

Confirmation Bias in Investments

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Abstract

Investors exhibit some well documented mistakes, such as the disposition effect and excessive trading. One potential explanation of these phenomena is confirmation bias. People are inclined to be attached to their investment thesis and are unwilling to consider or accept evidence that they are wrong. Thus, they make speculative bets and hold onto them even as they show a downward trend. Confirmation bias may result from people selectively acquiring information that allows them to continue believing what they initially believe. I investigated selective information acquisition among investors with an experiment that gave participants the choice to read an article supporting an investment they previously made or one opposing it. I discovered that investors are significantly more likely to read the article that is supportive of their decision rather than the article that opposed the investment they had chosen. This suggests that investors exhibit selective information seeking, which could be a source of confirmation bias and is thus a plausible explanation for the investor mistakes previously discussed.

Keywords: investments, confirmation bias, selective information acquiring

1. Introduction

1.1 Common Investment Mistakes and Its Relevance to Confirmation Bias

In financial markets we often see paradoxes that are hard to explain with mathematical models and theories. One simple yet interesting question is “why do trades happen?” According to the No Trade Theorem, because information is shared as common knowledge with private signals and the concurrent updates of beliefs, speculations should not occur (Milgrom & Stokey, 1982). That is, if an investor is willing to sell his stocks in the markets due to unknown sources of information, his willingness is a signal that the stock has the potential to drop. From the opposite perspective, if a buyer is willing to buy a certain stock, the seller might be reluctant to let go, for this signal from the buyer is indicating that the stock might rise. However, trades are indeed happening daily around the world; moreover, there seems to be an excessive flow of trades going on. In 1999, Terrence Odean examined the situation of the high trading volume in the markets by testing the hypothesis that overconfidence would cause trades to happen more often.

In an earlier thesis in 1998, Odean illustrated that investors realize their losing stocks’ situation at a much lower rate than profitable stocks in what has been called the disposition effect. This results in investors selling their winning stocks significantly before it reaches its pinnacle and holding on to losing stocks long after they first started to fall. Colossal financial losses are thus inevitable. How and why does this overconfidence emerge? What causes investors to be overly confident, even ignorant of their current situation?

One possible explanation for both the disposition effect and speculation is the confirmation bias. Confirmation bias is a term that describes the reluctance people show to change their initial beliefs. People are going to be more willing to see and accept new information consistent with what they already believe. A variety of phenomena fall under the category of confirmation bias. What one might have encountered in one’s life, such as subconsciously rejecting certain information that holds against personal opinions or spontaneously favoring a candidate’s statement because it resembles one’s moral beliefs. Such behaviors are often subconscious and whoever was to review the incident with no involvement in the case might identify it better than the subject.

Motivated confirmation bias happens when a person holds a certain belief and the desire to confirm that belief with the current information is strong. For instance, in a lawsuit, a juror who has already formed his beliefs may be inclined to overestimate the importance of a piece of evidence that supports his previous judgment. There are,

however, allied theories and concepts, overlapping with confirmation bias, that could potentially explain this kind of behavior. For example, belief consonance, the preference to have common beliefs with other individuals and the consequent disturbance of the conflicting beliefs, is similar to motivated confirmation bias. (Golman, Loewenstein, Moene, & Zarri, 2016.) In fact, belief consonance might be the stimuli to the display of confirmation bias: subconsciously misinterpreting information. On the other hand, the incoming information could be easily seen as a threat to the subject's current identity when considering believe-based utility. Thus, the subject will choose to avoid the information by means such as inattention, physical avoidance, and most importantly, biased interpretation. (Golman, Hagmann, & Loewenstein, 2017).

1.2 Importance of Research

People are indeed reluctant to accept information that counters their existing beliefs. In the context of financial markets, investors could continue to believe in their original decision (e.g. the stock will rise up) after it has shown signs of dropping (generating the disposition effect), or after they've found someone willing to sell the stocks (generating speculation). Vice versa, when investors are willing to update their beliefs (due to stocks rising) because it coordinates with their beliefs, speculations happen; and since people are more willing to accept positive information, the winning stocks are sold at a higher rate than the losing stocks. Should one acknowledge one's belief and be cautious of how it might influence future decision making, one could prevent financial loss and possibly gain benefits.

1.3 Hypothesis Development

The guiding question to my research is: are investors more willing to accept information favoring or criticizing their investment decisions? If so, such skewed information preference may well help explain the disposition effect and excess speculative trade. My hypothesis is that investors are more inclined to accept information that aligns with their previous investment decisions.

As prior theories have noted, information is valuable as it leads to better decision making, prevents mistakes, and increases benefits. Thus, it seems irrational to actively avoid valid information. (Golman, Hagmann, & Loewenstein, 2017). In the context of financial markets and investments, one should be open to and equally interested in a broad spectrum of information because of the benefits. More specifically, investors should value information criticizing their investments and favoring others. In doing so, investors can obtain a comprehensive understanding of their opponents, change plans when necessary, and be prepared for challenges ahead. On the other hand, positive information supports investors' decisions but doesn't provide much impact (whether positive or negative) on their future profits. However, the theories fail to represent an accurate model. Investors' personal portfolios are essential to their knowledge of loss and gain; therefore, investors should be checking their portfolio regularly. Yet researchers have discovered that the frequency of checking their portfolios went down (i.e. they avoided the information) when investors were experiencing financial downfalls. The confirmation bias theory suggests that people are prone to review information supporting their own beliefs and tend to avoid information that isn't consistent with their opinions. The research and the hypothesis are meant to find a relationship between confirmation bias and investment decision makings.

In addition to the first hypothesis, a secondary hypothesis was formed: "After reading the article of their choice, investors shift their investment plans in the direction of what they initially chose to invest in". This hypothesis would be a more direct test toward whether the participants indeed displayed confirmation bias, which is investigated by the reconsideration question they were given.

2. Method

2.1 Participant Characteristics

I recruited participants of the age of 18 or older. There were no specific requirements for degrees or experience, but a high school education was recommended for a clear understanding of the materials presented in the survey.

2.2 Sampling Procedures

2.2.1 Sample Size

We aimed for a total of 125 participants. The survey was created on Survey Monkey and was later released on Amazon Mechanical Turk. The platform enabled a broad range of people with different backgrounds to respond and thus supported a more generalized result. Participants indirectly assign themselves into 2 groups by answering the questions.

2.2.2 Research Design and Measures

The purpose of this survey is to investigate the guiding question: are investors more willing to accept

information consistent with their previous decision? The layout of the survey consists of two sections: experimental questions and personal questions. Participant is presented with background information regarding two kinds of mutual funds – actively managed funds and index funds. Actively managed funds are described as risky and more rewarding and index funds as having a lower expense ratio and a careful investment. The information is from Vanguard.com and contained three sections - goal, strategy, other things to consider - that give an overall description of each kind of fund. Then the participant decides between these two funds as if they are imagining making an investment of their own.

Next, participants are shown two headlines of articles regarding active management fund. The articles are selected from seekingalpha.com. Both articles are similar in lengths, though one article had graphs representing data mentioned in its contents; the articles are clearly supportive or oppositional based on headlines. 1st Headline: The Case for Active Management. 2nd Headline: I hate “Active Management”. As participants continue, the article they chose is shown, and they are given a chance to change their decision to invest more, no change, and withdraw.

In the personal question section, questions are asked concerning age, gender, degree, occupation, experience in economics and self-assessment of willingness to take risks. The answer to those questions were on a voluntary basis. To prevent responder fatigue and for the designated purpose, individual workers (Turkers) can only do the assignment (Human Intelligence Task) once. In addition, the reward for each participant to facilitate the experiment is one dollar per submitted assignment. The assignment takes roughly ten minutes to complete.

The phenomena of interest (i.e. the willingness to read positive information) are measured by the number of people who chose to read a certain article and their final decisions after reviewing the article.

2.2.3 Experimental Manipulation, Limitations, and Data Analysis Method

Response editing was turned off to ensure that choices are based on first-instinct for this experiment. However, one limitation of my study is that I could not randomly assign participants to a treatment condition. The treatment group and the control group are indirectly assigned: people who chose the active management fund are in the treatment group (since they received information regarding their own investment) and people who invested in index fund will be the control group (since they received information about an alternative investment option). The subjects sort themselves into groups, and this could present a selection effect. That is, different kinds of people choose to invest in actively managed funds and in index funds. It's possible that one of these differences in the types of people in each condition could lead to any observed difference in information preference behavior.

The data analysis is primarily focused on the choice made between two headlines. A mean is calculated to measure the percent of people who chose to read “The Case for Active Management Fund” in invested in people who originally invested in active management funds. Likewise, another mean was obtained for the index funds. A 2-proportion z-test was also conducted for evaluating statistical significance.

3. Results

3.1 Recruitment

A total of 136 survey responses was received. Five responses were incomplete as they were not in the submitted status; one responder didn't correctly enter his Mechanical Turk ID number as required; one responder stated his age as 10, which was smaller than the criteria – an age of 18 or older. Disregarding those seven responses, we are left with 129 valid responses. Since this was an online survey, the knowledge of the accuracy of the information regarding personal information is scarce.

The maximum age of the sample is ninety-year-old and the minimum age is twenty-two. Participants have had education ranging from high school to masters. Average value of the self-evaluation regarding risk-taking is 6.1 on a 10 point scale. Ninety-two participants are identified as male and 34 females, with 2 exception of gender non-binary (or “Others”).

3.2 Statistics and Data Analysis

The total number of people who chose to invest in actively managed funds is 74, and the number of investments for index funds is 55. 65 people both invested in active management funds and read the article “The Case for Active Management”; 35 people that invested in index funds read the article “The Case for Active Management”.

Table 1. Results of investment decisions and article preferences

	People who choose to read "The Case for Active Management"	People who choose to read "I Hate 'Active Management'"	Total number of people
People who invested in Active Management Funds	65 (88% of total)	9	74
People who invested in index funds	35 (64% of total)	20	55
Total	100	29	129

Bar Graphs of table above:

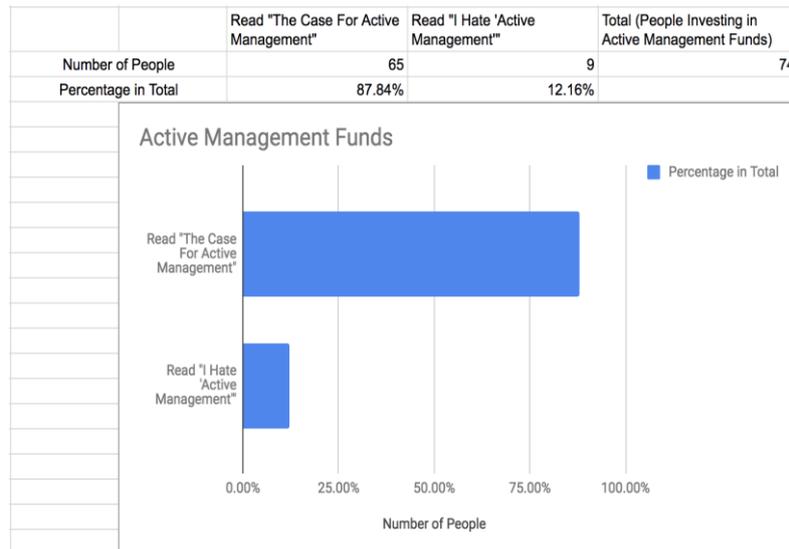


Figure 1. People invested in active management funds

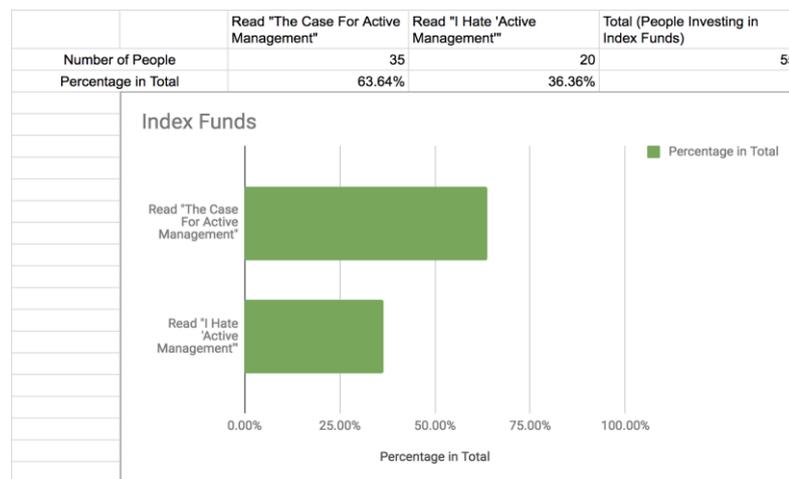


Figure 2. People invested in index funds

The data table is of one degree of freedom. Two independent proportions was calculated by using the formula: ratio = people who choose to read X / people who choose to invest in X. Considering the proportions, I decided to use a 2 proportion Z-test to measure the statistical significance. The alpha value set for p is 0.01(p<0.01).

Table 2. 2-Proportion Z-test for information preference

	Proportions	Total Number of Participants	P-hat	Q-hat	Z-value	p
Active Management Funds Investors	0.8783784*	74	0.775	0.225	3.256	0.00171
Index Funds Investors	0.6363636*	55				

*1. The proportion is obtained by 65/74.

*2. The proportion is obtained by 35/55.

After reading the article, participants were given a choice as to reconsider their investment decisions. The topics shown in the first row represents the options the participants could see. The table shows their reconsidered investments after reading.

Table 3. Results for Re-consideration question

	No Change	Invest(more) in Active	Invest(more) in Index	Withdraw from Active	Withdraw from Index	Total
Invest in Active + Read “The Case for AM”	12 (18.75%)	33. (51.56%)	14 (22.87%)	5 (7.81%)	0	64
Invest in Active + Read “I Hate AM”	5 (50%)	0	4 (40%)	0	1 (10%)	10
Invest in Index + Reda “The Case for AM”	11 (33.33%)	14 (42.42%)	3 (9.09%)	2 (6.06%)	3 (9.09%)	33
Invest in Index + Read “I Hate AM”	15 (75%)	1 (5%)	4 (29%)	0	0	20

Note. Active = Active Management Funds; The Case for AM: The Case for Active Management; Index = Index Funds; I hate AM = I Hate “Active Management Funds”; Total = Total number of people who answered the follow-up question.

3. Discussion

The Z-test gave a result of a p-value smaller than 0.01. That is, people who invested in active management funds are indeed more likely to accept information favoring active management funds. According to the confirmation bias and the information preference theory, people are inclined to accept information or beliefs that corresponds with one’s own belief and avoid information that is inconsistent. By having participants review materials regarding the mutual funds and deciding on their own, a belief is formed (consciously or subconsciously) that their investment is the “right” decision (the decision that will gain the most utility). Later, participants did display behaviors of seeking for information that could be reassuring and confirming their previous judgment.

However, limitations in this research do exist. Due to software functions, the experiment was originally designed to have 2 sets of headlines: one set had headlines both regarding the active management funds and the other set had headlines concerning the index funds. We were not able to randomize the different sets to present to participants, thus preventing us from confirming a causal relationship between confirmation bias and information avoidance.

In regards to the reconsideration question after reading the article, one can see from the results that reading tends to move people toward active management (probably due to that most people read the article favoring active management), but the move toward active management is not stronger for those who initially invested in active management than for those who initially invested in an index fund. Therefore, the data fails to support the secondary hypothesis. Evidence for information preference that would be consistent with confirmation bias is present, but there is no direct evidence for confirmation bias itself.

4. Conclusion

There is a strong relationship between the investment participants made and their article of choice. Previous studies showed that, like the information avoidance theory (especially the misinterpretation and inattention to information), investors will evaluate an information as more reliable and authentic if the information conforms to their prior beliefs. (Park, Konana, Gu, Kumar, & Raghunathan, 2013) My research presents an intrinsic relationship between decision making and receiving information. Furthermore, the relationship serves as a warning to those who try to stay objective. Future research could be dedicated to finding the causation for the information avoidance phenomena displayed in investors and thus helping people prevent financial loss.

In retrospect, the result indirectly responds to the speculation paradox previously introduced. With the benefit of

knowing that people do display this skewed information preference toward what they already believed, we can see that traders are more likely to react to positive information (i.e. sell the stocks) and avoid accepting information that suggests signs of downfall. While this imbalance between the information giver and the receiver exists, speculation happens to an extent of excess trade.

Another motivation for this research is its policy implications. To ensure the openness of information and to refrain from sudden market changes because of inside information, governments have regulations that require the frequency and quantity of company disclosures. One would suspect that disclosures are regarded by people as valuable information and that people would read it often enough, for information means profit in the markets. However, evidence suggests otherwise. Fewer than 3% of people read privacy disclosures (Jensen, Potts, & Jensen, 2005. Privacy practices of Internet users: self-reports versus observed behavior.) For all the effort to ensure the openness of information, these policies are not as effective as we'd hoped. One possible reason could be that people are reluctant to review disclosures because they are afraid that the information might go against their beliefs (e.g. A disclosure might imply that the company is experiencing downfalls and thus influence the stock markets). If we were to find that people indeed display confirmation bias when dealing with disclosures, we could provide an explanation for why the policy doesn't perform well.

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