

Conference Paper

Financial Literacy and Behavioral Skills: The Influence of Financial Literacy Level on Behavioral Skills

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Abstract

Financial literacy and behavioral finance have become a part of education not only in the United States, but also in the whole of Europe. The process of education, in terms of financial literacy, starts at primary schools where children start to be exposed to financial literacy. It is followed by additional stages of education system. Moreover, this is completed by range of other possibilities how to become familiar with this type of knowledge, in the way of various programs, usually conducted by governments and other specialized institutions. Especially, in terms of universities behavioral finance start to play important role as well.

Based on the previous assumptions, financial literacy needs to be tested, measured and evaluated, notably the level of students studying Economics, since their participation in economic world might affect the future of our society and welfare.

The goal of this article is to verify whether there are some gaps among students and find out what are predictors standing behind various level of financial literacy. Consequently, additional target is to detect how financial literacy influences the sensitivity to behavioral biases and heuristics. This goal is reached by doing own research, which is based on an electronic questionnaire. The questionnaire consists of three main parts. In the first part, respondents provide us with their demographic data, such as age, gender, education and other. The second one focuses on objective evaluation of respondent's knowledge of financial literacy. The last part examines behavioral finance, especially respondent's reaction to behavioral biases.

The methods, used for the questionnaire evaluation, are descriptive statistics, enabling us to make a first assessment of the data file, and two-sample t-test, enabling compare different groups or samples. It also provides a chance to verify whether suffering from a particular bias corresponds with higher or lower level of financial literacy.

Keywords: Financial literacy, behavioral finance, survey, t-test, biases and heuristics

1. Introduction

The growing importance of financial literacy and behavioral finance have is obvious in the area of economic, especially financial, education. Financial education nowadays starts at primary schools and accompanies students through secondary and high school. Moreover many activities improving financial literacy even by adults have been

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started. The range of other possibilities, for individuals, how to become familiar with financial issues is significant. Further behavioral finance and its knowledge come into the mind of the world population.

Behavioral finance emphasizes the role of psychology in finance. It aims to explain behavior of individuals and financial market movements, based on psychology-based theory. The general assumption of behavioral finance is that the individual's characteristics and information structure influence significantly financial markets. Despite the fact that human decisions are often influenced by human psychology, even in determining economic or financial decision, classical theory insist on fully rational individuals and efficient markets. However, although the behavioral finance theory and the research in this field is young, its origins go back to Adam Smith. Smith found out that people tend to decide on the base of impressions and believers, rather than on rational data analyzes.

This article provides an analysis of human behavior and its possible impact on their decision, based on their level of financial literacy. The goal of the study is to verify whether there can be found connection between financial literacy and investigated biases. The target is to detect how financial literacy influences the sensitivity to behavioral biases and heuristics.

The study investigates the following questions: Does the level of financial literacy influences overconfidence, availability, illusion of control, risk aversion, cognitive dissonance and status quo effect? The aim is to define whether the increase of financial literacy can lead to improvement in rational behavior of individuals.

2. Behavioral Finance and Financial Literacy Theory

Traditional finance has approached psychological biases as irrelevant. However, the past pieces of research show that even the smartest people are affected by them. Behavioral finance concentrates on how people actually behave in the area of financial decisions [6]. The main subjects of the study are emotions and cognitive skills. For the purposes of this study, there is a significant concept of behavioral finance, especially heuristics and biases. Heuristics can be understood as simplification which enables the decision making process to proceed fast in complicated situations, and behavioral biases can be defined as possible mistakes people can make in their decision making process [4].

Overconfidence is defined as overestimation of own predictive abilities and the precision of information they have [5]. Individuals generally overestimate their skills and knowledge, the perceived level of own skills and knowledge is typically high, higher than skills and knowledge.

Availability bias is often described as a mental shortcut. It can be summarized as an ability (of individuals) to estimate an outcome, based on how familiar such outcome is to the individual. More often repeated information is considered to be more likely. Fans root for the local sports team, and employees like own their company's stock. This is because the sports team and the company are familiar to them [1].

Illusion of control is a tendency to believe that we can control or influence outcomes, which is something, in fact, impossible. People are driven by the illusion of controlling uncontrollable outcomes [5]. Some people, who are successful in prediction of any events, indicators or other outcomes, actually believe that they are to guess the future properly, which is something that might weaken their real future performance.

Risk aversion is a cognitive bias. It might be described as a tendency to avoid risk. Risk aversion is based on past outcomes. The perception of risk varies over time, with regard to suffered losses and acquired gains during the certain period of time.

Cognitive dissonance is another cognitive bias that describes mental discomfort of individuals [5]. Cognitive dissonance is the state of imbalance caused by contradictory information. The term involves natural response to the individual's need for harmony and, therefore, the need to remove mental discomfort [3].

Status quo bias describes a tendency to choose what follows an original decision or extends this decision. In other words, it is the tendency not to change things. "Status quo bias refers to the findings that an option is more desirable if it is designed as the "status quo", rather than when it is not."

3. Methodology and Data Analyzes

For the purposes of this study, there was conducted a controlled field research, based on an electronic questionnaire, verifying financial literacy skills and behavioral characteristics of respondents. The survey was divided into three separate parts. In the first part, the respondents were asked to answer ten questions verifying their level of financial literacy. The second part consisted of 22 questions, testing six particular biases. At the end of this part students were asked to evaluate their own knowledge and skills in finance. The last part concentrated on personal data, such as gender, age, education and other.

The sample consists of 54 university students in the age between 18 and 28 years. From the point of gender, the relative frequency is balanced, since approximately 46% of all respondents are males.

4. Results

The main goal of this article, as stated before, is to verify whether financial literacy level has an impact on inclination to particular biases. For the purpose of the study there were chosen six cognitive biases: status quo, overconfidence, availability, illusion of control, risk aversion and cognitive dissonance.

This table summarizes differences between the group of respondents who suffer from the status quo bias and between the groups of people who are not affected by this bias. It is possible to see that there is a difference in the average values for both of the groups. However, p-value of t-test is higher than the significance level. Moreover, this is the only test which does not comply with one of the requirements

Name	Average value	P-value (t-test)	P-value (F-test)
With bias	13.05	0.347	0.376
Without bias	14.50		

TABLE 1: Comparison of those who suffer from the status quo bias and those who do not. Source: Based on own research, processed in STATISTICA.

Name	Average value	P-value (t-test)	P-value (F-test)
With bias	12.04	0.025	0.34
Without bias	14.03		

TABLE 2: Comparison of those who suffer from the cognitive dissonance bias and those who do not. Source: Based on own research, processed in STATISTICA.

- the normal data distribution. For one of the groups, the normality assumption is not fulfilled. Therefore, roughly said, the test cannot be taken into consideration.

The status quo bias did not deny the tested null hypothesis if financial literacy influences inclination to the status quo bias.

The table no. 2 provides us with the results concerning the test of the cognitive dissonance, the second tested bias. There is obvious gap between these groups of respondents. Respondents who do not suffer from the cognitive dissonance bias tend to score approximately 2 points higher results in comparison with the second group. In other words, there is a negative relationship, since respondents without this bias scored more points. Low p-value confirms a statistical difference between the groups. In the right column, there is p-value of F-test providing us with verification of model correctness.

Based on the results, the presence of the cognitive bias seems to be affected by the level of financial literacy. The results of the test show a negative relationship between financial literacy level and tendency to be influenced by the cognitive dissonance bias. In other words, those who reach more skills in financial literacy have tendency not to be influenced by this bias. It might be explained by their skills and education they believe in rather than by emotions and cognitive abilities.

Another bias which has been found as a significant one in this research is the availability bias. It is important to mention that the computed p-value almost reaches the significance level. Nevertheless, it still rejects the null hypothesis. However, comparing

Name	Average value	P-value (t-test)	P-value (F-test)
With bias	14.84	0.099	0.294
Without bias	13.33		

TABLE 3: Comparison of those who suffer from the availability bias and those who do not. Source: Based on own research, processed in STATISTICA.

Name	Average value	P-value (t-test)	P-value (F-test)
With bias	13.39	0.053	0.06
Without bias	9.67		

TABLE 4: Comparison of those who suffer from the overconfidence bias and those who do not. Source: Based on own research, processed in STATISTICA.

Name	Average value	P-value (t-test)	P-value (F-test)
With bias	12.45	0.459	0.565
Without bias	13.33		

TABLE 5: Comparison of those who suffer from the illusion of control bias and those who do not. Source: Based on own research, processed in STATISTICA.

it to the previous results, there is one essential difference. In terms of this test, higher level of financial literacy has been reached by those who are affected by this bias.

As stated, the test shows positive relationship between financial literacy level and suffering from this bias. The test, however, does not imply what are reasons and explanations of this trend. Based on the result it can be assumed that having more knowledge and information can lead to higher inclination to availability bias. The complicated structure of number of information and knowledge requires more effort for decision finding. Students with higher level of financial literacy seem to search for ways how to simplify the decision making. For the availability bias it seems to apply that more is sometimes less. To avoid availability bias it seems to be imperative to educate students in other fields, our proposal is e.g. psychology.

A significant gap is also spotted in terms of the overconfidence bias. The computed p-value rejects the null hypothesis (claiming that both the groups have the same average value). As well as in the previous test, higher level of financial literacy has been reached by those who suffer from this bias, rather than those who do not.

Based on the received results higher level of financial education has significantly increased the inclination to overconfidence bias. Overconfidence connected with higher level of financial education can be explained by the fact that students were asked to evaluate their skills related to the financial markets. With higher financial literacy we can expect more interest in financial markets and that can motivate students to believe more in own skills.

Despite the fact that this tests complies with all assumptions (normal data distribution, as well as homoscedasticity are fulfilled), the effect of this bias is not statistically significant. Even though, there is a difference amounting to approximately 0.85 points, the test does not render this difference as a statistical significant difference, since p-value exceeds the set significance level.

The respondents seem to be influenced by their decision-making process by the illusion of control bias. However, the level of financial literacy does not seem to influence the level. However all of the tested students tend to suffer from overestimation.

Name	Average value	P-value (t-test)	P-value (F-test)
With bias	13.04	0.741	0.454
Without bias	13.30		

TABLE 6: Comparison of those who suffer from the risk aversion bias and those who do not. Source: Based on own research, processed in STATISTICA.

One of the possible explanations can be that the students were asked to estimate outcomes of situation they are familiar with.

This study was testing only university students where the level of financial literacy and education was similar. For getting more answers regarding the importance of financial literacy in the context of behavioral finance as the next step we will continue with the research among broad population.

As displayed in the table no. 6, there is almost no gap between those who suffer from this bias and those who do not. It is confirmed by the computed p-value, which almost reaches 0.75.

However, the fact that we were not able to verify an impact of this bias, it might be caused by difficulties which are connected with testing of this bias. To ensure objective assessment of risk aversion bias, all respondents would have to be exposed to the same conditions. It is obvious that this situation is highly unlikely to occur in case of a questionnaire. One of the possibilities how to remove this obstacle is to conduct an experiment, enabling simulation of initial conditions. .

5. Summary and Discussion

The aim of this pilot study was to investigate the relationship between behavioral biases and financial literacy level, and verify whether there are some connections. Based on the previous results, the following biases have been proven to be statistically significant:

1. dissonance bias
2. availability bias
3. overconfidence bias

In other words, these three biases have been confirmed as significant ones. There are three behavioral biases which have not been rendered as significant ones:

1. status quo bias
2. illusion of control bias
3. risk aversion bias

It is necessary to state that one of the most complicated drawbacks of this article is the number of observations. Due to the fact that the average time respondents spent

on all three parts of the questionnaire took approximately 20 minutes, the number of valid answers was low. Therefore, some deeper trends are difficult to be looked into.

Either way, it gives as a signal that investigation into the relationship is worth conducting. The experimental sessions, which are being prepared these days, might provide us with convenient datasets. The fact that students will be paid (using scholarships) for participating in that research increases the likelihood to obtain more observations.

6. Conclusion

This study was run as a pilot study for the following experiment to confirm or deny assumptions of this experiment. The conducted research shows that higher level of financial literacy increases the inclination to availability bias and the overconfidence bias. On the other hand, it seems to decrease the inclination to cognitive dissonance bias. Finally, all students were influenced by illusion of control; however, this bias is independent on the level of financial literacy.

Based on the conducted research results, it has been proven that some behavioral biases can be influenced by the level of financial literacy. However, this does not work in case of the risk aversion bias, the illusion of control bias and the status quo bias. However, taking into consideration the number of respondents, it is not possible to reverse that these biases would be statistically significant if we had more observations. What might be also worth investigating, it is a research involving not only students. Further studies should also concentrate on two different directions: going more deeply into particular biases and broaden the number of tested biases.

Based on the results, it seems to be remarkable to research more on the links between behavioral finance and financial literacy. Even the study tested only six biases, there has been concluded that the level of financial literacy influences significantly the inclination to some biases. To get more details on these links, the next step will be a controlled experiment as stated before.

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