Nazifa Mohyuddin & Trine Lønnum

How do myopic loss aversion and individual characteristics affect investment decisions in a fictional lottery and the U.S stock market?

Master's thesis in Financial Economics
Supervisor: Jacopo Magnani
June 2023

Master's thesis

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Norwegian University of Science and Technology
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Preface

This thesis represents the completion of our two-year master program in Financial Economics at NTNU. Our thesis work took place during the spring of 2023, and while at times challenging and frustrating, it has provided us with valuable academic knowledge and a positive learning experience that we believe will serve us well in the future.

We would like to express our sincere gratitude to our supervisor, Jacopo Magnani, for providing exceptional academic support and always being available to answer our questions and guide us in our work.

Additionally, we would like to acknowledge the valuable guidance and input provided by Ranik Raaen Wahlstrøm, who assisted us greatly with the ordinal logistic regression model and offered constructive feedback. We are truly grateful for his contributions.

Abstract

This master's thesis explores the impact of myopic loss aversion (MLA) and individual characteristics on investment decisions in a fictional lottery and the U.S. stock market. Two groups, referred to as group H and group L, were compared based on the frequency of feedback. The results indicate that there is no significant difference in the mean investments in the lottery between the groups. However, in the stock market, group L demonstrates significantly higher investments than group H, suggesting reduced MLA tendencies.

Moreover, multiple linear regression analysis reveals that participants with higher levels of self-efficacy and investment experience tend to make higher investments. Age exhibits a positive relationship with investment in the lottery, where older participants tend to invest more. The ordinal logistic regression analysis supports the notion that higher levels of independent variables correspond to greater investment willingness, indicating decreased levels of MLA. Surprisingly, the findings do not support the expected relationship between lower feedback frequency and decreased levels of MLA. However, this research provides valuable insights into the decision-making processes in investment contexts, shedding light on the interplay between MLA, individual characteristics, and investment behavior.

Keywords: myopic loss aversion, investment decisions, feedback frequency, individual characteristics, fictional lottery, U.S. stock market, behavioural finance, self-efficacy.

Sammendrag

Denne masteroppgaven undersøker effekten av kortsiktig tapsskyhet (MLA) og individuelle egenskaper på investeringsbeslutninger i et fiktivt lotteri og det amerikanske aksjemarkedet. To grupper, kalt gruppe H og gruppe L, ble sammenlignet basert på tilbakemeldingsfrekvensen. Resultatene viser at det ikke er noen betydelig forskjell i gjennomsnittlig investering i lotteriet mellom gruppene. Imidlertid viser gruppe L signifikant høyere investeringer enn gruppe H i aksjemarkedet, noe som tyder på reduserte tendenser til kortsiktig tapsskyhet.

Videre viser multiple lineære regresjonsanalyser at personer med høyere mestringstro og investeringserfaring har en tendens til å foreta større investeringer. Alder har en positiv sammenheng med investering i lotteriet. Ordinær logistisk regresjonsanalyse støtter antagelsen om at høyere nivåer av uavhengige variabler korresponderer med større villighet til å investere, og indikerer dermed redusert kortsiktig tapsskyhet. Overraskende nok støtter ikke funnene den forventede sammenhengen mellom lavere tilbakemeldingsfrekvens og redusert kortsiktig tapsskyhet. Denne forskningen gir imidlertidig verdifulle innsikter i beslutningsprosessene i investeringskontekster og kaster lys over samspillet mellom kortsiktig tapsskyhet, individuelle egenskaper og investeringsatferd.

Nøkkelord: kortsiktig tapsskyhet, investeringsbeslutninger, tilbakemeldingsfrekvens, individuelle karakteristikker, fiktiv lotteri, det amerikanske aksjemarkedet, adferdsfinans, mestringstro.

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1 Introduction

Recent data shows that investing has gained popularity among the general public, with a growing proportion of the population engaging in various forms of investment (Yang, 2022). As a result, there is a growing interest in understanding how individuals make investment decisions and the factors that may influence these decisions. It has been found that several behavioral biases, including the well-documented phenomenon of myopic loss aversion, have an impact on an individual's investment decision.

Myopic loss aversion (MLA) refers to the tendency for individuals to place greater weight on immediate losses than on future gains, and is composed of two behavioral concepts: loss aversion and mental accounting. Loss aversion can be described as a phenomenon where individuals feel the pain of a loss more strongly than the pleasure of an equivalent gain. On the other hand, mental accounting refers to the unconscious strategies individuals use to categorize and assess financial outcomes. (Gneezy & Potters, 1997).

Previous studies have shown that experiments can be used to evaluate MLA. In 1997, Gneezy and Potters conducted a lottery using a laboratory experiment. This experiment was aimed at studying the evaluation period effect, which refers to the period where investors assess their investment outcomes and how this affects their investment in risky assets. The influence of the evaluation period on investment behavior is referred to as the myopic loss aversion hypothesis, which was first proposed by Benartzi and Thaler in 1995. The hypothesis of MLA was developed in response to the equity premium puzzle (EPZ) presented by Mehra and Prescott in 1985. The equity premium puzzle highlights the historical trend of stocks providing significantly higher average returns than bonds, to the point where it becomes challenging to justify why investors would choose to hold bonds at all. For instance, in the U.S, the average equity premium[1] over the past century has been around 6%, while traditional economic models suggest it should only be 1-2%. As a result, to rationalize the decision to hold bonds, investors would need to display an unusually high level of risk aversion (Mehra & Prescott, 1985).

To test Benartzi & Thalers (1995) theory of the EPZ, Gneezy and Potters compared two groups of investors, group H and group L, by manipulating and testing the evaluation period effect. Group L received less feedback and had fewer options for modifying their investments, while group H received more feedback, and had more flexibility in changing their investment decisions. Gneezy and Potters' (1997)

[1]Equity premium = Equity returns - Bond returns

experiment showed that when investors receive more feedback on their investment returns, they tend to invest less in risky assets, thereby supporting the MLA hypothesis. This result has been replicated in numerous other experiments, including those by Barron & Erev (2003), Sutter (2007), Haig & List (2005) and Gneezy et al. (2003). These findings imply that investment flexibility and feedback frequency have a similar level of importance, and that MLA has a significant impact on investment behavior (Fellner & Sutter, 2009).

Fellner & Sutter (2009) incorporated a third variable into their experiment, where participants were provided with information about the average payoff that was previously attained. Their experimental findings suggested that the additional information about payoffs resulted in the participants opting for less frequent feedback, but it did not cause them to increase the duration of commitment[2]. However, they discovered that the duration of commitment to a specific investment is a critical determinant of the degree of risky investments.

As mentioned earlier, Gneezy and Potter´s hypothesis is that investors become more risk-averse when they evaluate returns more frequently. This aligns with the hypothesis of MLA, where the main idea is that the evaluation period effect will influence a participants level of risk aversion. With this in mind, the main goal of this thesis is to investigate how varying levels of feedback frequencies and individual characteristics impact participants' behavior in the lottery, and in the stock market. To investigate this, we have divided the participants into two groups - group H and group L - based on the frequency of feedback. This allows us to detect group differences, and the tools used here are the t-test and Mann-Whitney U test.

Unlike running a lab experiment, like Gneezy and Potters did, we made a fictional lottery by utilizing the random function in python. Thereafter we presented different sequences of the achieved payoff in the fictional lottery. To stay consistent with Gneezy and Potters experiment, we used the same conditions and probabilities in our fictional lottery. Furthermore, we wanted to control for other factors that may potentially have an impact on the investment behavior, like age, gender, experience, and varying personality traits. In order to examine these effects, we employed both a multiple linear, and an ordinal logistic regression model. Through the use of these tools and models, our aim is to address the following problem:

[2]with duration of commitment referring to the duration for which the investment is held.

Problem:

How do myopic loss aversion and individual characteristics affect investment decisions in a fictional lottery and the U.S stock market?

The remainder of this thesis is organized as follows: Section 2 presents a literature review of relevant theory and findings to support our research. In section 3 we present the design and methodology utilized in our thesis. In section 4, we propose our hypotheses to complement our analysis and address our thesis question. In section 5, data and descriptive statistics are visualized and explained. Section 6 will provide analysis and results. In section 7 a critical point of view is offered with our research´s limitations and suggestions for further research, before section 8 will provide a conclusion.

2 Literature

We aim to accomplish our research objective by employing theoretical concepts related to myopic loss aversion and its impact on stock investments, how feedback frequencies can relate to myopic loss aversion, and lastly the relationship between myopic loss aversion and personality traits.

2.1 Myopic Loss Aversion and Equity Investments

The phenomenon known as the equity premium puzzle (EPZ) has been linked to myopic loss aversion, which is a commonly accepted explanation for the puzzle. This theory suggests that investors who are risk-averse tend to monitor their portfolios too frequently, which exposes them to frequent small losses in their stock portfolios. This frequent monitoring leads to a decreased investment in equities, which is characterized by MLA (Lee & Veld-Merkoulova, 2016).

Lee & Veld-Merkoulova (2016) conducted a study to verify the predictions made by Benartzi and Thaler (1995) regarding myopic loss aversion. They studied the relationship between portfolio evaluation, rebalancing and highly loss averse individuals. Further investigation revealed that individuals who checked their portfolios less often, tended to have an increase in equity holdings over time.

The study also found that individuals with higher levels of myopic loss aversion tend to have lower levels of investment in stocks as a percentage of their total assets. Lee & Veld-Merkoulova‘s (2016) study discovered a negative correlation between the individual´s MLA-level and the proportion invested in equity in their portfolio. Their findings support Gneezy and Potters‘ (1997) hypothesis, that people who receive infrequent feedback and have limited flexibility in their investment choices are more likely to invest heavily in equity than those who receive frequent feedback.

The study by Iqbal et al. (2021) also provided a methodological insight, by showing that experience can either increase or decrease the level of MLA. This happens because when you gain or lose experience, it acts as a reference point for your behavior.

2.2 Myopic Loss Aversion and Feedback Frequency

In the paper authored by Bellemare et al. (2005), the authors aimed to distinguish the impact of two variables – investment flexibility and feedback frequency, on the behavior of a myopic loss averse investor. Earlier experiments manipulated both variables at the same time, but Bellemare et al. (2005) wanted to know which manipulation had a greater impact on investment behavior during the evaluation period. To test this hypothesis, they conducted their own experiment with three groups: high frequency (H), with high feedback frequency and high investment flexibility, low frequency (L), with low feedback frequency and low investment flexibility, and a control group (M), with high feedback frequency and low investment flexibility. The purpose of including the control group was to compare the effects of feedback frequency and investment flexibility while holding the other variable constant. Through this comparison, the authors concluded that the evaluation period effect previously reported in the literature could be attributed to feedback frequency rather than investment flexibility.

Langer and Weber (2003) studied the effects of both feedback frequency and commitment period[3] separately on MLA. Their research revealed that the duration of commitment had a more significant impact on MLA compared to feedback frequency. The study by Langer and Weber (2003) differs from the other studies reviewed in this thesis in terms of the approach employed. Specifically, Langer and Weber utilized a multiplicative approach, which stands in contrast to the additive approach employed in the other studies. The multiplicative approach involves investors receiving an initial endowment that is carried over from one period to another and can be reinvested. On the other hand, the additive approach entails investors investing a fixed amount, with gains and losses in each period having no impact on subsequent endowments (Bellemare et al., 2005).

Bellemare et al. (2005) found that the average investments in group L were significantly higher than in group H for all three blocks, which is consistent with the results of Gneezy and Potters (1997). This finding confirms the hypothesis proposed by Lee & Veld-Merkoulova (2016) that individuals who receive infrequent feedback and have lower investment flexibility are likely to invest more in the stock market compared to those who receive frequent feedback and have higher investment flexibility.

2.3 Personality traits

Investment decision-making is significantly impacted by the behavioral bias of myopic loss aversion, as has been established in earlier studies conducted by Gneezy & Potters (1997) and Thaler et al. (1997). In 2008, Hopfensitz and Wranik conducted an experiment to investigate the effect of experience, individual differences, and emotions on how people respond to feedback frequency in an investment setting. Their findings showed that both experience and personality traits can impact

[3]with commitment period referring to the duration for which the investment is held.

investors behavior, with MLA being more likely to occur for investors who experience initial losses and have low self-efficacy[4] in the investment setting (Hopfensitz & Wranik, 2008).

Carver & Scheier (2002) suggest that optimistic individuals tend to view the future in a positive light, persisting in their pursuit of future gains despite experiencing past losses. Conversely, Maner and Schmidt (2006) argue that anxious individuals are more likely to be sensitive to uncertainty and, as a result, prefer to steer clear of risk. Consequently, it is reasonable to hypothesize that individuals with high levels of self-efficacy are less prone to myopic loss aversion, while those with low levels of self-efficacy are more vulnerable to it. To measure self-efficacy, the General Self-Efficacy Scale (GSE) developed by Schwarzer and Jerusalem (1995) is commonly used. By utilizing the GSE scale, the aim is to assess the participant's level of self-efficacy and subsequently predict myopic loss aversion. The GSE comprises ten statements, and the participants will rate their degree of agreement with each statement on a scale of 1 to 4. The primary objective of the GSE scale is to differentiate between individuals with high and low levels of self-efficacy (Hopfensitz & Wranik, 2008).

3 Design

We conducted a replication study of Gneezy and Potters' 1997 experiment to test the hypothesis of myopic loss aversion proposed by Benartzi and Thaler in 1995, and employed a between-subjects design[5]. Gneezy and Potters tested for two variables - feedback frequency and investment flexibility - and concluded that the evaluation period effect was equally attributed to both variables. However, Bellemare et al. (2005) and Lee & Veld-Merkoulova (2016) found that the evaluation period effect could be attributed to feedback frequency rather than investment flexibility. Accordingly, our replication study aims to investigate the impact of feedback frequency on the evaluation period effect. Our study's design aligns with previous research that emphasizes feedback frequency as a more effective approach for studying investment decision-making compared to investment flexibility. It highlights the significance of prioritizing control over feedback frequency rather than investment flexibility to ensure a more comprehensive and robust analysis.

To assess feedback frequency, we divided participants into two groups based on

[4]Self-efficacy is a personality profile featuring strong optimism, belief in one´s decision-making capabilities, and minimal anxiety (Judge et al., 1998).

[5]In a between-subject design, one observes two groups of individuals, where each participant is exposed to only one treatment (Charness et al., 2012)

their exposure to feedback frequency - group H and group L. Group H received frequent feedback, while group L received less frequent feedback. We used Python´s random function to create a fictional lottery, and shared the different sequences of the achieved payoff with the participants. In contrast to the original experiment, we only included 9 rounds, whereas Gneezy and Potters (1997) experiment consisted of 12 rounds. In rounds 10-12, Gneezy and Potters (1997) utilized a multiplicative approach[6], where the participants were allowed to spend what they had earned in the first 9 rounds. To stay consistent with the additive approach, we decided to only include the first 9 rounds. We presented two sequences with predetermined investment amounts of 1000 NOK and 500 NOK per round, and their results after 9 rounds. Group H received the outcome of each round in the lottery while group L received the results in three bulks, each containing three rounds.

We aimed to compare participants´ level of MLA in two scenarios: investment in the U.S stock market, which involves real data, and investment in the fictional lottery, which is more like a game. The purpose of this was to determine if there are any differences in how participants approach these two investment settings, and if the participant´s level of risk aversion differs between these two scenarios. Lee and Veld-Merkoulova (2016) discovered a negative correlation between myopic loss aversion and equity investment, where equity investment represents investments in the stock market. To explore this relationship further, our aim was to investigate investments in the U.S. stock market, and determine whether higher stock investments among participants led to a reduction in MLA. In this scenario, group H was given daily returns of the S&P index, while group L was given monthly returns.

As previous studies indicate that personality traits could potentially influence an individual's investment behavior, and predict their level of MLA, we chose to incorporate personality traits into our design. To incorporate personality traits into our study, we utilize the General Self-Efficacy (GSE) scale by Schwarzer and Jerusalem (1995), consisting of ten statements for participants to rate their level of agreement on a scale from 1 to 4. We aimed to investigate the relationship between self-efficacy and MLA, based on previous findings from Carver and Scheier (2002), Maner and Schmidt (2006), and Hopfensitz and Wranik (2008), which suggest that

[6] In the multiplicative approach, investors receive an initial endowment that can be reinvested across periods (Bellemare et al., 2005). For example, if an investor starts with 1000 NOK, invests it all in the first round, and gets a payoff of 2500 NOK, their endowment for the next round would be 3500 NOK (2500 NOK from the previous round's payoff plus the initial 1000 NOK). In the additive approach, investors invest a fixed amount, and gains or losses in each period don't affect future endowments (Bellemare et al., 2005). For example, if an investor starts with 1000 NOK, invests it all in the first round, and receives a payoff of 2500 NOK, their endowment for the next round would still be 1000 NOK.

individuals with higher self-efficacy scores tend to exhibit lower levels of MLA.

3.1 Procedure

For the purpose of data collection, we opted to create a Google Form and distribute it among students from various institutions in Trondheim. The form consisted of two surveys, one for group H and one for group L, with a target of obtaining 100 responses from each group. To investigate the extent to which feedback frequency contributes to MLA, the surveys utilized in this study were identical in all aspects except for our variable of interest, feedback frequency. This investigation is based on the findings of previous studies, such as those conducted by Bellemare et al. (2005) and Gneezy and Potters (1997), which have demonstrated a positive correlation between feedback frequency and MLA.

Given the constraints of time and resources, it was not feasible to conduct a laboratory experiment for the current study. Instead of creating a fictional lottery, alternative methodologies, such as subject interviews or data obtained from previous experiments on the subject, could have been considered. However, the implementation of interviews with a sufficiently large sample size would have been less efficient, while utilizing existing data would not have allowed for the collection of raw data. We also wanted to run our own sample, so that we could compare our results with previous findings. Additionally, Norwegian students, who were the desired target group for our study, had not been previously included in MLA experiments of this nature. Consequently, a survey was chosen as the primary approach for data collection, targeting the population of Norwegian students. This approach, though not without limitations, such as the potential for repeated participation by the same individual or unreliable responses, was deemed feasible and effective, and was ultimately employed for our study.

3.2 Survey

The survey consisted of four sections: demographics, personality traits, lottery and the U.S stock market. We initiated the survey by posing two demographic questions - gender and age. In order to maintain the anonymity of the participants, we decided not to ask any other personal questions. We then asked whether the participants had previously made investments in the stock market. Our aim with this was to examine whether the level of MLA can be influenced positively or negatively by one´s experience, as suggested by the study conducted by Iqbal et al. (2021).

In the second section, we utilized the General Self-Efficacy scale (GSE) by

Schwarzer and Jerusalem (1995) to explore how personality traits influence the degree to which participants display MLA. According to Schwarzer and Jerusalem (1995), the GSE is capable of predicting myopic loss aversion, whereby higher scores on the scale are indicative of lower levels of loss aversion. As stated by Judge et al. (1998), strong optimism, belief in one´s decision-making capabilities and minimal anxiety is positively correlated with the self-efficacy personality profile. We used the same ten statements as Schwarzer and Jerusalem (1995), but to ensure that the statements were easily understood by participants from diverse educational and cultural backgrounds, we reworded some of the claims into a less technical language. After reading the statements, participants were asked to rate their level of agreement on a scale of 1-4, where 1 represented "not true at all" and 4 represented "completely true". The statements employed in the survey are presented in table 1 below:

	Statements
1	If I try hard enough, I can always manage to solve difficult problems
2	If someone opposes me, I can find ways to get what I want
3	I consistently reach my goals by staying committed to my aims.
4	I am confident in my ability to handle unexpected events effectively
5	My resourcefulness allows me to effectively manage unexpected situations
6	By putting in the necessary work, I can overcome the majority of challenges I face
7	I can remain calm when facing difficulties because I can rely on my coping abilities.
8	In the face of challenges, I have the ability to identify multiple potential solutions
9	If I am in trouble, I can usually think of a solution.
10	I can usually handle whatever comes my way

Table 1: The 10 self-efficacy statements employed in the survey.

3.3 Lottery

In Section 3, we replicated Gneezy and Potters (1997) experiment by utilizing the random function in Python to calculate the payoff. The random function generates a number within the range of 0 to 1. The criteria for determining the payoff were based on the following conditions: if the random number generated was less than 1/3, the participant received the letter A; if the random number was less than 2/3, the participant received letter B; and if the random number was greater than 2/3, the participant received letter C.

To calculate the payoff, we chose "A" as the predetermined winning letter. Figure 1 shows a binomial tree with the payoff structure, where the participant starts with an initial investment of 1000 NOK.

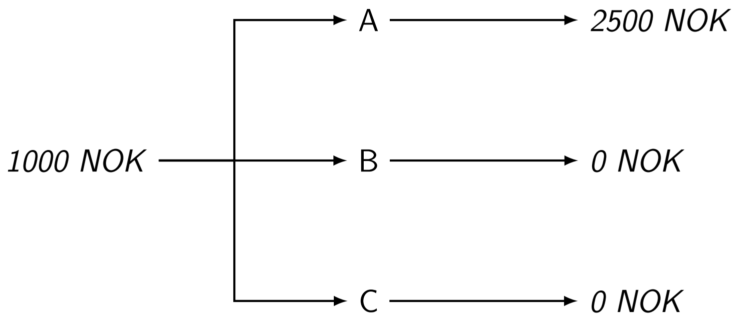

Figure 1: *The initial investment starts at the root at 1000 NOK. When receiving the letter A, the payoff is 2500 NOK, and 0 otherwise. This implies that there is* **1/3** *probability of winning and* **2/3** *of loosing the investment.*

To distinguish between group H and group L, we presented the data differently. Group H was provided with results after each round, while for group L, the results were presented in three bulks, each consisting of three rounds. Both groups had 9 rounds in total. Each round presents a probability of 1/3 to gain a return of 2.5 times the invested amount, and a probability of 2/3 to lose the entire investment. Group H was presented with the following explanatory text, and sequences shown in table 2 and 3:

You are given a budget of 1000 NOK, and you must decide how much of it to invest in a lottery that has three possible outcomes: A, B, or C. If you decide to invest, you will keep the portion of the budget that you don't invest. The lottery is played over nine rounds, with each round having a 1/3 chance of winning 2.5 times the amount invested and a 2/3 chance of losing the entire investment. The table below displays two random lottery sequences where a participant invests either 1000 NOK or 500 NOK. **NOTE: The amount invested is constant through all 9 rounds.**

Round	Payoff when investing 1000 NOK	Payoff when investing 500 NOK
1	2500	1250
2	2500	1250
3	-1000	-500
4	-1000	-500
5	-1000	-500
6	-1000	-500
7	2500	1250
8	-1000	-500
9	2500	1250

Table 2: *Sequence 1 in the Lottery for group H. Sequence 1 displays two examples of investing: 1000 NOK in the first column and 500 NOK in the second column. The cells with positive payoffs represent the rounds that the participants won, while the cells with negative payoffs represent the rounds they lost. In this sequence, the winning rounds are 1, 2, 7, and 9, while the losing rounds are 3, 4, 5, 6, and 8.*

Round	Payoff when investing 1000 NOK	Payoff when investing 500 NOK
1	-1000	-500
2	-1000	-500
3	-1000	-500
4	-1000	-500
5	-1000	-500
6	-1000	-500
7	2500	1250
8	-1000	-500
9	2500	1250

Table 3: *Sequence 2 in the Lottery for group H. Sequence 2 displays two examples of investing: 1000 NOK in the first column and 500 NOK in the second column. The cells with positive payoffs represent the rounds that the participants won, while the cells with negative payoffs represent the rounds they lost. In this sequence, the winning rounds are 2 and 9, while the losing rounds are 1,2,3,4,5,6 and 8.*

Group L was presented with the following explanatory text and sequences shown in table 4 and 5:

You are given a budget of 1000 NOK, and you must decide how much of it to invest in a lottery that has three possible outcomes: A, B, or C. If you decide to invest, you will keep the portion of the budget that you don't invest. The lottery is *played over nine rounds, with each round having a 1/3 chance of winning 2.5 times the amount invested and a 2/3 chance of losing the entire investment. The table below displays two random lottery sequences where a subject invests either 3000 NOK or 1500 NOK in each bulk.* **Each bulk contains 3 rounds.** *The following scenario offers two investment options: invest 1000 NOK or 500 NOK in each round. The displayed payoff represents the total return on investment, with the highest possible return being 7500 NOK if investing 1000 NOK in each round, and 3750 NOK if investing 500 NOK in each round. However, the maximum loss in each investment round is -3000 NOK for investing 1000 NOK, and -1500 NOK for investing 500 NOK.* **NOTE: The amount invested is constant through all 3 bulks.**

Bulk	Payoff when investing 3000 NOK	Payoff when investing 1500 NOK
1	4000	2000
2	−3000	−1500
3	4000	2000

Table 4: *Sequence 1 in the Lottery for group L. Sequence 1 displays two examples of investing: 3000 NOK in the first column and 1500 NOK in the second column, representing 1000 NOK and 500 NOK in each round, since each bulk consists of 3 rounds. The cells with positive payoffs represent the rounds that the participants won, while the cells with negative payoffs represent the rounds they lost. In this sequence, the winning bulks are 1 and 3 while the losing bulk is 2.*

Bulk	Payoff when investing 3000 NOK	Payoff when investing 1500 NOK
1	−3000	−1500
2	−3000	−1500
3	4000	2000

Table 5: *Sequence 2 in the Lottery for group L. Sequence 2 displays two examples of investing: 3000 NOK in the first column and 1500 NOK in the second column, representing 1000 NOK and 500 NOK in each round, since each bulk consists of 3 rounds. The cells with positive payoffs represent the rounds that the participants won, while the cells with negative payoffs represent the rounds they lost. In this sequence, the winning bulk is 3 while the losing bulks are 1 and 2.*

Both groups were presented with a set of five predetermined investment options in the lottery: 1000 NOK, 750 NOK, 500 NOK, 250 NOK, and 0 NOK. An alternative approach would have been to use a flexible investment scale in Google Forms, allowing participants to adjust their investment as they desired.

3.4 U.S Stock Market

In section 4, we presented historical data for the U.S stock market (S&P 500) to the participants, where group H was presented with daily returns over the past 5 years, and group L was presented with monthly returns over the same time period.

We gathered the historical data from Refinitiv Eikon, an open-technology platform designed for financial market professionals, and organized it in Excel. In order to enhance the understanding of the historical returns for the participants, we generated two charts, one for group H and one for group L. These charts are displayed below in figure 2 and 3. The participants in group H were presented with figure 2, along with the explanatory text:

Over a period of five years, this graph tracks the day-to-day fluctuations in the returns of the top 500 companies in the United States, based on the S&P 500 index. **Note: the percentage change in returns is displayed on the y-axis.**

While participants in group L were presented with figure 3, along with the explanatory text:

Over a period of five years, this graph tracks the monthly fluctuations in the returns of the top 500 companies in the United States, based on the S&P 500 index. **Note: the percentage change in returns is displayed on the y-axis.**

Participants from both groups were then asked to choose the amount they would like to invest in the U.S stock market from the same set of predetermined investment options as those provided in the lottery. This was to maintain consistency and make it easier to observe the impact of the variables of interest.

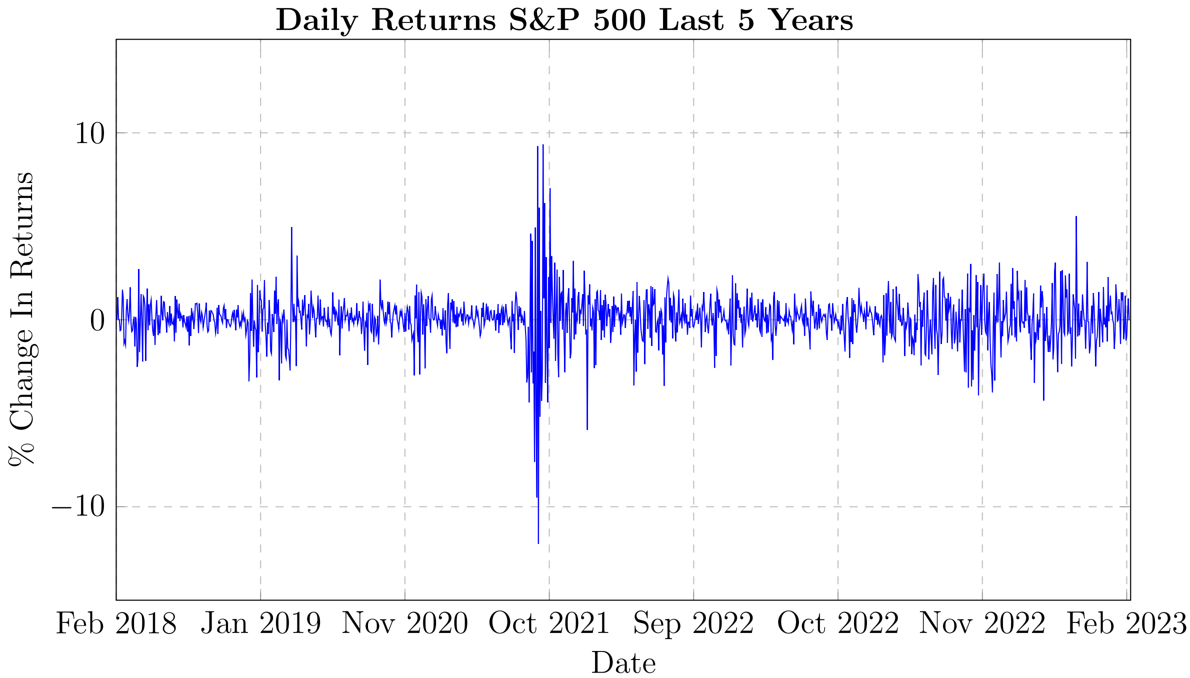

Figure 2: *S&P 500 historical return, group H. The figure shows the historical daily return on the S&P 500 index over the past 5 years. The x-axis displays the date, while the y-axis displays the percentage change in returns.*

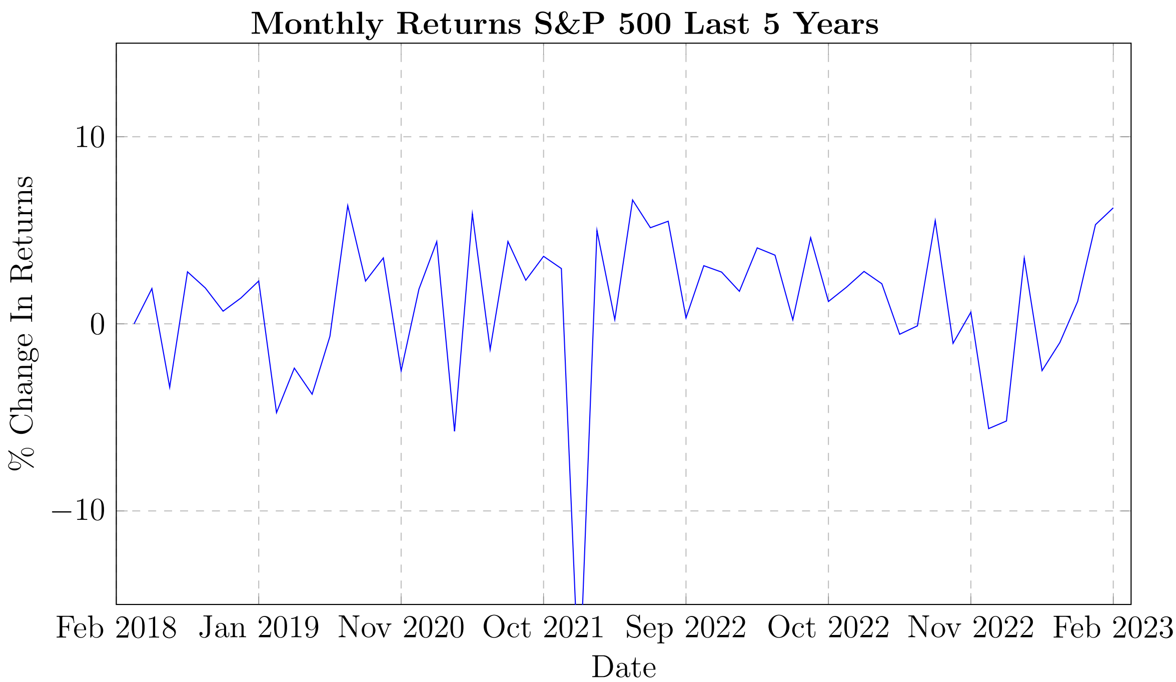

Figure 3: *S&P 500 historical return, group L. The figure shows the historical monthly return on the S&P 500 index over the past 5 years. The x-axis displays the date, while the y-axis displays the percentage change in returns.*

4 Hypotheses

4.1 Hypothesis 1

$H0$**:** The amount of money invested in the lottery by participants in group L is less or equal to the amount invested in the lottery by participants in group H.

Ha**:** Participants in group L will invest more money in the lottery than participants in group H.

4.2 Hypothesis 2

$H0$**:** The amount of money invested in the stock market by participants in group L is less or equal to the amount invested in the stock market by participants in group H.

Ha**:** Participants in group L will invest more money in the stock market than participants in group H.

4.3 Hypothesis 3

$H0$**:** Participants with higher levels of self-efficacy invests less or the same amount of money in the lottery compared to participants with lower levels of self-efficacy.

Ha**:** Higher levels of self-efficacy makes the participant invest more in the lottery.

4.4 Hypothesis 4

$H0$**:** Participants with higher levels of self-efficacy invests less or the same amount of money in the stock market compared to participants with lower levels of self-efficacy.

Ha**:** Higher levels of self-efficacy makes the participant invest more in the stock market.

5 Data and descriptive statistics

This section aims to provide a comprehensive description of the data utilized in our analysis, which was collected from participants in an investment experiment. We will examine the descriptive statistics to gain insights into the distribution and variability of the data, as well as identify any outliers or missing values that require attention and may impact our results. We will also analyze the correlation between our variables of interest using a correlation matrix to provide a better interpretation of the data.

5.1 Variables of interest

In our data analysis, we are analyzing what factors affect the investment in the lottery and the stock market, when controlling for other independent variables. We have two dependent variables, investment in the lottery, "choice_lottery" and investment in the stock market, "choice_stock". These variables consist of five investment categories: 0 NOK, 250 NOK, 500 NOK, 750 NOK, and 1000 NOK, and can therefore be interpreted as ordinal dependent variables. Although we have ordinal dependent variables, we will treat them as continuous in the first part of the analysis.

Table 6 lists the variables of interest.

Variables Of Interest	**Explanation Of Variables**
Choice_lottery	Continuous/ordinal, Investment amount in the lottery
Chice_stock	Continuous/ordinal, Investment amount in the stock market
SelfEfficacy	Continuous, Sum off the 10 statements
Male	Binary, Equal to 1 for male individuals
Age	Categorical, "18-21","22-25","26-29","30-33" or ">33"
Experience	Binary, Equal to 1 for prior investment experience
Feedbackfrequency	Binary, Equal to 1 for group H

Table 6: *The table shows the variables of interest in the first column, and the explanation of the variables in the second column. Choice_Lottery and Choice_Stock are our dependent variables, and the remaining variables are our independent variables.*

5.1.1 Descriptive statistics

Figure 4 illustrates the investment amounts in the lottery for group H and group L. It is evident from the graph that the majority of participants in both group H and group L invested 500 NOK in the lottery. This distribution supports $H0$ under hypothesis 1, which suggested that participants in group L would invest less or equal to those in group H in the lottery.

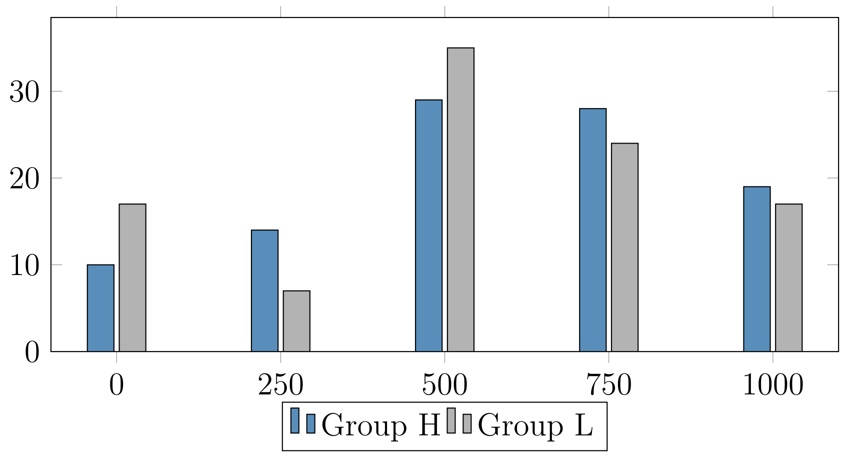

Figure 4: *The figure shows the distribution of investment in the lottery between group H and group L. The X-axis displays the 5 investment options, while the Y-axis displays the number of participants choosing each of the 5 investment options.*

Figure 5 displays the investment options in the stock market for group H and group L. It is evident from the graph that most participants in group H invested 250 NOK. Conversely, the majority of participants in group L invested 500 NOK. This distribution contradicts $H0$ under hypothesis 2 which states that participants in group L will invest less or equal to those in group H in the stock market.

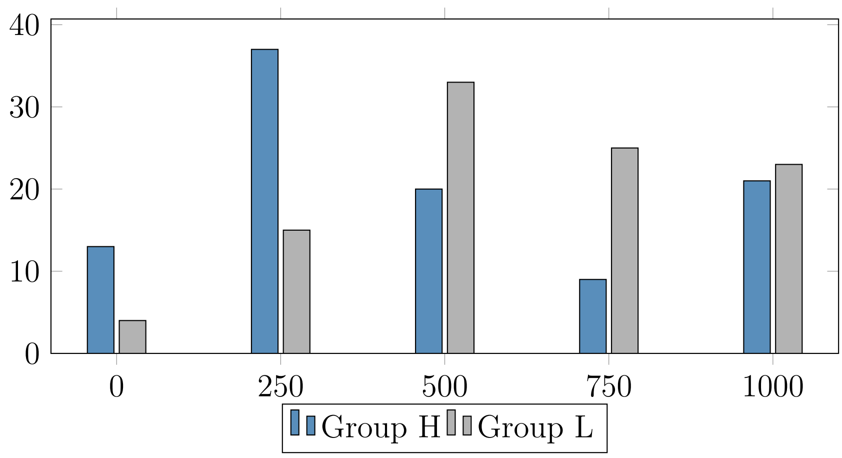

Figure 5: *The figure shows the distribution of investment in the stock market between group H and group L. The X-axis displays the 5 investment options, while the Y-axis displays the number of participants choosing each of the 5 investment options.*

Figure 6 exhibits the age of participants in group L and group H. It is apparent from the graphs that the largest proportion of participants fall within the 22-25 years age category, whereas the smallest proportion falls in the >33 years category. This distribution of age can be explained by the fact that the participants are primarily students from diverse institutions located in Trondheim, resulting in a lower average age.

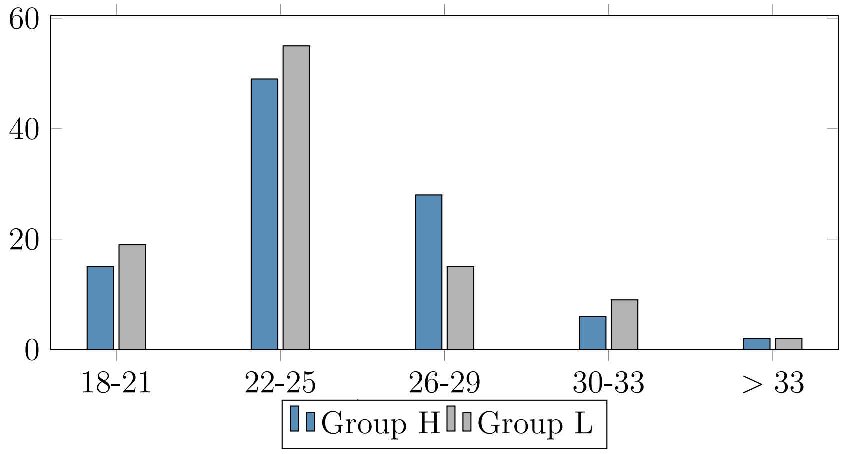

Figure 6: *The figure shows the distribution of the participants age in group H and group L. The X-axis displays the 5 age interval options, while the Y-axis displays the number of participants in each of the 5 age intervals*

Figure 7 displays whether the participants have prior stock market experience. It is clear from the graph that the majority of participants in both group L and group H have previously invested in the stock market.

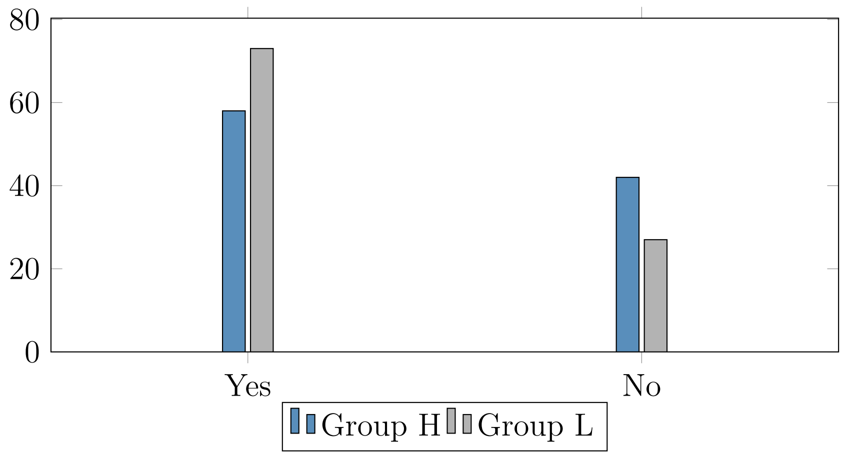

Figure 7: *Investment experience distribution. The figure shows the distribution of the participants who have previously invested in the stock market, between Group H and Group L. The X-axis displays the level of investment experience, where Yes represents the participants who previously have invested in the stock market, and No represents the participants who have not invested in the stock market. The Y-axis displays the number of participants in each of the two categories, Yes or No.*

Figure 8 displays the total scores of a participant's level of self-efficacy, obtained by adding up the scores of the ten statements for each participant. The X-axis displays the range of self-efficacy levels, with 0 representing the lowest possible score and 40 representing the highest. The Y-axis exhibits the number of participants at each level of self-efficacy. By computing the mean self-efficacy levels, it is evident that group L exhibits a higher mean level of self-efficacy compared to group H. Specifically, group L has a mean self-efficacy level of 30.07, while group H has a mean level of 25.89.

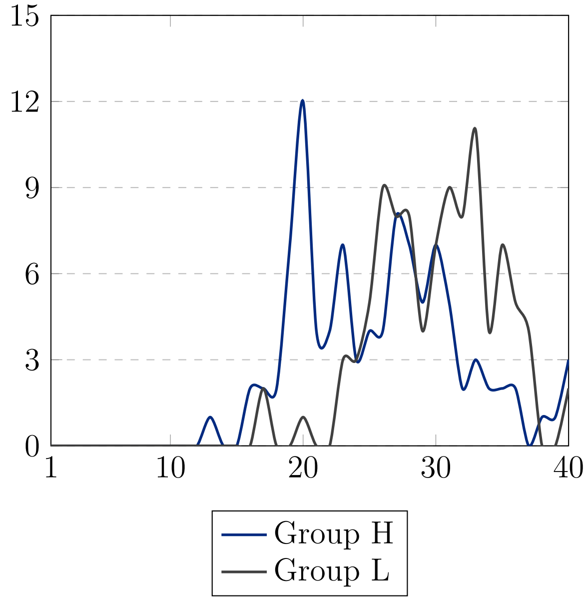

Figure 8: *The figure shows the participants' level of self-efficacy. The X-axis displays the total scores of a participant's level of self-efficacy after adding up the scores of the ten statements, ranging from 0-40. The Y-axis displays the number of participants in each of the levels of self-efficacy.*

The descriptive statistics provide insights into the distribution of our variables of interest, and whether the data supports our hypothesis. However, they do not show the relationship between the variables and the effect they have on our dependent variables, nor the other independent variables. In addition to this, they do not indicate whether this effect is significant or not. To address the relationship between the variables, we will examine the correlation matrix in the next subsection.

5.2 Correlation matrix

The correlation matrix shows the pairwise correlation coefficients between our variables. Diagonal elements are equal to 1 as the variables are perfectly correlated with themselves, and p-values indicate the level of statistical significance, with less than 0.05 being statistically significant at the 5% significance level. The correlation coefficient ranges from -1 to 1 and indicates the strength of the correlation, with -1 indicating a perfect negative correlation, 1 indicating a perfect positive correlation, and 0 indicating no correlation (Higham, 2002).

Investment in the stock market, age and investment experience have a statistically significant positive correlation with investment in the lottery. This means that higher investments in the stock market, a higher age category or a higher number of participants with investment experience, is associated with larger investments in the lottery.

Choice_stock shows significant positive correlation coefficients with self-efficacy, male, and experience. This indicates that a greater value in these variables are associated with higher investments in the stock market. However, there is a negative correlation between choice_stock and feedbackfrequency, indicating that higher number of participants in group H, is associated with a lower amount invested in the stock market.

Looking at the correlation between the independent variables, we observe that self-efficacy has a positive correlation with male and experience. This means that a higher number of males or participants with investment experience in our sample, is associated with a higher level of self-efficacy.

Further, there is a positive correlation between experience and males, indicating that higher number of participants with investment experience, is associated with a higher number of male participants. Additionally, feedbackfrequency is negatively correlated with experience, indicating that a higher number of participants in group H is associated with a lower number of participants with investment experience.

	Lottery	**Stock**	**SelfEfficacy**	**Male**	**Age**	**Experience**	**Feedback**
Lottery	1						
Stock	0,1388	1					
	0,0499						
SelfEfficacy	-0,1332	-0,519	1				
	0,0601	0					
Male	0,0358	-0,1682	0,1551	1			
	0,6148	0,0173	0,0283				
Age	-0,1944	-0,0563	0,0363	-0,0292	1		
	0,0058	0,4281	0,6099	0,6812			
Experience	-0,1421	-0,3674	0,3129	0,2562	-0,0048	1	
	0,0447	0	0	0,0003	0,9466		
Feedback	-0,06	0,2359	-0,3666	-0,405	0,0615	-0,1578	1
	0,3991	0,0008	0	0,5689	0,387	0,0257	

Table 7: *The figure shows the pairwise correlation coefficients between our variables, and their level of significance, with a p-value <0,05 representing the variable being statistically significant at a 5% significance level. The variables "Lottery" and "Stock" in the matrix represents the choice_lottery and choice_stock variables. While the variable "Feedback" represents feedbackfrequency*

6 Analysis and results

This section presents the analysis and results of our study, where we will examine group differences between group H and group L with regard to their investment behavior in the lottery and stock market. To accomplish this, we utilize two statistical tests to examine the significance of the observed differences. First, we employ a t-test to compare means between the two groups and assess the robustness of these findings by verifying the assumptions of this test. As the dependent variables in our study have an ordinal nature, we employ the Mann-Whitney U test. We conduct a sensitivity analysis by evaluating whether the assumptions of the Mann-Whitney U test are met. Additionally, we delve into more in-depth analysis by utilizing multiple linear regression and ordinal logistic regression models to investigate how myopic loss aversion and individual characteristics affect investment decisions in a fictional lottery and the U.S stock market. Overall, this section aims to provide a comprehensive and robust analysis of the data, which will help us draw meaningful conclusions regarding the investment behavior in group H and group L.

6.1 Group differences

The aim of this section is to examine potential variations between group H and group L in terms of their investment in the lottery and the stock market. We will employ two statistical tests, namely the t-test and Mann-Whitney U test. This enables us to identify any significant differences in investment patterns.

6.1.1 T-Test

The t-test is a widely used statistical method that compares the means of two independent groups, assuming normality of the data, equal variances between groups, and independence of observations. This test is useful for detecting statistically significant differences between groups on continuous dependent variables (Hayes, 2023).

The first test conducted was the t-test for the lottery, which compared the mean investment in the lottery between group H and group L. The null hypothesis of the t-test states that there is no difference in mean investment in the lottery between the groups, which is stated as the following: $H0 : diff = mean(L) - mean(H) = 0$ *,where "mean(L)" and "mean(H)" represent the mean investment for groups L and H, respectively.* Conversely, our hypothesis 1 proposes that group L invests less or an equal amount compared to group H in the lottery. If our results aligns with prior research, we anticipate to reject the null hypothesis in favor of Ha under hypothesis 1.

Hypothesis	T-statistic	p-value	Conclusion
H_0 : diff = 0	-0.8451		
H_1 : diff < 0		0.1995	Fail to reject H_0
H_1 : diff > 0		0.8005	Fail to reject H_0
H_1 : diff ≠ 0		0.3991	Fail to reject H_0

Table 8: *Table displaying the results of the t-test conducted on the variable "choice_lottery", where "mean(L)" and "mean(H)" represent the mean investment for groups L and H, respectively, and $diff = mean(L) - mean(H)$"represents the difference between the two groups.*

We obtain a t-statistic of -0.8451, suggesting that the difference between the mean investment in group L and group H is negative, which implies that the mean investment in group H is higher than for group L.

The alternative hypothesis is formulated in three different ways. The first alternative hypothesis suggests that the mean investment in group H is greater than that of group L, which is denoted by $H1 : diff < 0$. The second alternative hypothesis takes an opposite stance, stating that the mean investment in group L is higher than that of group H, which is denoted by $H1 : diff > 0$. The third alternative hypothesis is formulated as a two-sided test, implying that there is a significant difference in the mean investment in the lottery between the two groups, which is denoted by $H1 : diff \neq 0$.

After conducting the t-test for the lottery, we find that all the p-values for the three alternative hypotheses are greater than 0.05, indicating lack of evidence to reject the null hypothesis. Therefore, we cannot conclude that there is a significant difference in the mean investment in the lottery between group H and group L, or which direction the difference takes.

The next test conducted is the t-test for the stock market, which aims to determine whether there is a significant difference in the mean investment in the stock market between the groups. The null hypothesis states the same as before, that there is no difference in the mean investment in the stock market between the two groups.

Hypothesis	**T-statistic**	**p-value**	**Conclusion**
H_0 : diff $= 0$	3,4155		
H_1 : diff < 0		0.9996	Fail to reject H_0
H_1 : diff > 0		0.0004	Reject H_0
H_1 : diff $\neq 0$		0.0008	Reject H_0

Table 9: *Table displaying the results of the t-test conducted on the variable "choice_stock", where "mean(L)" and "mean(H)" represent the mean investment for groups L and H, respectively, and* $diff = mean(L) - mean(H)$ *represents the difference between the two means.*

We obtain a t-statistic of 3.4155, suggesting that the difference between the mean investment in group L and group H is positive, which implies that the mean investment in group L is greater than for group H.

If our results are consistent with the existing literature, we would expect to reject the null hypothesis under hypothesis 2. Our alternative hypotheses are formulated as both one-sided and two-sided tests. The p-value for the first one-sided alternative hypothesis $H_a : diff < 0$ is higher than 0.05, and therefore we fail to reject the null hypothesis. However, for both the one-sided alternative hypothesis $H_a : diff > 0$ and the two-sided alternative hypothesis $H_a : diff \neq 0$, the p-values are less than 0.05, indicating strong evidence against the null hypothesis. Thus, we conclude that there is a statistically significant difference in the mean investment in the stock market between group H and group L, with group L investing more in the stock market due to their reduced level of MLA.

6.1.2 Normal distribution

To ensure the validity of the t-test results, we first examined the normality assumption of our data distribution.

To assess the normality of the dependent variables we can examine the histogram, and if the histogram appears to be approximately bell-shaped and symmetric, it suggests that the normality assumption is reasonable. However, if the histogram shows a skewed or non-normal distribution, it may be necessary to consider a different statistical test, or to transform the data to achieve normality (Kim & Park, 2019).

A failure to meet the normality assumption could lead to inaccurate t-test results, and consequently, the risk of making either a Type I or Type II error. A Type I occurs when the null hypothesis is wrongly rejected, while a Type II error occurs when the null hypothesis is not rejected despite being false (Kim & Park, 2019).

By observing the distribution of the dependent variables, choice_lottery and choice_stock, it was found that the normality assumption did not hold for either of the variables. As these variables have an ordinal nature, it is not uncommon for them to exhibit non-normal distributions.

In Figure 9, the histogram of choice_lottery showed a skewed distribution with a peak at the middle value, indicating a high frequency of participants choosing the " $500NOK$" lottery option. Similarly, in Figure 10, the histogram of choice_stock exhibits a skewed distribution with a peak at the middle value.

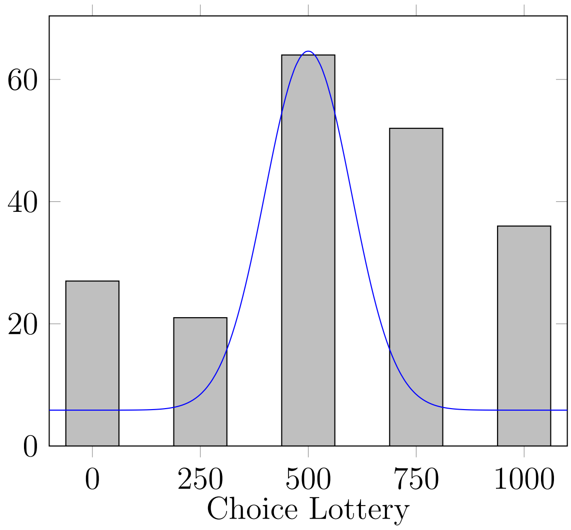

Figure 9: *The figure shows the histogram of the investment in the lottery distribution. The X-axis displays the 5 investment options in the lottery, while the Y-axis displays the density, which is the relative frequency of the data.*

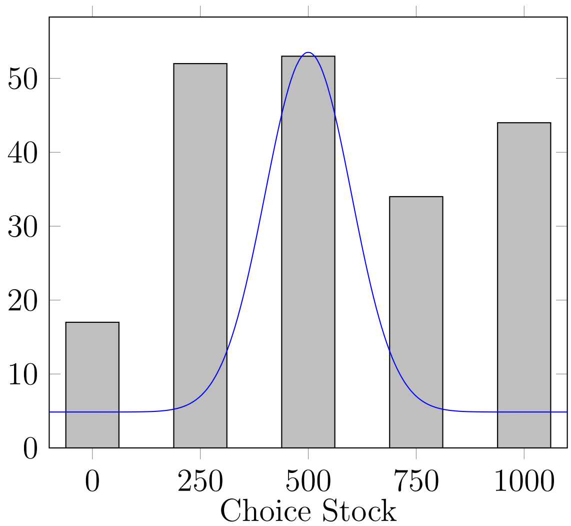

Figure 10: *The figure shows the histogram of the investment in the U.S stock market distribution. The X-axis displays the 5 investment options in the U.S stock market, while the Y-axis displays the density, which is the relative frequency of the data.*

6.1.3 Homogeneity of variance

To strengthen the reliability of our analysis, we aimed to evaluate the homogeneity of variance assumption, which requires verifying if the variances of the two groups are approximately equal. We employed a visual inspection of the distribution of our dependent variables, choice_lottery and choice_stock, by creating two boxplots, one for the lottery and one for the stock market.

These boxplots represents the distribution of the residuals for each group, showing the interquartile range, which contains the middle 50% of the residuals for that group, and the median value, which is indicated by a line within the box. The whiskers extend to the minimum and maximum values within 1.5 times the interquartile range and represent the range of the residuals for that group, with any outliers shown as individual dots. By comparing the sizes and shapes of the boxes and whiskers between the two groups, we can determine if the variance of the residuals is similar. If the boxes and whiskers are roughly equal in size and shape, it suggests that the variance of the residuals is similar between the two groups. On the other hand, if the size and shape are noticeably different, it indicates that the variance of the residuals may be different between the two groups, which can impact the accuracy and precision of the t-test (Moser & Stevens, 1992).

Based on the boxplot analysis of the lottery, shown in figure 11, we observe similar sizes of the box, but a different median value, and different lengths of the whiskers. This implies that the assumption of homogeneity of variance may not hold. However, it is also possible that this difference in medians and whisker lengths is due to differences in the distribution of the data, rather than unequal variances.

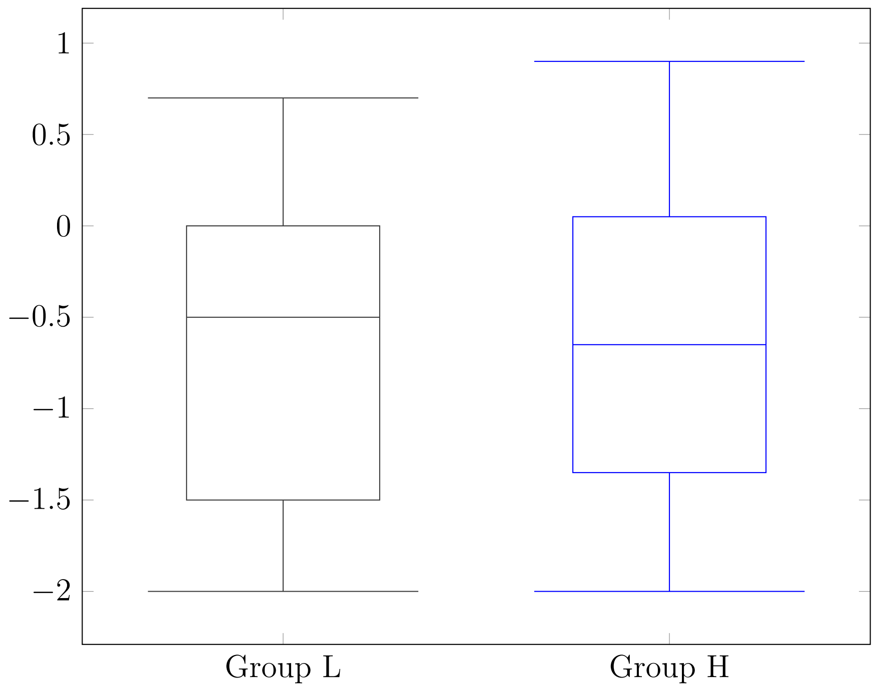

Figure 11: *The figure shows the boxplot for investment in the lottery, which represents the distribution of the residuals for each group. The X-axis displays the two different groups. The Y-axis displays the residuals.*

Figure 12 depicts the boxplot for investment in the stock market, which bears resemblance to the boxplot for the lottery in terms of its pattern. Despite having comparable box sizes, the two plots differ in their median values and the lengths of their whiskers, indicating potential heterogeneity of variance in stock investments.

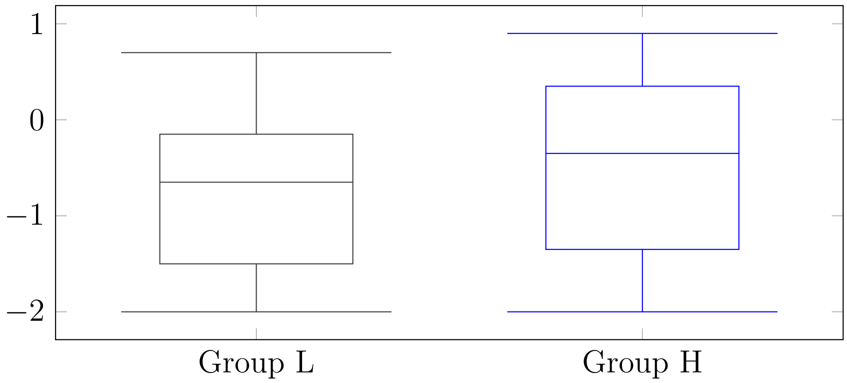

Figure 12: *The figure shows the boxplot for investment in the U.S stock market, which represents the distribution of the residuals for each group. The X-axis displays the two different groups. The Y-axis displays the residuals.*

6.1.4 Addressing assumption violations

After testing the assumptions of the t-test, it was observed that both dependent variables, choice_lottery and choice_stock, did not follow a normal distribution. This is typical for variables with an ordinal nature, and can result in inaccurate t-test outcomes, increasing the risk of Type I or Type II errors. Additionally, the assumption of homogeneity of variance may be violated, which could be due to differences in the data distribution rather than unequal variances. This suggests that the variance of the residuals may be different between the two groups, impacting the t-test's precision and accuracy.

In section 5.2, we also examined the correlation matrix, which sheds light on the independence assumption. The assumption of independence posits that the observations within each group are not related to one another (Hayes, 2023). The independence assumption may be violated if there is a significant correlation between the dependent and independent variables, as observed in the correlation matrix.

When this assumption is violated, it can result in a reduction of the test's statistical power. It is important to note that correlation does not imply causation, and additional investigation is required to establish any causal relationship between these variables.

Considering the ordinal nature of our dependent variables, assuming their continuity can be a strong assumption. Therefore, non-parametric tests, such as the Mann-Whitney U-test, are usually recommended for analyzing ordinal data. Unlike the t-test, the Mann-Whitney U test does not require any specific assumptions about the distribution of data, and uses rank data instead of raw data values. This makes the test more robust to outliers and extreme values (Nachar, 2008). Additionally, the Mann-Whitney U test is a powerful test that can detect small differences between two groups with a small sample size. It is an appropriate alternative to use when the assumptions of the parametric t-test are not met, such as when the data is not normally distributed or the variances of the two groups are unequal. It is important to note that the Mann-Whitney U test does not assume any particular distribution of data and does not estimate the *mean difference* between groups, but rather the *median rank difference* (Nachar, 2008).

6.1.5 Mann-Whitney U Test

In our study, we applied the Mann-Whitney U test to compare the investment behavior in the lottery and stock market between group H and group L. The Mann-Whitney U test is a statistical method that allows us to compare two independent groups of data without making assumptions about their underlying distributions. To perform the test, we need to first combine the observations from both groups, sort the data in ascending order, and assign a rank to each observation. The ranks is based on its numerical value relative to the other observations, and given that we have a total of 200 observations, we will also have a total of 200 ranks ranging from 1-200. This combined and ranked data set would then be used to perform the Mann-Whitney U test and assess whether there is a significant difference between the two groups (McKnight & Najab, 2010).

The U-statistic is used as the test statistic, which is computed based on the number of observations in each group, the sum of ranks in each group, and the total number of observations. The test result is reported as a z-score (McKnight & Najab, 2010).

Firstly, we conducted the Mann-Whitney U test for the lottery, with the following hypotheses:

H_0*: The median rank of group L and group H are equal.*
median rank (L) - median rank (H) $= 0$

H_1*: The median rank of group L is greater than the median rank of group H.*
median rank (L) - median rank (H) > 0

$z = -0.761$
$Prob > \|z\| = 0.4467$
$ExactProb = 0.4481$

Table 10: *Results of the Mann-Whitney U Test for investment in the lottery.*

A positive z-score would have indicated that the ranks in group L were higher than those in group H, while a negative z-score would have suggested the opposite. Therefore, based on the z-score obtained of -0.761, the median ranks in group H seems to be higher than for group L.

The "$Prob > |z|$" value gives us the p-value, which represents the probability of obtaining a z-score equal to or larger than the observed value, assuming that the null hypothesis is true. We obtain a p-value of 0.4467, which exceeds the standard significance level of 0.05. As a result, we do not have enough evidence to reject the null hypothesis. This indicates that we cannot conclude with certainty that there is a significant difference in the median ranks between group L and group H.

The "Exact Prob" value corresponds to the precise p-value of the Mann-Whitney U test and is more precise than the standard p-value. Nonetheless, we noticed that the exact p-value is quite similar to the p-value obtained from the z-score. This finding reinforces our earlier conclusion that we cannot confidently reject the null hypothesis, and we conclude that the ranks of the two groups are similar.

Further, we ran the Mann-Whitney U test on the stock market, with the same hypothesis as above:

$z = 3.513$
$Prob > \|z\| = 0.0004$
$ExactProb = 0.0004$

Table 11: *Results of the Mann-Whitney U Test for the investment in the stock market*

The Mann-Whitney U test yielded a test statistic of 3.513, indicating a significant difference in the median ranks between the two groups. The low p-value of 0.0004 suggests that if the null hypothesis were true, the observed test statistic would be highly unlikely. Therefore, we reject the null hypothesis in favor of the alternative hypothesis that the median rank of group L is greater than median rank of group H. This result contradicts $H0$ under hypothesis 2. It is important to note that we cannot make any assumptions about the magnitude of the difference between the two groups. We can only conclude that the difference is statistically significant.

6.1.6 Mann-Whitney U Test assumptions

In this section, we will examine the assumptions underlying the Mann-Whitney U test to assess the reliability of our test results. The three main assumptions of the test are independent observations, homogeneity of variance, and equal distribution shape. While the Mann-Whitney U test is robust to violations of some assumptions, such as independence, and homogeneity of variance, it is crucial to ensure that the equal distribution shape assumption holds (Nachar, 2008). As we have already examined the independence and homogeneity of variance assumptions, we will focus solely on investigating the equal distribution shape assumption in this section.

6.1.7 Equal distribution shape

The primary assumption for comparing two groups when using the Mann-Whitney U test is that they have the same distribution shape and spread, also known as the assumption of equal distribution shape (Nashar, 2008). This can be verified by inspecting the box plots of the two groups and ensuring that they are approximately similar in shape. Figure 13 depicts a box plot of the choice_lottery variable for group L and group H, with one box plot for each group.

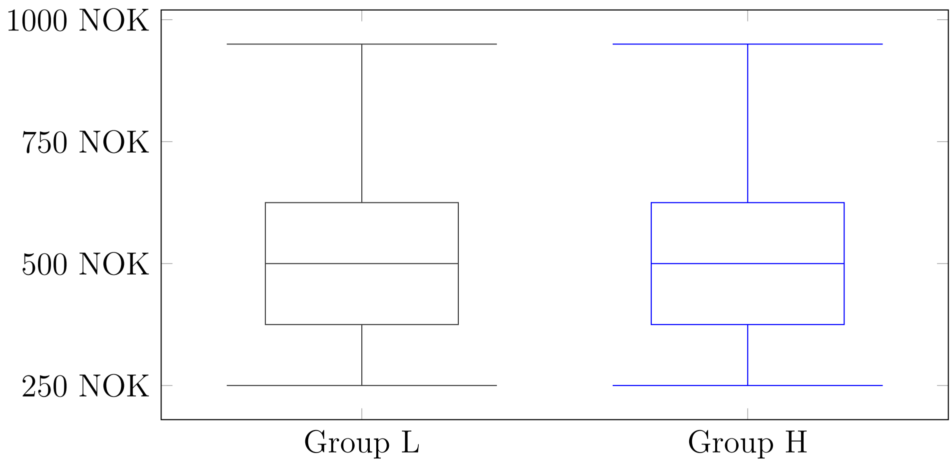

Figure 13: *Boxplot for investment in the lottery. The X-axis displays the two groups. The Y-axis displays the 5 investment options*

Upon examination, we notice that the groups have similar shapes of distribution when using the amount invested in the lottery. However, when looking at figure 14, the boxplot for the amount invested in the stock market, the groups do not have similar shapes of distribution. The boxplot for group H is larger and has a higher median value.

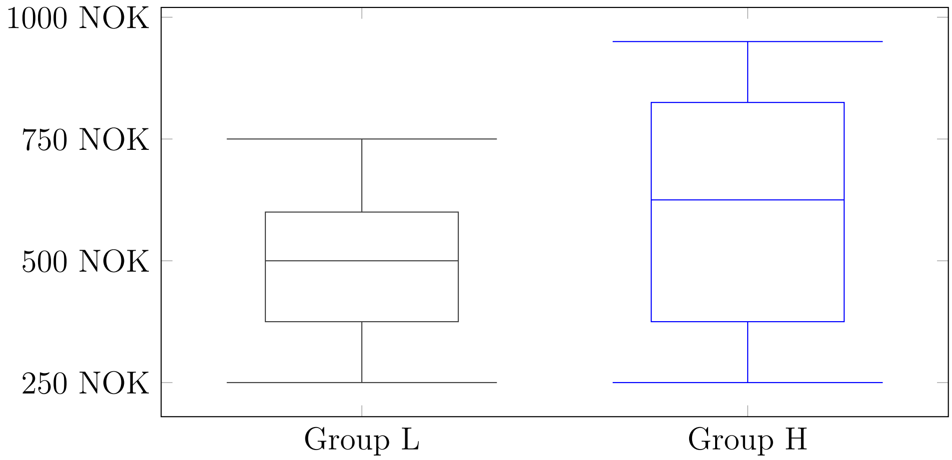

Figure 14: *Boxplot for investment in the stock market. The X-axis displays the two groups. The Y-axis displays the 5 investment options.*

6.2 Multiple linear regression

In order to enhance our understanding of the association between the independent and dependent variables, and to explore how the independent variables effect the dependent variables, we have conducted a multiple linear regression analysis using Stata software. In this part of the analysis, we treat our dependent variables as continuous by assuming that if the participants freely got to choose their investment amount, they would have chosen the predetermined options.

Our objective is to investigate the effects of self-efficacy, gender, age, experience, and feedback frequency on investment in both the fictional lottery and the stock market. Table 12 displays the results from the multiple linear regressions.

VARIABLES	(1) choice_lottery	(2) choice_stock
Self-efficacy	7.64*	23.73***
	(4.24)	(3.71)
Male	-52.62	29.99
	(45.25)	(39.59)
Age	63.04***	16.41
	(24.14)	(21.12)
Experience	91.69*	143.86***
	(48.89)	(42.77)
Feedbackfrequency	74.17	-29.82
	(46.43)	(40.62)
Constant	138.57	-252.82**
	(133.87)	(117.12)
Observations	200	200
R-squared	0.084	0.321

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12: *The table displays the outcomes of the Multiple Linear Regression (MLR). The first model, Model 1, displays the findings where investment in the lottery is the dependent variable. The second model, Model 2, exhibits the findings where investment in the stock market is the dependent variable.*

6.2.1 Model 1

Holding all other variables constant:

The coefficient in front of "Self-efficacy" indicates that one point increase in self-efficacy, will increase the amount invested in the lottery by $7,64$ NOK. This implies that participants with higher levels of self-efficacy are more likely to invest larger amounts of money in the lottery, which is consistent with the work of Hopfensitz and Wranik (2008). The coefficient is statistically significant at a 10% significance level, leading to a rejection of $H0$ under hypothesis 3.

On average males invest $52,62$ NOK less in the lottery compared to females. However, it should be noted that the variable "Male" is not statistically significant at any relevant significance level.

The coefficient in front of the variable "Age" demonstrates a positive relationship with the amount of money invested in the lottery, indicating that participants tend to invest more as they get older. Specifically, for each increase in the age category, e.g., "18-21" to "22-25", "26-29", "30-33", or ">33", the investment amount increases by 63.04 NOK. It is worth noting that this finding is statistically significant at a 1%

level.

According to the data, participants with investment experience tend to invest an average of 91.69 NOK more in the lottery than those without experience. This suggests that previous experience in the stock market is associated with a higher likelihood of investing more in the lottery. This finding is consistent with the results of Iqbal et al.'s (2021) study, which found that experience can have either a positive or negative effect on participants' MLA. Additionally, it is worth noting that the variable "Experience" is statistically significant at a 10% significance level.

Participants in group H, as represented by the variable "Feedbackfrequency", tend to invest more in the lottery compared to participants in group L. This finding is noteworthy as it contradicts the findings of Gneezy and Potters (1997), but supports $H0$ under hypothesis 1. Specifically, a participant in group H invests on average $74,17$ NOK more compared to a participant in group L. However, despite this finding, the variable "Feedbackfrequency" is not statistically significant in this model, and the finding is therefore inconclusive.

The constant coefficient of $138,57$ NOK in model 1 represents the estimated mean value of the investment amount in the lottery for the reference group. This reference group is defined as a female participant, who belongs to group L, has no prior stock investment experience, and is in the "18-21" age category. This implies that a female in the 18-21 age-category from group L, on average invest $138,57$ NOK in the stock market.

In a multiple linear regression model, the R-squared value measures how well the regression model fits the data. In this case, the R-squared value for model (1) tells us that only 8.4% of the variation in the dependent variable "choice_lottery" can be explained by the independent variables included in the model. This indicates that the majority of the variation in "choice_lottery" is influenced by other factors or variables excluded from this model

6.2.2 Model 2

Holding all other variables constant:

The coefficient in front of "Self-efficacy" indicates that one point increase in self-efficacy, will increase the amount invested in the stock market by $23,37$ NOK. This means that participants with higher levels of self-efficacy have a higher likelihood of investing more money in the stock market. The variable is statistically significant at a 1% significance level, leading to a rejection of $H0$ under hypothesis 4.

The coefficient in front of "Male" suggests that males on average invest $29,99$ NOK more in the stock market compared to females. However, this variable is not statistically significant at any relevant significance level.

Older individuals have a higher likelihood to invest more money in the stock market, as indicated by the coefficient in front of "Age". For each increase in the age category, the average investment amount increases by $16,41$ NOK. However, this variable is not statistically significant at any relevant significance level.

The coefficient for the variable "Experience" suggests that participants with prior stock investment experience tend to invest more money in the stock market compared to those without experience. Specifically, the average amount invested by participants with stock investment experience is 143.86 NOK higher than those without experience. This variable is statistically significant at a 1% significance level, indicating that the relationship between experience and the amount invested in the stock market is not random.

The coefficient for "Feedbackfrequency", indicates that participants in group H are expected to invest less in the stock market compared to those in group L. This is consistent with the results of Gneezy and Potters' (1997) study. On average, participants in group H invest 29.82 NOK less than those in group L. However, this variable does not reach significance at any relevant level, and we fail to reject $H0$ under hypothesis 2.

The constant coefficient represents the estimated mean value of the investment amount in the stock market for the reference group. This means that a female in the "18-21" age category in group L, on average invest $-252,82$ NOK in the stock market.

The R-squared value for model(2) indicates that 32.1% of the variation in the dependent variable "choice_stock" is explained by the independent variables, which is higher compared to the R-squared value of model(1). Therefore, we can conclude that model(2) fits the data better than model(1).

Based on the nature of our dependent variables, an ordinal logistic regression model could be a more suitable alternative as it can handle the nature of out dependent variables, and does not require the same assumptions as a linear regression model. This approach could potentially provide more accurate and reliable estimates, and may help to confirm or contradict the findings of the multiple linear regression model.

6.3 Ordinal logistic regression model

An ordinal logistic regression model is a statistical method used to analyze the relationship between an ordinal dependent variable and one or more independent variables (Harrell & Harrell, 2015). In our case, we have five ordered categories: 0 NOK, 250 NOK, 500 NOK, 750 NOK and 1000 NOK, with 0 NOK being the reference category. All the categories are evenly spread, as each category corresponds to an increase of 250 NOK. The equation for the ordinal logistic regression model is:

$$\text{logit}(P(Y \leq j)) = \alpha_j + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_K X_K \tag{1}$$

Where Y is the ordinal dependent variable, j is the category of interest. $P(Y_j)$ is the cumulative probability of the dependent variable being less than or equal to the category of interest. X_1, X_2, and X_K are the independent variables,j ,and 1 through K are the coefficients to be estimated. The coefficient represents the log odds ratio of moving from one category j to the next higher category $j + 1$, given one unit increase in the independent variable, where j is the current category (Parry, 2020). However, this is not related to the probability of belonging to a specific category.

The model estimates four cutpoints that define the threshold between the categories. These cutpoints represent the values on the continuous latent variable that corresponds to the transition between adjacent categories, and can be used to calculate the predicted probabilities of being in each category based on the values of the independent variables (Parry, 2020).

6.4 Comparative analysis

In this section, we will utilize an ordinal logistic regression analysis, and compare the results with the MLR analysis previously conducted. More specifically, we will examine the similarities and differences in treating our dependent variable as continuous versus ordinal.

	Model (1)	Model (2)	Model (3)	Model (4)
VARIABLES	choice_lottery	choice_stock	choice_lottery	choice_stock
Self-efficacy	7.64*	23.73***	0.06**	0.17***
	(4.24)	(3.71)	(0.03)	(0.03)
Male	-52.62	29.99	-0.30	0.23
	(45.25)	(39.59)	(0.27)	(0.27)
Age	63.04***	16.41	0.39***	0.14
	(24.14)	(21.12)	(0.15)	(0.14)
Experience	91.69*	143.86***	0.55*	0.99***
	(48.89)	(42.77)	(0.29)	(0.30)
Feedbackfrequency	74.17	-29.82	0.46*	-0.17
	(46.43)	(40.62)	(0.28)	(0.29)
0-250			0.93	2.79***
			(0.81)	(0.87)
250-500			1.66**	4.99***
			(0.81)	(0.90)
500-750			3.15***	6.44***
			(0.83)	(0.94)
750-1000			4.52***	7.47***
			(0.87)	(0.97)
Constant	138.57	-252.82**		
	(133.87)	(117.12)		
Observations	200	200	200	200
R-squared	0.084	0.321		
MCFadden's Pseudo R-squared			0.032	0.128

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13: *The table displays the outcomes of both linear and ordinal logistic regression analyses. Model 1 presents the results of the linear regression, with choice_lottery as the dependent variable, while model 2 exhibits the findings of the linear regression with choice_stock as the dependent variable. Similarly, model 3 illustrates the results of the ordinal logistic regression with choice_lottery as the dependent variable, and model 4 presents the outcomes of the ordinal logistic regression with choice_stock as the dependent variable.*

6.4.1 Cutpoints

The cutpoints in the ordinal logistic regression model are the values that separate adjacent categories of the dependent variable. In our case, Stata has estimated 4 cutpoints that divide the dependent variable choice_lottery and choice_stock into 5 categories. These cutpoints are the threshold where the probability of moving to the next higher category changes (Liu & Koirala, 2012). By looking at the cutpoints, we can interpret the results as follows:

	Cutpoints in model 3
Category 1	0 NOK corresponds to values less than 0,93.
Category 2	250 NOK corresponds to values between 0,93 and 1,66.
Category 3	500 NOK corresponds to values between 1,66 and 3,15.
Category 4	750 NOK corresponds to values between 3,15 and 4,52.
Category 5	1000 NOK corresponds to values greater than 4,52.

Table 14: *Cutpoints model 3*

	Cutpoints in model 4
Category 1	0 NOK corresponds to values less than 2,79.
Category 2	250 NOK corresponds to values between 2,79 and 4,99.
Category 3	500 NOK corresponds to values between 4,99 and 6,44.
Category 4	750 NOK corresponds to values between 6,44 and 7,47.
Category 5	1000 NOK corresponds to values greater than 7,47.

Table 15: *Cutpoints model 4*

A positive coefficient for a cutpoint means that the probability of moving to the next higher category increases as the value of the dependent variable increases beyond that cutpoint (Liu & Koirala, 2012). For example, a positive coefficient of the first cutpoint($0-250$) in model 3, means that as the value of the dependent variable increases beyond $0,93$, the odds of choosing 250 NOK versus 0 NOK increases.

A negative coefficient for a cutpoint means that the probability of moving to the next higher category decreases as the value of the dependent variable increases beyond that cutpoint (Liu & Koirala, 2012). For example, if the coefficient of the second cutpoint ($250-500$) is negative, it means that as the value of the dependent variable increases beyond the coefficient, the odds of choosing 500 NOK versus 250 NOK decreases.

We observe that the fourth cutpoint ($750-1000$) is greater than the third cutpoint ($500-750$). This means that the transition between the fourth category (750 NOK) and the fifth category (1000 NOK) occurs at a higher value of the independent variables than the transition between the third category (500 NOK) and the fourth category (750 NOK). This suggests that there may be a steeper increase in willingness to invest at higher levels of the independent variables, and indicating a non-linear relationship between the independent and dependent variables. This suggests that older males in group H, with high levels of self-efficacy and prior stock market experience, are likely to be willing to invest more compared to younger females in group L, who have lower levels of self-efficacy, and lack experience in the stock market.

It is also important to mention that all cutpoints, except for the first cutpoint ($0 - 250$) in model (3), is statistically significant. When a cutpoint coefficient is significant, it suggests that there is strong evidence indicating that the likelihood of transitioning to a higher category of the dependent variable changes significantly at that cutpoint.

6.4.2 R-squared

In an ordinal logistic regression model, we use McFadden's Pseudo R-squared to measure how well the model fits the data compared to the null model, which only includes the intercept, and no independent variables. It ranges from 0 to 1, with higher values indicating a better fit compared to the null model. However, it is important to note that unlike the R-squared value in a multiple linear regression model, the McFadden's Pseudo R-squared is not a true R-squared value. This is because there is no equivalent sum of squares errors in an ordinal logistic regression model. Therefore, we cannot use the McFadden's Pseudo R-squared to compare the goodness of fit between a multiple linear regression model and an ordinal logistic regression model. Instead, it should only be used as a relative measure of model fit when comparing different ordinal logistic regression models. A value of 0 means the model does not provide any improvement over the null model, and a value of 1 means the model perfectly predicts the outcome (Walker & Smith, 2016).

6.4.3 Interpretations

Model (1) and (3) both use the invested amount in the lottery as the dependent variable. In comparing these two models, we find that they reach the same conclusion about the relationship between the variable "Self-efficacy" and the amount invested in the lottery. Both models indicate that higher levels of self-efficacy lead to increased investments in the lottery. However, the coefficient in model (3) exhibits a higher level of significance compared to the coefficient in model (1), with significance levels of 5% and 10% respectively.

In the ordinal logistic regression model, the coefficient in front of the variable "Male" remains negative and insignificant, while the coefficients for "Age" and "Experience" are positive and significant. However, the difference is that the coefficient in front of the variable "Feedbackfrequency" is now statistically significant at a 10% significance level. This implies that there is now evidence to suggest that participants in group H are likely to invest more in the lottery compared to those in group L.

Models (2) and (4) both investigate the effect of the independent variables on the investment in the stock market. Notably, we observe that the signs and significance levels of the coefficients for the independent variables remain consistent across both models.

In conclusion, the comparison between the multiple linear regression and the ordinal logistic regression model reveals no major differences in the results. However, the statistically significant coefficient in front of the "Feedbackfrequency" variable in the ordinal logistic regression model suggests that participants in group H are likely to invest more in the lottery, which contradict the findings of Gneezy and Potters (1997).

7 Limitations and further research

Throughout our study, we have identified several limitations and opportunities for future research. These limitations may impact the reliability of our findings. One limitation is that our study differed from the original study by Gneezy and Potters (1997) in terms of methodology and the variables examined. We used Google Forms for data collection and examined feedback frequency. Conversely, Gneezy and Potters (1997) conducted their experiment in a laboratory and examined two variables - feedback frequency and investment flexibility. To address this limitation, future research could examine both feedback frequency and investment flexibility. One could also consider hosting subject interviews or conducting the experiment in a laboratory.

Another limitation of our experiment is the absence of incentives or financial rewards provided to participants, in contrast to the study conducted by Gneezy and Potters (1997). When providing incentives, it is reasonable to expect that they would impact participants' investment decisions by encouraging careful consideration of their choices. This may potentially lead participants to be more cautious and risk-averse compared to scenarios without incentives. A way to include incentives or financial rewards, could be conducting interviews, where participants are given a predetermined amount of money to invest in both the lottery and stock market. The payoff from their investments would be kept by the participants. This method could produce more reliable results that align better with Gneezy and Potters' (1997) study, as the investment decisions would be made in a more realistic setting.

Additionally, it is noteworthy that Gneezy and Potters (1997) utilized a combination of both additive and multiplicative methods in their lottery design, whereas we limited our design to the additive approach. To enhance the robustness of the comparison between the fictional lottery in our study and the lottery employed by Gneezy and Potters (1997), maintaining consistency with the method employed by Gneezy and Potters (1997) would be advisable.

Furthermore, we received feedback that the lottery described in our Google Form was difficult to understand, which may have influenced the participants investment decisions. To improve the methodology in future research, modifications to the explanatory text and more visual aids could be implemented. Distributing "test-forms" to a small group of participants to ensure instructions are clear and easily understood could also be beneficial.

As stated by Fellner and Sutter (2009), the duration of commitment is a critical determinant for risky investments. Our design did not consider commitment period, which based on their findings, can influence the level of risk-aversion in a investment-setting. For future research, one could inform the participant about the commitment period. For instance, in a stock market scenario, the influence of MLA on investment decisions could vary depending on whether the commitment period is set at 10 days or 1 year.

For future research, one possible modification would be to present the investment setting in the stock market in 9 rounds, allowing for a more direct comparison between the lottery and stock market scenarios.

By addressing these limitations and exploring the opportunities for future research, the reliability of the study can be improved.

8 Conclusion

In this master thesis, we examined how myopic loss aversion (MLA) and personal characteristics affect the evaluation period effect in a fictional lottery and the U.S. stock market. We compared two groups, group H and group L, with group H receiving frequent feedback on their investments and group L receiving less feedback. Additionally, we explored the influence of age, gender, investment experience, and personality traits on investment choices in both the lottery and the stock market.

Based on our hypothesis, we expected that participants in group L would exhibit lower levels of MLA and invest more in both the lottery and the stock market. Additionally, we predicted that participants with higher levels of self-efficacy would exhibit reduced MLA tendencies due to the evaluation period effect, and make higher investments in both the lottery and the stock market.

Based on our t-test results, there is not a statistically significant difference in the mean investment in the lottery between group H and group L. However, in the context of the stock market, we discovered a significant difference, suggesting that group L made greater investments. This can be attributed to the lower level of MLA observed in group L, aligning with the evaluation period effect reported by Gneezy and Potters (1997).

Nevertheless, it is important to note that the assumptions underlying the t-test were violated, leading us to employ the Mann-Whitney U test. The Mann-Whitney U test revealed that group H had a higher median rank in the lottery compared to group L, although this difference was not statistically significant. Conversely, group L demonstrated a significantly higher median rank in the stock market. However, it is important to note that the assumption of equal distribution shape was violated in the stock market data, which raises concerns about the reliability of the findings in this particular context.

To enhance our understanding of the relationship between our independent and dependent variables, we employed a multiple linear regression analysis (MLR). This analysis was under the assumption that the dependent variables were treated as continuous. The key findings from this analysis suggest that individuals with higher levels of self-efficacy and prior investment experience tend to make higher investments in both the lottery and the stock market. Furthermore, we observed a positive relationship between age and investment in the lottery, indicating that older individuals tend to invest more.

Based on the MLR analysis, we found that participants in group H tend to invest more in the lottery compared to those in group L. In contrast, participants in group L tend to invest more in the stock market. However, it is important to mention that this difference does not reach statistical significance in either of the MLR models.

In order to account for the ordinal nature of our dependent variables, we employed an ordinal logistic regression model (ologit). The findings from our estimated cutpoints indicated that higher levels of the independent variables is associated with a greater willingness to invest in both the fictional lottery and the U.S stock market.

Lastly, when comparing the MLR and ologit analyses, we discovered a significant difference. Specifically, the variable ”feedbackfrequency” showed significance in the ologit analysis but not in the MLR analysis. This finding suggests that participants in group H are likely to invest more in the lottery compared to group L, contradicting the findings of Gneezy and Potters (1997) as well as the hypothesis of MLA. Regarding the dependent variable related to the stock market, both the MLR and ologit analyses yielded similar results. In terms of the relationship between self-efficacy and the dependent variables, both models produced similar outcomes, although the ologit analysis demonstrated a higher significance in the coefficient.

Based on these findings, we have gathered enough evidence to reject **H0** for hypotheses 3 and 4. These hypotheses proposed that participants with higher levels of self-efficacy would invest either the same amount or less compared to participants with lower levels in both the fictional lottery and the U.S. stock market. However, for hypotheses 1 and 2, we were unable to reject **H0**. This indicates that group L would invest either equally or less than group H in both the fictional lottery and the U.S. stock market.

In conclusion, our study challenges the previously established correlation between the evaluation period effect and myopic loss aversion (MLA), as observed in the study conducted by Gneezy and Potters (1997). However, our findings provide compelling evidence that participants in group H exhibit a greater propensity to invest in the lottery, contradicting the findings of Gneezy and Potters (1997) and the hypothesis of MLA.

Furthermore, our research supports the notion that higher levels of self-efficacy contribute to increased investments, which in turn can be associated with reduced levels of MLA. This finding is consistent with the research by Hopfensitz and Wranik (2008), who propose that individuals with low levels of self-efficacy are more prone to MLA.

In light of these outcomes, we can conclude that MLA significantly influences investment decision-making in both the fictional lottery and stock market, regarding self-efficacy. However, our findings do not support a significant influence of MLA in relation to the evaluation period effect.

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Appendix A

A Predicted probabilities

In model (3) and (4), the coefficients for the independent variables indicate the log odds ratio for transitioning to a higher dependent variable category, and not the likelihood of belonging to a particular category. Therefore, we need to analyze the predicted probability of belonging to each category for our dependent variables, "choice_lottery" and "choice_stock."

The table below displays the computed probabilities for each category of the dependent variable "choice_lottery."

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Self	Male	Age	Experience	Feedbackfreq
0 NOK	-0.01**	0.03	-0.04**	-0.06*	-0.05
	(0.00)	(0.03)	(0.02)	(0.03)	(0.03)
250 NOK	-0.00**	0.02	-0.02**	-0.03*	-0.03
	(0.00)	(0.02)	(0.01)	(0.02)	(0.02)
500 NOK	-0.00**	0.02	-0.02**	-0.03*	-0.03
	(0.00)	(0.02)	(0.01)	(0.02)	(0.02)
750 NOK	0.01**	-0.03	0.03***	0.05*	0.04*
	(0.00)	(0.02)	(0.01)	(0.03)	(0.02)
1000 NOK	0.01**	-0.04	0.06**	0.08*	0.07*
	(0.00)	(0.04)	(0.02)	(0.04)	(0.04)
Observations	200	200	200	200	200

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 15: *The table displays the predicted probability for each category of the dependent variable choice_lottery, while controlling for all other independent variables, The x-axis shows the independent variables, while the y-axis represents the average marginal effects of each independent variable on the predicted probability of each category of choice_lottery.*

The table shows that higher levels of self-efficacy are associated with lower risk-aversion, as a one-unit increase in self-efficacy decreases the predicted probability of being in category 1 by 0.01, but increases the predicted probabilities of being in categories 4 and 5 by 0.01. These predicted probabilities are statistically significant at a 5% level.

Being male, compared to female, increases the predicted probability of being in category 1 by 0.03 but decreases the predicted probabilities of being in categories 4 and 5 by 0.03 and 0.04, respectively. None of these predicted probabilities are statistically significant.

For each increase in the age category, the predicted probability of being in category 1 decreases by 0.04, while the predicted probabilities of being in categories 4 and 5 increase by 0.03 and 0.06, respectively. All predicted probabilities for the variable "Age" are significant at a 5% significance level, suggesting that older participants invest more in the lottery.

Having investment experience decreases the predicted probability of being in category 1 by 0.06, while the predicted probabilities of being in categories 4 and 5 increase by 0.05 and 0.08, respectively. This indicates that participants with stock market experience are more likely to invest in higher categories than those without such experience.

Lastly, participants in group H, compared to group L, invest more in the lottery, as they decrease the predicted probability of being in categories 1, 2, and 3 by 0.05, 0.03, and 0.03, respectively, while increasing the predicted probabilities of being in categories 4 and 5 by 0.04 and 0.07, respectively. The predicted probabilities for categories 1, 2, and 3 are not statistically significant, whereas the predicted probabilities for categories 4 and 5 are significant at a 10% level.

The table shows that higher levels of self-efficacy are associated with lower risk-averison, as a one-unit increase in self-efficacy decreases the predicted probability of being in category 1 by 0.01, but increases the probabilities of being in categories 4 and 5 by 0.01 and 0.02, respectively. These predicted probabilities are statistically significant at a 1% significance level.

Being male, compared to female, decreases the predicted probability of being in category 1 by 0.02, and increases the probabilities of being in categories 4 and 5 by 0.01 and 0.03, respectively. However, none of these predicted probabilities are statistically significant.

For each increase in the age category, the predicted probability of being in category 1 decreases by 0.01, while the probabilities of being in categories 4 and 5 increases by 0.01 and 0.02, respectively. However, none of these predicted probabilities are statistically significant.

Having investment experience decreases the predicted probability of being in category 1 by 0.07, while the predicted probabilities of being in categories 4 and 5 increases by 0.04 and 0.14, respectively. This indicates that participants with invest-

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Self	Male	Age	Experience	Feedbackfreq
0 NOK	-0.01***	-0.02	-0.01	-0.07***	0.01
	(0.00)	(0.02)	(0.01)	(0.02)	(0.02)
250 NOK	-0.02***	-0.02	-0.01	-0.10***	0.02
	(0.00)	(0.03)	(0.01)	(0.03)	(0.03)
500 NOK	-0.00	-0.00	-0.00	-0.01	0.00
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)
750 NOK	0.01***	0.01	0.01	0.04***	-0.01
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
1000 NOK	0.02***	0.03	0.02	0.14***	-0.02
	(0.00)	(0.04)	(0.02)	(0.04)	(0.04)
Observations	200	200	200	200	200

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 16: *The table displays the predicted probability for each category of the dependent variable choice_stock, while controlling for all other independent variables, The x-axis shows the independent variables, while the y-axis represents the average marginal effects of each independent variable on the predicted probability of each category of choice_stock.*

ment experience are more likely to invest in higher categories than those without such experience. These predicted probabilities are statistically significant at a 1% significance level.

Finally, participants in group H, compared to participants in group L, invest less in the stock market, as they increase the predicted probabilities of being in categories 1 and to by 0.01 and 0.02, while decreasing the probabilities of being in category 4 and 5 by 0.01 and 0.02, respectively. However, none of these predicted probabilities are statistically significant.

B Cutpoint tranisition graph

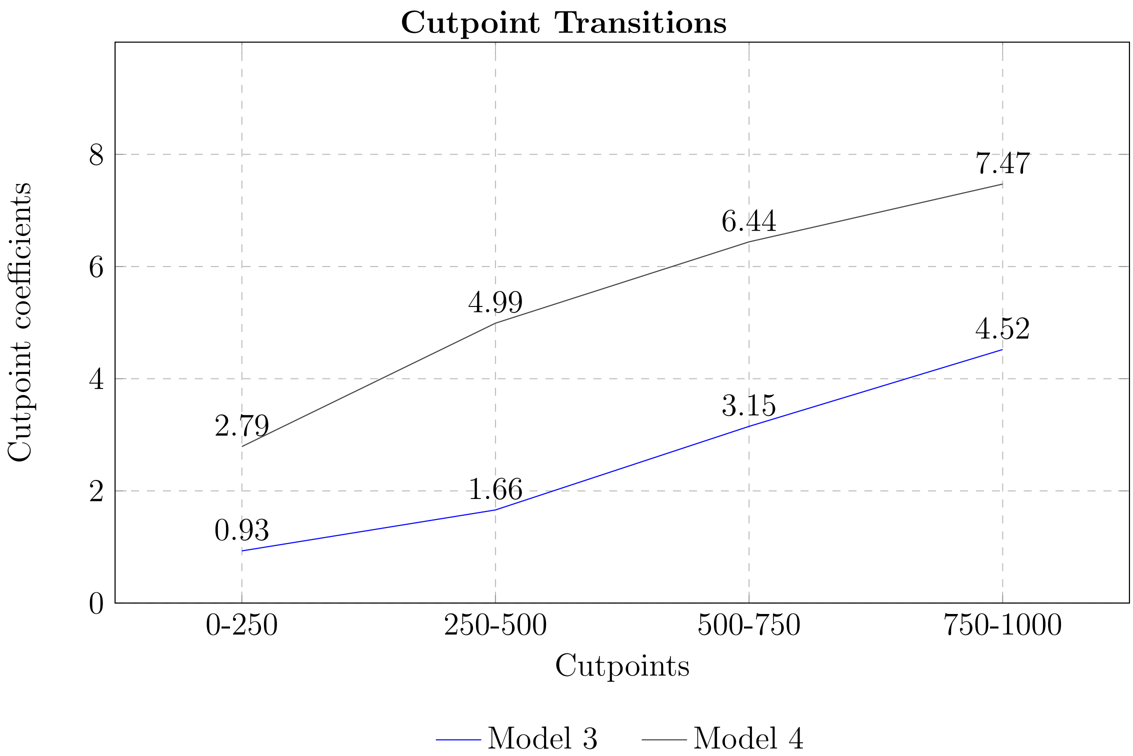


Figure 17: *The table displays the patterns of the cutpoints. Specially, the fourth cutpoint($750-1000$) is greater than the third($500-750$), the third cutpoint($500-750$) is greater than the second($250-500$), and the second cutpoint($250-500$) is greater than the first($0-250$). It is worth noting that a higher level of the independent variables is associated with a greater willingness to invest, as evidenced by the ascending pattern of the cutpoints*

C Google forms group H

Experiment Portfolio choices-H

This survey is part of a master thesis and aims to analyze portfolio choices of the participants, based on personality traits.

The survey contains 4 parts that are independent of each other, and should take approximately 5 minutes to complete.

* indikerer at spørsmålet er obligatorisk

Demographics

1. Gender *

Markér bare én oval.

- Female
- Male
- Other

2. Age *

Markér bare én oval.

- 18-21
- 22-25
- 26-29
- 30-33
- >33

3. Have you ever made investments in the stock market? *

Markér bare én oval.

- Yes
- No

Personality traits

In this section, you will receive statements where you must decide to what extent they apply to you.

4. If I try hard enough, I can always manage to solve difficult problems *

Markér bare én oval.

Not true at all

1
2
3
4

Completely true

5. If someone opposes me, I can find ways to get what I want *

Markér bare én oval.

Not true at all

1

2

3

4

Completely true

6. I consistently reach my goals by staying committed to my aims. *

Markér bare én oval.

Not true at all

1

2

3

4

Completely true

7. I am confident in my ability to handle unexpected events effectively *

Markér bare én oval.

Not true at all	
1	◯
2	◯
3	◯
4	◯
Completely true	

8. My resourcefulness allows me to effectively manage unexpected situations *

Markér bare én oval.

Not true at all	
1	◯
2	◯
3	◯
4	◯
Completely true	

9. By putting in the necessary work, I can overcome the majority of challenges I face *

Markér bare én oval.

Not true at all

1
2
3
4

Completely true

10. I can remain calm when facing difficulties because I can rely on my coping abilities. *

Markér bare én oval.

Not true at all

1
2
3
4

Completely true

11. In the face of challenges, I have the ability to identify multiple potential solutions *

Markér bare én oval.

Not true at all

1

2

3

4

Completely true

12. If I am in trouble, I can usually think of a solution. *

Markér bare én oval.

Not true at all

1

2

3

4

Completely true

13. I can usually handle whatever comes my way *

Markér bare én oval.

Not true at all
1 ⬭
2 ⬭
3 ⬭
4 ⬭
Completely true

Hopp til spørsmål 14

Lottery

You are given a budget of 1000NOK, and you must decide how much of it to invest in a lottery that has three possible outcomes: A, B, or C. If you decide to invest, you will keep the portion of the budget that you don't invest. The lottery is played over nine rounds, with each round having a 1/3 chance of winning 2.5 times the amount invested and a 2/3 chance of losing the entire investment. The table below displays two random lottery sequences where a participant invests either 1000 NOK or 500 NOK.

NOTE: The amount invested is constant through all 9 rounds.

Sequence 1: The payoff of the lottery after each round for investments of 1000 NOK and 500 NOK

Round	Payoff when investing 1000 NOK	Payoff when investing 500 NOK
1	2500	1250
2	2500	1250
3	-1000	-500
4	-1000	-500
5	-1000	-500
6	-1000	-500
7	2500	1250
8	-1000	-500
9	2500	1250

Sequence 2: The payoff of the lottery after each round for investments of 1000 NOK and 500 NOK

Round	Payoff when investing 1000 NOK	Payoff when investing 500 NOK
1	-1000	-500
2	-1000	-500
3	-1000	-500
4	-1000	-500
5	-1000	-500
6	-1000	-500
7	2500	1250
8	-1000	-500
9	2500	1250

14. Invest in a round of this lottery. *

Markér bare én oval.

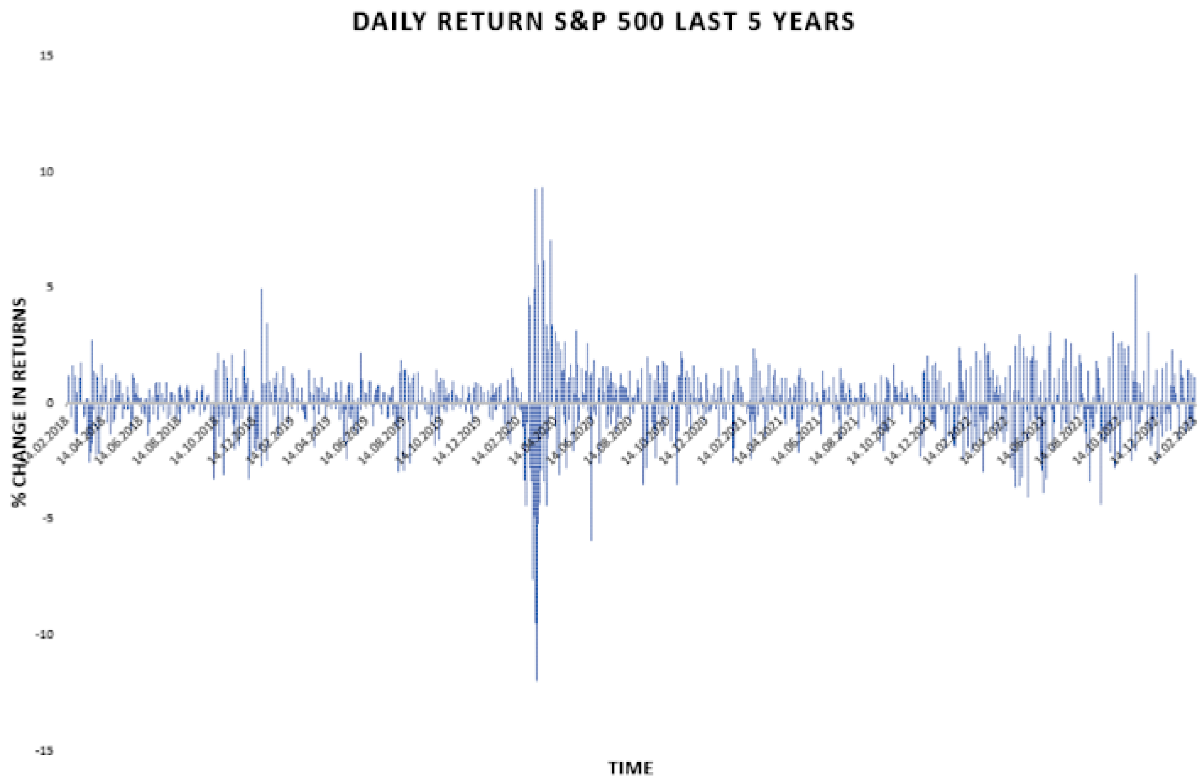
- 1000 NOK
- 750 NOK
- 500 NOK
- 250 NOK
- 0 NOK

U.S STOCK MARKET

Over a period of five years, this graph tracks the day-to-day fluctuations in the returns of the top 500 companies in the United States, based on the S&P 500 index.

Note: the percentage change in returns is displayed on the y-axis.

Daily returns S&P 500 last 5 years



15. Assuming you have 1000 NOK to invest, what amount would you choose to put into the S&P 500 index market? *

Markér bare én oval.

- 1000 NOK
- 750 NOK
- 500 NOK
- 250 NOK
- 0 NOK

D Google forms group L

Experiment Portfolio choices-L

This survey is part of a master thesis and aims to analyze portfolio choices of the participants, based on personality traits.

The survey contains 4 parts that are independent of each other, and should take approximately 5 minutes to complete.

* indikerer at spørsmålet er obligatorisk

Demographics

1. Gender *

Markér bare én oval.

- Male
- Female
- Other

2. Age *

Markér bare én oval.

- 18-21
- 22-25
- 26-29
- 30-33
- >33

3. Have you ever made investments in the stock market? *

Markér bare én oval.

- Yes
- No

Personality traits

In this section, you will receive statements where you must decide to what extent they apply to you.

4. If I try hard enough, I can always manage to solve difficult problems *

Markér bare én oval.

	Not true at all
1	⬭
2	⬭
3	⬭
4	⬭
	Completely true

5. If someone opposes me, I can find ways to get what I want *

Markér bare én oval.

Not true at all

1 ⬭

2 ⬭

3 ⬭

4 ⬭

Completely true

6. I consistently reach my goals by staying committed to my aims. *

Markér bare én oval.

Not true at all

1 ⬭

2 ⬭

3 ⬭

4 ⬭

Completely true

7. I am confident in my ability to handle unexpected events effectively *

Markér bare én oval.

Not true at all

1

2

3

4

Completely true

8. My resourcefulness allows me to effectively manage unexpected situations *

Markér bare én oval.

Not true at all

1

2

3

4

Completely true

9. By putting in the necessary work, I can overcome the majority of challenges I face *

Markér bare én oval.

Not true at all

1 ⬭

2 ⬭

3 ⬭

4 ⬭

Completely true

10. I can remain calm when facing difficulties because I can rely on my coping abilities. *

Markér bare én oval.

Not true at all

1 ⬭

2 ⬭

3 ⬭

4 ⬭

Completely true

11. In the face of challenges, I have the ability to identify multiple potential solutions *

Markér bare én oval.

Not true at all

1 ◯

2 ◯

3 ◯

4 ◯

Completely true

12. If I am in trouble, I can usually think of a solution. *

Markér bare én oval.

Not true at all

1 ◯

2 ◯

3 ◯

4 ◯

Completely true

13. I can usually handle whatever comes my way *

Markér bare én oval.

Not true at all
1 ⬭
2 ⬭
3 ⬭
4 ⬭
Completely true

Lottery

You are given a budget of 1000NOK, and you must decide how much of it to invest in a lottery that has three possible outcomes: A, B, or C. If you decide to invest, you will keep the portion of the budget that you don't invest. The lottery is played over nine rounds, with each round having a 1/3 chance of winning 2.5 times the amount invested and a 2/3 chance of losing the entire investment.

The table below displays two random lottery sequences where a subject invests either 3000 NOK or 1500 NOK in each bulk. **Each bulk contains 3 rounds.**

The following scenario offers two investment options: invest 1000 NOK or 500 NOK in each round. The displayed payoff represents the total return on investment, with the highest possible return being 7500 NOK if investing 1000 NOK in each round, and 3750 NOK if investing 500 NOK in each round. However, the maximum loss in each investment round is -3000 NOK for investing 1000 NOK, and -1500 NOK for investing 500 NOK.

NOTE: The amount invested is constant through all 3 bulks.

Sequence 1: The payoff of the lottery after each bulk for investments of 3000 NOK and 1500 NOK

Bulk	Payoff when investing 3000 NOK	Payoff when investing 1500 NOK
1	4000	2000
2	-3000	-1500
3	4000	2000

Sequence 2: The payoff of the lottery after each bulk for investments of 3000 NOK and 1500 NOK

Bulk	Payoff when investing 3000 NOK	Payoff when investing 1500 NOK
1	-3000	-1500
2	-3000	-1500
3	4000	2000

14. Invest in a round of this lottery. *

Markér bare én oval.

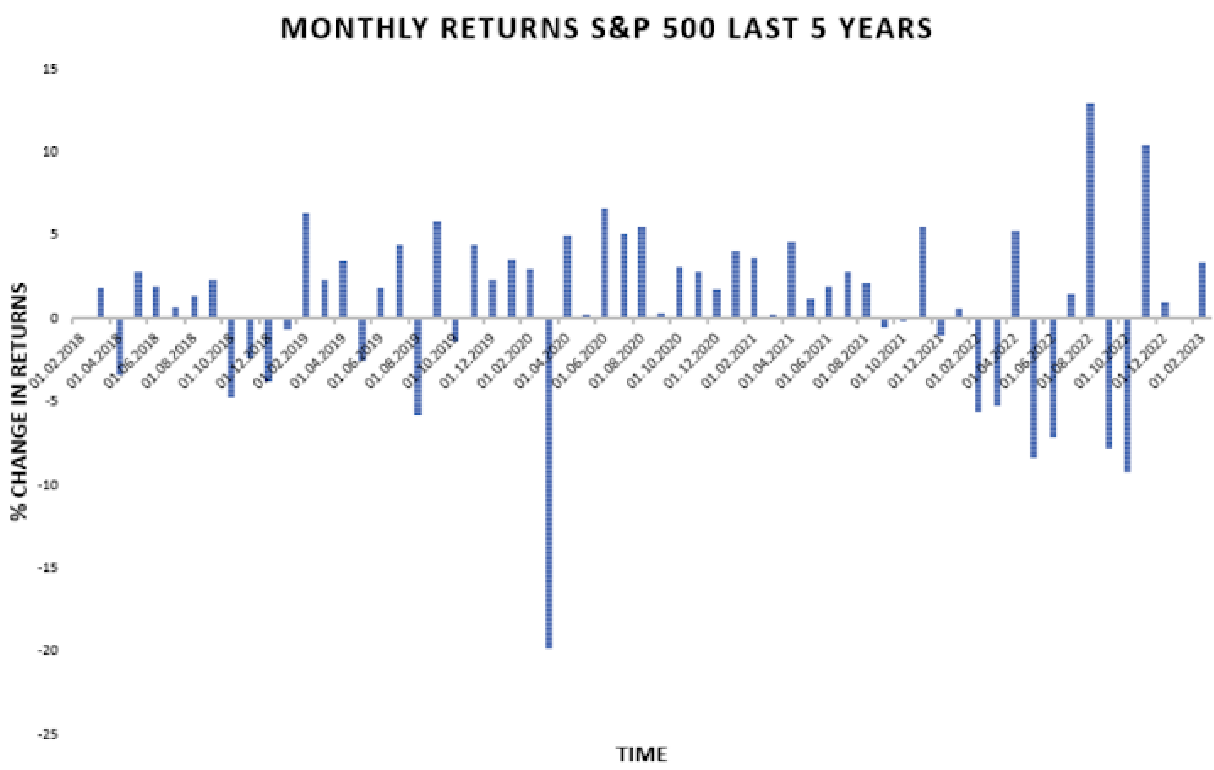
- 1000 NOK
- 750 NOK
- 500 NOK
- 250 NOK
- 0 NOK

U.S STOCK MARKET

Over a period of five years, this graph tracks the monthly fluctuations in the returns of the top 500 companies in the United States, based on the S&P 500 index.

Note: the percentage change in returns is displayed on the y-axis.

Monthly returns S&P 500 last 5 years



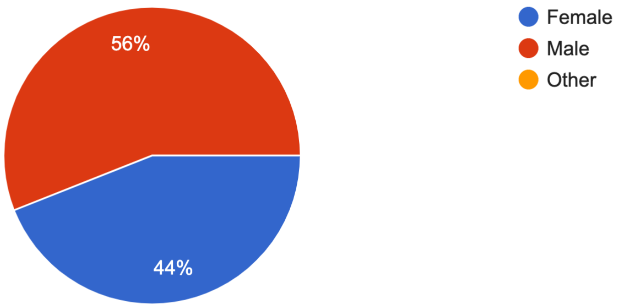
15. Assuming you have 1000 NOK to invest, what amount would you choose to put into the S&P 500 index market? *

Markér bare én oval.

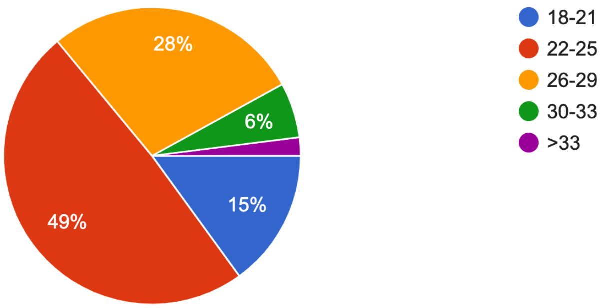
- 1000 NOK
- 750 NOK
- 500 NOK
- 250 NOK
- 0 NOK

E Google forms answers group H

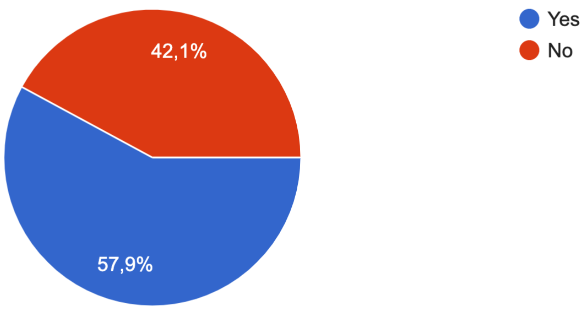
Gender
100 svar



Age
100 svar

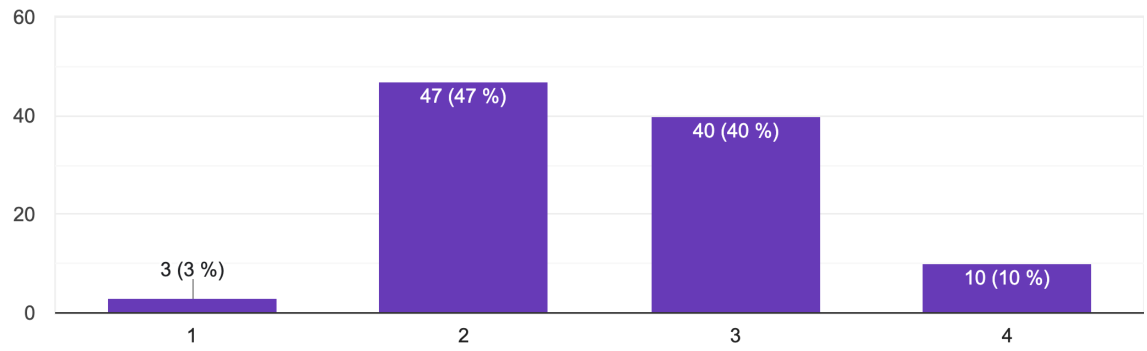


Have you ever made investments in the stock market?
95 svar



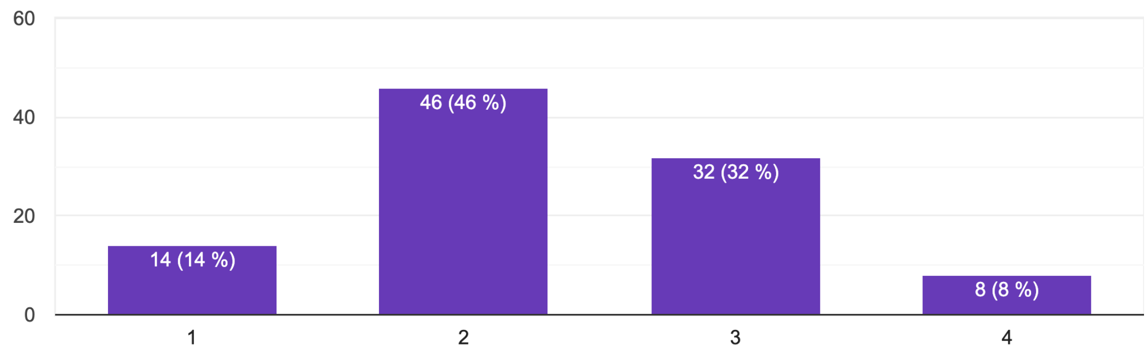
If I try hard enough, I can always manage to solve difficult problems

100 svar



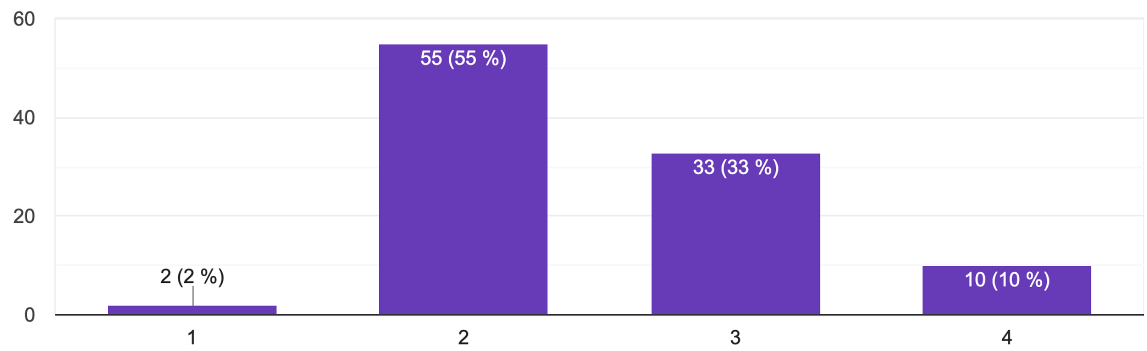
If someone opposes me, I can find ways to get what I want

100 svar



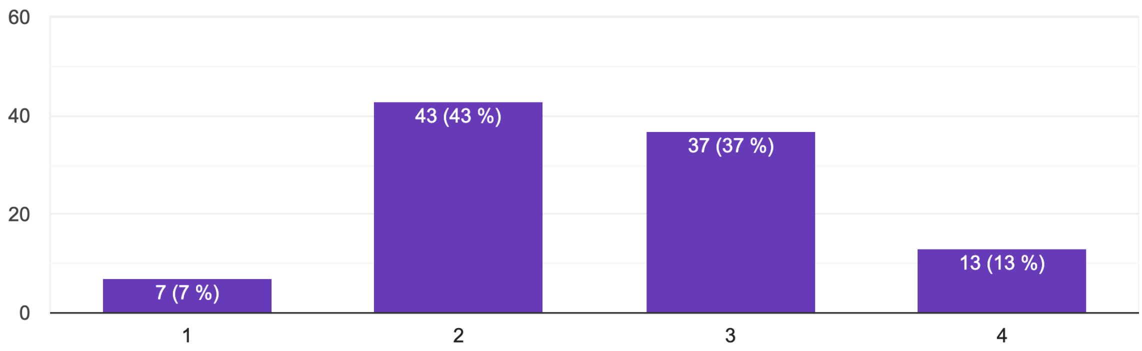
I consistently reach my goals by staying committed to my aims.

100 svar



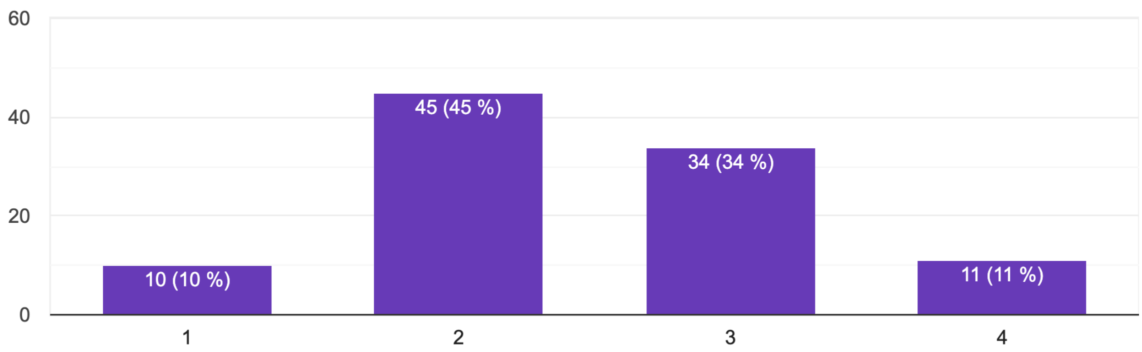
I am confident in my ability to handle unexpected events effectively

100 svar



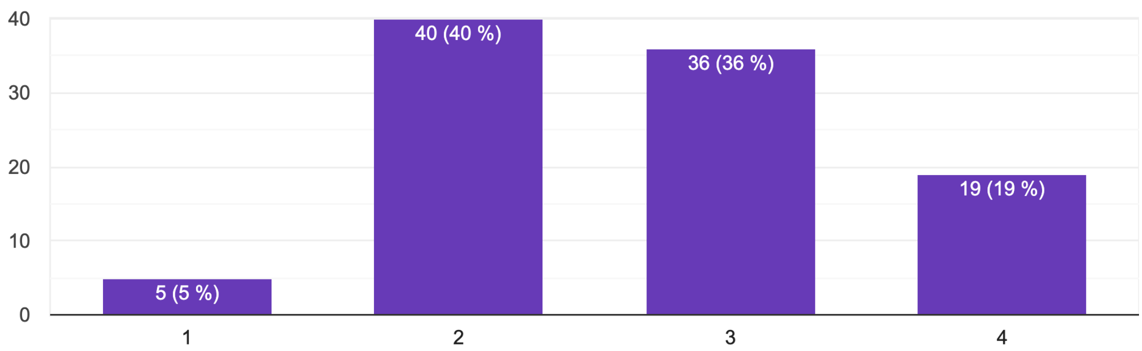
My resourcefulness allows me to effectively manage unexpected situations

100 svar



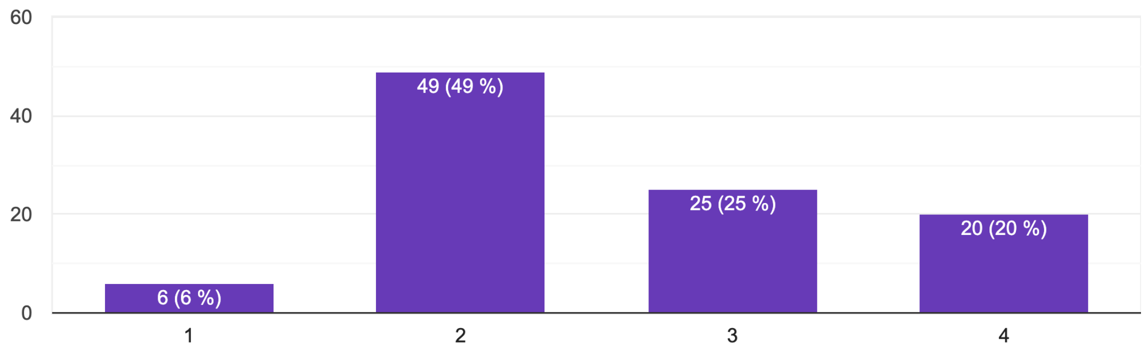
By putting in the necessary work, I can overcome the majority of challenges I face

100 svar



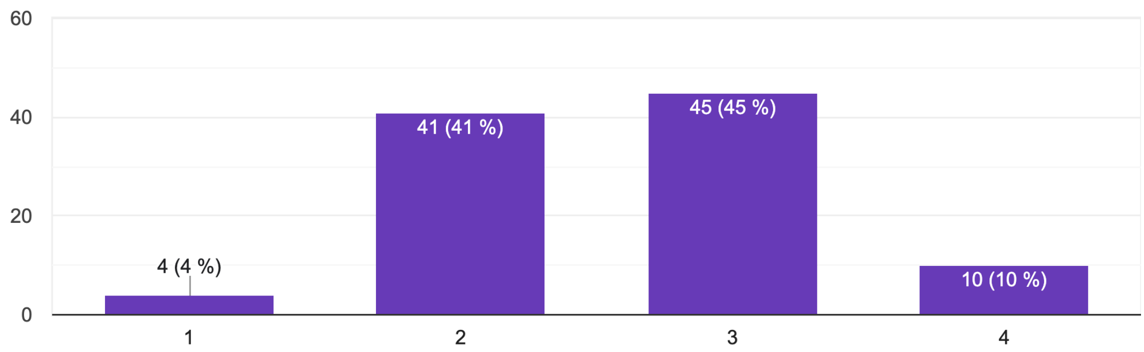
I can remain calm when facing difficulties because I can rely on my coping abilities.

100 svar



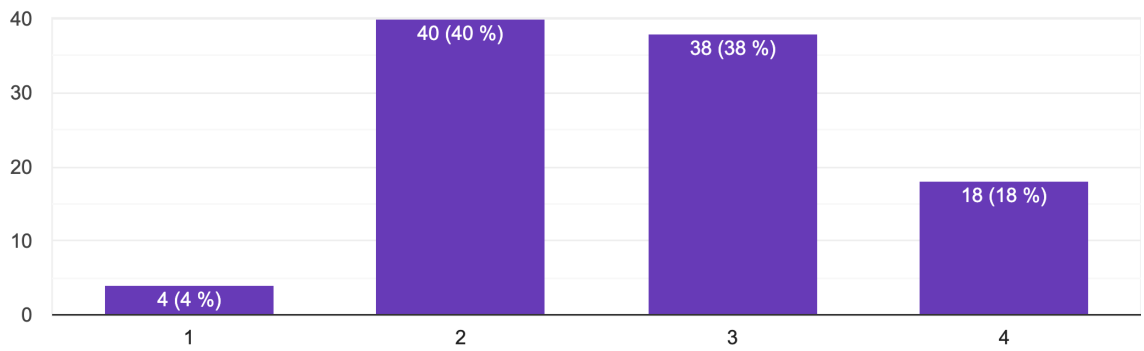
In the face of challenges, I have the ability to identify multiple potential solutions

100 svar

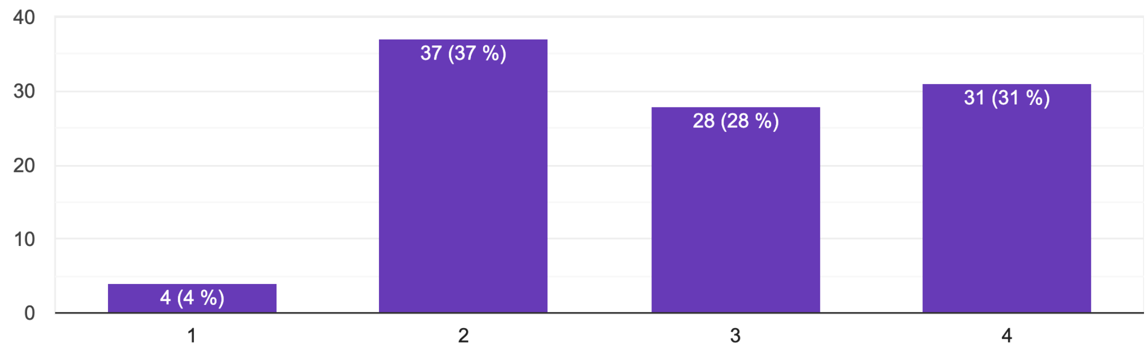


If I am in trouble, I can usually think of a solution.

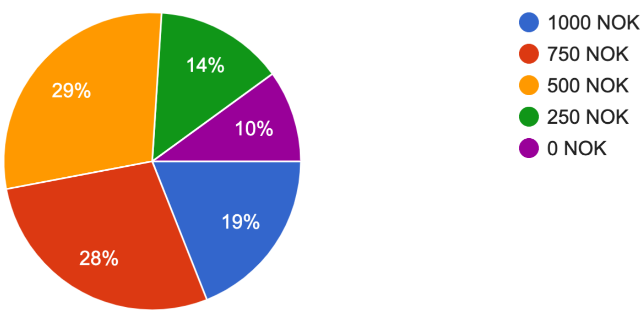
100 svar



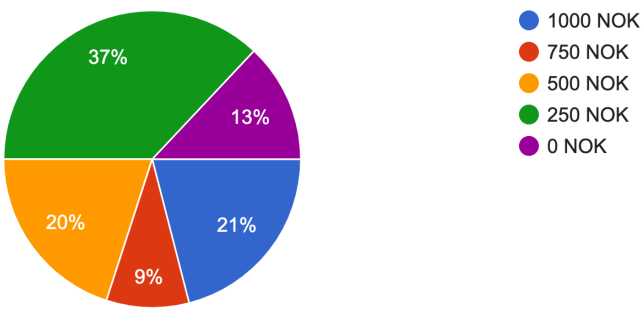
I can usually handle whatever comes my way
100 svar



Invest in a round of this lottery.
100 svar

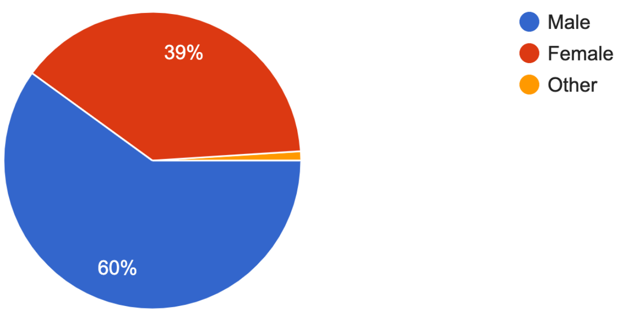


Assuming you have 1000 NOK to invest, what amount would you choose to put into the S&P 500 index market?
100 svar

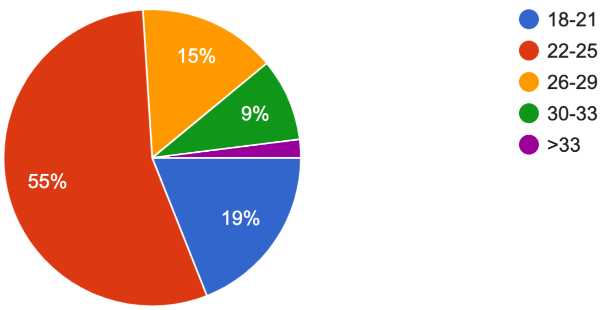


F Google forms answers group L

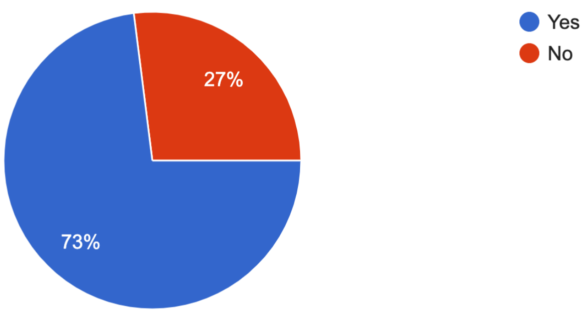
Gender
100 svar



Age
100 svar

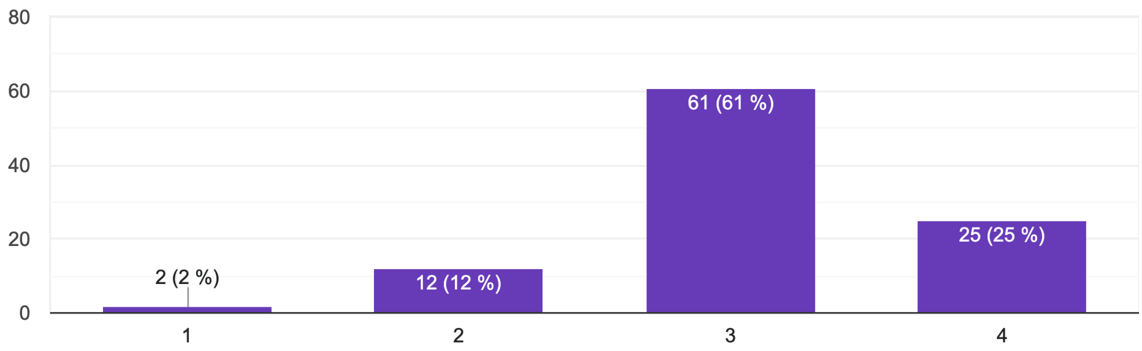


Have you ever made investments in the stock market?
100 svar



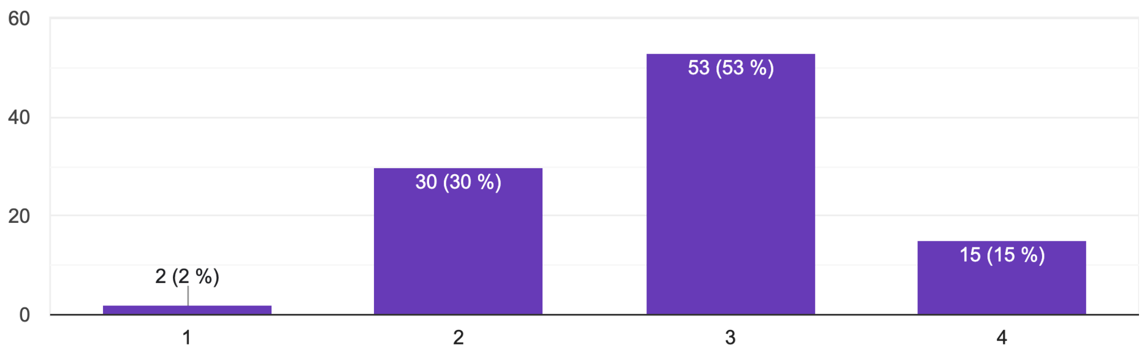
If I try hard enough, I can always manage to solve difficult problems

100 svar



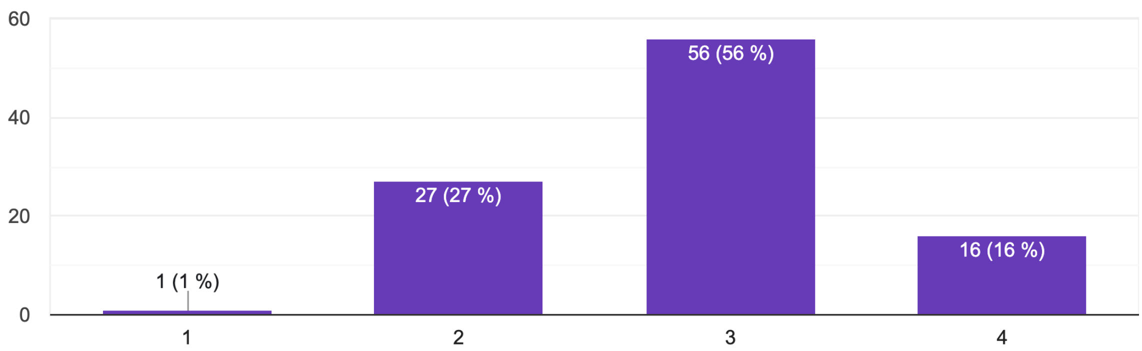
If someone opposes me, I can find ways to get what I want

100 svar



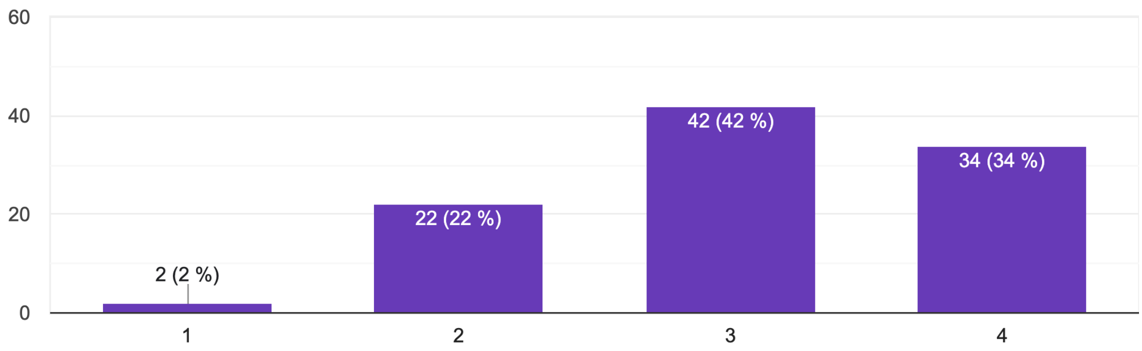
I consistently reach my goals by staying committed to my aims.

100 svar



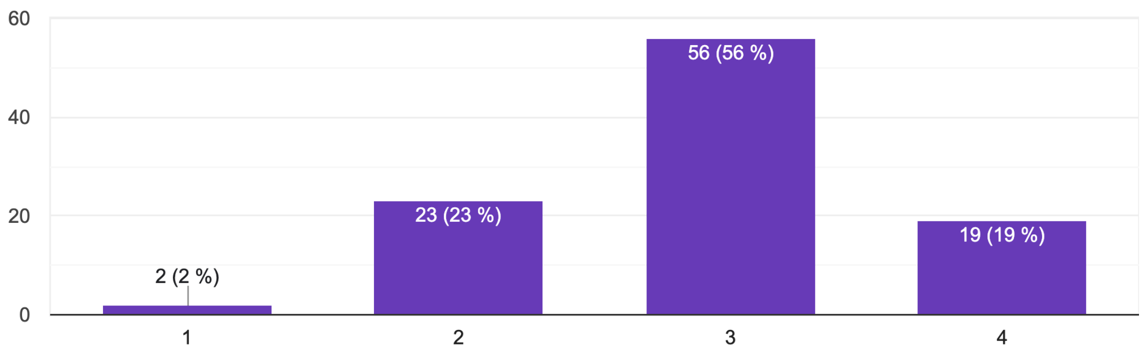
I am confident in my ability to handle unexpected events effectively

100 svar



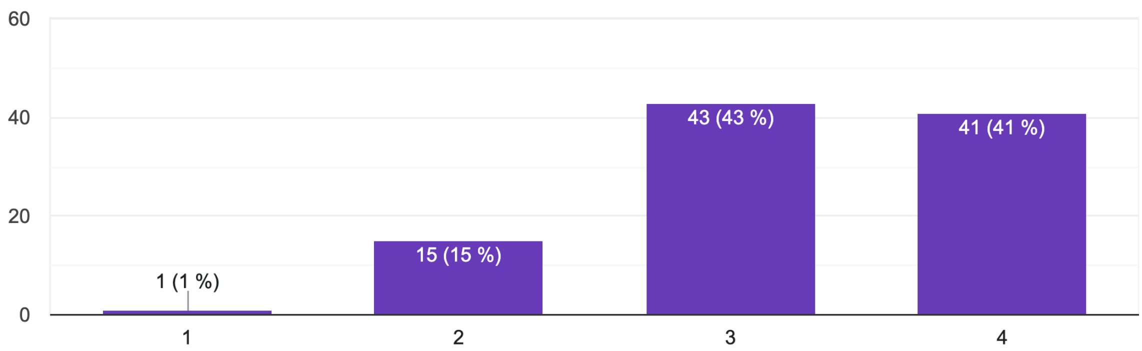
My resourcefulness allows me to effectively manage unexpected situations

100 svar

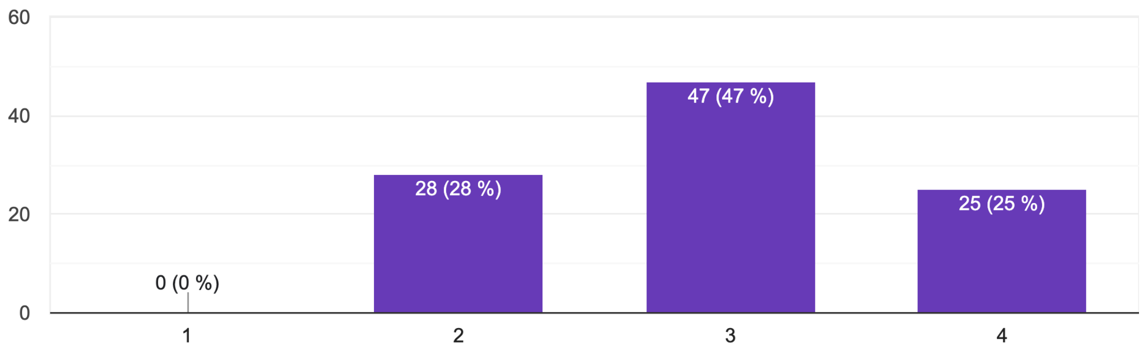


By putting in the necessary work, I can overcome the majority of challenges I face

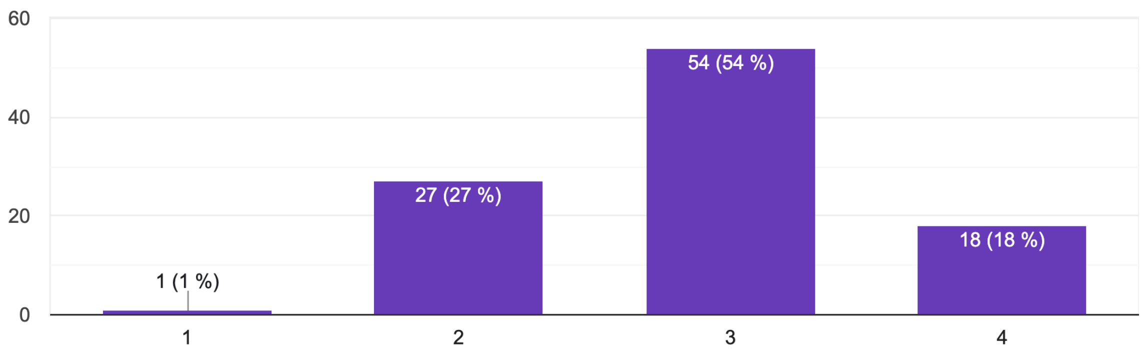
100 svar



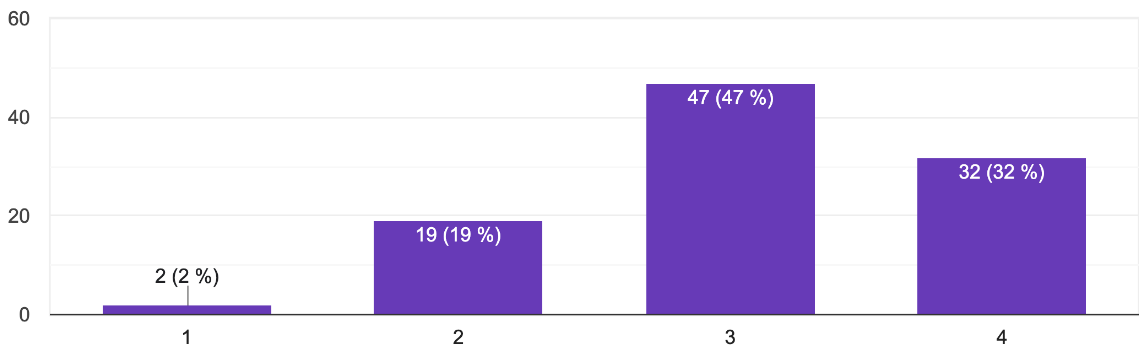
I can remain calm when facing difficulties because I can rely on my coping abilities.
100 svar



In the face of challenges, I have the ability to identify multiple potential solutions
100 svar

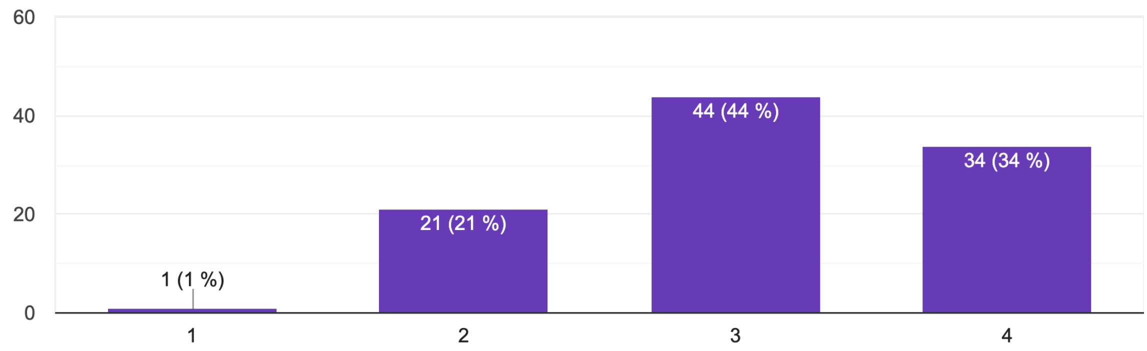


If I am in trouble, I can usually think of a solution.
100 svar



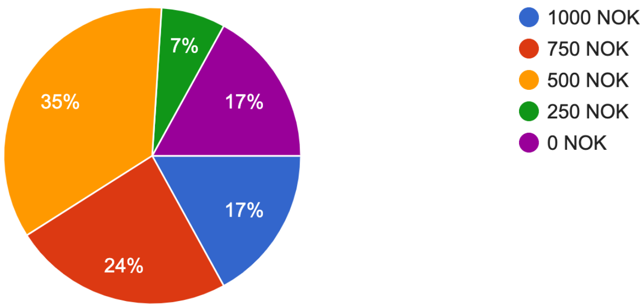
I can usually handle whatever comes my way

100 svar



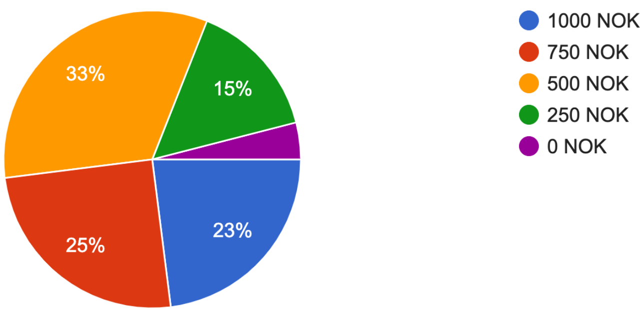
Invest in a round of this lottery.

100 svar



Assuming you have 1000 NOK to invest, what amount would you choose to put into the S&P 500 index market?

100 svar



NTNU

Norwegian University of
Science and Technology