occupations. Furthermore, similar "switching" analysis in separate periods prior to Rule 552 reveals a tendency for stability of dual traders, that is, Near-Brokers tended to remain Near-Brokers prior to May 20, 1991. Part of the asymmetry between Brokers and Locals may be due to another regulation. To execute customer orders, a floor trader must register as a floor broker. During the study period, locals could choose to avoid this registration. At the other end of the spectrum, there is an inherent demand for personal trading by brokers, in the form of personal trades to take care of errors which they have committed in the execution of customer trades.

The analysis which follows focuses on the trading of those individuals who appear to be most affected by the rule, the pre-552 Near-Broker group, and the Broker group in the pre- and post-552 periods. Two subsets of the pre-552 Near-Brokers are considered: DUAL-1, the 32 pre-552 Near-Brokers who switched to Broker in the post-552 period; and DUAL-2, the 18 traders who were classified as Near-Broker in both the pre- and post-552 periods. In addition, the 58 consistent brokers are analyzed and termed BROKER. Note that some "dual trading" continues to exist in the post-552 period since personal trading is still allowed every trading day prior to the execution of the first customer trade. In addition, error trades which are absorbed and offset as personal trades are allowed.

## THE VOLUME OF CUSTOMER TRADING

This section seeks to find whether the selected floor traders have increased their broker activity since Rule 552 has taken effect. Chang and Locke (1992) found evidence that customer volume in the currency contracts on the CME was significantly lower in the post-552 period. Given this aggregate decline, the methodology employed here determines whether the dual traders' mean daily "market share" of customer orders is equal to the pre- and post-552 periods. The groups' average daily execution of customer orders is calculated for the period from November, 1990 through November, 1991. In addition, the total volume of customer orders executed by all traders is calculated each day for the same period. For each group, the ratio of the group's customer order execution to total customer volume in the pit is determined. Tests are performed of the hypothesis that the groups' mean share of daily customer order execution in the pre- and post-552 periods is equal.

The share of customer volume for the trader groups is measured in the trader's home pit, other IMM pits, and agricultural pits on the CME. The average customer shares by group and *t*-statistics are presented in Table II. The *t*-statistics calculated for the test are positive when the pre-552 period average is smaller than the post-552 average. Also presented is the associated probability value under the null hypothesis that the means are equal. The major column headings correspond to the four currencies in which the groups are identified.

Consider first the short-run results for the share of home pit customer volume presented in panel A. For both dual trader groups, there is no evidence that the share of home pit customer volume has increased after the implementation of 552. There is some evidence that customer order execution by these traders has fallen in the immediate post-552 period. Identified brokers appear to increase their share of customer volume over the same period. In the short run, dual traders do not appear to increase their home pit broker activity when their personal trading is restricted.

The long-run results presented in Panel B of Table II are mixed. For Currency A DUAL-1 and Currency C DUAL-2, the home pit share of customer volume is significantly higher after the implementation of 552. For Currency B DUAL-1 and Currency D DUAL-2, the same measure shows a significant decrease. Also in the long run, BROKERs in Currencies A and D show an increase in the share of customer volume in their home pit broker activity.

**TABLE II**
Customer Order Executions

| Group | Pit Category | Currency A t-Stat | Currency A Prob Value | Currency B t-Stat | Currency B Prob Value | Currency C t-Stat | Currency C Prob Value | Currency D t-Stat | Currency D Prob Value |
|---|---|---|---|---|---|---|---|---|---|
| *Panel A: Short-Run Changes in Customer Volume* | | | | | | | | | |
| DUAL-1 | Home pit | −1.695 | 0.0960 | −1.718 | 0.0930 | 1.497 | 0.1406 | 0.8841 | 0.3804 |
| | Agricultural | −1.418 | 0.1670 | — | — | −1.362 | 0.1719 | 0.762 | 0.4516 |
| | Other IMM | −1.032 | 0.3105 | −1.902 | 0.0670 | −0.082 | 0.9354 | −0.242 | 0.8099 |
| DUAL-2 | Home pit | 1.0873 | 0.2814 | −3.948 | 0.0002 | −0.557 | 0.5798 | −1.433 | 0.1579 |
| | Agricultural | −1.851 | 0.0699 | −1.437 | 0.1613 | — | — | 1.308 | 0.2011 |
| | Other IMM | 0.2398 | 0.8114 | 1.423 | 0.1606 | 0.899 | 0.3760 | 0.876 | 0.3867 |
| BROKER | Home pit | 2.626 | 0.0110 | 2.886 | 0.0055 | −0.293 | 0.7704 | 0.018 | 0.9861 |
| | Agricultural | 1.000 | 0.3256 | 1.133 | 0.2643 | — | — | −1.000 | 0.3256 |
| | Other IMM | 0.155 | 0.8774 | −1.610 | 0.1135 | −1.773 | 0.0816 | −3.315 | 0.0023 |
| *Panel B: Long-Run Changes in Customer Volume* | | | | | | | | | |
| DUAL-1 | Home pit | 5.512 | 0.0001 | −4.210 | 0.0001 | 1.561 | 0.1197 | 1.152 | 0.2503 |
| | Agricultural | −2.161 | 0.0325 | −0.860 | 0.3907 | −8.028 | 0.0001 | 0.776 | 0.4393 |
| | Other IMM | 1.168 | 0.2451 | −5.410 | 0.0001 | 6.841 | 0.0001 | 1.959 | 0.0516 |
| DUAL-2 | Home pit | −0.819 | 0.4138 | −1.075 | 0.2836 | 8.396 | 0.0201 | −8.905 | 0.0001 |
| | Agricultural | 0.296 | 0.7672 | −2.852 | 0.0049 | −0.791 | 0.4304 | 0.895 | 0.3725 |
| | Other IMM | 1.112 | 0.2671 | 5.249 | 0.0001 | −3.746 | 0.0003 | 16.406 | 0.0001 |
| BROKER | Home pit | 10.177 | 0.0001 | −1.743 | 0.0820 | −0.792 | 0.4292 | 9.430 | 0.0001 |
| | Agricultural | 1.395 | 0.1657 | 6.192 | 0.0001 | 0.648 | 0.5184 | 1.244 | 0.2157 |
| | Other IMM | −1.937 | 0.0538 | −4.467 | 0.0001 | −1.162 | 0.2462 | 0.926 | 0.3558 |

The average daily number of contracts executed for customers is calculated by each group as a ratio of total customer volume. Customer trading is identified by pit location and the currency in which the traders were identified. The pits are defined as follows (1) Home pit, the trader's identified pit; (2) Agricultural pits; and (3) Other IMM, which consists of all IMM futures except for the home pit. Averages are formed in the pre- and post-552 period and *t*-statistics formed. The prob value is the probability of obtaining the *t*-stat under the null hypothesis of equal pre- and post-552 means. The short run is April 8, 1991, to July 1, 1991. The long run is November 11, 1990, to November 30, 1991.

For agricultural and other IMM customer trading, there are also mixed results, with a few significant increases and some significant decreases in the groups' shares of customer volume. If these other pits are in some equilibrium regarding floor trading prior to 552, then the dual traders from other pits may find it difficult to solicit customer business there. The mixed results offer limited support for this hypothesis.

Taken together, these mixed results over both the short and the long run offer no support for the hypothesis that dual traders gain a greater share of customer order execution when their personal trading is restricted. While there are some significant changes in the share of

customer order execution by these traders, the evidence does not suggest an increase in the propensity to execute customer orders. This is true for their home pit as well as other IMM and agricultural pits.

## PERSONAL TRADING

The next two sections examine the extent to which dual traders have proportionally increased their personal trading in other futures, futures options, or the unrestricted months of their home pit when their lead month personal trading is restricted. A floor trader choosing to execute personal trades while continuing to execute customer orders in the restricted market is allowed to travel to another pit or use unrestricted expirations for personal trading. But traders may develop particular skills in trading certain expirations or commodities. To the extent that floor traders have acquired trading skills unique to the pit or expiration in which they usually trade, such migration may be prohibitively costly. Nevertheless, this migratory option is available to some degree for all floor traders. Migration may take the form of a permanent move or may consist of temporary intraday movements. The migratory tendencies by the selected traders is examined in both the short-run period surrounding the rule change, and the long run.

## PERSONAL TRADING IN OTHER EXPIRATIONS

Under Rule 552 traders are allowed to execute personal trades in unrestricted expirations of the commodity in which they are executing customer orders. For example, during August, a trader could be executing customer orders in September deutsche marks, while executing personal trades in December deutsche marks (albeit not while holding an executable customer order). If traders have developed particular skills for a certain commodity, intra-pit migration may be the least cost solution for continued personal trading by dual traders. Moreover, if dual traders are able to extract valuable information from their customer orders [as, for example, in the model of Fishman and Longstaff (1992)] this migration to other expirations, whose prices reflect the same underlying value, represents a natural profitable alternative to the restricted expiration. However, in the currencies, the restricted lead month is by far the most active, with generally light trading in other expirations until the week prior to expiration, when the restriction rolls forward to the next contract. Due to relatively thin trading and low

liquidity, it may not be profitable for dual traders to execute profitable personal trades in the out months of these currencies.

Each group's daily volume of personal trading in the non-lead months of their home pit is calculated. In addition, the total volume of customer trading in the non-lead months of the currencies is calculated. Customer volume is used to normalize the group's personal trading. The daily ratio of the group's personal trading to total customer trading in the non-lead months of each currency is calculated. A *t*-statistic is formed to test the hypothesis that the mean daily ratio is equal in the pre- and post-552 periods.

The results of this analysis are presented in Table III. The first column contains the *t*-statistic for the short-run test. The second column contains the associated probability value under the null hypothesis. The third and fourth columns contain similar data for the long-run test. A positive value for the *t*-statistic indicates that the ratio of the group's personal trading to total customer trading in the non-lead months of their home pit is higher in the post-552 period.

In the short run, seven of eight *t*-statistics for dual trader groups are positive, although only two of these are significant at the 10% level. For

**TABLE III**
Personal Trading in Non-Lead Months

| | | *Short Run* | | *Long Run* | |
|---|---|---|---|---|---|
| *Group* | *Currency* | *t-Statistics* | *Prob Value* | *t-Statistics* | *Prob Value* |
| DUAL-1 | A | 0.401 | 0.6903 | −1.410 | 0.1607 |
| | B | 1.973 | 0.0574 | 2.867 | 0.0046 |
| | C | 0.553 | 0.5827 | −1.117 | 0.2660 |
| | D | 1.283 | 0.2098 | 0.494 | 0.6221 |
| DUAL-2 | A | −2.107 | 0.0435 | −2.522 | 0.0128 |
| | B | 0.146 | 0.8847 | −3.348 | 0.0010 |
| | C | 1.320 | 0.1971 | 0.251 | 0.8023 |
| | D | 1.882 | 0.0686 | −1.244 | 0.2144 |
| BROKER | A | 1.439 | 0.1608 | −1.601 | 0.1119 |
| | B | −0.190 | 0.8498 | −1.025 | 0.3064 |
| | C | −0.492 | 0.6255 | −0.678 | 0.4986 |
| | D | −1.221 | 0.2319 | 0.915 | 0.3612 |

Each group's volume of trading in non-lead months of the currency in which they normally trade is summed for each day. To adjust for daily changes in customer volume, this sum is divided by total customer volume in the non-lead months of the currency. These ratios are used in calculating the average participation rate in non-lead expirations. The *t*-statistic tests the hypothesis that the mean participation rate is equal in the pre- and post-552 periods. The prob value is the probability of obtaining the *t*-statistic under the null hypothesis of equal means. The short run is April 8, 1991, to July 1, 1991, and the long run is November 11, 1990, to November 30, 1991.

one group there is a significant short-run decrease in personal trading in non-nearby expirations. In the long run, only in Currency B, for DUAL-1, is there a slight but significant increase in personal trading in the out months. For two groups there is a significant decrease. These results suggest that personal trading in non-nearby expirations of these currencies is not used as an alternative for these dual traders personal trading.

## PERSONAL TRADING IN OTHER PITS

Depending on their membership status, floor traders may trade a variety of commodities on the CME. Previously, Kuserk and Locke (1993) found that there was little inter-pit migration of floor traders, at least of those identified as scalpers (locals). This section analyzes the extent of personal trading migration by dual traders restricted by Rule 552. The groups' personal trading each day on all CME futures is calculated, with separate analysis performed for groups of futures covered by different memberships. The hypotheses that the groups' personal trading around the CME floor is constant before and after the implementation of 552 are tested. To control for changes in customer volume each group's daily personal trading in the various pits is divided by the daily total customer volume in those pits.

A $t$-statistic is formed to test the hypothesis that the propensity for CME-wide personal trading of the group is equal in the pre- and post-552 period. Table IV presents these $t$-statistics and related prob-values, in a layout similar to Table II.

Consider first some interesting points from the short-run results in Panel A. Since the traders were identified by trading in their home pit, it is not surprising to find a significant decline in home pit personal trading by 7 of the 8 DUAL-1 and DUAL-2 groups. For five of these eight groups there is a significant increase in personal trading volume in other IMM commodities. There is no evidence of an increase in trading agricultural commodities. For two broker groups there is a significant decline in home pit personal trading. One of these groups has a significant increase in IMM trading.

The long-run results in Panel B are consistent with the short run. The decline in home pit personal trading corresponds to an increase in personal trading in other IMM pits. This evidence supports the notion that these currency traders generally hold IMM memberships rather than full CME memberships. However, post-552 IMM personal trading appears lighter proportionally than pre-552 home pit personal trading.

**TABLE IV**
Personal Trade Executions

| Group | Pit Category | Currency A t-Stat | Currency A Prob | Currency B t-Stat | Currency B Prob | Currency C t-Stat | Currency C Prob | Currency D t-Stat | Currency D Prob |
|---|---|---|---|---|---|---|---|---|---|
| *Panel A: Short-Run Changes in Personal Trading Volume* | | | | | | | | | |
| DUAL-1 | Home pit | −9.399 | 0.0001 | −4.112 | 0.0002 | −10.561 | 0.0001 | −11.342 | 0.0001 |
| | Agricultural | −1.000 | 0.3256 | — | — | −2.781 | 0.0079 | — | — |
| | Other IMM | 2.885 | 0.0064 | 2.635 | 0.0118 | 3.355 | 0.0022 | 3.375 | 0.0021 |
| | All pits | −10.168 | 0.0001 | 1.218 | 0.2303 | −11.099 | 0.0001 | −9.095 | 0.0001 |
| DUAL-2 | Home pit | −6.213 | 0.0001 | −0.942 | 0.3506 | −2.151 | 0.0366 | −7.118 | 0.0001 |
| | Agricultural | −2.299 | 0.0255 | −1.013 | 0.3195 | — | — | — | — |
| | Other IMM | 0.595 | 0.5558 | −1.336 | 0.1870 | 1.287 | 0.2061 | 3.274 | 0.0027 |
| | All pits | −6.816 | 0.0001 | −1.543 | 0.1287 | −2.896 | 0.0060 | −6.979 | 0.0001 |
| BROKER | Home pit | 0.089 | 0.9293 | −2.363 | 0.0215 | −0.162 | 0.8721 | −4.970 | 0.0001 |
| | Agricultural | — | — | 0.814 | 0.4217 | — | — | — | — |
| | Other IMM | −1.319 | 0.1975 | −1.412 | 0.1650 | 1.566 | 0.1242 | 2.688 | 0.0118 |
| | All pits | −0.722 | 0.4737 | −2.998 | 0.0043 | 1.472 | −0.1483 | −5.053 | 0.0001 |
| *Panel B: Long-Run Changes in Personal Trading Volume* | | | | | | | | | |
| DUAL-1 | Home pit | −17.183 | 0.0001 | −9.335 | 0.0001 | −16.861 | 0.0001 | −12.455 | 0.0001 |
| | Agricultural | −1.401 | 0.1635 | −1.000 | 0.3191 | −11.420 | 0.0001 | 1.000 | 0.3193 |
| | Other IMM | 1.364 | 0.1738 | 1.906 | 0.0578 | 6.303 | 0.0001 | 3.570 | 0.0005 |
| | All pits | −17.061 | 0.0001 | −0.392 | 0.6951 | −20.525 | 0.0001 | −16.750 | 0.0001 |
| DUAL-2 | Home pit | −7.127 | 0.0001 | −5.756 | 0.0001 | 2.476 | 0.0143 | −10.945 | 0.0001 |
| | Agricultural | −8.009 | 0.0001 | −0.924 | 0.3566 | — | — | −0.917 | 0.3600 |
| | Other IMM | 1.071 | 0.2858 | −5.846 | 0.0001 | −1.058 | 0.2917 | 5.013 | 0.0001 |
| | All pits | −9.011 | 0.0001 | −6.314 | 0.0001 | 1.252 | 0.2122 | −9.742 | 0.0001 |
| BROKER | Home pit | 2.732 | 0.0067 | −6.901 | 0.0001 | 1.893 | 0.0603 | −0.073 | 0.9418 |
| | Agricultural | — | — | 1.357 | 0.1771 | −1.000 | 0.3191 | — | — |
| | Other IMM | −4.563 | 0.0001 | 0.529 | 0.5972 | −1.166 | 0.2445 | −2.736 | 0.0066 |
| | All pits | 0.154 | 0.8776 | −4.635 | 0.0001 | −0.442 | 0.6587 | −1.984 | 0.0484 |

Daily personal trading in all CME futures is calculated by group. In addition, customer trading is calculated for the various pit-types relevant to the group. The pit-types are (1) Home pit—pit in which the trader was identified; (2) Agricultural; (3) Other-IMM pits— all IMM pits except for the trader's home pit; and (4) All pits combined. An observation is the ratio of personal trading by the group to customer trading in the pit category. The *t*-statistic tests the hypothesis that the mean personal trading in the pre- and post-552 period is equal, as a ratio of daily customer volume. The prob value is the probability of obtaining the *t*-statistic under the null hypothesis. The short run is April 8, 1991, to July 1, 1991, and the long run is November 11, 1990, to November 30, 1991.

This fact is apparent in the all pit statistics, where there is a general significant decline in personal trading by the dual trader groups.

Under Rule 552 floor traders are allowed to execute personal trades in futures options while executing customer orders in a restricted futures market. Tests to determine whether the traders have increased their options volume after the implementation of Rule 552, unreported, are inconclusive due to extremely sparse options trading by these traders.

The overall results of the analysis of personal trading by dual traders indicates that they have significantly reduced their personal trading after the implementation of Rule 552. This conclusion is particularly evident in the "All Pit" results. There is some evidence of dual traders shifting personal trading to other commodities, especially other IMM futures. However, average personal trading of these dual traders has declined, when all CME futures are considered together. Since customer volume fell over the period, these results also indicate a fall in the level of personal trading. One interpretation of these results is that they indicate the presence of high start-up costs associated with moving personal trading to other futures when dual trading is prohibited in a particular commodity.

## TRADING REVENUE

This section analyzes the extent to which rule 552 affects the trading revenues of dual traders. Given that personal volume has fallen dramatically, the expectation is that trading revenues have fallen in a similar fashion. Daily revenues are measured for groups both in their home pit as well as in all CME pits. Revenues are measured by identifying all trades executed by the group which indicate trading for a personal account. Daily revenues for the group are calculated based on that day's trading by the group. Any open position for the group that day is marked to market using CME settlement prices. This procedure was used by Fishman and Longstaff (1992) and Chang and Locke (1992). Finally, the ratio of the group's revenues to the number of group members trading that day is formed.

Daily revenues are calculated by group for their home pit trading and trading in all pits, over all commodities and expirations. A $t$-statistic is formed to test the hypothesis that the mean daily revenue per trader is equal in the pre- and post-552 periods. In addition, a non-parametric Wilcoxon-Z statistic (distributed standard normal) is calculated to test the hypothesis that median revenue per trader is equal in the pre- and post-552 periods.

Results are presented in Table V. Panel A contains results for tests of the mean and median daily revenue per trader over the shot run, with long-run results in Panel B. The third column under each currency contains the two statistics, and adjacent to the $t$-statistic is the probability value under the null hypothesis associated with the $t$-statistic. Note

**TABLE V**

Daily Revenue

*Panel A: Short-Run Changes in Daily Revnue*

| | | *Currency A* | | | *Currency B* | | | *Currency C* | | | *Currency D* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Pit* | *Average Revenue* | | *t (prob value)* | *Average Revenue* | | *t (prob value)* | *Average Revenue* | | *t (prob value)* | *Average Revenue* | | *t (prob value)* |
| *Group* | *Category* | *Pre-552* | *Post-552* | Z | *Pre-552* | *Post-552* | Z | *Pre-552* | *Post-552* | Z | *Pre-552* | *Post-552* | Z |
| | Home pit | −3.10 | −48.23 | −0.242 (0.8102) | 260.28 | −1.85 | −1.362 (0.1836) | 59.21 | −25.25 | −1.642 (0.1069) | −42.98 | −9.45 | 0.423 (0.6741) |
| DUAL-1 | | | | −1.175 | | | −2.122 | | | −1.604 | | | −0.111 |
| | All pits | 16.02 | −6.72 | −0.232 (0.8178) | 180.16 | −194.33 | −1.390 (0.1703) | 24.80 | −7.76 | −1.931 (0.0584) | −12.46 | 3.74 | 0.312 (0.7571) |
| | | | | −1.028 | | | −1.205 | | | −2.210 | | | −0.022 |
| | Home pit | 65.28 | −8.70 | −0.955 (0.3453) | 150.92 | 29.20 | −1.452 (0.1546) | −507.47 | −251.92 | 0.354 (0.7248) | −9.94 | 44.90 | 0.791 (0.4336) |
| DUAL-2 | | | | −1.560 | | | −2.447 | | | −0.111 | | | 1.309 |
| | All pits | −7.50 | 23.66 | 0.845 (0.4032) | 64.67 | −3.07 | −2.039 (0.0475) | −352.68 | −25.75 | 0.519 (0.6068) | −2.12 | 39.70 | 0.661 (0.5130) |
| | | | | 0.347 | | | −2.476 | | | −0.037 | | | 1.249 |
| | Home pit | 80.67 | −61.38 | −1.825 (0.0733) | 13.98 | −3.75 | −1.042 (0.3053) | −25.42 | 8.43 | 1.251 (0.2180) | 21.97 | 14.22 | −0.717 (0.4766) |
| BROKER | | | | −2.884 | | | 0.517 | | | 0.281 | | | −1.561 |
| | All pits | 69.00 | −42.63 | −1.844 (0.0707) | 2.40 | −0.43 | −0.840 (0.4068) | −18.60 | 22.09 | 1.385 (0.1718) | 16.75 | 10.12 | −0.773 (0.4428) |
| | | | | −2.795 | | | 0.244 | | | 1.013 | | | −1.449 |

*Panel B: Long-Run Changes in Daily Revnue*

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Home pit | 80.67 | −65.84 | −1.806 (0.0723) | 87.87 | −46.07 | −2.112 (0.0359) | 69.15 | 18.17 | −1.234 (0.2183) | −10.09 | −4.32 | 0.245 (0.8064) |
| DUAL-1 | | | | −2.705 | | | −2.276 | | | −3.944 | | | 0.157 |
| | All pits | 80.40 | −66.34 | −2.057 (0.0410) | 356.17 | 132.17 | −1.359 (0.1735) | 28.83 | 5.55 | −1.287 (0.1992) | 4.58 | −7.16 | −0.683 (0.4955) |
| | | | | −2.881 | | | −2.080 | | | −4.793 | | | −0.423 |
| | Home pit | 104.45 | −112.10 | −2.915 (0.0041) | 122.68 | 18.95 | −1.756 (0.0804) | 149.91 | 323.39 | 0.383 (0.7024) | 24.09 | 40.02 | 0.424 (0.6724) |
| DUAL-2 | | | | −3.962 | | | −3.993 | | | −1.280 | | | −0.651 |
| | All pits | 11.53 | −39.18 | −1.149 (0.2521) | 46.20 | 7.71 | −1.702 (0.0901) | 27.12 | 401.76 | 0.937 (0.3499) | 25.44 | 9.04 | −0.836 (0.4040) |
| | | | | −0.881 | | | −3.019 | | | −0.729 | | | −1.257 |
| | Home pit | 41.94 | −10.94 | −1.821 (0.0698) | −30.03 | −7.95 | 1.041 (0.2996) | −13.95 | 4.25 | 0.602 (0.5479) | 9.17 | −2.87 | −1.345 (0.1800) |
| BROKER | | | | −1.989 | | | −1.568 | | | 1.115 | | | −1.608 |
| | All pits | 17.35 | −7.00 | −1.526 (0.0707) | −4.73 | −2.42 | 0.651 (0.5162) | 30.48 | −14.80 | −1.086 (0.2791) | 8.69 | −6.19 | −1.955 (0.0517) |
| | | | | −1.542 | | | −2.225 | | | −1.239 | | | −1.975 |

Daily trading revenue is computed by group (with daily open positions marked to settlement). Daily revenue for the group is divided by the number of traders in the group to obtain revenue per trader for each group each day. The *t*-statistic tests for the equality of mean daily revenue per trader across periods. The prob value is the probability of obtaining the *t*-statistic under the null hypothesis. The Wilcoxon-Z tests for the equality of medians across periods. The short run is April 8, 1991, to July 1, 1991, and the long run is from November 1, 1990, through November 30, 1991.

that some average revenues are negative. Trading revenue is derived from a combination of error trading and discretionary personal trading, and can easily be negative.[5] In the short run, there are few instances of a significant decline in either the mean or median trading revenues. The lack of significant differences may be due to a relatively high variance in daily trading revenue, especially in the short run. In particular, when home pit revenue is calculated, the fall in median revenue for DUAL-1 is only significant for Currency B.

The revenue effects of rule 552 are more apparent in the long run. For DUAL-1, the Wilcoxon-Z statistic is significant at the 5% level for Currencies A, B, and C. For currency A there is a significant fall in Broker's home pit and all pit revenue. There is also some evidence of a decline in revenue for DUAL-2, in Currencies A and B.

Overall, these results reveal that, in both the short and long run, dual traders tend to suffer a fall in personal trading profits when their personal trading is restricted. While this is expected in their home pit, these traders are also shown not choosing to substitute personal trading in other pits to attempt to make up the lost revenue. These results on personal trading income corroborate the evidence of a decline in trading volume. In general, dual traders' personal trading as well as income are lower after the implementation of Rule 552.

## TRADING QUALITY

The above analysis is concerned with the revenue generated from personal trading. This section focuses on the per contract revenue earned by dual traders through their personal trading as a measure of trading quality. If dual traders are making a market with their personal trades and this skill is easily transferable to other pits, then revenue per contract need not be affected by Rule 552. This may be true even though daily trading volume and revenue declines. In other words, the decline in daily trading revenue could be due solely to the fall in volume and not due to a loss in the trading ability of dual traders.

Revenue per contract is measured both in particular pit categories, and overall. Each group's daily trading revenue in a contract month is calculated as above, again marking to settlement any intraday trading imbalances. Daily revenues are divided by the number of round trips (the maximum of contracts bought and sold) for the group for that day in

[5]Kuserk and Locke (1993) find that approximately 1/4 of all scalper trading days result in negative revenues. These dual traders are at most part-time scalpers, and may be day traders. Their incomes need not be greater than scalpers, and certainly need not be positive on all or even most days.

that contract month.[6] Average revenue per contract is calculated across contract months for each group by day, weighted by the number of round trips in each contract month.[7] The group's daily revenues per contract is used in the analysis of this section. Such a measure was used by Fishman and Longstaff (1992) and Chang and Locke (1992) as a measure of relative trader performance.

Table VI presents the average revenue per contract by group, by home pit and all pits, in the short and long run. The layout of Table VI is similar to Table V. The *t*-statistic and Wilcoxon-Z statistic test for equality of mean and median revenue per contract in the pre- and post-552 periods. Adjacent to the *t*-statistic is the associated probability value for obtaining this value under the null hypothesis.

In the short run there is little evidence of a decline in the trading ability of dual traders. Some point estimates of mean revenue per contract decline, but only one statistic, the Wilcoxon-Z for Currency C, All Pit, Dual-2, is significant. Further, the DUAL-2 group in Currency D shows a significant increase in average trading quality. Panel B presents the results for the long run. There is a significant decline in trading quality for DUAL-1 in Currency B and C. Other statistics suggest mixed results.

Overall, these results on personal trading quality suggest that the fall in trading revenue may be partially due to the inability of dual traders to execute profitable personal trades in other markets. Dual traders may be marketmaking with their personal trades, in which case this talent may be transferable to other pits. Of course, the ability to enter other pits to make a market may be limited by marketmaker competition in those pits. On the other hand, if dual traders are reacting to commodity specific information inherent in their customer orders, then this personal trading strategy is not readily transferable to other commodities. Under this second scenario both the per contract and total revenues may decline under a dual trading restriction. The results of this section offer mixed evidence for this debate.

[6]Recall that revenues are calculated by marking open (unbalanced) positions to market at settlement. Thus, the maximum of contracts bought and sold is the proper denominator to calculate unit profits.

[7]For example, suppose that on DAY 1 group X earns $100 on 10 round trips in the yen pit, $50 on two round trips in the mark pit, and $40 on one round trip in live cattle. Daily income on DAY 1 is $190, and revenue per contract is $14.62. On DAY 2, group X earns income of –$180 on 10 round trips in the yen pit, with no other trading. Daily trading revenue on DAY 2 is –$180, while revenue per contract is –$18. These two days results in an average daily revenue of $5, and an average revenue per contract of –$1.69.

**TABLE VI**

Revenue Per Contract

*Panel A: Short-Run Changes in Revnue Per Contract*

| | | *Currency A* | | | *Currency B* | | | *Currency C* | | | *Currency D* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Group* | *Pit Category* | *Average Revenue Pre-552* | *Post-552* | *t (prob value) Z* | *Average Revenue Pre-552* | *Post-552* | *t (prob value) Z* | *Average Revenue Pre-552* | *Post-552* | *t (prob value) Z* | *Average Revenue Pre-552* | *Post-552* | *t (prob value) Z* |
| DUAL-1 | Home pit | −0.41 | 0.88 | 0.032 (0.9748)<br>−0.000 | 24.30 | 13.42 | −0.367 (0.7155)<br>1.503 | 7.79 | −29.89 | −0.967 (0.3417)<br>−0.510 | −2.09 | −9.42 | −0.607 (0.5475)<br>1.327 |
| | All pits | 0.79 | −3.32 | −0.101 (0.9204)<br>−0.096 | 23.86 | 3.81 | −0.798 (0.4286)<br>0.864 | 8.87 | −20.54 | −1.246 (0.2223)<br>−2.122 | −2.23 | −2.86 | −0.030 (0.9763)<br>−1.057 |
| DUAL-2 | Home pit | 7.49 | −1.61 | −0.707 (0.4834)<br>−0.190 | 12.91 | 1.97 | −0.727 (0.4727)<br>−0.614 | −22.15 | −21.66 | 0.013 (0.9900)<br>0.016 | −4.54 | 43.19 | 1.704 (0.0999)<br>−2.182 |
| | All pits | 2.08 | 1.01 | −0.106 (0.9164)<br>0.481 | 12.06 | −7.85 | −1.067 (0.2945)<br>−0.806 | −28.54 | −32.72 | −0.098 (0.9922)<br>−0.000 | −3.92 | 38.94 | 2.487 (0.0187)<br>−2.249 |
| BROKER | Home pit | 81.03 | −23.67 | −1.526 (0.1361)<br>2.194 | 6.36 | −1.31 | −0.502 (0.6176)<br>−0.111 | −30.45 | 29.26 | 1.280 (0.2068)<br>−0.417 | 25.81 | 82.53 | 1.361 (0.1848)<br>0.460 |
| | All pits | 142.84 | −55.48 | −2.336 (0.0239)<br>2.476 | 3.71 | −3.89 | −0.565 (0.5740)<br>−0.259 | −83.72 | 5.76 | 1.046 (0.3022)<br>−1.006 | 26.83 | 23.14 | −0.138 (0.8911)<br>1.190 |

*Panel B: Long-Run Changes in Revnue Per Contract*

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DUAL-1 | Home pit | 9.57 | 69.57 | 1.140 (0.2568)<br>−0.686 | 4.95 | −0.274 | −0.515 (0.6068)<br>−2.250 | 7.17 | −10.08 | −1.640 (0.1032)<br>−2.558 | −1.97 | −1.12 | 0.117 (0.9073)<br>−0.714 |
| | All pits | 9.88 | 11.69 | 0.091 (0.9273)<br>−1.220 | 26.87 | −9.78 | −1.921 (0.0561)<br>−2.102 | 7.46 | −5.54 | −1.868 (0.0636)<br>−3.346 | −1.79 | −5.37 | −0.279 (0.7810)<br>−1.589 |
| DUAL-2 | Home pit | 7.61 | −17.62 | −2.150 (0.0333)<br>−1.659 | 7.61 | −1.83 | −1.504 (0.1343)<br>−1.882 | 35.43 | 23.83 | −0.349 (0.7276)<br>1.337 | 5.57 | −4.62 | −0.481 (0.6316)<br>0.919 |
| | All pits | 1.75 | −9.72 | −1.030 (0.3045)<br>−0.381 | 10.21 | 0.39 | −1.570 (0.1179)<br>−1.082 | 30.50 | 20.40 | −0.358 (0.7208)<br>1.112 | 5.01 | −13.00 | −1.385 (0.1682)<br>0.382 |
| BROKER | Home pit | 38.91 | −0.66 | −1.774 (0.0782)<br>2.098 | −12.95 | −5.70 | 0.679 (0.4981)<br>−1.960 | −25.55 | −2.08 | 0.552 (0.5815)<br>1.814 | −8.34 | 11.19 | 1.003 (0.3169)<br>−1.531 |
| | All pits | 36.50 | −8.92 | −1.878 (0.0619)<br>1.736 | −14.86 | −6.73 | 0.638 (0.5241)<br>2.517 | −14.13 | −27.15 | −0.405 (0.6855)<br>−0.545 | 6.39 | 2.92 | −0.214 (0.8311)<br>−2.391 |

Daily trading revenue is computed by group (with daily open positions marked to settlement). Daily revenue is divided by the group's round trip personal volume (maximum of contracts bought and sold) to obtain revenue per contract for each group in each contract each day. Then for each group each day average revenue per contract is formed as the weighted average across contracts, with round trip volume as the summing weight. The *t*-statistic tests for the equality of means across periods. The prob value is the probability of obtaining the *t*-statistic under the null hypothesis. The Wilcoxon-Z tests for the equality of medians across periods. The short run is April 8, 1991, to July 1, 1991, and the long run is from November 1, 1990, through November 30, 1991.

## CONCLUSIONS

This study examines changes in the trading behavior of a selected group of CME floor traders since the implementation of Rule 552. The analysis focuses on the customer order execution and personal trading of the traders most affected by Rule 552. The data comprise the records of these floor traders' activities in all CME commodities for one year. The results point to significant changes in the trading behavior of dual traders. The results offer no support for the hypothesis that dual traders gain a greater share of customer order execution when their personal trading is restricted. There is also little evidence of a shift of personal trading to other commodities by the former dual traders. Also, personal trading in unrestricted expirations of these currencies is not used as an alternative for these dual traders.

These results suggest that dual traders posses valuable skills and information related to the particular commodity they are trading. In both the short and long run, dual traders tend to suffer a fall in personal trading income when their personal trading is restricted to markets in which they do not execute customer orders. In other words, dual traders' personal trading strategies appear to be specific to the commodities in which they generally trade. This evidence should be taken into consideration in the dual trading debate. If dual trading restrictions are costly to dual traders in high volume markets, then there are reasons to believe that such restrictions will have similar personal costs, perhaps resulting in pronounced market-wide effects, on less liquid markets.

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