Internet Appendix to "Momentum, Reversal, and Uninformed Traders in Laboratory Markets"*

I. Instructions for Experiment One

Overview

During this session, you will trade shares in 12 different securities (one at a time) for 280 seconds each. Your gains and losses from the session will be denominated in "laboratory dollars." After trading shares in all securities, we will ask you a series of questions about your experience. The entire session should take about 75 minutes. Please do not talk with other subjects, look at others' computer screens, or leave the room without explicit permission from the experiment administrator.

Unrealized Loss Limits

This session is largely identical to one that you participated in earlier this semester. The primary difference is that for some of the securities you trade there will be a limit imposed on the amount of unrealized losses you can have. If you reach that limit, you will be forced to liquidate your shares—bringing your exposure to zero. Four of the securities you trade will not have an unrealized loss limit. Of the other eight securities you trade, four will have an unrealized loss limit of 100 and four will have a limit of 500.

The remainder of these instructions describes aspects of the markets that are unchanged since your last trading session.

Liquidating Disbursement

Each security will pay a *liquidating disbursement* at the end of the 280-second trading phase for that security. The amount of the disbursement will be determined over the course of trading. The *disbursement level* will begin at $500 and will go up or down by $1 on average once per second; however, you will not be told during trading the level of the disbursement. At the end of trading (after 280 seconds) each outstanding share will be converted into the liquidating disbursement equal to the ending disbursement level (which is announced with 10 seconds left of trading).

The changes in disbursement level are positively correlated. Each change in disbursement level will have a 95% chance of being in the same direction as the previous change. That is, if the disbursement level goes up by $1, there is a 95% chance that the next change will also be an increase of $1. Alternatively, if the disbursement level goes down by $1, there is a 95% chance that the next change will also be a decrease of $1. In other words, given a disbursement level

change, you would expect the disbursement level to continue to change in the same direction for about 19 more seconds.

Market Price
When you buy and sell shares, you will be trading with a computerized *dealer*. The dealer will sell you shares at $1 above market price (the *ask* price), and will buy shares at $1 below market price (the *bid* price). The *market price* is not the same as the disbursement level for the security. Market price is determined (approximately) as follows:

Market Price = 500 + (# of buys - # of sells) / (critical trade imbalance).

A *trade imbalance* occurs when traders are buying more than they are selling, or selling more than they are buying. **In today's session, market price will move by $1 as soon as there is a trade imbalance of 8 shares (i.e. "critical trade imbalance" = 8).**

Traders
In addition to the dealer and the human traders, there will be one computerized *robot* trader participating in the market. All human traders receive the same information. The robot receives information regarding the direction of the disbursement level changes and follows the following trading strategy based on those directions, *regardless of what the market price is at the time of the disbursement level change*:
- If the disbursement level goes down by $1, the robot will sell 8 shares (moving the price down by $1).
- If the disbursement level goes up by $1, the robot will buy 8 shares (moving the price up by $1).

Trading Gains and Losses
You start trading each security with no shares. Negative share balances are permitted, so you can sell shares you don't own ("short selling"). There are no cash constraints, so you can buy as many shares as you want. If you have a positive share exposure when the liquidating disbursement is paid, you will receive the amount equal to the liquidating disbursement for each share you hold. If you have a negative share exposure at the time of liquidating disbursement, you must pay an amount equal to the liquidating disbursement for each share you are "short."

There are two ways to generate trading gains in this market:
- Buy a share and then sell it for more than you paid.
- Sell a share and then buy it back for less than you paid.

You can implement these strategies using very short holding periods (for example, selling a share and buying it back very quickly), or longer holding periods (for example, selling a share and buying it back after waiting for a while). The longest holding period would entail buying or selling a share and holding it until the liquidating disbursement is paid, so that you would close out your position at the liquidating disbursement amount.

How to Trade
You can trade shares by buying or selling, as follows:

- Click the "Buy 1" button to buy 1 share at the ask price ($1 above the market price).
- Click the "Buy 2" button to buy 2 shares at the ask price ($1 above the market price).
- Click the "Sell 1" button to sell 1 share at the bid price ($1 below the market price).
- Click the "Sell 2" button to sell 2 shares at the bid price ($1 below the market price).

Note: Since each trade has the potential to move price (if the trade imbalance is near the critical trade imbalance), if you buy or sell shares using the "Buy 2" or "Sell 2" buttons, it is possible that the purchase or sale prices on your shares won't be the same for both shares. Further, if the market price is moving rapidly, your trade might not be executed the first time you press the buy or sell buttons. You can always tell if you successfully bought or sold a share by watching the trade indicator banner at the top right-hand side of the screen, or by watching the trade history spreadsheet at the lower left-hand side of the screen.

Information Spreadsheet
The grey, purple, and yellow spreadsheet in the upper center of the screen contains information regarding your trades, as well as information regarding market activity.

Trading Activity
This section indicates how many shares you have bought (a positive number) and sold (a negative number)—as well as how many shares in total have been bought and sold by all five humans and the robot—for this security. The "Net Exposure" indicates your current exposure as well as the total of the exposures of the five human traders and the robot.

Information Release
The final disbursement level (with 10 seconds left of trading) will be given in this section.

Financial Measures
- Your a*verage cost/revenue* indicates the average you paid or received for each share you hold ("Average Cost" if your share balance is positive or "Average Revenue" if your share balance is negative). This line shows "na" if your share balance equals 0.
- Your *realized gain/loss* is a running total of your trading gains and losses (before the liquidating disbursement).
  - A trade that reduces your exposure (making a positive exposure less positive or a negative exposure less negative) adds to your realized gain/loss if you sell for more than your average cost or buy for less than your average revenue.
  - A trade that reduces your exposure reduces your realized gain/loss if you sell for less than your average cost or buy for more than your average revenue.
- Your *unrealized gain/loss* is a running total of the additional trading gains and losses you would have if you traded away all your exposure at the current market price.
  - If you have an unrealized loss, a red percentage number will appear next to the unrealized loss indicating how close you are to the limit. Once the number reaches 1.000 (100%) you have reached the unrealized loss limit and you will be forced to liquidate your shares.
- Your *share exposure* is your share balance and can be positive or negative. The more positive or negative your share exposure is at the end of trading, the more your final

wealth will depend on the size of the liquidating disbursement. (The following page shows two examples of how the above financial measures are calculated.)
- o A positive share exposure at the end of trading means that you will gain money if the liquidating disbursement is higher than your average cost, but that you will lose money if the disbursement is lower than your average cost.
- o A negative exposure indicates that you will lose money at the end of trading if the liquidating disbursement is higher than your average revenue, but that you will gain money if the disbursement is lower than your average revenue.

EXAMPLE 1

You buy 2 shares for $500 each • Share Exposure = 2 shares • Average Cost = $500 • Realized Gain/Loss = 0	
You buy another share for $530 • Share Exposure = 3 shares • Average Cost = $510 • Realized Gain/Loss = 0 (unchanged)	**INSTEAD of buying, you sell 1 share at $530** • Share Exposure = 1 share • Average Cost = $500 (unchanged) • Realized Gain/Loss = $30

EXAMPLE 2

You sell 2 shares for $500 each • Share Exposure = -2 shares • Average Revenue = $500 • Realized Gain/Loss = 0	
If you sell another share for $530 • Share Exposure = -3 shares • Average Revenue = $510 • Realized Gain/Loss = 0 (unchanged)	**INSTEAD of selling, you buy 1 share at $530** • Share Exposure = -1 share • Average Revenue = $500 (unchanged) • Realized Gain/Loss = -$30

Market Information Charts
The chart at the lower right-hand corner of the screen shows market prices, trading volume, and bid-ask spreads over time. You can adjust the time interval aggregation on the chart (from 1 to 20 seconds). To get an updated chart, click the "Reset chart" button.

Converting Laboratory Dollars into U.S. Dollars
You will start the session with US$30. If your trading performance is poor, you can lose up to $30 of that money. If your trading performance is strong, your payment will be larger than $35. Your final winnings will be calculated as follows:

US$ Winnings = US$30 + [(Laboratory$ + adjustment) x Exchange Rate].

You are guaranteed a minimum payment of US$5. The exchange rate is positive, meaning that the more laboratory dollars you win, or the fewer you lose, the more US$ you take home. The exchange rate and adjustment are set so that the average winnings will be approximately US$35.

II. Instructions for Experiments Two and Three (that Differ from Experiment One)

Value and Information
The value begins at $500 for the first security; all other securities begin at the final value of the previous security. After the start of trading, the value of each security changes every three seconds by the sum of 12 random numbers, each taking on values of -2, -1, 0, 1, 2 with equal likelihood.

Every market includes traders who see "news" about current value every two seconds. The news for each of these traders consists of some (but not all) of the most recent random numbers. News follows these rules:
- All traders see the news with a slight delay that is, on average, the same for all traders. Thus, no trader who sees news sees "better" or "newer" information than the others who see news. So everyone who sees news sees some news before anyone else has seen it, other news after everyone else who sees news has seen it, and yet other news before some people but after others.
- Any given piece of news is seen at different times by different traders.
- Eventually, every piece of news is seen by all traders who see news, except for the very first and very last changes in each period.

Your market may also include traders who don't see news at all. The experiment administrator will tell you how many traders who do and don't see news are in your market.