Annals of Finance (2009) 5:1–14
DOI 10.1007/s10436-007-0092-0

RESEARCH ARTICLE

Behavior in a simplified stock market: the status quo bias, the disposition effect and the ostrich effect

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Received: 3 August 2007 / Accepted: 12 December 2007 / Published online: 18 January 2008

Abstract Previous literature suggests specific behavioral tendencies cause investors to deviate from optimal investing. We investigate three such tendencies in a simplified stock market. Subjects do trade for better stocks, but do not reach their maximum potential earnings, most commonly because they choose to ignore information and continue to hold on to a stock regardless of its performance. The results support the predictions of the status quo bias, but not the ostrich effect or the disposition effect.

Keywords Behavioral finance · Experimental economics · Status quo bias · Self-signaling · Disposition effect

JEL Classification C91 · D01 · D53 · D83

1 Introduction

Recent research has shown a number of instances in which investors behave in ways that traditional economic theory does not predict. These deviations from standard economic theory have given rise to the behavioral finance literature (see Stracca 2004 for

This research is an extension of Brown's undergraduate honors thesis at Ohio State University. Financial support was provided by the Honor's College and the Department of Economics at Ohio State University. Kagel's research was partially supported by grants from the National Science Foundation. We received helpful comments from Hal Arkes, David Cooper and two anonymous referees.

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a survey). This paper implements a simplified stock market experiment and examines whether subjects follow traditional profit-maximizing strategies, or deviate from them following well-known behavioral tendencies. These include (1) the status quo bias, the tendency to maintain a previous decisions regardless of changes in the environment, (2) the ostrich effect, the propensity to ignore unpleasant information about one's investments, and (3) the disposition effect, the tendency of investors to sell stocks that have gained in value and hold on to stocks that have lost value, gambling that those losses will be reduced.

Our experimental design is not intended to replicate the complexities of a large-scale stock market. Instead, we look to see if these behavioral tendencies, believed to be present in field settings, are observed in a simple laboratory experiment. As such we keep only the most basic elements of stock trading: subjects hold only one stock at a time, and can observe the market and exchange stocks after every period in which prices change. Stocks follow a known distribution resulting in a clear identification of the optimal stock(s). The three behavioral tendencies we look for work against subjects acquiring the optimal stock, thereby reducing subjects' earnings. Thus, if these behavioral biases reveal themselves when the optimal strategy is so simple and transparent, they are likely to be present in other markets which are much more complicated, where the optimal strategy is much harder to determine as well.

We do not believe there is any inherent conflict between field studies and experiments. Rather the two are compliments, not rivals or substitutes. With respect to the phenomena under investigation here, our experiment provides a way to investigate behavior absent many of the confounding effects present in field studies. For instance, how much of an investor not trading stocks is due to an inherent status quo bias and how much is due to tax considerations? With an experiment we can strip down investing to decisions about stocks and test tendencies that should be present in even this most simple of designs. Other variables that may have interfered with empirical analysis (e.g. tax incentives, agency problems with brokerages, false investment information, bragging about stock performance, transaction costs) are not present in our experiment, and if an effect exists without these variables we know not to attribute it to them. However, if in future experiments we wish to study those other variables, they can be incorporated into the design and compared with previous experimental results.

Investors in our experiment secure a little over half of the increased profits to be had as a result of following the optimal investment strategy (53.4%). However, they fall short of maximum possible earnings, primarily as a result of the failure to consistently compare the returns on their currently held stock to the returns on the available set of stocks. We distinguish this form of the status quo bias from the ostrich effect, the tendency of investors to observe their portfolio more often during strong performances than weak, which we do not observe in the data. Further, conditional on choosing to compare their existing stock to the available choices, subjects do *not* suffer from the disposition effect as they generally hold on to superior performing stocks and trade in poorer performing stocks. We attribute the failure of the disposition effect here compared to other studies to differences in the way we implement stock market choices, as our procedures do not trigger the framing effect considered to underlie the disposition effect. The status quo bias observed in our data is consistent with one or

Table 1 Discrete probability distribution of movement for each type of stock

Stock value distribution per day									
Stock	−20	−10	−5	No change	+5	+10	+20	Expected change	Standard deviation
A	0.025	0.075	0.100	0.200	0.250	0.200	0.150	4.50	9.27
B	0.075	0.125	0.200	0.200	0.200	0.125	0.075	0.00	9.75
C	0.150	0.200	0.250	0.200	0.100	0.075	0.025	−4.50	9.27

more of the behavioral tendencies identified in Samuelson and Zeckhauser (1988) and Benabou and Tirole (2002), which are discussed in detail.

The paper is organized as follows: Sect. 2 describes the design of the experiment; Sect. 3 characterizes the behavior of fully rational, income maximizing investors along with what each of the three behavioral deviations would predict given our design. Section 4 reports the results and Sect. 5 summarizes our main results.

2 Experimental design and procedures

The experiment employed a simplified stock market setting. Subjects pick one of twenty stocks to hold. The performance of all stocks is determined by one of three random distributions known to subjects. Capital gains varied randomly, independent of their previous values. In this way each stock performed as a random-walk sequence. Each stock followed a discrete probability distribution based on its type as shown in Table 1.

Subjects received all the previously mentioned information about stock performance except the type of each stock. For each trial they were given 180 experimental currency units (ECUs) to invest in the market over twenty periods.[1] In each period they could only hold one stock. Gains and losses in value were independent and identical draws from the characterized distributions. Thus, a gain of 5 on a stock would increase one's holdings for example, from either 90 or 270 to 95 or 275, respectively.[2]

At the end of each period subjects saw the performance of the stock they were holding (see Fig. 1). They also had the opportunity to continue on to the next trial or to observe the past performance of the full set of twenty stocks by clicking on the label "Market." If they chose to observe the market, Fig. 2 would come up which lists the net change in value since the beginning of the trial for each stock (the column labeled "Total") along with the current period change in the value of the stock. If subjects observed the market they could choose a new stock by choosing the relevant stock next to the "Select Stock" option, or they could continue to hold their existing stock

[1] The starting balance of 180 was chosen because it is twice the expected losses of holding a type C stock over 20 periods. So even if a subject was unlucky enough to hold a type C stock, and unwise enough to continue holding it throughout the experiment, it is very unlikely they would go bankrupt. No subject came close to bankruptcy, with the worst performance of any subject was an ending balance of 95.

[2] This was done to give subjects a clear reference point. The screen would tell them how much they gained or lost on any investment.

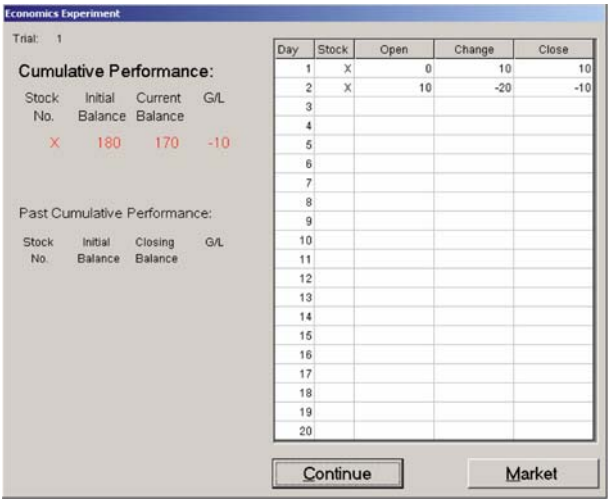

Fig. 1 Experiment window

by clicking "Cancel" and returning to Fig. 1 and clicking "Continue." If they changed stocks, whatever gains or losses the new stock accumulated were added to the existing net gains or losses for their previously held stock in that trial. There were no capital gains or losses associated with changing stocks; i.e., subjects could exchange stocks one-for-one regardless of past performance of the currently held stock or the one for which they were exchanging.

After 20 periods, subjects received information concerning the type of each stock they had held during each of the twenty periods and their final balance for that trial. They then began a new trial, with the program randomly reassigning the types of all stocks. There were eight trials in each experimental session. At the end of the eight trials, one trial was randomly chosen and subject earnings were paid using the conversion rate of 1 ECU = 0.1 US dollars applied to the end of trial balance.

The experiment was conducted at the Ohio State University economics laboratory. Subjects were recruited from undergraduate students enrolled in economics classes. An average session lasted about 1.5 h. Twenty-one subjects participated in the experiment. Subjects earned between $12.88 and $25.88 per person, with the average earnings of $22.37.

3 Characterization of optimal behavior and behavioral tendencies

3.1 Traditional profit-maximizing strategy

With unlimited time, brainpower and full information, rational subjects could calculate the conditional probabilities of any stock being type A, B or C based upon its performance. Since an A, B and C stock had an expected return of 4.5, 0 and −4.5 per period, respectively; it is possible to construct the conditional expected return of

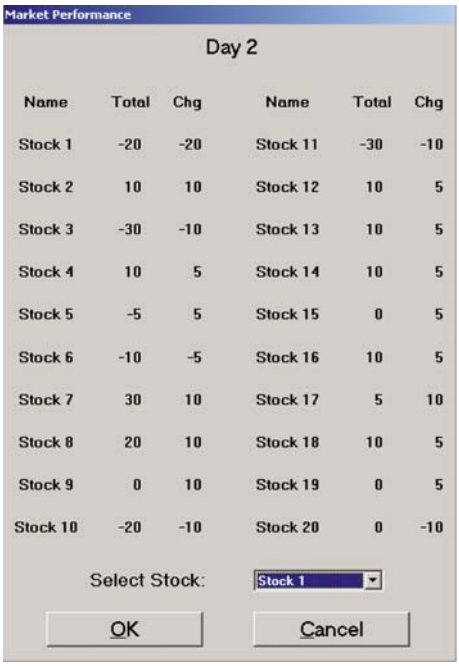

Fig. 2 Market performance window

any stock based upon its actual performance in the experiment. However, given the tremendous amount of time and effort it would take to perform these calculations, a simple rule of thumb—choose the stock with the highest total return—serves as an excellent proxy for the stock with the highest expected return.[3] So as not to bias our results against an optimal strategy, we will consider both choosing the stock with the highest expected return or highest cumulative return to be optimal strategies. Note that the rule of thumb, observing the market and determining which cumulative return is highest (see Fig. 2) should take minimal cognitive resources.

Traditional economic theory implies that in each round subjects will observe the market and choose the stock that maximizes expected profit for the remaining periods in a trial.[4] In what follows, we treat choosing the stock with the highest expected return for the next period, or the stock with the highest total net change from the beginning of a trial (which is easily recognizable), as the profit-maximizing strategy, and will refer to it as the "optimal stock."

[3] In 121 (of 3,192) decisions a subject held a stock with the highest expected return that did not have the highest cumulative return. By including both cases, if anything, we bias the outcomes in favor of the maximizing hypothesis.

[4] In other stock trading environments investors need to concern themselves with risk and diversification. In our experiment this is may not be necessary. Table 1 indicates type A stocks have lower standard deviation than type B. Hence they have the lowest risk associated with them and the highest returns. Since stocks do not have negative covariance with each other (they are all random walks), a risk reducing strategy is to choose a stock with the highest possibility of being a type A (or possibly a type C). Since stock As give much greater returns than Cs it seems the best way to eliminate risk is not through diversification but holding type A stocks.

Table 2 Profit-maximizing strategy

State	Action
Optimal stock	Observe market, hold current stock or possibly exchange for another optimal stock
Non-optimal stock	Observe market, exchange for one of the optimal stocks

If a subject begins a period holding an optimal stock, he will continue to hold it, or if two optimal stocks exist he may exchange one for another. If he begins a period holding a non-optimal stock he will exchange it for an optimal one. Table 2 shows a summary of the profit-maximizing strategy. Notice that a subject will not know which state he is in until he has observed the market. Thus he must observe the market in order to follow the profit maximizing strategy.

3.2 The status quo bias

In a variety of field and laboratory data, Samuelson and Zeckhauser (1988) observe a "status quo bias," the tendency of individuals to maintain their previous decisions regardless of the changes in their environment. While they note that a status quo bias may be optimal if there are high calculation or transactions costs, they find evidence for it even with minimal calculation and/or transactions costs present. They attribute part of the status quo bias to loss aversion as in prospect theory (see Sect. 3.3). But their main explanation for the status quo is psychological.

> "In sum, status quo bias is pervasive. It is a natural consequence of many well-known psychologically based deviations from the rational choice model. As a result the canonical choice model is unlikely to provide a reliable explanation for a substantial range of behavior, including economic behavior." (Samuelson and Zeckhauser, p. 41)

"Psychologically based deviations" from optimal choice that Samuelson and Zeckhauser consider are regret avoidance, drive for consistency, self-perception theory, and illusion of control. All would cause individuals to feel a status quo bias.

In *regret avoidance* individuals feel greater regret for a bad consequence if it is the result of an action rather than inaction (Kahneman and Tversky 1982). An individual, who prefers to avoid regret, would then exhibit a preference for inaction, producing a status quo bias. The *drive for consistency* is a natural product of cognitive dissonance theory in which an individual, already believing a previously made choice is optimal, distorts information to maintain the original perception of the choice, thereby producing a bias for the status quo. *Self-perception theory* suggests an individual infers his own preferences from his past decisions as if he were an outsider observing those decisions. Thus, he will defer to past decisions as a guide for future ones, and exhibit a bias for the status quo. (On these last two points, also see Benabou and Tirole (2002) who suggest that individuals may prefer to ignore information if that information could cause them to lose confidence or doubt their ability, both of which are valuable assets

over one's life.)[5] Finally, individuals tend to maintain an *illusion of control*, a belief in personal success at greater levels than what objective data dictates. For example, in experimental studies with lotteries, individuals are less likely to exchange their ticket for a ticket with a higher expected payoff if they chose their ticket than if it were given to them (Langer 1975). The illusion of control generates a status quo bias, as an individual incorrectly believes that their initial choice has a greater probability of success than its objective probability warrants.

It is not essential that all of these psychological factors are at play at the same time to generate a status quo bias in economic decisions. They have been listed, in the same way as Samuelson and Zeckhauser, to show the relatively high number of psychological tendencies that may cause an individual to favor the status quo over an optimal alternative. These tendencies can produce a status quo bias on two levels in our experiment (i) choosing not to look to compare returns on the current stock a subject is holding relative to the alternatives available (e.g., regret avoidance or self-perception theory) and (ii) choosing to stand pat with a suboptimal stock after having looked and comparing returns with other stocks (e.g., the drive for consistency or the illusion of control).

3.2.1 The ostrich effect

The ostrich effect, defined by Karlsson et al. (2005), is the tendency of investors to observe their portfolio more often during strong performances than weak. The authors suggest agents prefer to receive positive information about their financial holdings than negative information, and do so by selectively avoiding negative information. Karlsson et al. find empirical evidence to suggest the existence of an ostrich effect on the part of investors.

Another definition of the "ostrich effect" used by Galai and Sade (2006) is the preference of investors to avoid information that reveals the level of risk of their investment. They show that Israeli investors pay a premium on an illiquid asset (bank deposits) versus a liquid asset of similar risk (government t-bills) and cannot attribute the difference to taxes, risk or transaction costs. They conclude, "...investors show preferences (even at a cost) to investments with performance that is less frequently reported... (p. 2744)"

Both of these somewhat different views of the ostrich effect[6] involve a general tendency to avoid negative information. In our design subjects can avoid negative information (as well as regret) by not observing the market when the stock they are holding is performing poorly. If this is due to the ostrich effect, we should see subjects observing the market significantly more often when they hold a stock that has gained

[5] Bodner and Prelec (2002) have a model dedicated to this type of self-signaling. The model underlies the Karlsson et al. (2005) and Galai and Sade (2006) theory of the ostrich effect, discussed later in this paper.

[6] To distinguish our ostrich effect from Karlsson et al.: in their scenario an agent knows the market performance but has a choice whether to observe his own investments. In our experiment the agent knows his portfolio's value but can choose to observe (or avoid) the market, learning his portfolio's relative performance. We believe both decisions can be affected by an agent's desire to note or ignore information.

value while they are holding it (a winner) as opposed to when the stock has lost value (a loser).

3.3 The disposition effect

Coined by Shefrin and Statman (1985), the disposition effect involves the tendency of investors to sell investments that have gained in value and to hold onto investments that have lost value. The disposition effect is not consistent with standard utility theory, but it is consistent with prospect theory. Prospect theory suggests that economic agents do not make decisions based upon their final outcomes (i.e. aggregate wealth levels); instead, they choose a value as a reference point and make decisions based upon gains or losses from that value (Kahneman and Tversky 1979). The theory also requires agents to be risk averse concerning gains, but risk seeking concerning losses. As applied to the stock market, this theory suggests investors would sell winners quickly to realize gains, and hold onto losers, gambling that their losses will be reduced.

As Shefrin and Statman note, suppose an investor purchased a stock one month ago for $50, which is now selling for $40, and expects that in the next period the stock will either increase or decrease in price by $10 with equal probability. If we exclude transaction costs, discount rates, and tax considerations, the investor is faced with a choice of a $10 loss now or an equal chance of losing $20 or breaking even. If an investor has a S-shaped value function as in prospect theory, where the convexity in the loss domain is more severe than the concavity with respect to gains, the investor may choose to hold onto the stock, gambling that his losses will be reduced. Under traditional theory with diminishing marginal returns to wealth, a risk-averse investor would take the first option.

Examination of investor data supports the existence of a disposition effect. Shefrin and Statman found that investor data patterns were consistent with a combined effect of tax considerations and a disposition to sell winners and ride losers. Odean (1998) found that investors exhibit the disposition effect in all months except December. Later, Odean (1999) concluded that investors' excessive trading is caused by the disposition effect, as well as the large number of securities available to buy, the financial media, and investor reluctance to sell short. In experimental studies Weber and Camerer (1998) as well as Chui (2001) found evidence of the disposition effect. We test for a disposition effect conditional on subjects observing the market. That is, after observing the market, we expect a disposition effect to cause subjects to sell winners and hold onto losers.

4 Results

Taken over all periods and all trials, subjects did not bother to observe the market in 50.4% of observations. One possible rational explanation for this is that subjects observe the market early on, determine that they are very likely holding an A type stock and after several periods do not bother to observe the market. The data, however, are not consistent with this hypothesis as the frequency with which subjects observe the market in the first five periods does not dip below 39.3% in any given period and is quite high in period 1 (see Table 3).

Table 3 Decisions to not observe market by period

Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Ignored market (pct of 168)	50.6	44.6	45.2	44.0	39.3	47.0	52.4	48.2	57.1	50.6	51.8	49.4	51.2	54.8	55.4	47.0	56.5	54.2	58.9

Table 4 Frequencies of observing the market in first versus last ten periods: individual subject averages as the unit of observation

Frequency of observes market		
	Period 1–10	Period 11–20
Mean	0.521	0.521
S	0.283	0.268
N	21	21
2-tailed paired *t* test		
Mean difference		0
STDEV difference		0.227
t statistic		0
P value		1
2-tailed Wilcoxon signed rank test		
Positive rank sum		108
z statistic		−0.261
P value		0.794

Table 5 Decisions to not observe market by probability of holding type A stock

Range of probability of holding a type A stock	Frequency	Does not observe the market	Percentage of times not observe the market
(0.9, 1)	939	502	53.5
(0.5, 0.9]	1150	566	49.2
(0.1, 0.5]	778	367	47.2
(0, 0.1)	325	175	53.8
Total	3,192	1,610	50.4

We examined the choice to observe the market in the first and last ten periods by subject, taking the average difference between the frequencies, by subject, and running paired tests over the difference. In this technique the unit of observation (N) is each individual subject, eliminating the significance problem of repeated measures when all subject decisions are pooled together. The results are shown in Table 4. Neither the parametric paired *t* test nor the nonparametric Wilcoxon signed rank test indicates significantly different frequencies between the first and last ten periods.

Table 5 shows the choice to observe the market depending on the conditional probability of holding a type A stock. While the frequency of observing the market is affected by the conditional probability of holding a type A stock, the effect is not economically meaningful. Subjects when holding a stock that is very likely type A

Table 6 Individual subject decisions not to observe the market ($N = 152$)

Subject	Did not observe	Percentage not observe	Subject	Did not observe	Percentage not observe
1	60	39.5	12	121	79.6
2	138	90.8	13	116	76.3
3	62	40.8	14	111	73.0
4	62	40.8	15	33	21.7
5	62	40.8	16	6	3.9
6	15	9.9	17	116	76.3
7	72	47.4	18	58	38.2
8	69	45.4	19	127	83.6
9	28	18.4	20	121	79.6
10	82	53.9	21	141	92.8
11	10	6.6	Total	1,610	50.4

(likelihood > 0.9) ignore market information 4% more often than when holding a stock that is not as likely type A (likelihood ≤ 0.9). Individual subject data confirm this tendency (P value < 0.08). However, given the relatively small differences in frequency of observing the market, this effect does not account for most observations of subjects ignoring the market.

Note, however, that Table 5 shows that the probability of holding a Type A stock is usually greater than 0.25, the market average, indicating some movement toward choosing superior stocks over time. We will have more to say about that below.

Most subjects followed this pattern of not observing the market on a regular basis. Table 6 shows the number of times each individual subject chose not to observe the market after a period. While there are individual subject deviations on observing the market, we see that nearly half the subjects (9 out of 21) chose not to observe the market a majority of the time.

Finally, the frequency of observing the market does not change materially, on average, over the course of the eight trials. Using individual subject data as the unit of observation and comparing the frequency of observing the market in the first four trials versus the last four, we find no significant differences ($|t| < 1.0$; $|t$-statistic$| < 1.0$). Thus, there does not seem to be a boundedly-rational model that can explain the high frequency with which subjects do not observe the market.

4.1 The ostrich effect

Table 5 suggests that the ostrich effect is not responsible for subjects' tendency to ignore market information as subjects ignored information when holding strongly performing stocks about as often as when holding stocks that had lost value. Table 7 brings these data together in terms of conditioning on winners and losers.

Contrary to the ostrich effect, subjects observe stocks relatively more often when holding a losing stock (a stock that has lost value since they had acquired it) then when

Table 7 Decisions to not observe market by net gain of stock since holding it

State	Action	
	Does not observe the market	Observes the market
Winner	1,189	**1,020**
2,209 times	53.8%	**46.2%**
Loser	**342**	478
820 times	**41.7%**	58.3%
Neither winner or loser	79	84
163 times	48.4%	51.5%

Choices consistent with the ostrich effect are in bold

holding a winning stock (a stock that has gained value since it was acquired). Thus, since winning stocks are more likely to be optimal than losing stocks, subjects are clearly acting somewhat more rationally than the ostrich effect suggests.[7]

4.2 Performance relative to the profit-maximizing strategy

Tables 5 and 7 indicate that subjects are clearly capturing some of the profits to be had by following an optimal investment strategy. This section explores the basis for this outcome. First, subjects choose to observe the market more often when holding a non-optimal stock than when holding an optimal stock (51.6% of the time vs. 45.4% of the time).[8] Second, as also shown in Table 8, conditional on holding an optimal stock and looking at the market, subjects overwhelmingly chose to stay with their existing stock (80.7% of the time), switching to a non-optimal stock 1.9% of the time, and switching to another optimal stock 7.9% of the time. Thus, if anything, the status quo bias helps to achieve an optimal outcome in this case. Third, conditional on observing the market and holding a non-optimal stock, subjects switch to an optimal stock 19.8% of the time and continued to hold their non-optimal stock 37.6% of the time.

When not switching to an optimal stock (42.8% of the time), subjects switched to a stock with higher cumulative return a little over half the time (52.6% of the time), but also switched to a stock with a lower cumulative return 40.9% of the time. This relatively high frequency of sticking with a non-optimal stock, or switching to an even poorer performing stock, after observing the market is surprising since it should be reasonably obvious that there were other, better performing stocks out there. These choices are consistent with the "gamblers fallacy"; that is, such stocks are "due" for better outcomes. Under any circumstance, such choices do not help investors' bottom line.

Overall these deviations from the profit-maximizing strategy—failure to observe the market and failure to move to an optimal stock conditional on observing the market—

[7] This effect is robust across subjects.

[8] $P < 0.05$ using individual subject data.

Table 8 Observations testing traditional theory

State	Action			
	Observes market	Conditional on observing market		
		Continues with existing stock	Exchanges for non-optimal stock	Exchanges for an optimal stock
Optimal stock	472	**381**	9	**82**
1,040 observations	45.4%	**80.7%**	1.9%	**17.4%**
Non-optimal stock	1, 110	417	473	**220**
2152 observations	51.6%	37.6%	42.6%	**19.8%**

Choices consistent with profit-maximizing strategy is in bold

Table 9 Average subject earnings compared to optimal

	Numerical Amt	In US $
Starting balance	180.00	$18.00
Average actual gain	43.72	$4.37
Average total gain	223.72	$22.37
Average forgone gain from not choosing an optimal stock	38.23	$3.82

cost subjects $3.82 per session versus a maximum gain of $8.19 (see Table 9).[9] This represents 46.6% of the maximum possible gain lost as a result of not following the optimal investment strategy. Earnings are however significantly greater than random decisions making ($P < 0.01$), but also significantly less than if choosing optimally ($P < 0.01$). Although the absolute loss here is relatively small, the additional time it would have taken subjects to look at the market on a regular basis and to choose the optimal stock was quite small as well.[10]

4.3 The disposition effect

The disposition effect predicts that subjects are more likely to get rid of winning than losing stocks after looking at the market. However, Table 10 shows subjects are more likely to do the reverse, selling losers and holding winners ($P < 0.005$ for individual subject tests). Thus, the disposition effect does not account for most subjects' failure to choose the optimal stock. Table 10 shows all decisions made conditional on observing the market.

[9] This is calculated on a per trial basis, so this represents forgone earnings from participating in the session.

[10] We estimate it would have taken subjects about 5–10 s to observe the market and select the stock with the highest net change. Given the average number of times subjects failed to look at the market this would take an extra 6–12 min in total, with a very high potential hourly rate of return, only a little less than the hourly rate of return that they got from looking and choosing better stocks.

Table 10 Trades after market is observed (1,582 observations)

State	Action	
	Continues	Exchanges
Winner	647	**373**
1020 times	63.4%	**36.6**%
Loser	**114**	364
478 times	**23.8**%	76.2%
Neither winner or loser	37	47
84 times	44.0%	56.0%

Choices consistent with the disposition effect are in bold. If we consider all observations, including the times subjects chose to ignore market information, subjects held winners and continued to hold them 83.1% (1,836/2,209) of the time, they held losers and continued to hold them 55.6% (456/820) of the time, and continued 71.2% (116/163) when holding neither a winner nor loser. Thus, by these measures behavior is even more at odds with a disposition effect

While we fail to find a disposition effect, the structure of our experiment is different from those investment situations where a disposition effect has been reported, which creates a very different framing of the problem for our investors. In our experiment disposing of one stock for another does not generate a realized capital gain or a realized loss of capital since stocks are exchanged one-for-one. Thus, the decision to dispose of a winner or hold on to a loser does not trigger the same gain/loss framework believed to underlie the disposition effect. Rather, the exchange impacts the future flow of gains and losses. We believe it is this difference in framing that is responsible for the absence of a disposition effect here compared to those studies where it is reported.

5 Summary and conclusions

Subjects exhibited a robust status quo bias throughout this experiment that is not consistent with standard economic theory. In a majority of decisions, subjects chose to ignore information that could have potentially led to higher earnings. This status quo bias is reasonably robust across individuals, over time and independent of the stock's performance. It is present in an environment in which there are very low costs of identifying better performing stocks. A behavioral phenomenon that may explain this status quo bias is individuals' reluctance to receive information that might question their own abilities (see Benabou and Tirole 2002)—hence they choose to limit comparing the returns on their existing choices to the other options that were at their disposal. Evidence of ignoring the performance of other stocks has also been found in empirical work. When explaining the persistence of his result that stocks investors sell outperform their future portfolio, Odean (1999) notes that investors likely do not observe the performance of stocks they have sold nor compare that performance to their current portfolio. Thus, they do not learn to correct this trend. Although Odean does not attribute investors' reluctance to observe past stocks to a specific behavioral tendency, it could be explained by regret avoidance or a general tendency to ignore possibly

negative information. In our experiment it would be enough to cause subjects to avoid observing the market, since they would learn the performance of their previously held stock. Alternatively, overconfidence may explain the status quo bias as subjects believed they have picked the optimal stock and do not bother to observe the rest of the market.

The strong status quo result is not consistent with the ostrich effect as subjects tend to compare their own stock's results to other stocks when their stock is earning a below average rate of return as opposed to an above average rate of return. While the ostrich effect has been observed in other markets with a richer amount of information, our simplified setting does not trigger the effect.

The data provide little evidence for a disposition effect conditional on observing the market. After observing the market, subjects were more likely to hold onto winners and exchange losers than vice versa. They also had a greater tendency to hold onto winners than losers in general. This experiment allows subjects to exchange one stock at a time for another regardless of the performance of any stock, a feature not found in actual asset markets. This do-over apparently fails to trigger the gain/loss framing of selling winners and holding onto losers that underlies those settings in which a disposition effect has been identified, and which is believed to underlie the disposition effect.

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