



GENDER INFLUENCE ON INVESTORS BEHAVIOR-IS INVESTORS GENDER IMPORTANT?

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Abstract: *The scope of this paper is to research and show how both male and female investors approach investments under ambiguity and the difference between their approach towards loss aversion under ambiguity. This is needed in order to prepare adequate approach to the investors of different genders. In this papers, basic behavioral effects that influence investment decision-making process are presented, together with the explanation of different states according to the information available on the market. The methodology will be explained in details, as it is based on stock simulation rather than on hypothetical cases, and the subject group description will be presented. The results of the research among the subject group will be given, with further explanation of the obtained results and its influence on the personalized approach towards potential investors. The results show that there is difference among genders in loss aversion under ambiguity, showing the opportunity for financial products customization.*

Key Words: *Investors decision-making, Loss aversion, Gender role in investment, Financial product personalization*

1. INTRODUCTION

Trivial or business-related that can cause significant financial gains or losses, decisions are part of everyday lives of people, more often that they realize. What to wear for work or what to have for breakfast are just some examples of everyday decisions that people make and are usually overlooked as decisions. Business decisions are usually given more attention, especially if those decisions can cause significant financial gains or losses. Because of the monetary dimension of the decision, decision makers tend to invest more resources such as time and money into making the proper decision. However, even in cases where significant deliberation is made, and with the help of numerous decision-making tools, there is still room to influence even the most objective decision-makers.

Emotions and human nature are hard to pass-by, so new approaches in decision-making process try to integrate behavioural approach into decision-making theory. The concepts such as loss aversion, risk aversion, and heuristics are being extensively researched since the

publishing of the Tversky and Kahneman work in 1979 and their publishing of the prospect theory principles. Since then, behavioural approach in decision-making has become widely accepted part of decision-making theory.

Gender differences bring another dimension when it comes to investors decision-making. The exploration of differences between men and women investors have captured the eye of many, both scholars and professionals. Since there are different attitudes towards outer and inner influences on decision-making, it is important to test the exact differences in order to make proper adjustments in approach towards different genders, if needed.

2. DECISION-MAKING

The decision involves choosing from a set of at least two options (alternatives, actions) to which we can achieve the desired goal. If we have only one option, then there are no dilemmas regarding the choice, and therefore there is no problem of decision-making. [1] Options must be defined so that they mutually exclude each other, while the set of options must be final in order to be able to speak about the correct alternatives.

The goal of decision-making process is to come with the best possible alternative that will maximize the positive aspects and minimize the negative aspects concerning the choice. However, for that to happen, there must be enough information about the alternatives, the probabilities should be known and decision-makers must possess enough knowledge, experience, tools and resources in order to process information in the best possible way. However, decision-makers often do not have adequate information about the core of a problem; they do not have time or means to get information and often are incapable to understand the given information. They are facing the impossibility of memorizing so many information and limited ability of counting. [2] Those situations are called bounded rationality. Investors are often subjected to bounded rationality due to the quickly changing prices and trends, and decisions must be made in the shortest time possible.

2.1. Programmed and Non-Programmed Decisions

Depending on the previous knowledge and experience with the problem, decision-maker faces two

types of decisions: Programmed and non-programmed decisions. Programmed decisions are those decision whose basic characteristics are the routine performance of activities, the predetermined procedures for making the decision and the experience by which decision-making is made. [3] Programmed decisions are characterized by their predictability since they the problems to which decisions are related to tend to occur regularly, regardless of their complexity. Hence the programmed decisions are based on practices, rules and procedures that are result of past experiences. The decisions are usually decomposed on elements that can be defined, predicted and analyzed in order to create best-practice documents, procedures or policies that will help with making programmed decisions.

Non-programmed decisions are those decisions that decision-makers make for the first time and are related to new problems without pre-destined algorithm for its solving, with increased uncertainty compared to the programmed decisions. Behavioural theory is of great significance in making non-programmed decisions because it views decision-making process as a sequential, repeating process of alternative elimination. The rationality is applied on one choice among possible choices that satisfy given criteria of decision-making.

2.2. Optimal and satisfactory decisions

Depending on the clarity and probability of the outcome of the decision, two types of decisions can be identified: optimal and satisfactory decisions.

Optimal decisions are those decisions that maximize the outcome of the action, either being financial outcome or some other type. They are usually made in such cases where there is enough information and the possible outcomes of actions are clear and the process of decision-making concerning optimal decisions is connected to the classical theory of decision making. Much of the optimal decisions can be made by using decision-making software. Also, mathematics, statistics and algorithms are often used in making optimal decisions.

Satisfactory decisions arose from the cases in which optimal decisions couldn't be made due to the lack of information or the probability distribution. Given that financial utility can't be measured, satisfactory decisions present solutions that are "good enough" given the circumstances. The goal of making satisfactory decision is to bring the decision-maker least possible regret concerning the decision. Satisfactory decisions find support in behavioural decision making theory, which states that psychology, anthropology, philosophy and other social sciences have influence on decision-making of the individual.

2.3. Decision-making process

Decision-making process is a part of broader process called problem solving, which includes these phases:

1. Current situation (initial state) observation and problem identification;
2. Precision problem definition;
3. Goal definition (of choice criteria);
4. Alternative action (option) direction identification;

5. Information gathering;
6. Alternative evaluation;
7. Choosing the alternative;
8. Action implementation;
9. Results dissemination and analysis. [4]

By valuating efficiency (overseeing the results) it can be concluded if the decision has made expected outcome. In that way decision-making process can be presented as a system with its own subsystems that are interconnected and influence one another. [5]

The process of decision-making is passing through several stages:

1. Collection and analysis of needed information;
2. Business system goals definition;
3. Expected results elaboration;
4. Decision concerning resources needed;
5. Alternative decisions elaboration;
6. Choice of the decision;
7. Decision implementation. [6]

The goal of decision-making process is to help the decision-makers choose the best possible alternative among several alternatives given the information that are available.

2.4. Gender differences among investors

Throughout the years differences between genders are narrowing in such fields as education, income and wealth, although differences have been noted in long-term financial security. [7] The openness of the modern world gives women access to the same knowledge bases as for the men, especially in first world countries. In the sense of the same opportunities, genders are becoming more equal in developed countries. However, countries with societies that tend to promote patriarchy have greater differences among genders in education, income and wealth.

Gender differences in risk aversion and loss aversion, as well as ambiguity aversion can be observed in works of Schmidt and Traub [8], Rau [9], Byrns et al. [10], Agnew et al. [11], Hartog et al. [12]. All researches showed that women are both more loss averse and risk averse, as well as ambiguity averse, than men.

The same information does not necessarily have the same meaning for both genders. Although both man and woman can have the same educational background, there can be a difference in a way they make decision if the same information is provided. There is an evidence that women are more risk averse than men, however the reason for that could be social learning, and not psychological trait. [13] The clear preferences towards more secure investments among woman can be seen in their choice of time deposits, gold and funds for investments, and the case that men trade more often than women. [14] However, women actually lose less on excessive trade and generally make better yields on investments. [15] Women exhibit less overconfidence which is a reason why they deliberate more when making a decision and do not change their views often, which brings better results at the end.

3. RISK, UNCERTAINTY AND AMBIGUITY

Risk represents the state where numerical probability for occurrence of certain events is known, such as in case of a coin toss, where the probability for either heads or tails to occur is $p=0.5$. The decision-making under risk is common practice in programmed decisions, because the frequency of occurrence can provide decision-makers with a number of instances and better probability calculation.

In case where there is no known probability, but the probability can be calculated from past events by using statistical methods or by expert opinion, decision will be made in uncertainty. Uncertainty represents risk where the numerical probability is set with smaller degree of confidence due to the either lack of necessary information or different use of given information by different decision-makers.

Ambiguity is defined as a decision environment when there are no probabilities that decision-makers can assign to the outcomes of their actions. This situation usually happens when decision-makers are dealing with new problems.

Investors usually work in either uncertainty or ambiguity. In the case of the investments, the future cash flows are usually projected on the basis of current market situation and the results of the similar projects in the past. However, not all investors possess the knowledge or experience needed to interpret data in a way that would help them maximize their wealth. In their case, even with the information that is provided to them, they make decisions under ambiguity.

4. INVESTMENT DECISION-MAKING

Investments represent conscious renunciation of current consumption in order to acquire larger gains in the future. Although the term investment is colloquially associated with finance, investments can be made in other domains as well, since money is not the only resource that can be invested. However, humans as decision-makers doesn't always maximize their incomes from decisions, as first described by Bernoulli in 1713, but their decision is ruled by the expected utility that the actions/consequences of their decisions will have upon them. Namely, not all gains are measured equally.

Prospect theory, set by Tversky and Kahneman in 1979 and expanded in 1992, define that decision-makers are influenced by the psychological factors more than it was believed before, and that humans are often unable to make optimal decisions. This is due to the two phase decision model, which consists of preliminary analysis of the choices given and their simplification (editing phase) and later evaluation. Because decision-makers during editing phase are susceptible to the certain psychological effects, their decisions are not in line with the expected utility theory. [16]

Effects that, according to the behavioural economist influence decision-making are numerous, and some of better researched are:

- Loss aversion: One of the basic phenomena of choice under both risk and uncertainty is that losses loom larger than gains. The observed asymmetry between gains and losses are to

extreme to be explained by income effects or by decreasing risk aversion. [17]

- Heuristics – represent the wide group of psychological tools that help decision makers during their decision-making process under bounded rationality. Heuristics doesn't necessary help decision-makers make best decisions, but they just speed-up the process of decision making, sometimes leading to the decisions that are neither optimal nor satisfactory. Notable heuristics include anchoring, representativeness, availability, etc.
- Risk aversion – Decision-makers are risk averse in that sense that they prefer sure gains over possibility of larger gains coupled with the possibility of loss.
- Ambiguity aversion – people prefer lotteries with known probabilities over those with unknown probabilities.

Investors decision-making under ambiguity is characterized by the lack of information given to the investors, or misunderstanding of the information due to the lack of knowledge. As it is almost impossible to come to the precise probabilities of directions of price movements on the market, it can be argued that investors work either under uncertainty or under ambiguity, with the prior experience, knowledge and access to information making the difference between the two states.

Although there are certain models of decision-making under ambiguity, such as method for measuring loss-aversion under ambiguity by Abdellaoui et al [18], those models are not suitable for the research of investors, due to specific scenarios in which investors operating on the stock exchange might find them. The stock market, in contrast to the most models, is not a lottery, meaning that the maximum gain can't be measured. Also, the usual volatility of the prices presents a problem, because most of the methods take linear approach to the price change, which is usually not the case. However, most of the researchers found that the coefficient for loss aversion is in a region of 2, meaning that people tend to ask for two units in case that one unit can be lost. Although widely accepted, some researchers found that current evidence does not support that losses, on balance, tend to be any more impactful than gains. [19] Gal also contest that loss aversion is not responsible for some of the effects it produce. [20]

Investment institutions, such as investment banks, brokers or hedge-funds mostly serve clients with some degree of knowledge of capital market and with resources large enough that it can be profitable to engage in customization of investment portfolio for those clients. Smaller clients are usually provided with pre-made offerings. However, with rising number of small investors, the need for customization arises in order to better capture the needs of customers. Having taking into account differences among genders in investment decision-making, financial product customization for small investors could provide a better matching between small investors and investment institutions, giving better satisfaction of the investor with more clients for the financial institution.

5. METHODOLOGY AND SAMPLING

To measure ambiguity aversion under risk, we prepared an on-line questionnaire. The research was done as a part of PhD thesis research on models of decision-making under the ambiguity. The subject group consisted of the current and past students of Industrial engineering and management department of Faculty of technical sciences, University of Novi Sad. Total of 214 invitations were sent, of which 145 were opened and 89 answered the research, of which 50 were women. The choice of such subject group was done in order to have a subject group that either has a theoretical or practical knowledge of the stock market principles, as the researchers wanted to find out how investors with knowledge and/or experience on the market react in situations under ambiguity. The research was anonymous. The questions were on Serbian language. There were no infractions of the process and not a single result was dropped.

The questionnaire was divided into three parts, of which two will be presented. The first part consisted of questions concerning date of birth, employment status and gender of the subject, as well as his previous knowledge and experience about stock-market exchange. The first part was used as a check of consistency, as all students who received invitations for research either attended courses connected to the stock-market exchange or were part of the simulation.

Second part of the questionnaire was presented as a hypothetical scenario in which subject took the role of the investor with a certain amount of financial resources. They had a choice of three different stocks that had the same price. The only difference between the stocks were the spread between the potential gains and losses, as the first one had small spread, meaning smaller potential gains and smaller potential losses, second had larger spread between potential gains and losses, and third was presented as a stock with both high potential gains and losses. The only information that subjects had been given is that the market is stable and it is predicted it will remain stable in the near future. By not giving information needed for the proper assessment of the stocks, the subjects were put under ambiguity for the decision making, as no probabilities were given.

Service used for distribution of questionnaire and collection of answers is sogosurvey.com, and excel was used for graphical and statistical presentation of the results.

6. RESULTS AND INTERPRETATION

The results of the research show that women as investors have clear preference towards smaller risk investment. The number of the subject that choose each stock can be seen in Fig. 1.

Out of 50 female subjects, 41 chose more secured stocks, showing loss aversion under ambiguity. Only 9 subjects exhibited no loss aversion under ambiguity. These results are in line with previous researches done in this field, even showing a bit higher levels of loss aversion under ambiguity. This can be taken as a sign of rational behavior, as trading in a surrounding where there is no adequate information is strongly unadvisable. Investors tend to avoid trading under ambiguity (and under strong uncertainty), however some investors are

closer to obsessive gamblers who think that they can predict the outcomes based on their own beliefs.

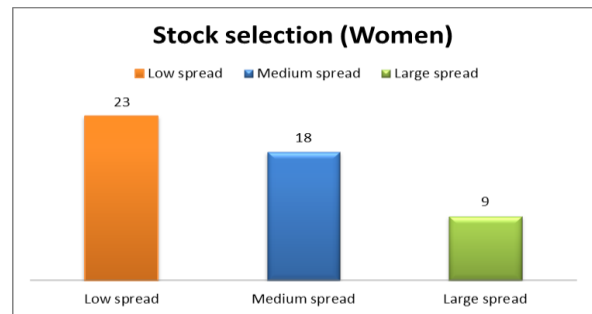


Fig. 1. Number of selections of each stock according to their spread

Fig. 2. Shows differences among male and female subjects, with differences in selections of low spread stocks and high spread stocks, while the percentage of the subjects choosing medium spread is almost identical across genders. This clearly shows that women, as investors, are clearly more loss averse under ambiguity than men, and are showing more rational behavior when investing than men, where men are more prone to making risky investments without proper information.



Fig. 2. Number of selections of each stock according to their spread for women, men and total

7. CONCLUSION

The risk of trading under ambiguity is high and investors with enough expertise know that in such cases investment process should stop, as there are no informations needed for proper investment decision-making. If needed, investors will invest in secure options with smaller yield, but with equally smaller risk.

The need for different and customized approach to genders from the financial institutions is underlined by this research. This research showed that women are more loss averse under ambiguity, which in this case is more reasonable and closer to the professional investors behavior. Previous researches showed that women, as investors, are more risk and loss averse, which this research verify. The results clearly show different preferences among two genders, so in order to better position themselves, financial institutions should take different approaches towards genders, especially when dealing with uneducated investors. While both genders are loss averse in general, men tend to exhibit less loss aversion than women, meaning that they are more susceptible of trading with risky financial instruments, even in the ambiguous surrounding. That can cause significant problems for those traders, so, in order to

prevent exploitation of those cases, adequate information must be provided. Women prefer smaller potential gains coupled with smaller potential losses, and financial institutions should focus more on financial instruments with low level of price volatility, promising small but certain yield, especially with uninformed female investors. The risk for exploitation of female investors is somewhat smaller than in the case of male investors.

The authors argue that this research shows the need for strong influence of the policy makers and also highlights the opportunity for the investment institutions to better understand their clients. In order to protect unprofessional investors, policy makers should enforce the information distribution among the investors, emphasising male investors. On the other hand, the results show that there is a space for investment product portfolio customization according to gender of the investor. Female investors should be interested in lower risk investments with lower possibilities of price changes, such as government securities, bonds, low-risk mutual funds, real estate and similar investments. If investment institutions recognize and implement customization of their investment products according to the gender of the investor they would be able to be more competitive on the financial products market.

The results from this research were obtained through a simulation of a real investment choices, while most of other researches usually employ different kinds of laboratory gambles to obtain results. The authors consider that, in order to test hypothesis concerning market behavior, test should be done on the market itself or on the simulated market. That way results should mirror real choices of decision-makers.

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