Behavioral Biases in Amateur Stock Selection

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Abstract

Investing in stock markets is becoming increasingly popular among many who do not have a financial education background and who has a job other than stock-trading. These investors trade stocks on a part-time basis while having other jobs. It is thus reasonable for some to doubt whether such traders can perform rational investment decisions that maximize their investment returns. This paper aims to discuss three behavioral biases among amateur stock traders during their stock selection process. Surveys are conducted with some amateur traders to test the stated biases. These surveys include replications of classic experiments as well as modifications of such experiments. Lastly, this essay proposes possible actions to reduce the effect of these biases.

Keywords: behavioral biases, stock selection, anchoring effect, framing effect, availability bias

Behavioral Biases in Amateur Stock Selection

Amateur stock traders constitute a significant portion of all stock traders within most stock markets. According to data from a report published by the China Securities Investor Protection Fund Corporation, there were 160 million stock investors in China by December 31, 2019, of which 99.76% are individual investors rather than institutions or organizations (China Securities Investor Protection Fund Corporation Limited, 2020). Results from the same investigation revealed that, among all respondents to the survey, 15.3% identified themselves as "novices who need introductory knowledge," 48.6% considered themselves to "have basic knowledge related to investment," and another 36.1% who believed that they are "relatively professional in investment."

Most of these traders invest their personal wealth into the stock market. Their performance in the stock market is of paramount importance to their welfare. For those amateur traders still in work, the return from stock investment is closely related to their future dependency on others and the social welfare system after retirement.

Unfortunately, in 2019, 91.4% of professional institutions made profits from stock investment, while only 55.2% of individual investors profited during the same period (China Securities Investor Protection Fund Corporation Limited, 2020). This difference marks a clear contrast between the performance of professional traders and non-professional individuals.

Though many factors govern the performance of all traders, this paper focuses on three behavioral biases that could have influenced the investors' investment decisions

during stock selection, the process of which will later determine the profitability of the investment. These three biases are the anchoring effect, the framing effect, and the availability bias.

This paper aims to test and analyze the presence of these biases among amateur stock traders. By discovering behavioral biases that governs stock selection, it is possible to propose certain policies that can help those amateur traders to make better selections and earn more from investing in stocks. Such discoveries will contribute both to individual finance as well as macroeconomic health.

This paper will first introduce pieces of background literature related to the subject as well as the definition for "amateur traders." It will later describe the details of the methodology of surveys conducted with 55 amateur traders. Results from the surveys are then analyzed. Finally, suggestions are made to help to reduce and possibly eliminate the effect of the biases and improve performance among amateur stock traders.

Literature review

This paper is a research in the discipline of behavioral economics. A description of the discipline can be found in Camerer et al. (2004): "Behavioral economics increases the explanatory power of economics by providing it with more realistic psychological foundations" (p. 3). The above book also provides a comprehensive discussion of major behavioral economics findings and their applications.

In an array of innovative behavioral findings, this paper chooses to focus on only three of them: the anchoring effect, the framing effect, and the availability bias. The

description of anchoring (as well as some other biases) is found in Tversky and Kahneman (1974). The anchoring effect is defined as follows by Tversky and Kahneman (1974):

> "In many situations, people make estimates by starting from an initial value that is adjusted to yield the final answer. The initial value, or starting point, may be suggested by the formulation of the problem, or it may be the result of a partial computation. In either case, adjustments are typically insufficient. That is, different starting points yield different estimates, which are biased toward the initial values. We call this phenomenon anchoring (p. 1128)."

Slovic and Lichtenstein (1971) proposed that people's adjustments from the anchors are always insufficient. Kaustia (2008) showed that there is a more significant anchoring effect among inexperienced traders, compared to more experienced professional traders.

The classic work on framing effect is explored by Tversky and Kahneman (1981). The researcher's definition of framing goes as follows:

> "We use the term "decision frame" to refer to the decision-maker's conception of the acts, outcomes, and contingencies associated with a particular choice. The frame that a decision-maker adopts is controlled partly by the formulation of the problem and partly by the norms, habits, and personal characteristics of the decision-maker (p. 453)."

The relation of investment risk and framing are later explored more specifically by Brooks (2009) and Sawers (2011). Another specific application of narrow framing

in investment is made by Barberis (2006).

The availability bias is explored by Tversky and Kahneman (1973). The availability bias is defined as follows in:

> "…a judgmental heuristic in which a person evaluates the frequency of classes or the probability of events by availability, i.e., by the ease with which relevant instances come to mind (p. 207)."

More specifically, a bias known as the recency effect may affect decision making among investors. The psychological explanation of the recency effect is given by Baddeley (1993), and an exploration of the recency effect among repurchasing of stocks is given by Nofsinger (2013).

Unfortunately, except for a few pieces of research, such as Kaustia (2008), there is a lack of literature that focuses specifically on the behavioral biases that are prevalent among amateur traders. Nor is there sufficient literature exploring how changes, such as financial education and trading experience, can help to eliminate such biases within amateur traders.

Definitions

Amateur traders, as used above and in the next parts of the essay, are those stock traders with the following characteristics:

1. Have never attended any educational program related to personal finance, (stock) investment, or financial economics;
2. Have at least one other full-/part-time job other than stock trading;
3. Have less than 20 years of trading experience.

There are justifications for these definitions. Frist, “amateur traders” should not have any financial education background. Educational background in investment may help to mitigate or even eliminate the effect of certain biases. Thus, it is unreasonable to define amateur traders as people who could have received professional education in stock-trading. Furthermore, since the proportion of stock investors that have a financial education background is small, by defining amateur traders as those who have not received such education, the results of this article can be more conclusive for a more significant proportion of stock traders. Secondly, these investors should not trade stocks for a living. It is undoubtedly true that some may earn more from stocks than from their other jobs, but the presence of a full-/part-time job other than stock-trading just intends to mean that the person has other sources of income. Third, in order to rule out the possibility of learning through experiences of trading, those traders who have more than 20 years of trading experience are excluded from the scope of the research. Whether trading experience will reinforce certain biases or help to reduce the effect of some biases is still unclear. Twenty years of experience is only an arbitrary time period and requires further validation.

Survey methodology and results

In order to test whether amateur traders are affected by the three behavioral biases, a series of survey questions had been handed out to a sample of amateur traders. This section of the essay explores the methodology behind the questions that will prove the presence of the biases. Later, the results of this survey will be discussed and analyzed. A copy of the survey can be found in the appendix.

Methodology

There are already classic experiments that had identified and confirmed the three behavioral biases among many groups of participants and under various circumstances. In many cases, participants of the experiments are university students and faculty. In some instances, the students may have majored in business-related disciplines and should be considered to have strong investment knowledge background.

In my replications and modifications of a series of classical experiments, I tried to focus on those amateur stock traders only. In the first part of the questionnaire, there are specific sections for participants to fill in their trading experience and educational background. The purpose of such questions is to identify who is an amateur trader by the definition above and who is not one.

All surveys had been answered under the supervision of the experimenter in the office where the participants worked. No other people are present except the experimenter and the participant. The experimenter would first tell the participants that they are answering the survey for an "economics assignment at school" and ask the participant to follow the instructions printed on the survey. Then the experimenter does not raise further questions for participants and only answers questions from participants if the answer will not affect the decisions made by participants when answering the questionnaire.

There are three questions in the second part, each intended to test a specific bias. The first question asked about the anchoring effect. It was a modification of the

experiment involving a roulette wheel, originated from Tversky and Kahneman (1974). Participants received the question with a graph. The survey instructions said that the graph represented the performance of an unknown stock in a foreign stock exchange market in the previous year. Participants would then predict the performance of the stock in the following year. There were two versions of the question, both having the same graph, but the "unknown stock" had different codes. The stock was numbered 000002 and numbered 000045 in another. In both cases, the code was printed in a larger size than the previous text and written in a bold font. The aim was to instill an anchor into the participants. The first part-question asked participants to predict whether the percentage return of the stock is higher or lower than 2 percent (45 percent in the later version) in the next year. This part-question aims to establish an anchor within the participants who, in theory, could rely on this reference point for adjustment towards a more exact answer on return rate. The second part-question asks for the exact value of this rate.

The second question of the second part of the survey asked about the framing effect. It was an exact replication of one experiment in Tversky and Kahneman (1981). Three gambles were presented to the participants. The aim was to explore risk preferences when questions are presented differently. The first and second part-questions included two separate choices between two gains (the first part-question) and between two losses (the second-part question). On the following page, a third gamble was presented. The two choices of this part-question were aggregates of options above. The combination of the first two gambles should, in the conventional

economics framework, yield the same result as gamble three, which is indeed a combination of two choices from the first two part-questions. The only difference was that the third presented the two choices in aggregate, while the first two part-questions presented choices separately. This question aims to test how framing can influence participants' risk preferences.

The third question aimed to explore the availability bias. In the first part-question, participants were asked to list five examples of profitable stocks (less than five stocks are allowed) from the banking industry. Afterward, participants were asked to predict whether investing in the stock industry in the past year was profitable or not. In the second part-question, participants were asked to write only one example of unprofitable stock from the car industry in the past year, and to predict whether an investment in this industry was, in general, profitable in the past year. It could be difficult for some participants to recall five profitable stocks from the banking industry, especially for those who do not usually invest in the banking industry. This cognitive strain may thus cause participants to judge the banking industry as unprofitable. On the other hand, the second part-question tried to capture the opposite effect. When the survey only asked for one example of an unprofitable stock from the car industry, participants might have considered it easier to retrieve relevant examples and may thus regard the whole industry as unprofitable in general.

Survey results and analysis

A total of 55 surveys had been given out and answered. Among these, some participants had skipped certain questions and part-questions or had produced

contradictory results (i.e., estimating that the return of the unknown stock will be lower than two percent after one year while predicting that the profitability will be 10 percent in the same period). This might be due to my failure to produce perfectly understandable survey questions. Thus, such answers were excluded when calculating the final results.

In total, 54 participants (98.1%) had given out their years of trading experience, averaging about 14.6 years. None had trading experiences of more than 20 years. All of the participants had work other than stock trading, and all had no financial education background. They all come from the Airport Police Station of Nanchang, China, and Jiangxi Air Traffic Control Bureau. The sample should be considered as amateur traders that have been defined above.

The question on the anchoring effect

Twenty-seven participants had received surveys containing the anchor 000045. Among these, 19 participants (70.4%) had produced useful results. Their average prediction of the stock's profitability in the following year was 28.4%, and the median estimation is 20%. Meanwhile, another 28 participants had received surveys containing the anchor 000002, and 21 participants (75%) had produced useful results. Their average prediction is 22.3%, and the median prediction is 15%. Both indicators of central tendency were lower in the 000002 group than the values from the 000045 group.

Tversky and Kahneman (1974) explained that when people consider estimates with reference to an anchor, they adjust towards a certain direction from that anchor,

but this adjustment is often insufficient. A rise in the stock price of the unknown stock of 45% or more seemed unlikely to happen in the next year. Nor was it likely that the stock will experience only moderate growth of 2% (the graph indicated a stronger trend of growth than 2%). Thus, most participants would consider the likely profitability to be somewhere below 45% (for the first group) and higher than 2% (for the second group). Based on these anchors, participants would adjust towards the right value, starting from the anchor. Since the adjustment is usually insufficient, it turned out that those starting with the anchor 45 predicted, on average, higher profitability of the same stock than those who received an anchor of 2.

The question on the framing effect

Forty-nine participants from a total of 55 participants (89.1%) had produced useful answers on the question related to framing. The scenario in the first choice of the first part-question (a sure gain of $240) combined with the scenario in the second choice of the second part-question (75% chance to lose $1000, and 25% chance to lose nothing) to form the first choice of the third part-question (25% chance to win $240, and 75% chance to lose $760), which was printed in the following page. The scenario in the second choice of the first part-question (25% chance to gain $1000, and 75% chance to gain nothing) combined with the scenario in the first choice of the second part-question (a sure loss of $750) to form the second option of the third part-question (25% chance to win $250, and 75% chance to lose $750). If participants had a consistency of choice, they should select a choice in the third part-question, which combines the two choices they had chosen in the previous two part-questions.

Twenty-one participants out of a total of 49 (49.0%) had selected a combination of choices in the first two part-questions that corresponds to a choice in the third part-question. Out of these 21 participants, only 9 participants (37.5%) had selected the corresponding choice when presented with the third pair of choices. The result showed a clear lack of consistency, which contradicts the assumptions of conventional economic theory on rationality.

The question on the availability bias

In the question regarding the availability bias, 44 out of 55 participants (80%) had produced useful results. In the first question regarding the banking industry, 28 participants (63.6%) had predicted that the banking industry would had been profitable to invest in the past year. The other 16 participants (36.4%) believed that such investment would be unprofitable to invest in the past year.

The results from this experiment confirmed with those obtained in Tversky and Kahneman (1973). In this classic paper, the researchers concluded that a majority of participants would opt negative if they fail to come up with enough positive circumstances. In the task in the survey, participants had to write five profitable stocks from the banking industry in the past year. This task should have caused unease among many participants who do not know a lot about the industry. The results were promising. Though a significant portion of participants believed that the banking industry was unprofitable to invest in the past year, an interesting result should be noticed. Among those who believed that the industry would be profitable to invest in the past year, they wrote out an average of 3.03 examples of profitable stocks from the

industry. Among those who believe that the industry was not profitable, they wrote out, on average, 1.75 examples of profitable stocks. The explanation is thus simple: the failure to recall examples in support of a statement helps to falsify the statement.

Similar results were obtained in the second part-question. Participants were asked to write out one example of an unprofitable stock from the car industry in the past year and then judge whether it is profitable to invest in this industry in the past year. 21 out of 44 participants (47.7%) believed that it would be unprofitable to invest in the industry in the past year. The other 23 participants (52.3%) believed the contrary. It was believed that recalling one example would be relatively easy, and thus participants may judge that the whole industry was unprofitable. The answers did not support this belief by an insignificant extent. But it was still noticeable that one in 1.25 participants who had predicted the industry to be unprofitable to invest in the past year had given out an example of an unprofitable stock from the industry. Only one in 1.64 participants who believed that the industry would have been profitable to invest in the past year had given out the example of an unprofitable stock from the industry. This result shows that those who believed that the industry was unprofitable were more able than those who believed that the industry was unprofitable to produce a relevant example.

(Note: according to 东方财富信息股份有限公司 (2020A) and 东方财富信息股份有限公司 (2020B), the aggregate price index of the two industries within the two stock exchange markets in Mainland China both grew from the beginning of 2019 to the beginning of 2020, meaning that if investors selected a weighted portfolio in both

industries at the start of 2019, the value of their investment would increase in the one-year period.)

Analysis of Biases

The results from the survey confirmed with behavioral findings, rather than standard economic theory. Thus, it can be concluded that amateur traders in the sample are subjected to such biases. The following section analyzes the implication of such biases in more specific stock-selection contexts.

The anchoring effect

The anchoring effect is defined as follows in Tversky and Kahneman (1974):

> "In many situations, people make estimates by starting from an initial value that is adjusted to yield the final answer. The initial value, or starting point, may be suggested by the formulation of the problem, or it may be the result of a partial computation. In either case, adjustments are typically insufficient. That is, different starting points yield different estimates, which are biased toward the initial values. We call this phenomenon anchoring (p. 1128)."

In investment scenarios, anchoring could play a big role. Usually, investors would be anchored to the profitability of their first stock, the length of time they held their first stock for, and the performance of the first stock they saw in an industry. For instance, when an investor tries to invest in the car industry, it is possible that they would be anchored to the performance of the first stock they saw or purchased within or even outside the industry (whether a number would become an anchor in a specific case is not relevant in this paper). Later assessments of stock options would be made

with reference to, either consciously or unconsciously, this first stock. If such anchors do exist, they could make investors lose a chance of profiting if their initial anchor was too high and vice versa. Traders could also be anchored to (as demonstrated in the above survey) the code of the stock (in Mainland China's two stock exchange markets, stocks are numbered with six-digit codes rather than letters in the US case).

More significant implications arise when people do make concessions and adjustments. Such changes are always insufficient, as mentioned in the above definition. People fail to adjust to the right value, and thus may purchase too much or too little of a stock at a too-high or too-low price. The result may be higher profitability (due to luck) or simply lower profits, in most cases.

The framing effect

The framing effect is discussed in detail by Tversky and Kahneman (1981). The researcher's definition of framing goes as follows:

> "We use the term "decision frame" to refer to the decision-maker's conception of the acts, outcomes, and contingencies associated with a particular choice. The frame that a decision-maker adopts is controlled partly by the formulation of the problem and partly by the norms, habits, and personal characteristics of the decision-maker (p. 453)."

From the above experiment, Tversky and Kahneman (1981) concluded that people lose consistency of choice when choices are presented in aggregate rather than separately. This was the result of the framing effect. When outcomes are framed differently, people's preferences (risk preferences, in this case) change. The shift in

preference is rather significant and could take important roles in investment decision making.

When observing company performance from news and third-party sources, it is likely that amateur traders would take different opinions if the information is framed differently. For instance, investors may prefer a company with “growing revenue but falling profitability” over one that has “declining profits.” In the previous case, if the percentage change in revenue is smaller than that of profitability than it literally means falling profits. The information on one company is presented in aggregate, while the others had separate pieces of information that require a combination. Though this specific case has not been included in my experiment, it is possible that when information about company performance is framed differently, people are going to choose different stock options.

The framing effect may also affect investors when those investors read about other qualitative information on the company’s website, such as corporate culture and current projects. Investors could judge the same company differently if the information is presented in different ways. Though better presentation could bring a firm more investment, the result would be an inaccurate prediction of the company’s prospects by traders. Much incomplete information has indeed been depicted on the most popular sources of information for investors who responded to the survey (a question in the survey asked about the participants’ most-used sources of information on stocks and companies).

The framing effect can also be observed in correlation with the anchoring effect.

Companies may present relatively small anchors for investors, so that when these investors would be more satisfied with low profits and continue to invest in the company.

The availability bias

The availability bias is defined as follows in Tversky and Kahneman (1973):

> "…a judgmental heuristic in which a person evaluates the frequency of classes or the probability of events by availability, i.e. by the ease with which relevant instances come to mind (p. 207)."

In the above experiment, participants were asked to write examples of stocks from an industry. In the first-part question, the survey asked for five examples. It should be relatively hard to write out five examples, and thus the participants would be more likely to believe that the industry is not profitable to invest in the past year because it is hard to think of examples of profitable stocks. This hypothesis turned out to be true: those who believed that the industry is not profitable to invest in the past year wrote out, on average, fewer examples of profitable stocks than those who believed that the industry would be profitable to invest in. The same pattern was also observed in the second part-question.

This bias should extend further into other investment scenarios. When deciding which industry or stock to invest in, investors may choose to look at those industries or stocks which brought them profits before or which come into their mind more quickly than others. Especially in repurchasing scenarios of stocks, investors may recall past instances in which they had profited from investing in the industry.

Though this bias produces satisfying results in most cases, it may not be useful all the time; for instance, when market circumstances change. It is also possible that due to framing, investors may have only received partial information about a stock or industry. Thus, when they recall examples, they may only recall certain profitable stocks that they happen to come across, due to the framing of the information they received.

Discussion

Though the sample of the survey in this paper came from a relatively homogenous sample, they share many characteristics with a typical amateur trader. They had a job other than stock trading, they had never received professional financial education, and they invested their own sums of money into the stock market. Therefore, the results of this paper should have a robust application in more general circumstances. However, the sample size of this paper is insufficient to reach any new conclusions with absolute certainty. More experiments should be done to confirm the results of this experiment.

However, it is arguably true that the results from this paper confirmed with the results of most classic experiments as well as replications of those classics. Therefore, the results and conclusions from previous classic experiments should also apply to the amateur traders in my sample.

This essay has also proposed many specific applications of the three biases in the stock selection process. These applications lack specific experimental foundations and should be tested further in later research. However, it is plausible that these effects do

exist in real-life circumstances. In most cases, the effect of such biases might be trivial. However, it is still important to reduce the effect of the biases in other instances when the biases do affect investment decisions in an unfavorable manner.

Another aspect worthy of notice is how these three and possibly more biases work together to affect investment decisions. For instance, information can be framed to provide a biased anchor among investors. In addition, framed information can change the ease in which relevant examples come to mind among investors. Other biases, such as the representativeness bias, may also work in line with these three and more biases to affect decision-making. More research is needed in this area to provide a better understanding of how multiple biases govern stock selection dynamically.

Policy proposal

Specific policies can help traders to reduce the effect and possibly eliminate the effect of such biases.

The first policy is the provision of information. Investors should be presented with more information and possibly more objective and accurate information. Finucane et al. (2000) provided evidence to prove that providing specific information can alter people's risk and benefit judgment. When such information, such as unfavorable information about an item or event, is provided to participants, the participants' perception about the subject changes through the work of an "affect heuristic." It is thus possible for anybody, such as the government, to nudge people's stock selection perceptions by providing the right information. The institution can provide certain information for traders that can alter their degree of reliance on

different heuristics in a favorable direction. Statistical information may be helpful. For instance, when explicit data tells these traders that an industry has grown by a certain percentage in the past year, traders will not need to retrieve partial information from their mind and rely on the availability bias. Furthermore, when investors face more numbers, there would be more values to anchor on, and thus extreme cases of anchoring may be avoided. Obtaining more objective, more consistent information can also help to reduce the effect of the framing effect. For instance, a table should be used to present data, so that all aspects of different companies will be equally-exposed.

Information can be provided in many ways. If any government-funded institution aims to improve investor performance, they can set up information websites that bring more objective information. Brokers can also set up services for customers to explore comprehensive data sets. This policy can help to attract more customers.

The second policy is providing investors with more trading experience. For instance, Feng and Seasholes (2005) demonstrated that experience could help to mitigate certain aspects of the disposition effect (another behavioral bias), though experience alone cannot totally eliminate the effect of the bias. List (2003) has also demonstrated through experiments that experience in the market "plays a significant role in eliminating the endowment effect" (p. 41). Kaustia et al. (2008) had concluded that, though the effect of anchoring is still economically and statistically significant among professionals, professionals had shown a much smaller anchoring effect than students who participated in the experiment. These results may also apply to the

biases in the case of amateur stock selection. Investors may realize the limitations of their strategies after years of trading. Trading experience can also provide investors more information about specific industries and companies, leading to a better understanding of the market.

A new trend in the finance departments in many Chinese universities is to allow students to experience stock trading with simulating software. Participants use a sum of "fake money" (say, one million CNY) in the software to trade at real-market prices. They can explore the best portfolio as well as the best trading strategy and learn about specific firms and industries. Any public organization or broker could design such software and make it easily available to use for the public.

The third proposal is to provide professional financial education for amateur traders, making them no longer "amateur traders." Such experience can teach investors about the right ways to obtain information from credible and objective sources, as well as the right way to assess the possible risk and return of any investment. Ateş et al. (2016) have conducted surveys to measure to what extent 596 individuals of varying educational backgrounds are susceptible to different behavioral biases. They found that the effect of overconfidence, cognitive dissonance, framing, and loss aversion decreases as financial literacy improves. Financial education may thus be helpful to reduce the effect of these biases.

These programs should be subsidized by the government to make them more accessible. Brokers can also provide such courses for traders when they open accounts. To allow for part-time studying (because amateur traders have other jobs),

and to reduce costs as well, courses can be recorded and replicated online for all to learn from.

The last policy is to tell investors about the biases. When investors fully realize the presence of the biases, at least some would deliberately try to avoid being trapped by subjective reports on company information, avoid being anchored to an extremely high or low initial value, and avoid being misled due to the lack of full information. The effect of the biases should thus reduce at least among a certain portion of traders who have realized the biases.

To allow this policy to be implemented, both public institutions and brokers can set up campaigns and advertisements to propagate relevant information about the biases. This information can also be included in the educational programs mentioned above.

However, it is doubtful whether such a policy will be effective. A lot of biases, including the two of the biases mentioned in detail in this paper, have been systematically explored more than 40 years ago. The anchoring effect was explored by Tversky and Kahneman (1974); the framing effect was explored by Tversky and Kahneman (1981); and the availability bias was explored by Tversky and Kahneman (1973). During these long periods of time, there are ample opportunities for traders to read about the biases, and yet a significant number of traders are still susceptible to the biases. It is rather unclear whether these traders haven’t known about the biases or that telling the traders about the biases will make them no less susceptible to the biases.

The above policies are only a few possible ways to help reduce and possibly eliminate the effect of these biases. Their effectiveness will need to be testified in real-life experiments. A possible approach to increase the chance of success is to use all policies together so that some aspects of one policy could probably compensate for the limitations of other policies.

Conclusion

This paper has explored three behavioral biases – the anchoring effect, the framing effect, and the availability bias – among amateur traders. Surveys have been handed out to participants to test for the presence of the biases. The result turned out to confirm with past studies conducted among other samples.

Later sections explore more specific applications of the biases in the stock-selection processes of amateur traders. Lastly, four policies have been proposed to help reduce and possibly eliminate the effect of such biases among traders. Mitigating the effect of behavioral biases can help traders to make more accurate predictions and allow for opportunities to earn a higher return from an investment.

However, this study is limited in terms of the small sample in the survey. This study also lacks established academic foundations in specific applications of the biases in amateur traders during stock selection. More research should focus on specific investment scenarios and the effectiveness of policies to mitigate the effect of the biases.

Appendix:

Survey

PART 1: Personal Information

Please complete the items below to provide us more information about yourself. The results will be collected and presented anonymously.

1. Educational background

i) What is your current job?

_____

ii) For how long have you been trading stocks?

_____ years

iii) Have you attended any (educational) programs dedicated to stock trading/investment?

□ Yes, it is _____
for _____ (length of time)
Yes, it is _____
for _____ (length of time)

□ No

iv) How often do you check for stock prices and news updates (please select the closest frequency)?

□ Once a day □ Once every three or four days □ Once a week
□ Once every two weeks □ Once every month
□ Hardly ever (not even once per month)

v) What kind of sources do you use to obtain information about your **potential** stock options (you can select more than one choice)?

□ Printed news, such as newspapers and magazines, etc.
□ Social media posts, such as Wechat articles and Weibo posts, etc.
□ News websites, such as Eastmoney.com, etc.
□ Company websites
□ Friends, workmates, and family members
□ Professional brokers and traders
□ Others: _____

2. Current stock options

Please write down how you **first** got to know the stock or the company:

Name of Stock	Source (Please Select a Number)

1. Printed news, such as newspapers and magazines, etc.
2. Social media posts, such as Wechat articles and Weibo posts, etc.
3. News websites, such as Eastmoney.com, etc.
4. Company websites
5. Friends, workmates, and family members
6. Professional brokers and traders
7. Others: _____

PART 2:

In this section, you will be asked to select options of hypothetical gambles and make predictions. There are no correct answers to the following questions. Please allow your answers to reflect your actual decision in real-life. In other words, answer what you will do rather than what you think is correct to do.

1. **Estimation**:

This stock is a stock numbered **000002/000045** from a foreign stock exchange.

Do you think the return after one year (starting from now) will be higher or lower than

2/45 percent?

□ Higher □ Lower

If you are to purchase **000002/000045** now, estimate the profitability of the stocks after the next year.

_____ %

2. You will have **one** chance only to play each of the following gambles.
   Gamble 1:

   Choose between:

   □ a sure gain of $240

   □ 25% chance to gain $1000, and 75% chance to gain nothing

   Gamble 2:

   Choose between:

   □ a sure loss of $750

   □ 75% chance to lose $1000, and 25% chance to lose nothing

Gamble 3:
Choose between:

□ 25% chance to win $240, and 75% chance to lose $760

□ 25% chance to win $250, and 75% chance to lose $750

3. Please write five examples of profitable stocks from the **banking** industry for the year 2019.

_____

_____

_____

_____

_____

Do you think investing in this industry in 2019 is profitable?
☐ Yes ☐ No

Please write one example of an unprofitable stock from the **car** industry for the year 2019.

_____

Do you think investing in this industry in 2019 is profitable?
□ Yes □ No

All questions have been answered. Thank you for your support!

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