TALLINN UNIVERSITY OF TECHNOLOGY
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Gender differences in investment behaviour

Bachelor's thesis

Programme International Business Administration, specialisation finance and accounting

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I hereby declare that I have compiled the thesis independently.
and all works, important standpoints, and data by other authors
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has not been previously presented for grading.

The document length is 8303 words from the introduction to the end of the conclusion.

Ekaterina Usova 20.12.2023

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ABSTRACT

Previous researchers suggest that there is a difference between men and women in terms of investment behaviour. For example, some researchers suggested that women are less likely to take financial risks than men. At the same time, these statistics could be affected by the fact that the financial gap between men and women was significantly higher. Even though the problem of an income gap still exists, people made huge progress in decreasing the gap.

Using the survey, this study investigates the differences in investment behaviour between men and women. Also, it tries to investigate if the income level affects the investment preferences. The result shows that there is a difference in risk tolerance between genders. The analysis reveals that women tend to have a lower percentage of risky assets in their portfolio, and they are less willing to take financial risks to achieve higher profits.

Keywords: Gender, Investment Behaviour, Risk, Income gap

INTRODUCTION

As of 2023, the gender investment gap continues to be a significant issue. Previous researchers have indicated a higher engagement rate in financial transactions and investment decisions among men, compared to women. Men more frequently invest money into shares or bonds in the financial markets (Damian Walczak, 2018). Potentially there can be different factors that could affect this situation. For example, educational backgrounds, differences in income levels, differences in risk tolerance, societal norms, and psychological influences.

But for the past years, the problem of the gap between men and women has been recognised and there were different initiatives to reduce this gap, for example promoting financial education for women. As a result of various initiatives undertaken over the past years, the gender investment gap has shown a decrease. However, this reduction does not happen fast enough, reflecting modest progress in decreasing of gender gap in financial engagement. Nevertheless, the percentage of male investors for example in the venture capital world is still much higher than women investors, reflecting an imbalance in the sector (European Women in VC, 2023). Also, different researchers highlight the trend that men are more actively involved in trading stocks, and women show their preferences towards saving money, a pattern that underscores differing investment strategies between the genders (Mintautė Mikelionytė, 2021). Also, the researchers suggest that men tend to have a higher risk tolerance than women, which has a direct impact on their investment behaviour and investment strategies (Patti J. Fisher, 2017; Chris Brooks, 2019).

It is also important to mention that in many societies women still earn less, than men. This earning disparity between men and women might lead towards the result where women face a reduced capacity for them to allocate their income to investing, and that could be a reason, why they give preference to saving money over investing it. The last data in Estonia shows that in 2022 pay gap in Estonia was 17.7%, still a significant figure. According to the report from the European Commission in 2021, Estonia was in the top counties in Europe with one of the highest gender pay gap (20,5 %), but according to the Statistics of Estonia, in 2021 gender pay gap was 14,9%.

Despite the existence of the investing gap, there is a positive trend, that shows that more and more women become active investors and start to make early investments. Women are more actively involved in financial markets and their own wealth accumulation.

The aim of this research is to understand if the difference between genders in investment behaviour really exists, and how it differs. If there is a difference in willingness to take risks, and how men and women prefer to invest money. This research will provide more information about the potential factors that are influencing investment behaviour.

It is crucial to mention, that everything is individual, and it may vary, and generalization is not applicable to everyone.

Hypothesis 1: Men tend to be more confident in making investment decisions.
Hypothesis 2: Women are less likely to invest in risky assets.
Hypothesis 3: People with higher incomes are more likely willing to invest in risky assets.
Hypothesis 4: Women are more risk averse.
Hypothesis 5: Men tend to invest higher share of their income.

In examining how gender factors influence financial investment strategies, this study develops five hypotheses to research the behaviours and preferences separating men from women in financial markets. These hypotheses are based on the objective to understand better the impact of gender and income gap on investment decisions, risk tolerance, and comprehensive investment strategies. This research paper attempts to investigate the hypothesis through the collection of survey data. The primary objective was to gather a minimum of 120 responses, but the final outcome exceeded expectations, with a total of 133 responses successfully collected.

To test the hypotheses six regression models were used, that were analysing the data that was collected from the survey.

This research paper consists of different parts and starts with a literature review, where more information about investment behaviour, risk tolerance and the wage gap is presented. Also, this section provides an overview of insights from prior studies, illustrating various findings. Following the literature review, there is an explanation of the data and the methods, that were used in the analysis. The results of the analysis are presented right after the section with data and methodology.

The paper is summarized with a conclusion, which provides the research outcomes. All the sources are presented in the list of references.

1. LITERATURE REVIEW

1.1. Investment Behaviour

Investment behaviour refers to the decisions, preferences, and possible actions that a person decides to make when it comes to the process of investing money. There are several factors that can influence a person's investment behaviour, such as risk tolerance, amount of possibility to invest, for how long the person plans to invest money, level of financial knowledge, psychological biases, and market situation. All those factors in general can make an impact on investment strategies.

Investment behaviour is the concept that evolved from behavioural economics and finance. Behaviour finance is the field of finance, that tries to explain the psychological factors that influence the behaviour of people. Also, it tries to explain how psychology makes an impact on financial decisions, and how it affects the market (Shefrin, 2000). Behaviour finance if a relatively new field of psychology and finance (Dhruva Jyoti Sharma, 2022) . Dhruva Jyoti Sharma and Dr. Nripendra Narayan Sarma wrote an article about behavioural finance, where they gave an overview of different studies about behavioural finance. They were describing different concepts, that exist in behavioural finance.

The factor that can make an impact on why men feel more confident in making an investment decision, is that men do not tend to focus on the most important information and not try to confirm the information they have, while female investors will display less confidence in their decisions, and try to find more information, and some information might be incompatible with their initial decision (Janne Chung, 1998). This information shows that women tend to be more careful when they are making any financial decisions, as they are experiencing the need to find more information.

On the other hand, other research shows that nowadays women do not feel less confident than men when they are making a financial decision. For example, the research conducted by Ellen Katrine Nyhus (2023) reveals that women feel even more financially overconfident than men.
At the same time, the research by Tabea Bucher-Koenen (2016) reveals that women consistently demonstrate lower levels of financial literacy compared to men. It is observed that women are less

likely to correctly answer questions pertaining to basic financial concepts and more inclined to express uncertainty in their knowledge. This trend persists across age groups, including those for whom financial knowledge is particularly vital, such as widows or single women.

Furthermore, previous findings revealed a tendency among women to lean more towards saving money rather than using their money for investing. This dynamic contributes to a situation where men, in comparison with women, are more actively involved in financial decisions and investing (Mintautė Mikelionytė, 2021).

1.2. Risk Tolerance

Risk Tolerance in the context of financial decision-making can be defined as the individual's willingness to endure potential losses in their collection of investment assets. This willingness is a key determinant in an investor's approach to managing their assets, dictating their comfort level with the inherent uncertainties of the market. Individuals with higher risk tolerance are more inclined to invest in assets characterized by higher volatility while anticipating greater returns. For example, stocks and cryptocurrencies. These assets, while offering the potential for high returns, also come with a greater risk of substantial value fluctuations. In contrast, those with lower risk tolerance prefer to invest in safer assets, with lower volatility and lower returns. Prioritizing the preservation of capital over potential high returns. Typical examples of these kinds of investments include bonds and real estate, which are generally considered more stable and less prone to sudden market changes.

The level of risk tolerance has a direct impact on the investor's investment strategies and behaviour. It guides how they allocate their resources among various assets.
Previous researchers suggest that men are more likely willing to take financial risks, and women more often lean toward traditional and safer investment strategies (John Watson, 2019). It can be explained with the fact, that women have a different perception about their financial literacy. And they feel that they need to increase their financial literacy, and that will make them feel much more confident. Behavioural finance factors have a direct impact on how investors perceive risks associated with their investment decisions. It is important to consider an individual’s perception

of risk, as it can impact their willingness to take risks and affect the performance of their investment portfolio (Bashar Yaser Almansour, 2023).

Lower financial literacy is often associated with less risky investment portfolios. Since women typically have lower financial literacy levels, this could lead to more conservative investment behaviours (Annamaria Lusardi, 2011).

People, who underestimate their own financial risk tolerance are more likely to have a lower-risk investment in their portfolio. Which gives a correlation between lower confidence levels and risk aversion (Abed G. Rabbani, 2022). Different researchers were able to find the differences in risk tolerance between genders, which was directly affecting their investment behaviour. According to those researchers' women a less risk-tolerant than men are (Chris Brooks, 2019) (Patti J. Fisher, 2017).

1.3. Wage Gap

Indeed, risk tolerance and confidence level are making a direct impact on people's investment behaviour. But it is important to take into consideration other social-economic factors. One such crucial factor is the gender pay gap, which is one of the indicators of gender inequality in the society. The difference in salary is something that does not only impact monthly spending abilities or daily habits, but it also makes an impact on people's social benefits and pensions, ability to invest money and plan the future.

Women, who are facing a wage pay might be facing some difficulties in accumulating money for investments, but also it might exhibit their willingness to engage in financial risks. The wage gap could be a reason, why women are more careful with their assets.

Researchers suggest that there are several factors that could make an impact on the exitance of the wage gap, such as social segregation and stereotypes about gender roles. For example, due to social gender stereotypes and unequal family responsibilities men and women more often tend to choose different career options. Gender stereotypes play a significant role in people's perception of a

suitable career option. Also, statistically, women are less confident, and it happens less often that women ask for a higher salary, compared to men.

Estonia has a plan to implement the Pay Transparency Directive. The goal of the government is to achieve a situation in society, where there won't be financial inequality between genders (Ministry of Economic Affairs and Communications of Estonia, 2023).

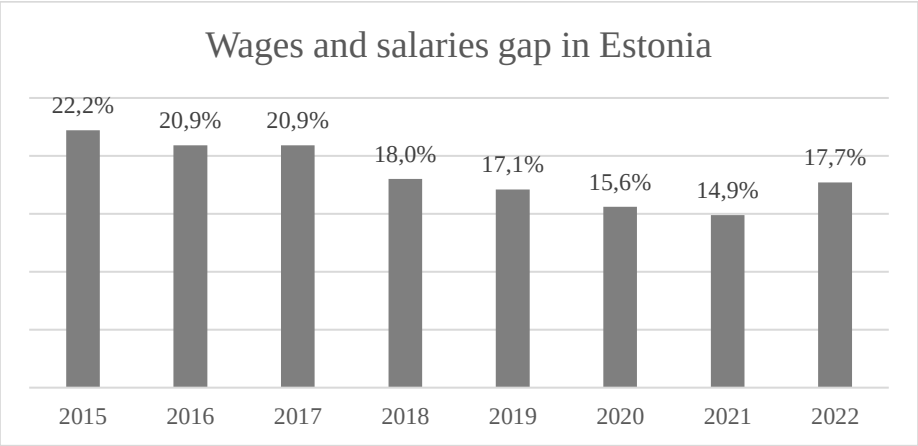

Figure 1. Wages and Salaries Gap in Estonia
Source: Gender Pay Gap, Statistics Estonia

In many countries, women are still working in a lower paid sectors and still have a lower unemployment rate than men. Also, women have lower rate of involvement in managerial work, compared to men (Pantelopoulos, 2021). Different stereotypes might influence the employer's perception of women's contribution to work, which might affect the opportunity to develop a career.

According to the research by Oksana Boiko (2015) women are more often involved in work in the public sector, while men are working more in the private sector, where compensations are usually higher. The same research suggests that men on average have better numeracy skills.

1.4. Previous research

Previous researchers suggest that statistically men tend to invest more than women. According to different research, the main factor is the confidence level, that women feel that they need to gain

more knowledge to start investing more. Psychological research established that men are experiencing overconfidence more often than women, especially in finance (Sewell, 2007).

Also, women experience more anxiety towards financial decisions, than men. And in general women feel less secure in terms of finance and worry more often about it (Thérèse Lind, 2020). According to the research article (Pantelopoulos, 2021), even though the world made huge progress towards the elimination of the gap between men and women, women are still not able to achieve full economic independence.

The research made by Kannadhasan (2013) shows that findings on gender in connection with financial risk taking and financial risk-taking behaviour need attention. In the research gender was one of the demographic factors that made an impact on financial risk-taking behaviour.

The results of an experimental study by Barkah Susanto (2023) showed that females had a higher tendency to make riskier decisions than males. Even though, there were only 22 participants. And research by Nicoletta Marinelli (2017) did not reveal the difference in men and women's portfolios. In the research by Gary Charness "Strong Evidence for Gender Differences in Risk Taking" (2012) there is a difference in men's and women's investment behaviour. Statistically, women's portfolios tend to be less risky than the men's.

Also, the research that was conducted in Lithuania (Mintautė Mikelionytė, 2021) reveals that the possibility that men will choose a higher risky asset than women is higher. And men might experience overconfidence, even if they have less knowledge. Women are more likely to choose lower-risk assets due to socio-economic reasons. Also, women are experiencing a lack of confidence in their knowledge. As it was mentioned before, the research by Janne Chung (1998) revealed, that women tend to try to find more information, and test their original decisions and knowledge.

Patti J. Fisher in her research in 2020 suggests that previous researchers suggested that women are less risk averse without the reasons, just as a fact. And conducted research to analyse the reasons why there is a difference between men and women in their financial behaviour. The results show that an average women have a lower income level and a higher level of uncertain income. At the same time, men who had an uncertainty in income were more risk tolerant than women. The

result of that study showed that there are differences in investment behaviour between men and women, but the reason is not the gender, but other factors that make an impact on a risk tolerance. Also, in 2021 Capital.com distributed a survey between 2000 people. The results show that women consider themselves less informed about investments than men. Also, it revelated that more men were involved in trading and buying stocks online, and women were more willing to save their money than men.

The research by Antonio Filippin (2015) was investigating the difference between genders in their risk tolerance. The results showed that different situations and tasks affect differently behaviour and attitude towards risks. Gender differences might be associated with the existence of a secure choice.

1.5 Hypothesis Development

The primary object of the research is to understand whether there is a difference between genders in their investment behaviour. As it was mentioned before in the literature review, there are different factors that can make an impact on investment decisions and an individual's attitude towards financial risks. Understanding how factors such as gender, among others, might influence financial choices can provide valuable insight into the dynamics shaping investment patterns.

Hypothesis 1: Men tend to be more confident in making investment decisions.
Previous researchers reveal that men feel more confident than women in situations when they must make financial decisions. Also, men feel more confident in trading (Brad M. Barber, 2001). Women have higher anxiety level about their finance, and they worry more about making wrong decisions (Thérèse Lind, 2020).

Hypothesis 2: Women are less likely to invest in risky assets.
According to the previous research, women prefer to invest money in assets with a lower volatility, because they prefer to take a lower risk related to the finance. Or according to the research by Gary Charness (2012), women prefer to invest smaller amounts in the risky assets, than men do. Also, the data from the research by Abed G. Rabbani (2022) showed that women had a less risky portfolios.

Hypothesis 3: People with higher incomes are more likely willing to invest in risky assets.
According to the statistics, people with a higher income level are more willing to invest in risky assets. People tend to allocate their assets with the opportunity to increase their financial wealth. However, people with a lower income tend to make safer investments due to a lower capacity to lose money. Research by Sylwia Hubar (2020) shows that middle-class households are less likely to take higher financial risks than households with a higher income. Also, in the research by Patti J. Fisher (2017) there was a finding about a positive correlation between higher wealth and risk tolerance.

Hypothesis 4: Women are more risk averse.

As it was mentioned in the literature review. Pervious researchers suggest that women are less risk tolerant than men (Patti J. Fisher, 2017; Chris Brooks, 2019).

Hypothesis 5: Men tend to invest higher share of their income.
People with a higher salary can investment a higher share of their income. And due to the existence of the wage gap, this research paper with explore if men invest a higher share of their income.

2. DATA AND METHOLOGY

2.1. Survey Data

This research was administered using an anonymous survey form in Google Forms, which was distributed via social media. Participants represent people of different socio-demographic groups. The survey consists of 17 questions, that were divided into 3 groups: Demographics, Financial Education and Confidence, and Investment Behaviour and Risk Tolerance.

The survey was distributed through:

- My social media in Instagram 1140 people
- LinkedIn account 701 people
- Facebook Group Finantsvabandus approx. 67 000 people

The survey was published on 08.11.2023, and in two weeks 133 responses were collected. Several data corrections had to be applied in the responses data due to small errors, for example when people answered the % with the "%" sign. A total of eight responses had to be excluded when the data was processed in regression analysis, due to the answer "No" to the question, if any investments were made. This step aimed to focus on respondents with investment experience. This question was asked to see, how many people never invested, but those responses could not be used in the regression.

Also, in the questions, where the respondent had to choose from a scale from 0-10, option 0 was added for people, who never made any investments. Those answers were still presented in the socio-economic descriptive statistics. And one more answer was removed due to an obvious mistake.

2.2. Structure of the survey

The survey was created to be simple and to take 3-5 minutes for people to complete the questionnaire.
It comprised three sections:

- Demographics
- Financial Education and Confidence
- Investment Preferences and Risk Tolerance

The first section consists of five questions. This section determines the social-demographic characteristics of respondents. It includes gender, age, degree, employment status and monthly income. In the question about degree, respondent was able to choose between “yes” or “no” for the question, if they own a university degree. The income group was divided into seven groups, with the smallest value “0- 1000”, and the highest “more than 3 500”, due to the fact that in September 2023 the average salary in Estonia was 1868 euro, so 3 500 is almost two times higher than the average salary. A new minimum salary level was instituted in Estonia in January 2023, set at 725 euros.

The second section of the survey consists of two questions regarding financial education and confidence to make financial decisions. Respondents were able to evaluate both questions on a scale from 0 to 10.

The third section focused on investment preferences and risk tolerance and included ten questions. There were different questions such as when respondents made their first investments, what are their preferred investment assets, and what is the allocated share of the salary. Also, there were four questions, that were asked to assess the willingness to take the financial risks.
The last question in the survey was to evaluate, what stops people from investing. And this question was asked to provide some insights into the reasons, that stop people from investing money. This information was decided to collect as extra information and it was not used in the regression analysis.

The details of the survey and variables are described in the Appendix. 1

2.3. Methodology

As a method to analyse the data, that was collected from the survey was decided to use regression analysis. Regression analysis is a method to analyse the statistical data and it is used to determine the relationship between different variables. It provides an opportunity to test the significance of the relationship between different variables, which will help to understand if the hypothesis can be provided.

The survey was distributed in the third quarter of 2023. In 2022 according to the data from the European Central Bank, Estonia had one of the highest inflation rates (around 20%). In the Third quarter of 2023, the unemployment rate in Estonia was 7,3%, which was 1,7% higher than in 2022. Those factors could have an impact on people's willingness to take financial risks. As it was mentioned before in the literature review, according to Estonian Statistics in 2022 the wage gap between men and women was 17,7%.

2.4 Descriptive Statistics

Full data of descriptive statistics presented in the Appendix.2

The age of participants of the survey was between 20 and 53 years old, with a weighted average of 32 years old. A total of 133 responders participated in the survey, and 69 of them were men (51.9%) and 64 women (48,1%). In regression analysis men were coded as "0" and women as "1". Most of the participants owned a university degree (71,4%), and 38 participants (28,6%) answered that they do not own a university degree.

In terms of employment status, 118 of respondents (88,7%) were employed, 9 (6,8%) respondents were unemployed, and 6 (4,5%) were students. None of the respondents was retired.

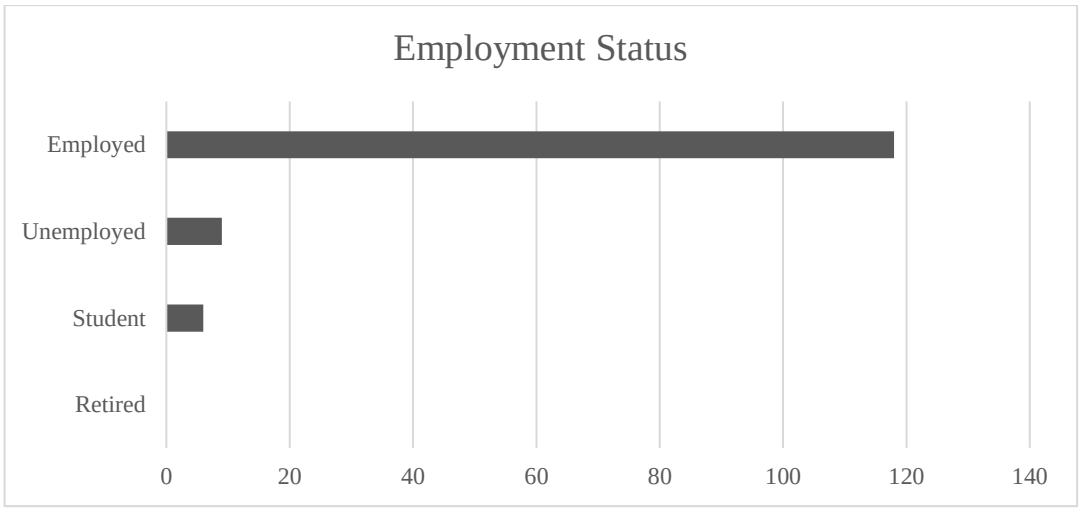

Figure 2. Employment status

Source: Usova (2023), author's survey

The income of participants was measured as net income representing income after tax and costs deduction by person by month. The result from the survey, data presented that there were participants with different income levels, 16% of respondents had an income less than the average in Estonia, which is less than 1500-euro net), 35% of respondents had a salary between 1500-2500 net, and other 40% had an income more than 2500-euro net. The highest income option, labelled as "More than 3500," and 18% of participants have chosen this option, making the highest percentage within the respondent pool.

Figure 3. Monthly Income

Source: Usova (2023), author's survey

In the first regression analysis income levels were grouped as income_0-1500, for people with an income lower than the average, income_1500-2500 for people with an average salary and a bit higher, and income_more.2500 for people with a high income. But it created an error, and the data was corrected for one Income variable and average values were included:

- Income 0-1000 was substituted with 750
- Income 1000-1500 was substituted with 1250
- Income 1500-2000 was substituted with 1750
- Income 2000-2500 was substituted with 2250
- Income 2500-3000 was substituted with 2750
- Income 3000-3500 was substituted with 3250
- Income More than 3500 was substituted with 3501

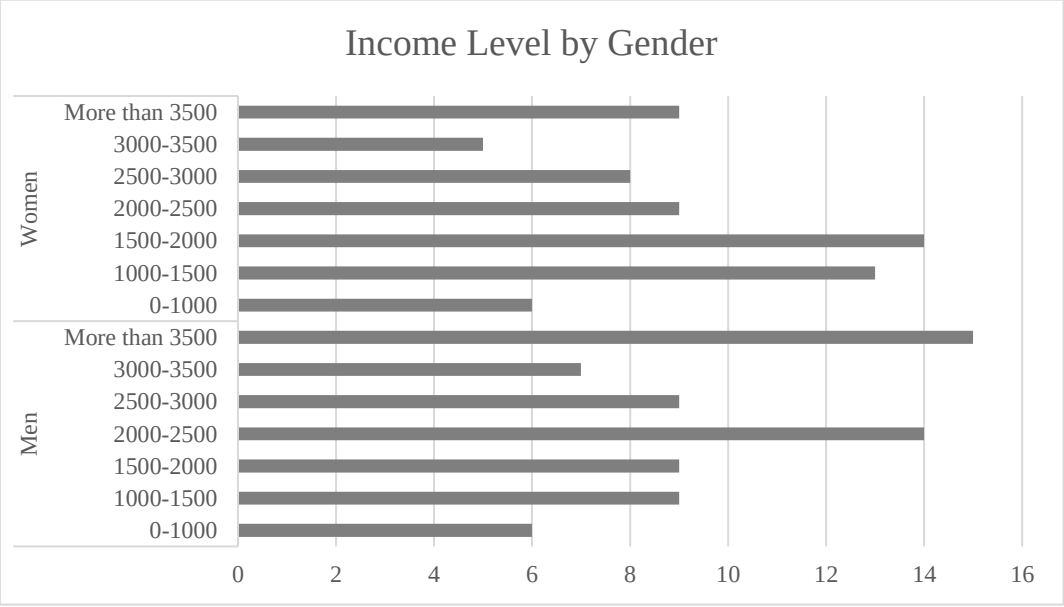

Figure 4. Monthly Income by Gender

Source: Usova (2023), author's survey

Figure 3 shows that based on the answers from this survey it is possible to make a conclusion that men are earning more than women. The option "More than 3500" was chosen by 15 men, and only 9 women chose this option. The second highest income option "2500-3000" was chosen by 7 men

and 5 women. The most popular option for men was “More than 3500” (21,7% of men respondents), and for women it was “1500-2000” (21,8% of women respondents).
This data also serves as evidence of the gender wage gap among respondents.

To measure the financial knowledge level and confidence level there were two questions. Both questions were rated on a scale from 0 to 10. For the question “Have you ever taken a finance course or a workshop?”, participants were able to choose from 0 “Never” to 10 “I am professional”. The mean for this answer was 3,5, with a median value of 3. Confidence level was measured with the question “How confident do you feel about making financial decisions? (budgeting, saving, and investing)”, and respondents were able to choose from 0 “Not Confident at all” to 10 “I am professional”. For this question, the mean was 6,5 and the median was 7. This result suggests that respondents, on average, perceive themselves to be moderately confident when it comes to making financial decisions.

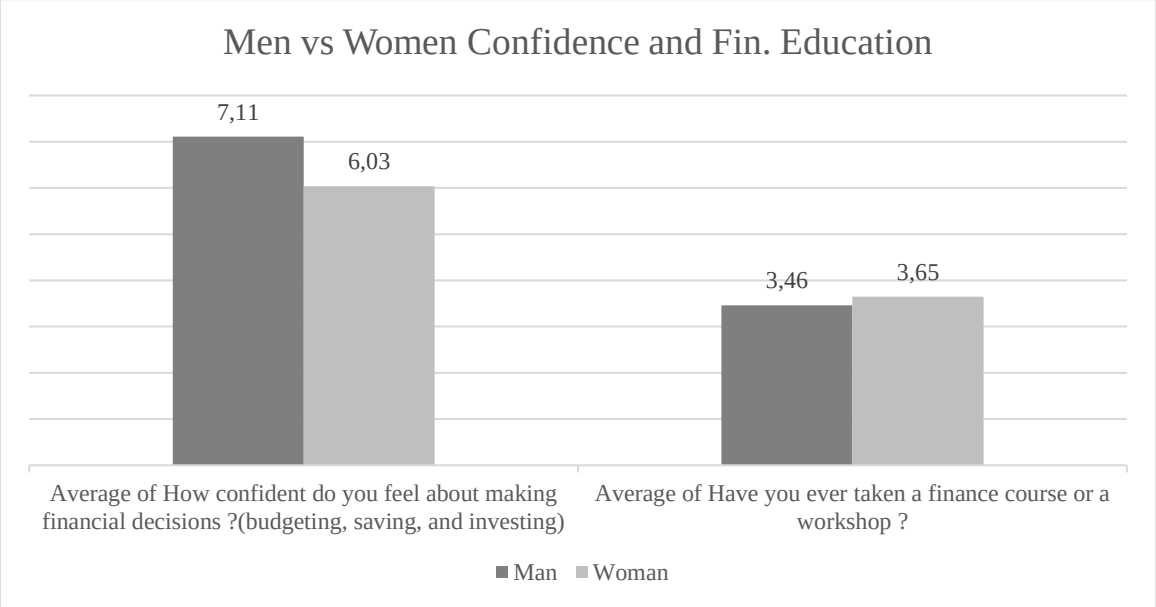

Figure 5. Men vs Women Confidence and Fin. Education
Source: Usova (2023), author’s survey

Figure 5 provides with a comparison of Men and Women in terms of their confidence level and financial education. Despite the statistics, that men have a slightly lower level of financial education, they tend to show a higher confidence level in making financial decisions.
Then there were 10 questions about investments. The first question was asked to understand if the respondent had made any investments ever. Indeed, 7 individuals responded with "No" to this

question. This was an important step, as it was crucial to exclude people, who never made any investments from the further analysis. And they will not be presented in other statistics related to investment behaviour. For the statistics, out of those seven respondents, four were women and three were men.

To analyse the investment behaviour, the dataset will include will only 125 responses, where the answer was “Yes” to the question if they ever made any investments. One more answer was removed, because the person marked that the first investment was made, then he was 3 years old, which is an obvious mistake.

The mean for the question “How old were you when you made your first investment?” was 23,6 years old. The maximum value was 45 and the minimum was 15. Then there was a question “How many times a month do you adjust your portfolio?”, and the median value was 1. The mean was 4,7, but it was due to the fact that one of the respondents answered “300” and the other one answered “100”, which significantly increased the deviation. So, in this case, the median value provides us with a better overview.

For the question about preferred assets to invest, respondents had 6 options: Stocks, Bonds, Real Estate, Currency, Cryptocurrencies, and Commodities. Respondents were able to choose as many as they wanted. But each of the options was a separate variable to have a better overview of investment preferences. 108 out of 125 respondents are investing money in stocks. Only 44 invest in bonds and cryptocurrencies and 54 invest in Real Estate. The least popular options were currency and commodities, each of them was chosen only by 14 respondents. Figure 6 shows the percentage, of how many respondents chose each option.

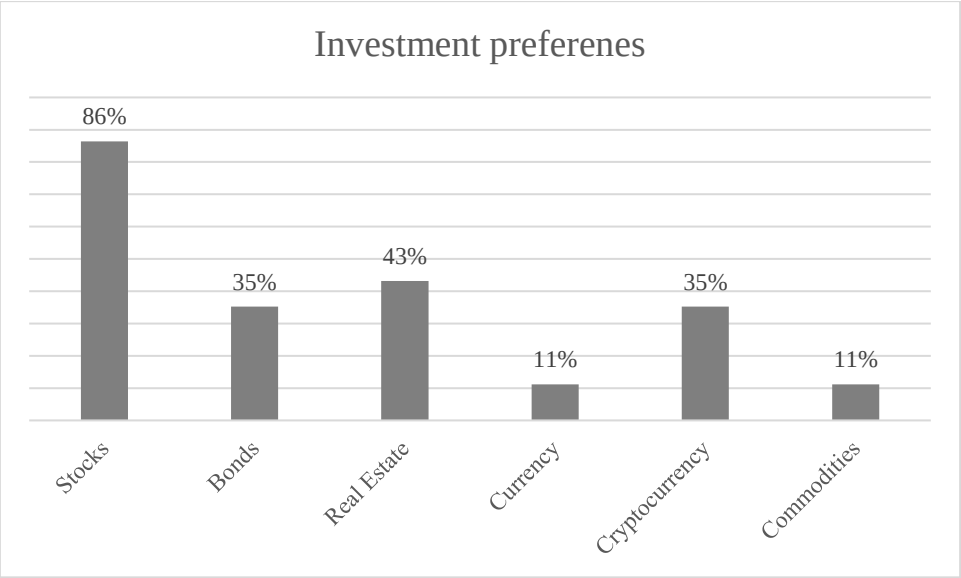

Figure 6. Investment Preferences

Source: Usova (2023), author's survey

The median for the question about what is the percentage of the salary that person is investing on a monthly basis, the mean value is 20%. The median value is 13%. For this question, there were some corrections in the data, because respondents were entering a "%" mark or using the answers like "5-10", in that case, the second number was removed and considered as "5".

The part of the survey about investment behaviour included also questions to analyse the willingness to take financial risks. This part included 4 questions. All those questions were linear scale type of questions. Respondents were able to choose from 0 to 10. The first question in this subsection was to understand what the percentage of risky assets in the respondent's portfolio is. On average, the percentage of risky assets in this sample was 40%. Both, the mean and the median were around four. Then, there were three questions to analyse the behaviour and attitude toward risky investments. Respondents had to choose from 0 "Totally disagree" to 10 "Totally Agree". For both questions "I tend to take higher risks to achieve higher profits" and "Usually I invest in safe assets, even if I don't get a huge return from that", mean and median values are 5.

The fourth question "I had situations where I sold the assets when I saw a market downturn" showed that respondents usually prefer to keep the assets even during the market downturn, as the mean value was 3.

Figure 7. Men vs Women Risk

Source: Usova (2023), author's survey

Figure 7 provides with an overview of the average values for the questions, that were evaluating willingness to take financial risks. This figure shows that on average men were more willing to take financial risks to achieve higher profits, and women are more willing to invest in safer assets. The last question was asked to understand, what prevents people from investing. Respondents were able to choose as many as they wanted. Most of the respondents (51%) answered that they are investing all available money. 40 respondents answered that they are saving for a short-term project. Other options were: "Don't have enough knowledge" and "Don't see any good opportunities", both were chosen 27 times (22%).

Most of the respondents (57%), who answered "No" to the question if they ever made any investments, to this question answered that they do not have enough knowledge.

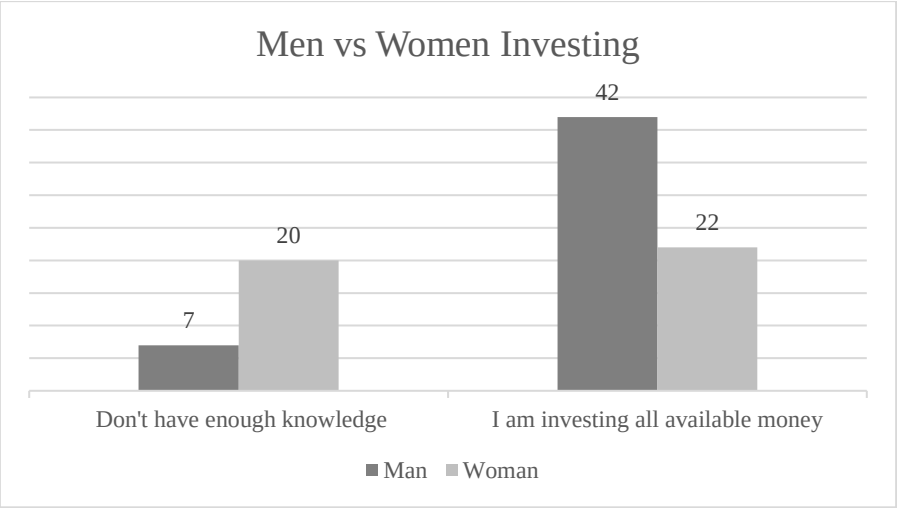

Figure 8. Men Vs Women Investing

Source: Usova (2023), author's survey

Figure 8 shows, that men are investing all available money more than women. And the option "Don't have enough knowledge" was chosen more by women. Twenty women and only seven men chose this option. This result shows that men feel more confident about their knowledge than women.

3. RESULTS

3.1. Regression Models

Twenty-four independent variables were developed: Age, Education, Employment, Income levels, Finance Education, Confidence, Age when the first investment was made, Portfolio adjustment frequency, Investment types, Percentage of risky assets in the portfolio, share in invested income, Willingness to take risks, Experience. For a comprehensive listing of all variables and their descriptions, please refer to Appendix 3. It is important to note that not all of these variables were used in the regression analysis. But it was decided to keep them to give a better overview of the work.

For the regression model, it was decided to give up two answers, as they were creating a huge standard deviation. As it was mentioned before, there were two answers “100” and “300 to the question “How many times a month do you adjust your portfolio?”. It is impossible to say if those answers were correct, but due to the fact, that they might affect the whole regression analysis, it was decided to remove those answers. So, in total 123 responses were used in the analysis.

To answer the hypotheses in this paper, it was decided to use linear multiple regression models. In total, six models were created to analyse the data.

The first multiple linear regression model included variables gender, age, education level, income levels, financial education, and confidence level. Gender, Age, Education, Finance_Education and Income were used as independent variables, and Finance_Confidence was a dependent variable. At first, there was a mistake in the data, because the first try was with binary values for the income. Income was divided into three groups. As it was described previously in 2.4:

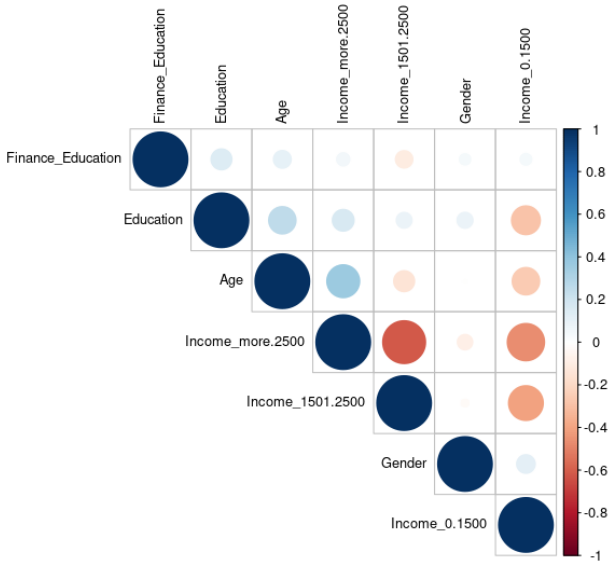

Figure 9. Confidence Level error

Source: Usova (2023), author's survey

In Figure 9. It is possible to see why there was an error with income level variables. This error occurred because R model found a strong correlation between variables Income_1501_2500 and Income_more.2500.

Regression Results: Main Specification

	Dependent variable:
	Confidence Level Model 1.1
Age	-0.048 (0.034)
Gender	-0.770** (0.363)
Education	-0.732* (0.430)
Employment_working	-0.326 (0.580)
Income_level	0.001*** (0.0002)
Finance_Education	0.190*** (0.055)
Expirience	0.049 (0.038)
Constant	6.915*** (0.927)
Observations	123
R^2	0.225
Adjusted R^2	0.177
Residual Std. Error	1.929 (df = 115)
F Statistic	4.759*** (df = 7; 115)
Note:	*p<0.1; **p<0.05; ***p<0.01

Table 1. Confidence Level

Source: Usova (2023), author's survey

From the Table 1. It is possible to see the association between several independent variables and the dependent variables. This regression reveals that there is a relationship between gender and confidence level. The model underscores a notable relationship between gender and confidence levels, with women generally reporting lower confidence levels compared to men. Confidence level was measured on a scale from 0 t to 10. Table 1 shows that the impact of the gender is quite significant, and women are losing 0,77 points in the confidence level, compared to men. Furthermore, a university degree (education) is one of the factors that makes an impact on the confidence level. However, there is no relationship between income level and confidence.

The second linear regression model analysed the age, when the first investment was done, and tried to find if there was a difference between genders, and the correlation between different variables. This model was added to analyse the data, and explore, what could be the factors influencing the initiation of the first investment. This model does not test the hypothesis, but its relevance lies in providing supplementary knowledge to the aim of the research. Age_First_Investment was a dependent variable, and Age, Gender, Education, Employment_Working, Income_Level, Finance_Education, Finance_Confidence, and Risk_High_risk_high_profits were used as independent variables.

Regression Results: Supportive Information

	Dependent variable:
	Age First Invesment
	Model 2.1
Age	0.385*** (0.060)
Gender	1.372 (0.911)
Education	0.058 (1.060)
Employment_working	2.078 (1.398)
Income_level	-0.0003 (0.001)
Finance_Confidence	-0.235 (0.232)
Finance_Education	-0.206 (0.138)
Risk_High_risk_high_profits	-0.146 (0.163)
Constant	12.335*** (2.576)
Observations	123
R^2	0.353
Adjusted R^2	0.308
Residual Std. Error	4.676 (df = 114)
F Statistic	7.773*** (df = 8; 114)
Note:	*p<0.1; **p<0.05; ***p<0.01

Table 2. Age_First_Investment

Source: Usova (2023), author's survey

The findings from the second model are inconclusive, as it is impossible to make a conclusion from the result. The analysis does not show a statistically significant association between gender and when people make their first investments, as the results are out of the confidence interval. But the result shows a positive correlation between age and the age, when the first investment was made.

The third model was linear regression, which analyses the relationship between different variables and the percentage of the risky assets in the portfolio. Percentage of the risky assets was a dependent variable, and Age, Gender, Education, Employment_Working, Income_Level, Share_of_income_invested, Finance_Education, Finance_Confidence, and Experience. Risk_Low_risk_low_profits were used as independent variables.

Regression Results: Main Specification

	Dependent variable:
	% of risky assets
	Model 3.1
Age	0.021 (0.040)
Gender	-0.726* (0.428)
Education	-0.226 (0.499)
Employment_working	1.418** (0.668)
Income_level	-0.0004 (0.0003)
Share_of_income_invested	-0.018 (0.012)
Finance_Education	-0.007 (0.066)
Finance_Confidence	0.011 (0.110)
Expirience	-0.029 (0.045)
Risk_Low_risk_Low_Profits	-0.673*** (0.084)
Constant	7.482*** (1.374)
Observations	123
R^2	0.403
Adjusted R^2	0.349
Residual Std. Error	2.203 (df = 112)
F Statistic	7.554*** (df = 10; 112)
Note:	*p<0.1; **p<0.05; ***p<0.01

Table 3. Percentage of risky assets

Source: Usova (2023), author's survey

Table 3 presents the evidence that there is a relationship between gender and willingness to invest in risky assets. Women have a lower percentage of risky assets in their portfolios. The measurement of the Percentage of risky assets ranged from 0 to 10, where 10 was "100%". The regression analysis indicates that women, on average, invest approximately seven percentage points less in risky assets compared to their male counterparts. Additionally, the employment status makes a direct impact, as employed people demonstrated a higher willingness to invest more in risky assets, than people who are not employed. And people, who prefer to invest in assets with lower risk and lower return, have a lower percentage of risky assets in their portfolio. There were no findings that could show that the income level makes an impact on the level of riskiness of a portfolio.

The fourth model was a binary logistic regression, which was trying to predict the investment types based on ten independent variables. There were six investment asset types in the survey: Stocks, Bonds, Real Estate, Currency, Cryptocurrencies, and Commodities. The model's aim was to evaluate the influence of specified independent variables on the willingness to give a preference towards some specific investment asset.

Regression Results: Alternative Specifications

	Dependent variable:					
	Stocks	Bonds	Real Estate	Currency	Cryptocurrencies	Commodities
	Model 2.1	Model 2.2	Model 2.3	Model 2.4	Model 2.5	Model 2.6
Age	-0.037 (0.057)	0.068* (0.041)	-0.006 (0.039)	0.034 (0.060)	-0.122*** (0.047)	0.057 (0.060)
Gender	-1.111 (0.733)	-0.038 (0.441)	-0.119 (0.420)	0.132 (0.658)	-0.345 (0.437)	-1.352* (0.753)
Education	-0.450 (0.825)	0.604 (0.543)	0.382 (0.504)	0.802 (0.889)	-0.780 (0.505)	-0.415 (0.745)
Employment_working	-0.220 (1.068)	-0.486 (0.690)	0.214 (0.713)	-0.708 (0.946)	1.625** (0.786)	-0.350 (0.948)
Income_level	0.001* (0.0004)	0.0001 (0.0003)	0.001** (0.0003)	0.0001 (0.0004)	0.0002 (0.0003)	0.00004 (0.0004)
Share_of_income_invested	0.083* (0.044)	0.022* (0.013)	0.004 (0.012)	0.004 (0.017)	-0.011 (0.012)	0.007 (0.016)
Finance_Education	0.051 (0.111)	0.105 (0.067)	-0.014 (0.066)	0.028 (0.095)	0.004 (0.067)	-0.011 (0.096)
Finance_Confidence	0.350** (0.161)	0.237* (0.131)	0.119 (0.115)	0.232 (0.194)	-0.044 (0.112)	0.087 (0.195)
Expirience	0.001 (0.075)	-0.050 (0.045)	0.030 (0.043)	-0.025 (0.065)	0.093* (0.051)	0.053 (0.065)
Risk_Low_risk_Low_Profits	0.135 (0.145)	0.025 (0.089)	0.087 (0.084)	-0.072 (0.134)	-0.130 (0.087)	0.167 (0.137)
Constant	-1.192 (1.957)	-5.133*** (1.600)	-3.415** (1.472)	-4.812** (2.295)	2.466 (1.520)	-5.134** (2.555)
Observations	123	123	123	123	123	123
Log Likelihood	-33.184	-69.732	-75.145	-38.723	-71.561	-37.487
Akaike Inf. Crit.	88.368	161.464	172.290	99.447	165.122	96.974
Note:						*p<0.1; **p<0.05; ***p<0.01

Table 4. Investment Preferences

Source: Usova (2023), author's survey

According to the findings delivered from the fourth model, it is possible to make a conclusion that the income level does not make an impact on investment preferences. Gender emerges as a factor that makes an impact on investments in the Commodities. This Model indicated that Women have a lower rate of inclination towards investments in Commodities. Additionally, the model shows that age and employment status are making an impact on cryptocurrency investments. While the impact of age is relatively small, but it still suggests the trend that younger people are investing

more in cryptocurrencies. Furthermore, people who are employed are demonstrating a higher evolvement in investments in cryptocurrencies, than people who are not employed.

The fifth model was linear regression, which tried to research the correlation between different socio-economic variables and willingness to take higher risks to achieve higher profits. High_Risk_High_Profits was a dependent variable, and Age, Gender, Education, Employment_Working, Income_Level, Finance_Education, Finance_Confidence, Experience were used as independent variables.

Regression Results: Main Specification

	Dependent variable:
	High Risk, High Profits
	Model 5.1
Age	-0.020 (0.048)
Gender	-1.251** (0.513)
Education	-0.644 (0.604)
Employment_working	0.599 (0.806)
Income_level	-0.0003 (0.0003)
Expirience	0.048 (0.053)
Finance_Confidence	0.353*** (0.129)
Finance_Education	-0.002 (0.080)
Constant	4.258*** (1.567)
Observations	123
R^2	0.176
Adjusted R^2	0.118
Residual Std. Error	2.677 (df = 114)
F Statistic	3.039*** (df = 8; 114)
Note:	*p<0.1; **p<0.05; ***p<0.01

Table 5. High Risk, High Profits

Source: Usova (2023), author's survey

The fifth model revealed that there is a direct and strong correlation between gender and willingness to take higher risks to achieve higher profits. Women are less willing to take higher risks, despite the opportunity to achieve better financial results. The result of this regression and correlation with the Gender variable is -1,23 points. Also, we can see that confidence level makes

an impact in this case. The third model did not reveal this relationship, but it also revealed that men are more risk-tolerant than women.

The sixth model was also a linear regression, which analysed the relationship between different variables and the share of income that respondents invest on a monthly basis. Share_of_income_invested was a dependent variable, and Age, Gender, Education, Employment_Working, Income_Level, Finance_Education, Finance_Confidence, Risk_High_risk_high_profits, and Experience were used as independent variables.

Regression Results: Main Specification

	Dependent variable:
	Share of Income Invested
	Model 6.1
Age	-0.494 (0.300)
Gender	-4.693 (3.314)
Education	-3.622 (3.820)
Employment_working	3.056 (5.085)
Income_level	0.004** (0.002)
Expirience	0.570* (0.337)
Finance_Confidence	1.990** (0.841)
Finance_Education	0.013 (0.502)
Risk_High_risk_high_profits	0.114 (0.589)
Constant	10.102 (10.174)
Observations	123
R^2	0.218
Adjusted R^2	0.156
Residual Std. Error	16.848 (df = 113)
F Statistic	3.510*** (df = 9; 113)
Note:	*p<0.1; **p<0.05; ***p<0.01

Table 6. Share of Income Invested

Source: Usova (2023), author's survey

The sixth model highlights a clear correlation between the confidence level and the share of income that individuals choose to invest. Also, there is a positive correlation between experience and the amounts that people are investing. Although this model indicates that Gender impact is -4.6, it is

impossible to make a conclusion from this result, as it falls outside of the confidence interval. Income level continues to show, that it does not impact the investment behaviour, as there is no significant finding of the relationship between the share of income invested and the income level.

3.2. Hypothesis results

Six regression models were developed to answer different questions. Five linear regressions and one logistic regression.

The first question, that I wanted to answer was “What makes an impact on the confidence level? And is there a difference between men and women?”. There was a strong opinion by previous researchers that men are experiencing overconfidence more often than women. Researchers named different reasons, such as lack of knowledge, willingness to find more information, and socio-economic factors. The first regression model was trying to answer those questions. And according to the result, it is possible to make a conclusion, that women feel less confident in making financial decisions. Table 1. shows that women feel less confident by 0,77 points. The other factor that makes an impact on the confidence level is a university degree. People, who own a higher education, tend to be more confident in making decisions, than people, who do not. What is interesting, is the fact, that financial education does not have a significant impact. The impact of income level on confidence levels is entirely negligible.

Also, I wanted to understand if there is a difference between men and women in the age, when they make their first investments. But it is not possible to provide any result on this topic, as it was not included in the confidence interval.

The third model was created to give the answers to the questions “Is there a difference between men and women in their willingness to take financial risks? And what are other factors that make an impact on the amounts of investments in risky assets?”. The results that the model provided, help to make a conclusion that the difference in risk tolerance between genders exists. Women have a lower percentage of risky assets in their portfolios than men. Another factor that has a relationship with risk tolerance is employment status, people, who are employed feel more confident than people who are not (students and unemployed). The income level variable does not show a strong relationship in this model as well.

The fourth model was predicting investment preferences. It was trying to give an answer to the question “Do genders prefer to invest in different assets? What makes an impact on investment asset preferences?”. The results show that gender was insignificant in five investment asset models, except commodities. Table 4 shows that men were observed to invest more in commodities than women. Income level was an insignificant factor in all six asset models. All the variables did not show a significant result. Only employment status was making an impact on cryptocurrency investments. Employed people are investing more in cryptocurrencies, than unemployed.

The fifth model was created in order to get another overview of the relationship between willingness to take financial risks and different socio-economic factors. This model highlighted a significant impact of gender on willingness to take higher financial risks in order to achieve higher profits. It showed a negative correlation between gender variable and higher risks, which reveals that women are less likely willing to take higher financial risks when they are making investments. The results show that women are more risk averse. Also, this model revealed a positive relationship between confidence level and willingness to invest in riskier assets.

The sixth model was analysing, which factors are making an impact on the share of income, that people are investing in. And, as the aim of the research is to understand if there are differences between genders in investment behaviour, with this model I wanted to get the answer to the question "Does gender make an impact on the percentage that respondents invest?". The results reveal that there is a strong correlation between confidence level and the share of invested income. Another factor that makes a positive impact is experience. People with a higher confidence level are investing more of their income, but the income level did not show any significant result. Unfortunately, it was impossible to make a conclusion about the impact of gender factors, as the result fell out of the confidence interval.

Based on the results it is possible to say that the first hypothesis has been substantiated, and men’s perception of their confidence level in making financial decisions is higher than women’s. This result was revealed regression model nr 1.1, which can be seen in the Table 1. The fact that men tend to experience overconfidence can be highlighted from the descriptive statistics as well, as women experience less confidence in their financial decisions, even if they have the same level of financial education. Also, twenty women marked that the reason, that stops them from investing money is the fact that they do not have enough knowledge, while only 7 men chose this option.

The second hypothesis has been validated as well, as the empirical findings indicated that women tend to invest less in risky assets than men do, as the percentage of risky assets in their portfolios is lower than in men's portfolios. Additionally, it can be confirmed by the fact, that there was a negative correlation between gender and willingness to take higher financial risks in order to achieve higher profits. The interplay of those results brings to the conclusion that women tend to choose a more conservative approach toward risk taking in investments.

The third hypothesis has been invalidated, there was no pattern indicating that people with a lower income tend to take lower financial risks. The data suggested the opposite, people with a lower income invest in risky assets as much as people with a higher income. The income level does not make any impact on the willingness to invest in more risky assets. Across all five models, where the income level variable was included, the relationship between income and risk tolerance was not observed.

The regression results were in line with the fourth hypothesis, as the regression analysis revealed that there is a negative correlation between gender and risk tolerance. Regression analysis showed that women are less willing to invest in risky assets to achieve higher profits.

In the regression that tests the fifth hypothesis, the result lies beyond the confidence interval, making the coefficient estimate for gender not statistically significant. Therefore, give the data used in this study, the fifth hypothesis is rejected.

CONCLUSION

This research tries to explore the relationship between gender and investment behaviour, such as willingness to take risks and confidence in investing. The problem of the financial gap between genders still exists, even though, that in the past years society made a huge effort to change that. Investing is helping people to increase their assets and achieve a higher result in their financial wealth. Using the survey, I tried to answer the question, if there is a difference between genders in their financial behaviour in 2023.

Data was collected through the anonymous survey in Google Forms, which was distributed through social media.133 respondents were able to complete the survey. In regression 123 responses were used, it was decided to remove 10 responses due to different errors or the fact, that seven of those respondents never made any investments. They were still presented in descriptive statistics. As the number of respondents was not large, and this sample is not a representative sample of the population. Six regression models were developed to analyse the data.

The outcome of the analysis did not show a positive correlation between income level and investments in risky assets, so it is possible to make a conclusion that income does not make an impact on investment preferences and investment behaviour overall.

Also, the results show that the evidence is consistent with the hypothesis, that women are more risk-averse in investments than men. However, it is crucial to mention that the results show that the difference is not highly substantial and may be a subject influenced by various factors. The second hypothesis was also validated, as the regression model and descriptive statistics showed that men tend to experience more overconfidence than women. Descriptive statistics also revealed that women are less confident about their knowledge than men and think that they don’t have enough knowledge in the investment area. This perceived knowledge gap is identified as a factor stopping women from engaging in investment activities, as much as men do.

In conclusion, this research was able to find the differences between genders in investment behaviour. But at the same time, the differences are not highly substantial. That was a positively surprising result, as it is great to see that so many people are involved in investments.

Increasing society's financial literacy is extremely important as it provides people with better financial opportunities. Decreasing gender gaps in all areas is the key factor that will help the economy and society to grow and develop, as everyone despite their gender should have the same opportunities. So, it is not only a matter of social justice, but it is a way for society to become stronger.

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APPENDICES

Appendix 1. Survey Questionnaire

1. Demographics.

1. Your Age:
2. Your Gender:
    - Man
    - Women
    - Other
3. Do you own a university degree?
    - Yes
    - No
4. Your employment status:
    - Employed
    - Unemployed
    - Student
    - Retired
5. Your monthly income (net):
    - 0-1000
    - 1000-1500
    - 1500-2000
    - 2000-2500
    - 2500-3000
    - 3000-3500
    - More than 3500

2. Financial Literacy

6. Have you ever taken a finance course or a workshop?
    - 0 to 10, where 0 is “Never” and 10 is “I am professional”.
7. How confident do you feel about making financial decisions? (budgeting, saving, and investing)
    - 0 to 10, where 0 is “Not confident at all” and 10 is “I am professional”.

3. Investments

8. Have you ever made any investments?
    - Yes
    - No
9. How old were you when you made your first investment? (Please type only number)
10. How many times a month do you adjust your portfolio? (Please type only number)
11. What kind of investments do prefer to make? (Directly or through the mutual funds)
    - Stocks
    - Bonds
    - Real Estate
    - Currency
    - Cryptocurrencies
    - Commodities
12. What is the % of risky assets in your portfolio?
    - 0 to 10, where 0 is “0%” and 10 is “100%”
13. I tend to take higher risks to achieve higher profits.
    - 0 to 10, where 0 is “Totally Disagree” and 10 is “Totally Agree”.
14. Usually I invest in safe assets, even if I don't get a huge return from that.
    - 0 to 10, where 0 is “Totally Disagree” and 10 is “Totally Agree”.
15. I had situations where I sold the assets when I saw a market downturn.
    - 0 to 10, where 0 is “Totally Disagree” and 10 is “Totally Agree”.
16. What share (%) of your income do you invest on a monthly basis? (Please type only number)
17. What prevents you from investing money? (Choose as many, as you want)
    - Don't have enough knowledge.
    - Don't see any good opportunities.

- Saving my money for a short-term project
- I am investing all available money.

Appendix 2. Descriptive Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Age	123	32.065	7.750	20	53
Gender	123	0.480	0.502	0	1
Education	123	0.740	0.441	0	1
Employment_working	123	0.878	0.329	0	1
Income_0.1500	123	0.236	0.426	0	1
Income_1501.2500	123	0.350	0.479	0	1
Income_more.2500	123	0.415	0.495	0	1
Income_level	123	2,250.195	957.327	500	3,501
Finance_Education	123	3.512	3.298	0	10
Finance_Confidence	123	6.585	2.127	0	10
Age_First_Investment	123	23.561	5.619	15	45
Adjust.Portfolio	123	1.332	2.109	0.000	12.000
Investment_Stocks	123	0.862	0.347	0	1
Investment_Bonds	123	0.350	0.479	0	1
Investment_Real.Estate	123	0.431	0.497	0	1
Investment_Currency	123	0.106	0.309	0	1
Investment_Cryptocurrencies	123	0.358	0.481	0	1
Investment_Commoduties	123	0.114	0.319	0	1
Percentage_of_risky_assests	123	4.073	2.732	0	10
Risk_High_risk_high_profits	123	5.171	2.851	0	10
Risk_Low_risk_Low_Profits	123	5.049	2.492	0	10
Risk_Sell_Market._Down	123	3.341	3.107	0	10
Share_of_income_invested	123	19.956	18.341	0.000	100.000
Expirience	123	8.504	6.811	0	29

Appendix 3. Variables

Variables	Description
Gender	In Binary coding man as "0" and woman as "1"
Age	Age of the respondent
Education	In Binary coding no as "0" and yes as "1'
Employment_working	In Binary coding other as "0" and Employed as "1'
Income_0-1500	In Binary coding other as "0" and 0-1500 as "1'
Income_1501-2500	In Binary coding other as "0" and 1501-2500 as "1'
Income_more.2500	In Binary coding other as "0" and 2501 and more as "1'
Income	Corrected income levels of respondents, average values. Can be found in 2.4
Finance_Education	Finance education level of respondent, scale 0-10
Finance_Confidence	Finance Confidence level of respondent scale 0-10
Age_First_Investment	Age, when respondent made a first investment
Adjust.Portfolio	In Binary coding less than 0,99 as "0" and if at least 1 then «1'
Investment_Stocks	In Binary coding other as "0" and stocks as "1'
Investment_Bonds	In Binary coding other as "0" and bonds as "1'
Investment_Real Estate	In Binary coding other as "0" and real estate as "1'
Investment_Currency	In Binary coding other as "0" and currency as "1'
Investment_Cryptocurrencies	In Binary coding other as "0" and cryptocurrencies as "1'
Investment_Commodities	In Binary coding other as "0" and commodities as "1'
Percentage_of_risky_assests	Percentage of risky assets in respondent’s portfolio, scale 0-10
Risk_High_risk_high_profits	If the respondent is ready to take high risks for high profit, scale 0-10
Risk_Low_risk_Low_Profits	If the respondent invests in safe assets and ready for low profits, scale 0-10
Risk_Sell_Market _Down	If respondent sold assets, when market went down
Share_of_income_invested	scale 0-10, number is %
Expirience	Age - Age_First_Investment

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