Susceptibility to Behavioural Biases among Professional Investors versus Naive Individuals

Abstract

Purpose: Exploring the degree of susceptibility to behavioural biases (the disposition effect, overconfidence, mental accounting, and the sunk cost fallacy) among professional investors \( (n = 90) \) from Polish investment banks and brokerage houses and among naive individuals, i.e. psychology students \( (n = 90) \) from the Department of Psychology, University of Finance and Management.

Design: This study was conducted on a convenience sample. 180 participants represented two 90-person groups, which differ in the level of expertise with a stock market investing filled out questionnaire made up of four situational exercises, which assessed susceptibility to behavioural biases.

Findings: Statistical analyses demonstrated that susceptibility to behavioural biases may not depend on the level of expertise in investing, i.e. a higher level of expertise with investing does not prevent from irrational behavior on the stock market.

Research limitations: This study is limited by the relatively small number of participants, a specific sample of psychology students as naive individuals, who due to their psychological

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knowledge may be familiar with some biases in this study and the exercises used to measure susceptibility to biases, which could seem somewhat artificial to professionals.

**Practical implications:** Expertise with investing does not necessarily help in making rational decisions.

**Social implications:** This study indicates the necessity of better educating investors to make them aware of psychological aspects of decision making.

**Originality/value:** This study has provided a new insight into the psychological aspects of decision making in the stock market.

**Keywords:** behavioural biases, rationality, behavioral finance

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1. **Introduction**

Psychologists have conducted many studies which proved that humans have limited cognitive possibilities and are controlled by emotions while making choices in risky and uncertain situations. Abundant evidence from psychological research, evidencing that a human's rationality is bounded, was a direct inspiration for financial behaviorists to criticize the *homo economicus* assumption and the hypothesis about the market's efficiency. In addition, several authors underlined that an investment decision-making process is driven greatly by so-called behavioural biases, resulting from judgmental biases, heuristics as well as emotions. Behavioural biases disrupt the rationality of the process of making investment decisions and contribute to asset mispricing. Importantly, it was observed that professional experience in investing sometimes helps in making rational decisions, but equally often professional investors are susceptible to many behavioural biases, sometimes even to a more extent than naive individuals.

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Szyszka developed the Generalized Behavioural Asset Pricing Model, which shows how asset prices can be shaped by various behavioural biases and how prices may deviate from fundamental values due to investors' bounded rationality. The model mentioned biases that are linked to errors in understanding and transforming information signals, problems with representativeness and probability judgment, and unstable preferences. In this paper, four examples of behavioural biases that are captured by this model were investigated: the disposition effect, overconfidence, mental accounting and sunk-cost fallacy. In particular, it was investigated how these four important behavioral phenomena manifest among participants, depending on their level of expertise, i.e. among professional investors and naive individuals (psychology students).

The disposition effect is a behavioural bias which is linked to the tendency of investors to sell shares whose price has increased, while keeping assets that have dropped in value. The disposition effect has been documented in all the available large databases of individual investor trading activity and has been associated with important pricing phenomena such as the post-earnings announcement drift and stock-level momentum. The disposition effect is usually explained by the prospect theory, i.e. the asymmetric risk aversion according to which investors are risk averse when faced with gains and risk-seeking when faced with losses he/she may think of the stock as trading at a gain.

There are plenty of studies in psychological research which proved that a person's subjective confidence in his or her judgments is greater than the objective accuracy of those judgments. In particular, overconfidence has been defined in four distinct ways, such as the better than average effect, calibration effect, unrealistic optimism, and expertise effect. These biases can have significant implications for decision making and financial outcomes.

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and illusion of control. Overconfidence proved to be one of the most prevalent behavioural biases among stock market investors, responsible for excessive trading volume observed especially in speculative markets and underreaction to new information on the market\textsuperscript{11}.

Mental accounting is a process of mentally coding, categorizing, and evaluating cash flow, that is, recording particular expenditures and revenues in various mental accounts\textsuperscript{12}. Stock market investors are susceptible to mental accounting when they treat profits attained as dividends (cash) differently than identical “paper” profits – those resulting from an increased exchange rate\textsuperscript{13}. It has also been observed that investors often are unable to close losing positions and investing funds from those losing shares into new endeavors, because these shares are treated as a separate mental account\textsuperscript{14}. Instead, many of them hope for changing trends to make up for those losses in the future, which leads to a progressive reduction of the worth of their investment portfolio.

The sunk-cost fallacy is a behavioural bias which describes the influence of costs incurred in the past on future investment decisions\textsuperscript{15}. The neoclassical finance theory points out that only an analysis of current and future losses and profits should impact investment decisions\textsuperscript{16}. Nevertheless, professional investors relatively often attach importance to past costs, which significantly influence both present and future decisions\textsuperscript{17}. The sunk-cost fallacy on the stock market often prevails in keeping positions that generate costs for too long, and sometimes even to purchasing more shares after declines\textsuperscript{18}. In this way, investors hope to reduce the average price of purchasing


\textsuperscript{14} T. Odean, \textit{Are Investors Reluctant to Realize Their Losses}, “Journal of Finance” 1998, no. 11, pp. 21–43.


a share, in the hope that they will be able to record profits more quickly after a small economic upturn19.

**The current study**

The aim of this study was to explore the degree of susceptibility to behavioural biases (the disposition effect, overconfidence, mental accounting, and the sunk cost fallacy) among people of complete different level of expertise in market investing, that is, among professional investors from Polish investment banks and brokerage houses (see further: professionals), and naive individuals, i.e. psychology students from the Department of Psychology, University of Finance and Management (see further: students), who had no experience in stock market investing and no formal education in finance or economics. As there is still an insufficient number of studies in behavioral finance literature on the association between stock market expertise and the rationality of a decision making process (or the existing results are ambiguous), this study was exploratory research in nature. Therefore, the following hypotheses were tested:

1. The degree of susceptibility to behavioral biases (the disposition effect, overconfidence, mental accounting, and the sunk cost fallacy) in decision making varies depending on the amount of expertise an individual has in stock market investing.

**2. The Method**

**2.1. Participants and Procedures**

This study was conducted on a convenience sample. 180 participants represented two 90-person groups, who differ in the level of expertise with stock market investing. The first group was 90 professional investors, working in BGŻ Brokerage House in Warsaw, BRE Investment Bank in Warsaw, IDMSA Brokerage House in Cracow. The second group comprised of 90 psychology students from the Department of Psychology of University of Finance and Management. As mentioned above, these students had no experience in stock market investing and no formal education.

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in finance or economics. The basic demographic data are presented in Table 1, for the entire sample and split by group.

Table 1. Participants' Basic Demographic Information and Stock Market Investment Expertise

<table>
<thead>
<tr>
<th>Group</th>
<th>Gender</th>
<th>Age</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Professionals (n = 90)</td>
<td>Men 49</td>
<td>M = 35.81</td>
<td>Primary = 0, Secondary = 5, Tertiary (MA or BA) = 85</td>
</tr>
<tr>
<td></td>
<td>Women 41</td>
<td>SD = 7.13</td>
<td></td>
</tr>
<tr>
<td>2. Students (n = 90)</td>
<td>Men 23</td>
<td>M = 22.14</td>
<td>Primary = 0, Secondary = 82, Tertiary (MA or BA) = 8</td>
</tr>
<tr>
<td></td>
<td>Women 67</td>
<td>SD = 5.76</td>
<td></td>
</tr>
</tbody>
</table>

Source: the author's own study.

In this study a laboratory experiment was conducted, which allowed us to isolate behavioral biases and to measure their impact on an investor's behavior, *ceteris paribus*. The questionnaires were delivered to the participants face to face, so as to discuss the main goals of the research, inform about anonymity and confidentiality of individual results, and provide them with all the necessary explanations in order to eliminate possible mistakes in the completion of the questionnaires. The participants filled out the questionnaires in Polish and the study total response rate was 72%, i.e. out of 250 participants selected to the study, 180 agreed to participate.

2.2. Materials

Participants filled out a form made up of four situational scenarios (see: Appendices), in which they had to choose how they would behave in a hypothetical situation, where they were faced with a number of options. In each scenario, susceptibility to the behavioural biases mentioned in the hypothesis was assessed. These scenarios were used in modern or classical studies on behavioral finance and decision making. In the first scenario, which was adapted from Czerwonka & Gorlewski, propensity toward the disposition effect was measured – here answer A suggests that a participant displayed the disposition effect and was treated as an irrational answer. In the second scenario, which was adapted from Heath & Tversky the susceptibility

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to overconfident behavior was assessed. In this scenario, according to Heath, Tversky\(^\text{22}\), answer A indicates a tendency to display overconfident behavior, and is treated as an irrational answer. The third scenario, adapted from Thaler\(^\text{23}\), checked susceptibility to mental accounting. In this scenario, according to Thaler\(^\text{24}\), resigning from seeing the movie in option A and buying a new ticket to the cinema in option B is the answer indicating a propensity towards mental accounting, i.e. irrational behavior. Finally, the last scenario, adapted from Arkes, Blumer\(^\text{25}\), measured the propensity towards the sunk cost fallacy. In this scenario, according to Arkes, Blumer\(^\text{26}\), answer A indicates a tendency to display the sink cost fallacy, and is treated as an irrational answer.

### 3. Results

A statistical analysis was conducted using PASW Statistics 21\(^\text{27}\). In order to test the hypothesis, concerning the differences in susceptibility to behavioural biases among professionals and students, as measured through the four behavioral biases contained in the exercises, a series of chi\(^2\) tests of independence of two variables were conducted. Four comparisons were made. In each, one variable was the group of participants (professionals or students), the other variable was making a rational or irrational decision in each of the four exercises in turn (see: Appendices). For a rational answer (one that showed no behavioral bias), a participant received 1 point. For an irrational answer (one that showed the bias) a participant received no points.

In order to assess whether professionals were different from students with regard to susceptibility to the disposition effect, a chi\(^2\) test of independence of two variables was performed. The results are shown in Table 2. The frequency of rational answers made by professionals vs. students was compared, showing relative susceptibility to the disposition effect.

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\(^{22}\) Ibidem.


\(^{24}\) Ibidem.


\(^{26}\) Ibidem.

Table 2. Outcome of Chi² Test for Frequency of Rational Answers of Professionals and Students in the Exercise Measuring Susceptibility to the Disposition Effect

<table>
<thead>
<tr>
<th>The disposition effect</th>
<th>Professionals</th>
<th>Students</th>
<th>Chi²</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>37</td>
<td>56</td>
<td>8.03</td>
<td>1</td>
<td>.005</td>
</tr>
</tbody>
</table>

Source: the author's own study.

A significant chi² result allows us to reject the null hypothesis about the independence of the two variables and to accept the alternative hypothesis that the two variables are somehow related. In the case of the disposition effect scenario, the group of students behaved significantly more rationally (56 rational answers) than the group of professionals did (37 rational answers), chi² (1, N = 180) = 8.03; p < .01. Professionals, thus, were shown to be more susceptible to the disposition effect than were students.

The same analysis was performed to investigate whether professionals differed from students with regard to the level of overconfidence. The results are shown in Table 3.

Table 3. Outcome of Chi² Test for Frequency of Rational Answers of Professionals and Students in the Exercise Measuring Susceptibility to Overconfidence

<table>
<thead>
<tr>
<th>Overconfidence</th>
<th>Professionals</th>
<th>Students</th>
<th>Chi²</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>37</td>
<td>45</td>
<td>1.43</td>
<td>1</td>
<td>.231</td>
</tr>
</tbody>
</table>

Source: the author's own study.

In the case of overconfidence, the difference in answers measuring the susceptibility to this bias between professionals and students was not significant, chi² (1, N = 180) = 1.43; ns.

In the case of mental accounting, the difference in answers measuring the susceptibility to this bias between professionals and students was not significant, chi² (1, N = 180) = .41; ns.

Table 4. Outcome of Chi² Test for Frequency of Rational Answers of Professionals and Students in the Exercise Measuring Susceptibility to Mental Accounting

<table>
<thead>
<tr>
<th>Mental accounting</th>
<th>Professionals</th>
<th>Students</th>
<th>Chi²</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>59</td>
<td>63</td>
<td>.41</td>
<td>1</td>
<td>.523</td>
</tr>
</tbody>
</table>

Source: the author's own study.

In the case of the sunk cost fallacy, the difference in answers measuring the susceptibility to this bias between professionals and students was not significant, chi² (1, N = 180) = .93; ns.
Table 5. Outcome of Chi² Test for Frequency of Rational Answers of Professionals and Students in the Exercise Measuring Susceptibility to the Sunk Cost Fallacy

<table>
<thead>
<tr>
<th>Sunk cost fallacy</th>
<th>Professionals</th>
<th>Students</th>
<th>Chi²</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>14</td>
<td>.93</td>
<td>1</td>
<td>.335</td>
<td></td>
</tr>
</tbody>
</table>

Source: the author’s own study.

4. Discussion

The results of this study showed that susceptibility to behavioural biases may not depend on the level of expertise within investing, i.e. a higher level of expertise with investing does not prevent from irrational behavior on the stock market. It turned out that professional investors were not only susceptible to the studied behavioural biases, but also no differences between professionals and naive individuals (students) were observed or the degree of this susceptibility was sometimes stronger in this group than among students (see Tables 2, 3, 4 and 5).

These results correspond with earlier studies, which proved that experts are susceptible to behavioural biases. In particular, Szyszka proved that a lack of education in finance and the capital market can, paradoxically, enhance rationality of decisions. In his study, students of fine arts and music were less susceptible to overconfidence and were more accurate in their estimates of the probability of market events than were a group of professional stock market traders.

Kahneman confirmed that the tendency to display behavioural biases is a highly automatized process, and so both experts and even naive individuals might be unconscious of the impact these biases have on the decisions they make. It is in line with the dual process theory, which provides a framework for understanding of how a decision making process can be influenced by the two different processes, i.e. an implicit (automatic), unconscious process and an explicit (controlled), conscious

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A vast majority of decisions are driven by this implicit (automatic) process, which makes people susceptible to biases while decision making. In addition, several authors found that experts often show a strong tendency to be overconfident when making decisions, and sometimes automatically use different rules of thumb to simplify the decision making process. In particular, Tetlock observed that professionals are less capable of admitting to making mistakes and correcting them than are naive individuals in order to maintain their self-esteem and professional reputation.

To conclude, it should be underlined that this study is limited by the relatively small number of participants and the exercises used to measure susceptibility to biases, which could seem somewhat artificial to professionals, who deal with much more complex investment problems in their everyday decisions. In addition, some of the psychology students, due to their education, may be familiar with selected behavioral biases mentioned in the questionnaire, so their answers could be influenced by this fact.

Nevertheless, this study provided some new insights into the psychological aspects of decision making in the stock market. In particular, expertise within investing does not necessarily help in making rational decisions, which may indicate the necessity of better educating investors to make them aware of psychological aspects of decision making.

5. References


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Appendices

Appendix 1. The exercise measuring susceptibility to the disposition effect

EXERCISE 1
Imagine that you have two blocks of shares of two companies: A and B. On A shares you earned 20% and B shares caused a 20% loss. Taking into account the uncertain future of these companies, which shares would you like to sell: A or B?

Appendix 2. The exercise measuring susceptibility to overconfidence

EXERCISE 2
Please imagine the following two situations, A and B, and circle the behavior that you would choose (A or B).
A. A stock is selected at random from the Wall Street Journal. You guess whether it will go up or down tomorrow. If you’re right, you win $5.
B. A stock is selected at random from the Wall Street Journal. You guess whether it went up or down yesterday. You cannot check the paper. If you’re right, you win $5.

Appendix 3. The exercise measuring susceptibility to mental accounting

EXERCISE 3
Please imagine the following two situations, A and B, and circle the behavior that you would choose in each:
A. You have decided to go and see a movie and you have bought a ticket for 20 PLN. After entering the cinema, it turns out you have lost the ticket. You do, however, have a 20 PLN bill in your pocket. Do you spend another 20 PLN to buy another ticket, or do you decide not to see the movie?
B. Now please imagine that you have decided to go and see a movie but you have not yet bought a ticket. As you leave your home, you take two 20 PLN bills with you. After entering the cinema, it turns out that you have lost 20 PLN. In this situation, do you spend the other 20 PLN to buy a ticket, or do you decide not to see the movie?
Appendix 4. The exercise measuring susceptibility to the sunk cost fallacy

EXERCISE 4

As the president of a large aviation company, you have invested 10 million dollars into a development project. Its goal was to build an airplane that would quickly cover the distance between Europe and the USA. When your project is 90% complete, a rival company announces that it is introducing an identical plane onto the market, which, as it turns out, is much more economical than yours is to use. In this situation, would you invest the final 10% of the costs to complete the project (option A), or would you instead decide to immediately abandon it (option B)? (please circle the option you would choose).