Once Burned, Twice Shy: How Pride and Regret Affect the Repurchase of Stocks Previously Sold

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Abstract

We establish two previously undocumented patterns in the purchase selections of individual investors and confirm a related pattern. These patterns hinge on investors' previous experience with a stock. We demonstrate that investors prefer to: (1) repurchase stocks they previously sold for a gain rather than stocks they previously sold for a loss, (2) repurchase stocks that have lost value subsequent to a prior sale, rather than stocks that have gained value subsequent to a prior sale, and (3) purchase additional shares of stocks that have lost value since being purchased, rather than additional shares of stocks that have gained value since being purchased. We document these trading patterns by analyzing trading records for 66,465 households at a large discount broker between January 1991 and November 1996, and 665,533 investors at a large retail broker between January 1997 and June 1999. We propose that these trading patterns are driven by investors' desire to limit the degree of regret they experience in association with unsuccessful trades and increase feelings of pride and satisfaction associated with successful trades. Investor returns do not reliably benefit from any of the three trading patterns we document.

Past actions and outcomes affect our decision making in ways that sometimes make little economic sense. For example, people routinely respond to sunk costs by making additional investments even when a project's economic prospects do not justify additional investment (Straw, 1976, 1981). And consumers who previously missed an opportunity to purchase a good at a discount are less likely to purchase that same good at a small discount if the foregone discount was large. The latter phenomenon is an example of inaction inertia and can be explained by people's tendency to avoid either experienced or anticipated regret (Tykocinski and Pittman 1998, 2001, McConnell et. al., 2000, Arkes, Kung, and Hutzel, 2002)..

Analyzing trading records for 66,465 individual investors with accounts at a large discount brokerage and 665,533 individual investors with accounts at a large retail brokerage, we find that the decisions of individual investors to repurchase stocks they previously sold are affected by whether they sold for a gain or a loss and whether the stock has appreciated or fallen since sold. Investors are half as likely to buy a stock that they sold in the previous year if that sale was for a loss. Furthermore, investors are half to two-thirds as likely to buy a stock they sold in the previous year for a gain if the stock is now trading at a higher price than they sold it for. For stocks previously sold for a loss, subsequent performance has little effect on the repurchase rate. The repurchase of additional shares of a stock currently owned, depends upon the original purchase price. Investors are less likely to buy a stock they currently own if that stock is now trading at a higher price than they originally paid. The repurchase behaviors we document are are consistent with investors' making choices that help to avoid feelings of both anticipated and experienced regret and to increase feelings of pride and satisfaction.

Tykocinski, Pittman, and Tuttle (1995) define *inaction inertia* as occurring "when bypassing an initial action opportunity decreases the likelihood that subsequent similar action opportunities will be taken." For example, in one of their experiments, subjects are presented with a hypothetical scenario in which they have an opportunity to purchase a ski pass usually costing $100 for $90. Those who failed to take advantage of an earlier opportunity to buy the pass for $40 are less likely to buy it for $90 than those who missed an earlier opportunity to buy it for $80. In variations of their experiment, Tykocinski,

Pittman, and Tuttle (1995) (and Tykocinski and Pittman, 2001) show that inaction inertia is not apparently driven by cognitive dissonance. It is also not driven by participants' use of the earlier discounted price as a proxy for value; people who are aware that an item was previously sold at a lower price but did not personally miss the opportunity to buy at that price, do not display inaction inertia. Furthermore, inaction inertia arises when a proposed action is framed as a loss relative to the past opportunity but not when it is framed as a (smaller) gain. Tykocinski and Pittman (1998) speculate that people may regret not having taken advantage of earlier opportunities and that "[b]y rejecting the subsequent opportunity promptly, individuals are spared from dwelling on an issue that for them is associated with a negative psychological outcome."

Subsequent research in inaction inertia has focused on avoidance of regret. Researchers draw a distinction between anticipatory regret and experienced regret. Anticipatory regret is the regret one expects to feel if one buys something at a higher price than one could have bought it at earlier. As one participant wrote in a post-experiment debriefing "paying the full price for something I could have had for much less would make me feel like a sucker." Experienced regret is regret over a past action. A person who regrets not having purchased an item at a low price in the past might not want to prolong or exacerbate that regret by now purchasing the item or even deliberating such a purchase. Post-experiment statements such as "How stupid I was for not acting sooner," suggest that regret is actually experienced rather than anticipated (Tykocinski and Pittman, 1998). Experimental evidence suggests that both the desire to avoid experienced regret (Arkes, Kung, and Hutzel, 2002) and to avoid anticipated regret (Tykocinski and Pittman, 1998; McConnell et. al., 2000; Fujikawa, Niedermeier, and Ross, 2006) can motivate inaction inertia.

Consumers have constant opportunities to buy goods and goods are often offered for sale at higher prices that they sold at in the past. However, inaction inertia does not arise simply because an item was sold more cheaply in the past. Inaction inertia arises when a consumer perceives herself to have considered and missed an opportunity to buy at a significantly better price. The juxtaposition of the current inferior opportunity with the superior foregone opportunity triggers upward prefactual thinking comparing the

actual state with the better but unrealized one. Upward prefactual thinking evokes anticipated regret, e.g., "If I buy now at a higher price, I will regret that I didn't buy before at a lower price." (Tykocinski and Pitman, 2001; Fujikawa, Niedermeier, and Ross, 2006).

Investors have constant opportunities to buy and sell stocks. However, most individual investors trade infrequently and probably only consider buying and selling a small subset of stocks on a small subset of days.[1] In general, it is difficult to know when investors consider but choose not to execute particular trades. However, when a trade is observed, it is likely that the investor considered both doing and not doing that trade. Thus an investor who sold a stock probably considered not selling it. And an investor who sold a stock and now has the opportunity to repurchase that stock at a higher price may consider the upward prefactual that "If I buy this stock now at a higher price, I will regret that I sold it before at a lower price." Thus anticipated regret similar to that which can lead consumers to engage in inaction inertia may lead investors to refrain from repurchasing stocks that they previously sold at a lower price.

Arkes, Kung, and Huzel (2002) report evidence that a desire to escape experienced regret also causes inaction inertia. They reason that consumers regret missing the initial bargain and therefore "shun further purchases in order to minimize the negative feelings one would feel if one interacted further with this troubling situation." Thus, consumers don't even want to spend time considering a purchase that reminds them of a previous lost opportunity. Similarly, investors who previously sold a stock for a loss may not want to spend time considering repurchasing that stock because reading about and thinking about that stock stirs up feelings of regret regarding their prior loss.

The remainder of this paper is organized as follows. In the first section, we discuss related studies of investor behavior. In Sections 2 and 3, we describe our data and our methodology. In Section 4, we present results. We then discuss our theoretical

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[1] For the discount brokerage dataset described below, the median common stock portfolio value of $16,210, the median turnover rate of 31 percent, and the median sale size of $5,738. Thus, the median household makes one roundtrip trade a year. As discussed below, means are somewhat higher.

contribution to understanding investing behavior, alternative explanations for our findings, and present a summary of our conclusions.

1 Prior Research on Investor Behavior

Recent research has examined how investors choose which stocks to buy and which to sell. Perhaps the best established pattern is the disposition effect, that is, the tendency of investors to sell winners more readily than losers (Shefrin and Statman, 1985; Odean, 1998; Grinblatt and Keloharju, 2001; Barber, Lee, Liu, and Odean, 2007; Dhar and Zhu, 2002; Jackson, 2003; Feng and Seasholes, 2002). While the disposition effect leads investors to sell stocks with strong recent performance, investors also tend to buy stocks with strong recent performance (Odean, 1999; Barber, Odean, and Zhu, 2009; Barber, Lee, Liu, and Odean, 2007; and Jackson, 2003). However, Odean (1998) finds that the preference for buying shares of stocks with strong recent performance does not hold for stocks that investors currently own.

When selecting individual stocks to buy, investors face a daunting search problem due to the thousands of options from which they can choose. Barber and Odean (2008) argue that because of the difficulty of considering all possible purchase options, many investors simply choose from the subset of stocks that catch their attention. They find, for example, that investors are more likely to buy stocks that are in the news, simply because they think about those stocks. Investors are also more likely to think about stocks that they've owned in the past year than about other stocks. Thus, it is not surprising that investors tend to repurchase stocks they previously owned and sold (as well as stocks that they still own, but have not sold) at much higher rates than they repurchase stocks that they have never owned; repurchases of stocks sold during the previous year account for 15 percent of all purchases in our large discount brokerage dataset and 8 percent of all purchases in our large retail brokerage dataset. In this paper, we demonstrate that the probability that a given investor will repurchase a given stock is affected by whether that stock was previously sold for a loss or for a gain, as well as by whether the price of that stock has risen or fallen in price since the investor last bought or sold it.

2 Data

We analyze two datasets of investor trades. The first dataset was provided by a large discount brokerage firm. It includes trading and position records for the investments of 78,000 households from January 1991 through December 1996.[2] The data include all accounts opened by each household at this discount brokerage firm. Sampled households were required to have an open account with the discount brokerage firm during 1991. Roughly half of the accounts in our analysis were opened prior to 1987, while half were opened between 1987 and 1991. We focus on investors' common stock trades. We exclude from the current analysis, investments in mutual funds (both open- and closed-end), American depository receipts (ADRs), warrants, and options. Of the 78,000 households sampled from the large discount brokerage, 66,465 had positions in common stocks during at least one month; the remaining accounts held either cash or investments other than individual common stocks. Roughly 60 percent of the market value in these households' accounts was held in common stocks. There were over 3 million trades in all securities; common stocks accounted for slightly more than 60 percent of all trades. During our sample period, the average household held 4.3 stocks worth $47,334, though each of these figures is positively skewed. The median household held 2.61 stocks worth $16,210. In December 1996, these households held more than $4.5 billion in common stock. There were slightly more purchases (1,082,107) than sales (887,594) during our sample period, though the average value of stocks sold ($13,707) was slightly higher than the value of stocks purchased ($11,205). As a result, the aggregate values of purchases and sales were roughly equal ($12.1 and $12.2 billion, respectively). The average trade was transacted at a price of $31 per share. The value of trades and the transaction price of trades are positively skewed; the medians for both purchases and sales are substantially less than the mean values.

The second data set contains information from a large retail brokerage firm on the investments of households for the 30 months ending in June 1999. This data set includes daily trading records. Using client ownership codes supplied by the brokerage firm, we limit our analysis to the 665,533 investors with non-discretionary accounts (i.e., accounts

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[2] Position records are through December 1996; trading records are through November 1996. See Barber and Odean (2000) for a more compete description of these data.

classified as individual, joint tenants with rights of survival, or custodians for minors) with at least one common stock trade during our sample period. The average household held 5.5 stocks worth approximately $107,000. During this period these accounts executed over 10 million trades. We restrict our analysis to their common stock trades: 3,974,998 purchases with a mean value of $15,209 and 3,219,299 sales with a mean value of $21,169.

3 Hypotheses Regarding Individual Investor Repurchase Decisions

3.1 Escaping Experienced Regret: Stocks Sold for a Gain vs. Stocks Sold for a Loss

To test whether investors are more likely to repurchase stocks that they previously sold for a profit than stocks that they previously sold for a loss, it is not sufficient to compare the number of purchases of stocks previously sold for a gain to the number of purchases of stocks previously sold for a loss. In an upward-moving market, investors are likely to have sold more stocks for a gain than for a loss; even if the market is not trending upward, investors are likely to sell more stocks for a gain than for a loss due to the disposition effect. Suppose that investors have previously sold more stocks for gains but are indifferent to repurchasing their prior winners and losers. These investors will tend to repurchase more stocks previously sold for a gain than stocks previously sold for a loss, simply because they have more opportunities to do so. Therefore to test whether investors demonstrate a preference for repurchasing stocks that they previously sold for a gain rather than those they previously sold for a loss, we must look at the frequency with which they repurchase prior winners and losers relative to their opportunities to repurchase each.

We begin our analysis at the account level. Starting one year after the beginning of each dataset (i.e., January 1992 at the discount brokerage and January 1998 at the retail brokerage), we look at each day on which an investor made a purchase. We observe whether any of the stocks purchased on that day had been sold by the same investor during the previous 252 trading days (i.e., one year). If so (and when the data allow us to

do so), we determine whether the last time the investor sold this stock, the sale was for a gain or a loss (based on the average share-weighted purchase price). We count the number of repurchases of stocks previously sold for a gain (winners repurchased) and the number of stocks previously sold for a loss (losers repurchased). We then count the number of those that were sold for a gain during the last year that the investor could have repurchased on this day (opportunities to repurchase winners). These include stocks sold for a gain during the last year that were repurchased on the day in question and stocks sold for a gain during the last year that could have been repurchased that day but were not. Similarly, we calculate the number of opportunities to repurchase losers on this day. On days when no purchase takes place, we do nothing; no actual winners repurchased, actual losers repurchased, opportunities to repurchase winners, or opportunities to repurchase losers are counted.

For each account, we tabulate and aggregate over time the number of stocks sold for a gain that were repurchased relative to the number of opportunities to repurchase stocks that were sold for a gain. We do the same for the number of stocks sold for a loss that were repurchased relative to the opportunities to repurchase stocks sold for a loss. We sum these tabulations for all investors at each brokerage firm and then calculate two ratios:

$$\frac{\text{\# of Prior Winners Repurchased}}{\text{\# of Opportunties to Repurchase Prior Winners}} = \text{Proportion of Prior Winners Repurchased (PPWR)} \quad (1)$$

$$\frac{\text{\# of Prior Losers Repurchased}}{\text{\# of Opportunties to Repurchase Prior Losers}} = \text{Proportion of Prior Losers Repurchased (PPLR)} \quad (2)$$

Our first hypothesis is that investors are more likely to repurchase a stock that they previously sold for a gain than they are to repurchase a stock they previously sold at a loss. That is:

Hypothesis 1: Proportion of Prior Winners Repurchased > Proportion of Prior Losers Repurchased.

The formal null hypothesis here is that PPWR ≤ PPLR. If markets are efficient in the sense that past price patterns do not predict cross-sectional differences in future risk-adjusted returns, investors expectations will be unaffected by whether they have made or

lost money on a stock in the past. Thus, the null hypothesis under this version of the efficient market hypothesis would be PPWR = PPLR. If investors sometimes sell stocks for a tax-loss with the intention of subsequently repurchasing these same stocks, then we would expect that for taxable accounts, PPWR < PPLR. Our null hypothesis of PPWR ≤ PPLR captures these two alternatives. One other possibility is that investors who have made money on a stock in the past take this as evidence that they have superior information about that stock and therefore buy it again. While we cannot dispute that some investors may hold this belief, we find no evidence that investors earn superior returns by repurchasing stocks that they have previously sold for a gain. We discuss this further in Section 5.1.

3.2 Avoiding Anticipated Regret: Stocks Up Since Being Sold vs. Stocks Down Since Being Sold

We calculate the proportion of stocks that have gone up in price since being sold that are repurchased (PSUSSR), and the proportion of stocks that have gone down in price since being sold that are repurchased (PSDSSR), in a manner analogous to the calculations of PPWR and PPLR. Starting one year after the beginning of each dataset, we look at each day on which an investor made any purchase. We observe whether any of the stocks purchased on that day were sold by the same investor during the previous year. If so, we determine whether the stock was repurchased at a higher, lower, or equivalent price compared to the price at which it was most recently sold by this investor. We count the number of times stocks were repurchased at a higher price (stocks that have increased in price since being sold and were repurchased) and the number of times stocks were repurchased at a lower price (stocks decreased in price since being sold and were repurchased). We ignore stocks repurchased at the same price as the most recent sales price. To calculate the number of opportunities to repurchase stocks that have gone up since being sold and the number of opportunities to repurchase stocks that have gone down since being sold, we examine every stock sold from the account during the previous year, note the price at which the stock was previously sold, and determine whether its price is up, down, or the same since the most recent sale. If the high price of the day (or the actual repurchase price for stocks that are repurchased) is lower than the most recent sales price, we count that as an opportunity to repurchase a stock that has

gone down in price since being sold; if the low price of the day (or the actual repurchase price for stocks that are repurchased) is above the most recent sales price, we count that as an opportunity to repurchase a stock that has gone up since being sold. We ignore cases where the stock could have been repurchased on that day at either a higher or lower price than the previous sales price.

For each account, we tabulate and aggregate over time the number of stocks that went up since being sold and were repurchased relative to the number of opportunities to repurchase stocks that went up since being sold. We do the same thing for the number of stocks that went down since being sold and were repurchased relative to the opportunities to repurchase stocks that went down since being sold. We sum these tabulations for all investors at each brokerage firm. We then calculate two ratios:

$$\frac{\text{\# of Stocks Up Since being Sold Repurchased}}{\text{\# of Opportunities to Repurchase Stocks Up Since being Sold}} = \begin{array}{c}\text{Proportion of Stocks Up Since being}\\\text{Sold Repurchased (PSUSSR)}\end{array} \quad (3)$$

$$\frac{\text{\# of Stocks Down Since being Sold Repurchased}}{\text{\# of Opportunities to Repurchase Stocks Down being Since Sold}} = \begin{array}{c}\text{Proportion of Stocks Down Since}\\\text{being Sold Repurchased (PSDSSR)}\end{array} \quad (4)$$

Our second hypothesis is based on the notion that investors use counterfactual reasoning to create a situation that is more favorable than one that might have been. This hypothesis predicts that investors are more likely to repurchase a stock that has gone down in price since they last sold it than they are to repurchase a stock that has gone up in price since they sold it. That is:

Hypothesis 2: Proportion of Stocks Down Since being Sold that are Repurchased > Proportion of Stocks Up Since being Sold that are Repurchased.

The formal null hypothesis here is that PSDSSR $\leq$ PSUSSR. If markets are efficient in the sense that past price patterns do not predict cross-sectional differences in future risk-adjusted returns, investors should be indifferent between repurchasing stocks that have gone up or down since they were last sold. Thus, the null hypothesis under this version of the efficient market hypothesis would be PSDSSR = PSUSSR. Investors who sold a stock before a decline may take their fortuitous timing as evidence that they have superior information about that stock and, for this reason, buy it again. Again, we do not dispute that some investors may hold such beliefs. However, we find no evidence that investors earn superior returns by repurchasing stocks that have lost value since they were sold.

9

3.3 Avoiding Anticipated Regret: Stocks Up Since Purchase vs. Stocks Down Since Purchase

We calculate the proportion of currently owned stocks up since purchase that are repurchased (PSUSPR) and the proportion of currently owned stocks down since purchase that are repurchased (PSDSPR) in a manner analogous to our previous calculations. Our analysis begins at the account level. Starting at the beginning of each dataset, we look at each day on which an investor made a purchase. We observe whether he repurchased a stock already in his portfolio. If so, we determine, if we are able to do so, whether the stock was repurchased at a higher or lower price than the average purchase price previously paid. Stocks repurchased at a higher price are counted as currently owned stocks up since purchase that are repurchased; stocks repurchased at a lower price are counted as currently owned stocks down since purchase that are repurchased. To calculate the number of opportunities to repurchase currently owned stocks that are up since purchase and the number of opportunities to repurchase currently owned stocks that are down since purchase , we examine every stock in the portfolio and determine whether it is currently held for a gain or for a loss (relative to the average purchase price). If the high price of the stock that day (or the actual repurchase price for stocks that are repurchased) is below the average price previously paid for the stock, we count that as an opportunity to repurchase at a lower price. If the low price of the stock that day (or the actual repurchase price for stocks that are repurchased) is above the average price previously paid for the stock, we count that as an opportunity to repurchase at a higher price.

For each account, we tabulate and aggregate over time the number of currently owned stocks trading at a price above the average purchase price that are purchased again, relative to the number of opportunities to purchase additional shares of currently owned stocks trading at a price above the average purchase price. We do the same thing for the number of currently owned stocks trading at a price below the average purchase price that are purchased again, relative to the number of opportunities to purchase additional shares of currently owned stocks trading at a price below the average purchase

price. We sum these tabulations for all investors at each brokerage firm and then calculate two ratios:

$$\frac{\text{\# of Stocks Up Since Purchase Repurchased}}{\text{\# of Opportunities to Repurchase Stocks Up Since Purchase}} = \begin{array}{c}\text{Proportion of Stocks Up Since}\\\text{Purchase Repurchased (PSUSPR)}\end{array} \quad (5)$$

$$\frac{\text{\# of Stocks Down Since Purchase Repurchased}}{\text{\# of Opportunities to Repurchase Stocks Down Since Purchase}} = \begin{array}{c}\text{Proportion of Stocks Down Since}\\\text{Purchase Repurchased (PSDSPR)}\end{array} \quad (6)$$

Our third hypothesis, also based on counterfactual reasoning, is that investors are more likely to purchase additional shares of a currently owned stock that has gone down in price since originally being purchased than they are to purchase additional shares of a currently owned stock that has gone up in price since originally being purchased. That is:

Hypothesis 3: Proportion of Currently Owned Stocks Down Since Purchase that are Repurchased > Proportion of Currently owned Stocks Up Since Purchased that are Repurchased.

The formal null hypothesis here is that PSDSPR ≤ PSUSPR. If markets are efficient in the sense that past price patterns do not predict cross-sectional differences in future risk-adjusted returns, investors should be indifferent between repurchasing stocks that have gone up since they were purchased and stocks that have gone down since they were purchased. Thus, the null hypothesis under this version of the efficient market hypothesis would be PCOLR = PCOGR. It is unlikely that an investor who bought a stock that then declined in value would take this as an indication that he has superior information about this stock. Nevertheless, we test whether investor returns benefit from purchasing additional shares of stocks that have lost value since being purchased. We find no evidence of this.

4 Results

4.1 Escaping Experienced Regret: Stocks Sold for a Gain vs. Stocks Sold for a Loss

In Table 1, we present our calculations of the proportion of stocks that were sold for a gain that were repurchased and the proportion of stocks that were sold for a loss that were repurchased for both the discount broker and the retail broker. Investors might be unwilling to repurchase stocks that were sold for a loss within 30 days of a sale stocks

that were sold for a loss because doing so would prevent them from claiming the loss for tax purposes. To determine whether our results are influenced by this or any other tax consideration, we calculate the proportions separately for taxable and tax-deferred accounts.[3] At both the large discount broker and the large retail broker, and for both taxable and tax-deferred accounts, investors repurchase stocks previously sold for a gain at significantly higher rates than stocks previously sold for a loss. On average, the proportion of previous winners repurchased is approximately double the proportion of previous losers repurchased. The difference between these proportions is highly statistically significant (t = 59). These results support our first hypothesis.

The tests of the null hypotheses treat each repurchase of a stock previously sold for a gain, repurchase of a stock previously sold for a loss, and decision not to repurchase on a particular day, as separate independent observations.[4] These observations are aggregated across investors. This independence assumption will not hold perfectly. For example, suppose an investor chooses not to repurchase the same stock on repeated occasions. It is likely that the decision not to repurchase on one date is not independent from the decision not to repurchase on another date. This lack of independence will inflate the test statistics, but will not bias the observed proportions. All three of our null hypotheses are rejected with such a high degree of statistical significance that some lack of independence is not problematic.

As a robustness check, we calculate PPWR and PPLR at the account level on each account for which we have sufficient information. We then employ a binomial test of whether the proportion of investors who prefer to repurchase prior winners is greater than 50%. Instead of assuming independence at the transactions level, this test assumes independence only across investors. At the large discount brokerage, PPWR is greater than PPLR for 71.6% of the 12,913 accounts for which there was at least one opportunity

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[3] In unreported analyses, we also calculate these proportions excluding any repurchases within 30 days of the most recent sale of a stock. Doing so does not qualitatively change our results.

[4] To calculate the t-statistics in Table 1, the standard error for the difference in the proportions PPWR and

PPLR is: $\sqrt{\dfrac{PPWR(1-PPWR)}{\text{\# of opporuntities to repurchase prior winners}} + \dfrac{PPLR(1-PPLR)}{\text{\# of opportunities to repurchase prior losers}}}$.

Standard errors are calculated similarly for the differences in PDSSR and PUSSR and PCWR and PCLR.

to repurchase a stock sold for a gain during the previous year and at least one opportunity to repurchase a stock sold for a loss. We can reject the null hypothesis that one half or more of these investors prefer to repurchase previous losers or are indifferent between repurchasing previous losers and winners (t = 49.1). At the large retail brokerage, PPWR is greater than PPLR for 74.7% of 31,785 accounts. Again the null hypothesis is rejected (t = 88.1). As predicted by our first hypothesis, investors exhibit a clear preference for repurchasing stocks that they previously sold at a gain as opposed to repurchasing stocks that they previously sold at a loss.

4.2   Avoiding Anticipated Regret: Stocks Up Since Sold vs. Stocks Down Since Sold

In Table 2, we present our calculations of the proportion of stocks that have decreased in value since being sold that were repurchased (PSDSSR) and the proportion of stocks that have increased in value since being sold that were repurchased (PSUSSR). To determine whether our results are influenced by tax considerations, we again calculate the proportions separately for taxable and tax-deferred accounts. At both the large discount broker and the large retail broker, and for both taxable and tax-deferred accounts, investors repurchase stocks that have decreased in value since being sold at significantly higher rates than stocks that have increased in value since being sold. The difference between in these proportions is significant (t = 50). We calculate PSDSSR and PSLSSR at an account level for accounts in which there was at least one opportunity to repurchase a stock that had decreased in value since it was sold during the previous year and at least one opportunity to repurchase a stock sold that had increased in value since it was sold during the previous year. We find that at the large discount brokerage (LDB) PSDSSR > PSUSSR for 66.5% of 15,076 accounts, and at the large retail brokerage (LRB) PSDSSR > PSUSSR for 55.5% of 37,311 accounts. We can reject the null hypothesis that the proportion of investors who prefer to repurchase stocks that have lost value since being sold is less than or equal to 50% (t = 40.5 at the LDB and t = 21.2 at the LRB). In short, the results of our analysis support hypothesis 2, which predicted that investors would be more likely to repurchase stocks that have gone down in price since the last sale than stocks that have gone up in price since the last sale.

4.3 The Interaction Between Profitability of Last Sale and Change in Price Since Last Sale

In examining the relationship between whether a stock was last sold for a loss or for a gain and whether the stock has risen or fallen in price since the last sale, we find that the tendency of investors to repurchase stocks that have lost value since last being sold applies almost exclusively to stocks that were sold for a gain. Investors who have lost money when they sold their position are reluctant to buy that stock again regardless of whether it has gone up or down since they sold it. Looking only at stocks previously sold for a loss in both taxable and tax-deferred accounts at the large discount brokerage, the proportion of stocks down since being sold that are repurchased is 0.041 and the proportion of stocks up since being sold that are repurchased is 0.037 (Table 3). Though statistically significant (t = 10.5), the difference in these proportions is not economically substantial. At the large retail brokerage, looking only at stocks previously sold for a loss, the proportion of stocks down since being sold that are repurchased is 0.026 and the proportion of stocks up since being sold that are repurchased is 0.027. We calculate PSDSSR and PSLSSR at an account level for stocks that were previously sold for a loss for accounts in which there was at least one opportunity to repurchase a stock that had decreased in value since it was sold for a loss during the previous year and at least one opportunity to repurchase a stock sold that had increased in value since it was sold for a loss during the previous year. We find that at the large discount brokerage, PSDSSR > PSUSSR for 53.3% of 2,348 accounts (t = 3.2). At the large retail brokerage, PSUSSR > PSDSSR for 53.6% of 4,445 accounts (t = 4.6). Thus, at the large discount brokerage there is a slight tendency to more readily repurchase stocks previously sold for a loss if those stocks have decreased in value since being sold, while at the large retail brokerage there is a slight tendency to more readily repurchase stocks previously sold for a loss if those stocks have increased in value since being sold.

When we look at stocks that were previously sold for a gain, the story is quite different. At the large discount brokerage, looking only at stocks previously sold for a gain, the proportion of stocks down since being sold that are repurchased is 0.105, and

the proportion of stocks up since being sold that are repurchased is 0.055. We can reject the null that these proportions are equal (t = 104). At the large retail brokerage, looking only at stocks previously sold for a gain, the proportion of stocks down since being sold that are repurchased is 0.068 and the proportion of stocks up since being sold that are repurchased is 0.043. We can reject the null that these proportions are equal (t = 111). We calculate PSDSSR and PSLSSR at an account level for stocks that were previously sold for a gain, in accounts for which there was at least one opportunity to repurchase a stock that had decreased in value since it was sold for a gain during the previous year and at least one opportunity to repurchase a stock sold that had increased in value since it was sold for a gain during the previous year. We find that at the large discount brokerage PSDSSR > PSUSSR for 68.7% of 6,437 accounts (t = 30.0). At the large retail brokerage, PSDSSR > PSUSSR for 55.0% of 13,402 accounts (t = 11.6). At both brokerages, investors are far more likely to repurchase stocks previously sold for a gain if those stocks have decreased in value since being sold.

4.4 Avoiding Anticipated Regret: Up Since Purchase vs. Down Since Purchase

Analyzing a dataset of 10,000 individual investor accounts at large discount brokerage for the period 1987-1993, Odean (1998) finds that investors are more likely to repurchase a stock they currently own if the price of the stock has decreased in value, rather than increased in value, since they purchased it. We confirm this result with larger, more recent datasets. For these analyses, we pool taxable and tax-deferred accounts. Results are reported in Table 4. At the large discount brokerage, the proportion of currently owned stocks up since purchase that are repurchased is 0.094, whereas the proportion of currently owned stocks down since purchase that are repurchased is 0.146; the difference in the proportions is statistically significant (t = 113.2). At the large retail brokerage, the proportion of currently owned stocks up since purchase that are repurchased is 0.094 while the proportion of currently owned stocks down since purchase that are repurchased is 0.128; again, the difference in the proportions is statistically significant (t = 136.7).[5]

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[5] Daniel, Hirshleifer, and Subramanyam (1998) theorize that if investors buy a stock on the basis of private information and that information is then confirmed by public information, these investors will become overconfident about their private information and drive prices higher than would have otherwise been the

These results support our third hypothesis. Investors exhibit a clear preference for repurchasing stocks they currently own when the stocks are trading at a lower price than the average purchase price rather than when they are trading at a higher price. This is consistent with their preference for repurchasing stocks that are trading at a lower price than the price at which they were sold during the last year and consistent with the investors avoiding the regret of buying additional shares at a higher price that they could have bought previously at a lower price However, the tendency to purchase additional shares of a stock on which an investor has lost money could appear to be at odds with the tendency to avoid repurchasing stocks that were sold for a loss. We suspect that there are salient differences between purchasing additional shares of a stock that has decreased in value since being purchased and repurchasing a stock that one previously sold for a loss. A stock one still own that is trading for less than one paid may not yet be mentally coded as a loss. Unlike a stock previously sold for a loss, this loss is unrealized and not yet certain..   Once a stock is sold, and a loss has formally occurred, it is as if the book is closed and one does not want to open it again. An investor who still owns a stock that he purchased for a higher price does not have the luxury of forgetting about that stock, so it is as if the book is still open. As Kahneman and Tversky (1979) write: "A person who has not made peace with his losses is likely to accept gambles that would be unacceptable to him otherwise." By purchasing additional shares of a stock that has lost value, an investor does accept an additional gamble. While he lowers his average break even point—and likely reference point—he also increases his potential losses.

5   Performance Analysis and Alternative Explanations for the Results

5.1   Performance: Is Purchasing Prior Winners More Profitable than Purchasing Prior Losers?

Investors prefer to repurchase stocks that they previously sold when that sale was profitable. We believe that investors are refrain from purchasing stocks previously sold

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case. Our evidence appears to contradict this theory. We observe that investors who have already bought a stock (perhaps reflecting their bullish private information), are less, rather than more, likely to buy additional shares if the stock price increases (thus publicly confirming their bullish private beliefs).

for a loss because these stocks bring up feelings of regret. In contrast, stocks previously sold for a gain trigger feelings of pride and satisfaction. Furthermore, investors may anticipate that if they repurchase a stock previously sold for a loss and lose again, they will experience particularly poignant regret. An alternative explanation for the behavior we observe is that past failures and successes are indicative of an investor's stock specific ability to forecast future returns   If so, repurchasing previous winners may be normative. However, in general, individual investors do not exhibit stock picking ability (Odean 1999; Barber and Odean 2000, 2001; Barber, Lee, Liu, and Odean 2009).   For investors without stock picking ability, repurchasing previous winners is unlikely to improve performance.

We test whether investors are benefiting from the repurchase of stocks previously sold for a gain by calculating returns earned on such stocks subsequent to being repurchased.   We assume a holding period of one year; results are qualitatively similar at other horizons. We form transaction-value-weighted portfolios of stocks repurchased by investors after being sold for a profit by the same investor within 252 trading days (i.e., one year).   Securities are held in the portfolio for 12 months subsequent to portfolio formation.   To see whether any observed abnormal returns can be explained by investment style, that is, by stock characteristics known to affect returns, we employ a three-factor model that includes market, size, and value factors (Fama and French 1993).[6] To evaluate the return performance of a portfolio (R_{pt}), we estimate the following monthly time-series regression:

$$\left(R_{pt} - R_{ft}\right) = \alpha_j + \beta_j\left(R_{mt} - R_f\right) + s_j SMB_t + h_j VMG_t + \varepsilon_{jt}, \qquad (7)$$

where R_{ft} is the monthly return on T-Bills, R_{mt} is the monthly return on a value-weighted market index, SMB_t is the return on a value-weighted portfolio of small stocks minus the return on a value-weighted portfolio of big stocks, and VMG_t is the return on a value-weighted portfolio of high book-to-market (value) stocks minus the return on a value-weighted portfolio of low book-to-market (growth) stocks.

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[6] The construction of the *SMB* and *VMG* portfolios is discussed in detail in Fama and French (1993). We thank Kenneth French for providing us with the remaining data.

Our results are reported in Table 5, Panel A, where we see that investors at both the discount and retail brokerages tilt their repurchases of prior winners towards high beta, growth stocks. Investors at the discount firm also prefer small stocks, though the retail investors display no such preference. On their portfolios of stocks previously sold for a gain that are repurchased, neither the discount nor the retail investors earn style-adjusted returns that are reliably different from zero.

5.2 Performance: Is Purchasing Stocks that Have Fallen in Price More Profitable than Purchasing Stocks that Have Risen in Price?

To test whether investors are benefiting from the repurchase of stocks previously sold that have dropped in value since they were sold, we calculate style-adjusted portfolio returns subsequent to stock purchases at prices lower than previous sales prices. Results are reported in Table 5, Panel B. For both the discount and retail investors, the regression intercept (i.e., alpha) is negative, though not reliably so. Thus, we find no evidence that investor performance is systematically benefiting from repurchasing stocks that have dropped in price since they were last sold.

It is unlikely that an investor who bought and held a stock that then declined in value would take this as an indication that he has superior information about this stock. Nevertheless, we tested whether investors are benefiting from purchasing additional shares of stocks currently owned that have dropped in value since they were purchased. To do so, we calculated style-adjusted portfolio returns subsequent to stock purchases of currently owned stocks at prices lower than the original purchase price. Results are reported in Table 5, Panel C. For both the discount and retail investors, the regression intercept (i.e., alpha) is negative, though reliably so only at the large discount brokerage. Thus, we find no evidence that these investors' performance is systematically benefiting from purchasing additional shares of stocks currently owned that have dropped in value since they were first purchased.

5.3   Possible Alternative Explanation: Counterfactual Reasoning or a Belief that Stocks are Mean Reverting

We observe that investors are more likely to repurchase a stock that they previously sold if that stock is now trading for less than the price at which they sold it. We argue that by repurchasing a stock that she previously sold, an investor highlights the counterfactual in which she would own the stock today because she never sold it. If she repurchases the stock at a lower price than she sold it, repurchasing makes her better off than she would have been under the counterfactual; the comparison makes her feel good. If she repurchases the stock at a higher price than she sold it, repurchasing makes her worse off than under the counterfactual; the comparison makes her feel bad. Thus, investors increase the emotional pleasure associated with trading stocks when they repurchase stocks at prices lower than they sold them for. In contrast, repurchasing at a higher price than one has sold a stock for increases regret at having sold the stock in the first place.

One alternative explanation for our results is that investors may rightly or wrongly believe that stock returns are mean reverting, and so they prefer to buy stocks with poor recent performance. We test this alternative by observing that, if investors simply believe that stock returns are mean reverting, this belief should apply both to stocks the investor has owned before and to other stocks. We form a partition of investors who exhibit a preference for buying stocks at a lower price than they sold them (i.e., the partition of investors for whom PDSSR > PUSSR). We then look to see whether this group of investors tends to select stocks with poor recent performance when they are buying stocks that they have not owned during the past year. We do so by calculating the mean market-adjusted return on purchases in event time, where day 0 is the day of purchase for stocks purchased by these investors, but not owned by them during the previous year. These means are cumulated beginning one year (252 trading days) prior to the purchase.

In Figure 1, we see that at both the discount and retail brokerage houses cumulative market-adjusted returns prior to purchase are, on average, strongly positive for stocks not owned during the last year. In general, these investors chase performance, rather than bet

19

on mean reversion. Only when they have previously owned a stock do they buy after poor performance. Thus, having different experiences with a stock can cause two investors to treat that same stock differently.

As discussed in Section 4.4, investors are more likely to purchase additional shares of a stock that they currently own if the stock's price is lower than the average price at which they bought it. Suppose investors routinely sell part, but not all, of their holdings in a stock, and they then purchase additional shares of stocks they own that have fallen in price. If so, our observation that investors repurchase stocks that have lost value since being sold could be driven by investors' tendency to repurchase currently owned stocks that have dropped in value since they were purchased. To test whether the tendency to repurchase stocks that have dropped in value since being sold is independent from the tendency to repurchase stocks that have dropped in value since being bought, we rerun our calculations of the proportion of stocks down since being sold that are repurchased (PDSSR) and the proportion of stocks up since being sold that are repurchased (PUSSR) with the added condition that we only count repurchases of stocks that the investor does not currently own. Our results are qualitatively similar to those reported in Table 2. For example, for all accounts at the large discount brokerage, the difference in PDSSR and PUSSR is 0.0260 (t = 57.9).

6 Conclusion

Analyzing trading records for hundreds of thousands of individual investors at a large discount brokerage and large retail brokerage, we establish two previously undocumented patterns in the purchase selections of individual investors. Both patterns hinge on investors' previous experience with a stock. Investors prefer to repurchase:

(1) stocks previously sold for a gain, and

(2) stocks that have lost value since they were last sold.

The first pattern dominates the second, that is, investors are reticent to repurchase stocks they previously sold for a loss, regardless of the post sale return. However, investors are much more likely to repurchase a stock previously sold for a gain if it has lost value since it was sold. None of these trading patterns reliably improve investors' returns.

We propose that these trading patterns can be explained by investors' desire to avoid actions leading to anticipatory and experienced regret while engaging in actions that trigger feelings of pride. An investor who previously sold a stock for a loss may prefer not to think about that stock because of the regret associated with it. Thus he does not consider repurchasing it. An investor who sold for a gain has positive associations with the stock and with his previous experience of investing in it. An investor who considers buying a stock for a higher price than he previously sold it at, anticipates regretting the sale more poignantly than if he simply avoids thinking about the stock's performance after he sold it or tells himself he has no interest in a longer term investment in this stock. If he repurchases at a higher price than he sold, no matter what happens going forward, he will know that he could have achieved a better outcome had he never sold. An investor who buys a stock at a lower price than sold it feels nothing but pride and satisfaction.

In addition to establishing these two previously undocumented purchase patterns, we confirm that in the case of stocks they still own, individual investors are more likely to purchase additional shares of stocks that have decreased in value since being purchased than they are to purchase additional shares of stocks that have risen in value since being purchased. Like the repurchase of stocks that have fallen since last being sold, this behavior makes sense in terms of regret and pride associated with counterfactual reasoning. Usually, an investor who purchases additional shares of a stock he already owns could have achieved his current portfolio position by simply purchasing more shares to begin with. If the stock has decreased in value since the original purchase, the investor who buys again feels that he is better off than he might have been, If it has increased in value, he is feels that he is worse off.

Our large and detailed data sets enable us to document trading patterns of real investors with great certainty. The explanations we offer are both consistent with previous psychological research and intuitive. It makes emotional sense that investors repurchase stocks that have decreased in value since being sold. Investors who do so feel the pleasure of making choices resulting in better outcomes than what might have been had they not previously sold the stock, while investors who repurchase at higher prices feel regret from knowing that they could have easily done better. Similarly, avoiding

what has been a source of pain in the past is one of the most basic primal instincts that humans possess. Thus, it is not surprising that investors are attracted to stocks that have treated them well in the past, but shy away from stocks by which they were once burned.

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Table 1: Preferences for Repurchasing Stocks Previously Sold for a Gain vs. Stocks Previously Sold for a Loss

This table compares the aggregate Proportion of Prior Winners Repurchased (PPWR) to the aggregate Proportion of Prior Losers Repurchased (PPLR). PPWR is the number of stocks sold for a gain in the previous year that were repurchased divided by the number of opportunities to repurchase stocks sold for gain in the previous year. PPLR is calculated similarly. All counters are incremented only on days when purchases are made. Results are separately aggregated across accounts for taxable accounts and tax-deferred accounts at the large discount brokerage (LDB) (January 1991 through November 1996) and the large retail brokerage (LRB) (January 1997 through June 1999). The t-statistics test the null hypotheses that the differences in proportions are equal to zero assuming that all purchases and non-purchases result from independent decisions.

	Large Discount Broker		Large Retail Broker	
	Taxable	Tax-Deferred	Taxable	Tax-Deferred
Winners Repurchased	69,326	20,097	161,139	65,371
Opportunities to Repurchase Winners	860,061	236,439	3,162,706	874,513
Proportion of Prior Winners Repurchased (PPWR)	0.0746	0.0783	0.0485	0.0696
Losers Repurchased	23,268	5,065	56,881	16,433
Opportunities to Repurchase Losers	567,884	130,347	2,118,692	517,679
Proportion of Prior Losers Repurchased (PPLR)	0.0394	0.0374	0.0261	0.0308
Difference (PPWR – PPLR)	0.0352	0.0409	0.0223	0.0388
t-statistic	94.8	55.3	139.6	109.8

Table 2: Preferences for Repurchasing Stocks Up Since being Sold vs. Stocks Down Since being Sold

This table compares the aggregate Proportion of Stocks Up Since being Sold that were Repurchased (PSUSSR) to the aggregate Proportion of Stocks Down Since being Sold that were Repurchased (PSDSSR). PSUSSR is the number of stocks sold in the previous year that were repurchased for a higher price than the price at which they were sold, divided by the number of opportunities to repurchase stocks sold in the previous year for a higher price than the price at which they were sold. PSDSSR is calculated similarly. All counters are incremented only on days when purchases are made. Results are separately aggregated across accounts for taxable accounts and tax-deferred accounts at the large discount brokerage (LDB) (January 1991 through November 1996) and the large retail brokerage (LRB) (January 1997 through June 1999). The t-statistics test the null hypotheses that the differences in proportions are equal to zero assuming that all purchases and non-purchases result from independent decisions.

	Large Discount Broker		Large Retail Broker	
	Taxable	Tax-Deferred	Taxable	Tax-Deferred
Stocks Down Since being Sold that were Repurchased	52,017	14,683	112,534	43,046
Opportunities to Repurchase Stocks Down Since being Sold	644,417	153,736	2,431,841	619,761
Proportion Stocks Down Since being Sold that were Repurchased (PSDSSR)	0.0747	0.0872	0.0442	0.0649
Stocks Up Since being Sold that were Repurchased	40,451	10,442	105,604	38,772
Opportunities. to Repurchase Stocks Up Since being Sold	788,372	213,563	2,869,340	774,497
Proportion of Stocks Up Since being Sold that were Repurchased (PSUSSR)	0.0488	0.0466	0.0355	0.0477
Difference (PSDSSR – PSUSSR)	0.0259	0.0406	0.0087	0.0173
t-statistic	65.7	49.5	52.1	45.0

Table 3: Interaction Effects

This table separately compares the aggregate Proportion of Stocks Up Since being Sold that were Repurchased (PSUSSR) to the aggregate Proportion of Stocks Down Since being Sold that were Repurchased (PSDSSR) for stocks that were previously sold for a gain and for stocks that were previously sold for a loss. PSUSSR is the number of stocks sold in the previous year that were repurchased for a higher price than the price at which they were sold divided by the number of opportunities to repurchase stocks sold in the previous year for a higher price than the price at which they were sold. PSDSSR is calculated similarly. All counters are incremented only on days when purchases are made. Results are separately aggregated across accounts at the large discount brokerage (LDB) (January 1991 through November 1996) and the large retail brokerage (LRB) (January 1997 through June 1999). The t-statistics test the null hypotheses that the differences in proportions are equal to zero assuming that all purchases and non-purchases result from independent decisions.

Panel A: Stocks Previously Sold for a Gain

	Large Discount Broker	Large Retail Broker
Stocks Down Since being Sold that were Repurchased	51,584	119,293
Opportunities to Repurchase Stocks Down Since being Sold	445,846	1,697,761
Proportion Stocks Down Since being Sold that were Repurchased (PSDSSR)	0.1037	0.0657
Stocks Up Since being Sold that were Repurchased	37,442	106,773
Opportunities. to Repurchase Stocks Up Since being Sold	646,117	2,333,335
Proportion of Stocks Up Since being Sold that were Repurchased (PSUSSR)	0.0548	0.0438
Difference (PSDSSR – PSUSSR)	0.0489	0.0219
t-statistic	95.5	97.0

Panel B: Stocks Previously Sold for a Loss

	Large Discount Broker	Large Retail Broker
Stocks Down Since being Sold that were Repurchased	14,890	35,875
Opportunities to Repurchase Stocks Down Since being Sold	346,435	1,337,652
Proportion Stocks Down Since being Sold that were Repurchased (PSDSSR)	0.0412	0.0261
Stocks Up Since being Sold that were Repurchased	13,248	37,222
Opportunities. to Repurchase Stocks Up Since being Sold	348,208	1,293,562
Proportion of Stocks Up Since being Sold that were Repurchased (PSUSSR)	0.0367	0.0280
Difference (PSDSSR – PSUSSR)	0.0046	-0.0019
t-statistic	10.0	-9.4

Table 4: Preferences for Purchasing Currently Owned Stocks Up Since Purchase vs. Currently Owned Stocks Down Since Purchase

This table compares the aggregate proportion of currently owned stocks up since being purchased that are purchased again to the aggregate proportion of currently owned down since being purchased that are purchased again. The proportion of currently owned stocks up since purchase that are repurchased is the number of stocks purchased and still owned that were purchased again for a higher price than the average price at which they were previously purchased in the past year, divided by the number of opportunities to purchase currently owned stocks for a higher price than the average price at which they were previously purchased in the past year. The proportion of currently owned stocks down since purchase that are repurchased is calculated similarly. All counters are incremented only on days when purchases are made. Results are aggregated across accounts for accounts at the large discount brokerage (LDB) (January 1991 through November 1996) and the large retail brokerage (LRB) (January 1997 through June 1999). The t-statistics test the null hypotheses that the differences in proportions are equal to zero assuming that all purchases and non-purchases result from independent decisions.

	Large Discount Broker	Large Retail Broker
Currently Owned Stocks Down Since Purchase Repurchased	109,932	350,514
Opportunities to Repurchase Currently Owned Stocks Down Since Purchase	1,165,032	3,725,718
Proportion of Currently Owned Stocks Down Since Purchase Repurchased (PSDSPR)	0.0944	0.0941
Currently Owned Stocks Up Since Purchase Repurchased	136751	393,679
Opportunities to Repurchase Currently Owned Stocks Up Since Purchase	938345	3,094,891
Proportion of Currently Owned Stocks Down Since Purchase Repurchased (PSUSPR)	0.1457	0.1272
Difference in Proportions	0.0514	0.0331
t-statistic	113.2	136.7

Table 5: Percentage Return Performance and Style Tilts of Portfolios Formed on the Basis of Repurchases of Stocks Previously Sold for a Gain and Repurchases of Stocks that have Decreased in Value Since Previously Sold

Transaction value-weighted portfolios are formed of stocks purchased by investors that were sold for a profit by the same investor within the 252 trading days (i.e., one year) and of stocks purchased that have decreased in value since being previously sold by the same investor during the last 252 trading days. Securities are held in the portfolio for 12 months subsequent to portfolio formation. To evaluate the return performance of a particular decile (R_{pt}) we estimate the following monthly time-series regression:

$$\left(R_{pt} - R_{ft}\right) = \alpha_j + \beta_j\left(R_{mt} - R_f\right) + s_j\,SMB_t + h_j\,VMG_t + \varepsilon_{jt},$$

where R_{ft} is the monthly return on T-Bills, R_{mt} is the monthly return on a value-weighted market index, SMB_t is the return on a value-weighted portfolio of small stocks minus the return on a value-weighted portfolio of big stocks, and VMG_t is the return on a value-weighted portfolio of high book-to-market (value) stocks minus the return on a value-weighted portfolio of low book-to-market (growth) stocks. t-statistics are in parentheses.

Panel A: Repurchases of Stocks Previously Sold for Gain

	α	β	s	H
Discount	0.080	1.335	0.481	-0.527
Brokerage	(0.25)	(10.89)	(4.05)	(-4.15)
Retail	-0.147	1.070	-0.0504	-1.390
Brokerage	(-0.11)	(3.57)	(-1.17)	(-3.11)

Panel B: Repurchases of Stocks Down in Value since being Sold

	α	β	s	H
Discount	-0.100	1.366	0.474	-0.534
Brokerage	(-0.29)	(10.44)	(3.74)	(-3.94)
Retail	-0.245	1.097	-0.381	-1.325
Brokerage	(-0.19)	(3.74)	(-0.90)	(-3.03)

Panel C: Purchases of Currently Owned Stocks Down in Value since being Purchased

	α	β	s	H
Discount	-0.532	1.369	1.032	-0.059
Brokerage	(-1.80)	(13.80)	(9.13)	(-0.48)
Retail	-0.186	0.943	0.528	-0.780
Brokerage	(-0.38)	(7.99)	(3.76)	(-4.17)