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# **INVESTIGATING THE INFLUENCE OF SOCIAL ECONOMIC STATUS AND RISK WILLINGNESS ON THE USE OF INVESTING APPS: AN INTERACTION EFFECT ANALYSIS**

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## Summary

This thesis focuses on whether there is an interaction effect between social economic status, risk preferences and the usage of investing applications. The rapid growth of investing apps has increased accessibility to investing for individuals across different socio-economic statuses (SES). If individuals with lower SES, who would be more risk-seeking, are more likely to invest, this could lead to finding the result that protective measures should be added to the apps. Therefore, the research question of this thesis is: *How do SES and risk preferences interact and determine whether individuals make use of investing apps?*

Investing apps offer benefits e.g., low costs, easy accessibility, and speed of execution, but they also have drawbacks. The advice given on the apps is impersonal and perhaps does not align with individuals' risk preferences. Moreover, users must exercise self-control and critical thinking skills when making investment decisions.

A survey was conducted involving 148 participants to explore the interaction effect between SES, risk preferences, and investing app usage. Four clusters of regressions were created as SES and risk preferences were both measured in two ways. The analyses of the four clusters revealed the interaction effect of SES and risk preferences on investing app usage is not significant.

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## 1 Introduction

At the end of 2018, the total amount of investments by Dutch households was 126.8 billion euros. Three years later, this sum has increased with 46.1% to 185.6 billion euros (DNB, 2022). One reason which played a role behind this growth is that the Dutch started investing more, with their net purchases being worth 4.1 billion euros in 2021. According to the AFM Consumer Monitor (2021), the number of investing households grew to 1.9 million in 2021. There is a trend that investments play an increasing role in the total household wealth. The growing interest in investing among individuals matches with the increasing accessibility to invest and the desire among households to make more returns now that interest rates on savings are close to zero (DNB, 2022).

Investing in the derivatives market is widely seen as an effective way to increase wealth over the long term (Siegel, 2014). However, in the past, building wealth in such a way used to be only available to the individuals who hold a considerable number of financial resources. This group of people put down a minimum amount of money to be able to benefit from the financial services of brokers (Kim et al., 2006). This option was only available to people who hold a higher social economic status (SES). SES refers to a person's or a group's place on the socioeconomic scale in society. This position is based on a variety of social and economic factors such as: income, level and type of education, occupation and (location) of residence (Considine & Zappalà, 2002).

Recently however, a new tool to invest has been introduced, namely investing apps (from now on called apps) which can be installed on phones and computers (Cook et al., 2020). One of the benefits of the apps is that they have eliminated the requirement for a minimum investment. This lowered the barriers of entry to start investing for people with a lower SES.

The SES of individuals plays a significant role in forming an individual's behaviour regarding wealth management (Wilska, 2002). People with a higher socioeconomic background may be more willing to take investing risks to achieve returns than individuals with a lower SES. However, most research on investing behaviour is based on people who make use of financial

brokers instead of investing apps. Due to the novelty of the current apps, there is no research yet about the relationship between SES and the use of the tools. Therefore, this thesis aims to contribute to the existing literature by investigating whether people with a lower SES will make use of the apps compared to individuals with a higher SES.

Another factor that affects the use of investing apps are risk preferences. Risk is the uncertainty of the future. Thence, risk preferences of individuals show how much uncertainty one is willing to take based on an expected outcome. The more risk-seeking one is, the more uncertainty one is willing to take to make a profit (Di Mauro & Maffioletti, 2004).

The conclusions from the research on the interaction between SES and risk preferences and app usage can have useful applications. Policymakers and stakeholders can use the results to create initiatives addressing specific challenges faced by various socioeconomic groups. For instance, if risk aversion is found to be a major barrier to app adoption among people from with a lower SES, interventions should be created which concentrate on lowering the perceived risks in technologies through educational campaigns or with the help of specialized support.

Therefore, the research question of the thesis is: *How do SES and risk preferences interact and determine whether individuals make use of investing apps?*

The academic relevance of the thesis is to discover how SES and risk preferences affect the usage of investing apps. Investing apps exist now for around 15 years ((Assia, 2016);(Kuyen, 2021)). Therefore, most research on investing was written before the apps were put online. The results of the thesis can show whether the preferences for making use of a digital app or traditional investing are different and therefore, if the research between the dependent variables and investing should also be approached from different perspectives.

The practical relevance of this thesis can help determine if certain groups are drawn to these apps, particularly groups of people who might require more protection. For example, if

individuals who show risk-seeking behaviour and have a lower socioeconomic status (SES) are more likely to use investing apps, there might be a concern about the possibility of excessive risk-taking. Consequently, this could lead to a weaker economic position for this specific group of people. In that event, policies could be implemented to prevent this unnecessary risk-taking.

To find out what the relationship looks like between the three variables, the thesis has the following structure. Chapter 2 discusses the theoretical background and the hypotheses. Next, the methodology is discussed in chapter 3. This chapter will discuss an experiment that is implemented to find out the answer on the research question. Chapter 4 focusses on the results of the experiment whereas chapter 5 includes the discussion and conclusion of the experiment. Chapter 6 includes the bibliography. After that, the thesis ends with Appendix A which includes the questionnaire for this thesis and Appendix B, which shows the robustness checks of the results.

## 2 Theoretical Framework

The backbone of the thesis is investing app usage. The apps have become more popular over time (see paragraph 3.1). One of the biggest contributing factors as to why these apps are so popular can be explained with the theory of gamification (see paragraph 3.2 for further details on definition and relevance). Even though the investing apps have become quite popular because of the benefits they provide, it does come with flaws, in comparison to traditional investing (see paragraphs 3.3-3.10). The thesis will further progress by giving additional characteristics on the group of investing app users to enhance the understanding on investing apps (see paragraph 3.11), followed by elaborating on the relationship between the apps and independent variables, therefore furthering on the topic of relationship between SES and investing app usage (see paragraph 3.12). Additionally, the relationship between risk preferences and investing app usage will be explored (see paragraph 3.13), followed by the effect of interaction between SES and risk preferences about whether people make use of investing apps is discussed as these forms the main element of the research question (see paragraph 3.14). Lastly, based on the previous paragraphs, the hypotheses of this thesis will be declared (See paragraph 3.15).

### 2.1 Use of Investing Apps

Investing is the concept that people buy assets for cheap and sell them later for a higher price with the goal of obtaining a profit. However, there is no such thing as a free lunch. The possibility of gaining a return is not without problems, as there is risk involved in losing the amount of money one put down (Raghubir & Das, 2009).

By 2021, there were more than 130 million investing app users worldwide. There was an increase of 49% compared to the year before (Curry, 2023). The growth in users shows the increase in people's trust in the online platforms to manage their money well. The popularity can be explained by the effects of the pandemic (Chaudhry & Kulkarni, 2021). Many people had to stay at home in 2020. Individuals were not able to go to work or go somewhere in their free time. Because of this, they had more time on their hands, so many looked for new hobbies. One

of the most popular one was investing, since this gives people the opportunity to also have a second income stream (Wahyuni & Astuti, 2021).

Next to this, the apps became popular during COVID-19 because of the quick advancements in technology. Investors used to meet their brokers in person to invest their money before investment apps became more commonly used (I. Lee & Shin, 2018). Due to the pandemic, this was not possible any longer as people were discouraged from meeting each other. With the apps, people can invest online without the help of a third person. Online investment apps became popular quite quickly. Moreover, because the apps offer many stocks to invest in, the apps helped investors to diversify their portfolios in national and international stocks (Puspitasari et al., 2022)

## **2.2 Investing Gamification: Explaining Popularity of Investing Apps**

There is a strong relationship between investing apps and gamification (Pal et al., 2021). Gamification is a way of adding game-like features to a non-game context, such as websites. The goal of gamification is to make these contexts more appealing to people (Simpson & Jenkins, n.d.). In this case, the gamification techniques are added to make investing apps more accessible to a broader range of users.

Gamification is associated with the self-determination theory (SDT) (Rigby & Ryan, 2018). This framework explains how intrinsic motivation of people to finish a task is encouraged by satisfying three needs, namely the needs for autonomy, competence and relatedness (Vansteenkiste & Ryan, 2013), 2013):

1. **Autonomy:** Investing apps use gamification techniques to give the users the feeling that they are skilled in investing. The apps can encourage users to make well-informed decisions about their investments with the help of visual tools and by providing feedback on their investment performance (Chaudhry & Kulkarni, 2021).
2. **Competence:** Gamification techniques allow users to feel that they are in control regarding their investments and the outcomes. By providing educational features, the apps can help users to increase their investment knowledge and skills over time (Chiong & Shuler, 2010).

3. Relatedness: Using gamification techniques can increase the feeling of connection between the users. Offering social features such as an online forum and the ability to send text messages to each other, allow users to connect and engage with each other's. In this way, the apps can create a sense of community and so, persuade users to keep on making use of the app (Zhao & Balague, 2015).

## **2.3 Benefits and Drawbacks of Investing Apps**

In this part of the thesis, the differences between investing apps and broker's services will be discussed. Some of these differences have been discussed before, but here they will be written down in more detail. First, the benefits of investing apps compared to traditional investing are mentioned in order of importance before the drawbacks are mentioned, in the same order.

### **2.4 Benefit: Low Costs of Investing**

The most important factors enabling people to participate in the investing market are the lower costs; lower minimum investment requirements, no commissions/fees and possibility of buying fractional shares (Wang, 2021).

#### *2.4.1 Benefit: Minimum Investment Requirements*

Investing apps offer their services for low costs, including low transaction costs. Sometimes, the apps even charge nothing (Chaudhry & Kulkarni, 2021). Therefore, individuals with smaller amounts of capital can start investing. As the costs are lower to make use of an investing app compared to making use of the services of a financial advisor, investing has become more accessible to the public (I. Lee & Shin, 2018). An example of traditional investing not being affordable to the public is that ABN AMRO offers a private banking service; MeesPierson. To make use of their services whereby the bank invests for their client, an individual needs to hold at least 500.000 euros (Spence, 2017).

#### *2.4.2 Benefit: No Commissions / Fees*

Due to the introduction of investing apps, it has become easier for people with a low SES to start investing. Financial brokers require some quite high fees for commissions and

management costs (Lusardi, 2008). Now, as there is no such fee required to be paid for by the users of the investing apps, investing has become more affordable for people with lower SES (Birdthistle, 2008).

## **2.5 Benefit: Accessibility**

Moreover, another benefit is the accessibility of the apps (Shrier et al., 2016). Instead of going to a third party who will invest for a client, one can choose themselves directly which derivatives to invest in. Banks also offer self-directed investment programs for the individuals so at first sight, that can be seen as a middle ground. However, when people make use of that program, one cannot decide what to invest in exactly as one can only choose how much risk one want to take with the customers' investments. The bank still decides which derivatives will be bought and sold (Bouck, 2022). With an app, one is able to immediately look for what kind of derivative a customer want to get (e.g., stocks, options, ETFs) and what product and sector to invest in. Moreover, after one has made an account and wired some money in it, an user can start with investing (Symons & Pierce, 2019). With traditional investing, one must transfer their funds to a third party. This can take some more time before the financial broker confirms that he/she has received the funds. Moreover, when the customer wants to buy or sell their derivative, they first need to call their broker to do that for them. As the broker also often is available between 9 and 17, the value of the stocks can decrease and increase during that time. So for example, when the customer wants to sell a stock at 18 o'clock but when putting in the request which will be honored in the morning, the profit that the customer would have made if sold directly could be higher than what the customer will receive (Dobbins et al., 2009). Therefore, due to easier access to the derivatives, the speed of execution is faster for people who make use of investing apps compared to people who make use of traditional investing. However, for people who do not have the time available to spend it on learning financial instruments, they can make use of automatic investments plans (Lourenço et al., 2020). The users can put aside a fixed amount of money on a timed basis (e.g., monthly).

## **2.6 Benefit: Encourages Financial Literacy**

Investing apps provide educational tools and resources to learn their users how to make well-informed investing decisions (Chaudhry & Kulkarni, 2021; Gramitto Ricci & Sautter, 2022). There are several ways of how investing apps encourage their users to increase their financial literacy. This mainly is a great help for people with a lower SES because this group of people often did not receive a lot of financial education in their life.

There are several ways of how investing apps encourage individuals to increase financial literacy. Investing apps allow their users to make their own investment decisions and to manage their portfolios (Azhar, 2014). First of all, The applications have user-friendly interfaces and provide educational tools (Fernando et al., 2022). This allows people to feel comfortable to know what is going on which encourages the individuals to make use of the app. Moreover, these apps also often provide a social trading platform on which users can share their strategies with each other (Aldridge & Krawciw, 2017). The apps themselves also provide information to the users, namely by tracking the user's portfolio and providing an overview of that in real time. On the other hand, with traditional investing, brokers provide an overview of what to invest in for their customers. However, this is biased information as the brokers do not have time to discuss all the available stocks. Therefore, the brokers will mainly discuss what they are experts in, which might be completely different from what the customers are interested in. The customers from traditional investing might require a lower level of financial literacy to use the services. For investing app users, this counts as well. However, with the educational tools provided, this allows the users to at least have a way of increasing their financial literacy (Lusardi et al., 2017).

## **2.7 Drawback: Less Personal**

Investing apps also have some drawbacks to them. One of them is that the advice given by the apps is less personal compared to the advice given by the traditional investors. Investing apps provide news and market updates to their users (Thurman, 2011). Therefore, the apps do give enough information to its users so that the group is able to make their own unique investment plans. However, all the news that is send to the users is based on what characteristics the customer provides on the app (Hentzen et al., 2022). With traditional investing, the brokers are

not only able to provide advice to the customers, but they are also able to hold discussions with their clients about the derivatives they advise to or discourage from investing in.

As a counterargument, one could argue that users are also able to discuss with others what to invest in. Financial advisors invest in stocks that their clients are positive about to invest in (Gomber et al., 2018). However, individuals can online pretend to be a good investor while this is not the case. For financial brokers, their clients can find their credentials and know that they have a professional in front of them. The financial advisor has enough expertise so that the customer can also know for certain that they advise they receive is legitimate.

## **2.8 Drawback: More Self-Control Necessary**

An important part of investing is having the self-control to not cash out too early or too late. Known as the disposition effect, this is a behavioral finance explanation of why people sell their winner assets too early and their loser assets too late (Kaustia, 2010). The reason behind this effect is that when assets are increasing in price (winner assets), individuals fear the price going down so they sell their assets even though they could have made more profit if they waited. For the derivatives which are decreasing in price, people are less likely to take out their money. Since money as already been invested in the stock, one does not want to give up on the money they invested. Therefore, when the price of a stock is decreasing, people will wait before selling the asset as they hope that the price will go up again so they will not lose their money.

Digital apps offer the autonomy that investors can make their own decisions regarding when to invest or not. People can choose the assets they want to invest in, customize the portfolios and executing trades without relying on a broker (Jung et al., 2019). These people have not received the financial education that there are heuristics holding people back from making more profit. Heuristics are mental shortcuts to arrive to decisions quicker. However, there are many other factors which could indicate that it would be more beneficial to not buy the share. Heuristics are quite helpful however, in case of people wanting to earn as much as possible, they can also have negative effects. They will probably let individuals make more risky decisions

than necessary as people do not have or want to spend a lot of time analyzing whether a stock is a good or a bad buy (Otuteye & Siddiquee, 2013).

Another factor affecting the self-control of individuals are emotions. Emotions are important but should be ignored when it comes to investing. Financial advisors state that people should not rely on their feelings regarding seeing the price of a stock going down or up in one day. Instead, people should set their money apart for a time, such as a year (Luskin et al., 2005). In the meantime, the users should not look at their portfolio too often to prevent being upset by the increases and decreases in prices. Financial advisors are used to the movements of the stocks, so therefore, they will be less likely to take out their money out of the stock. This enables people who make use of brokers having a lower change of losing money simply by taking out their money too early or too late out of the game compared to people who make use of investing apps (Haslem, 2010).

## **2.9 Drawback: Less Critical Thinking Necessary**

The apps are easy to use so individuals can rely too much on them. Instead of critically analysing their financial playing, the apps encourage the users to make use of an automated process (Light et al., 2018). This can lead to excessive risk-taking by just not outlining the possible risks of investing. Financial brokers also take over the critical thinking of deciding what stocks to invest in (Sachdeva et al., 2022). However, making use of traditional investing still allows a person to decide whether it is smart to invest or not. The brokers namely not only earn financial capital but also reputation by offering their services to a customer. As they want to get good reviews of the clients to keep on doing their job, they will make sure that they critically analyse investments before deciding to take part in it (Richards & Safari, 2021). Investing apps itself push all the responsibility to its customers. Therefore, the apps do not take any responsibility if something goes wrong (Peres da Costa, 2020). This can lead to more financial struggles than necessary for the clients. Instead of real advisers, Robo-advisors help users to make better informed and less biased decisions. However, Robo-advisors activate the investors' automatic system processes. As a result, investors could become alienated from the stock

market, and decrease their understanding of the investment process (Darskuvienė & Lisauskienė, 2021).

## 2.10 Overview Benefits & Drawbacks Investing Apps Compared to Traditional Investing

Below here is table 1, which gives an overview of the previously mentioned pros and cons of investing apps compared with traditional investing.

TABLE 1: OVERVIEW BENEFITS AND DRAWBACKS INVESTING APP USAGE VS TRADITIONAL INVESTING

### **Benefits**

#### *Lower costs*

- Low minimum investment requirements
- No extra fees
- So not only people with a high **SES**, but now also people with a low **SES** can use the app.

#### *Easy to use*

- Access to many stocks
- Fast speed of execution

#### *Low level of financial literacy required*

- Apps have user-friendly interfaces.
- Apps offer educational tools

### **Drawbacks**

#### *Less personal advice*

- Advice is given to sub-groups instead of on an individual level

#### *Higher need for self-control*

- Very easy to invest all the money.
- (Too) easy to make use of the app if one is very **risk-seeking** without thinking of the financial consequences.

#### *Less critical thinking*

- Due to the user-friendliness of the app, one can start investing without critically analyzing possible outcomes

### **2.11 Characteristics of Investing App Users Compared to Traditional Investors**

There are several differences between the groups of investing app users compared to the traditional investors:

- 1) Due to the technological advancement in society, the new generations grew up with technology around them. Due to this, the younger people are quite good at using it. As a result, the users of investing apps are younger than traditional investors (I. Lee & Shin, 2018).
- 2) Since investing apps are quite easy to use and as the apps provide educational tools to improve financial literacy, the users of the apps are more likely to make informed investment decisions compared to traditional investors (Chaudhry & Kulkarni, 2021).
- 3) Lastly, since apps offer more derivatives from different countries to buy and sell compared to financial brokers, the group of app users also tends to invest in a more diversified way compared to traditional investors, in terms of what products they invest in (Chaudhry & Kulkarni, 2021)

### **2.12 The Relationship Between Socioeconomic Status and App Investing**

Socioeconomic status is the standing of an individual or group in a society. The social standing of people is determined by several factors such as one's income, received education and profession (Galobardes et al., 2006).

SES plays an important role regarding the decision to invest. There is a positive correlation between income levels and investment app usage according to macroeconomic theory (Mitchell et al., 2019). Due to individuals with higher incomes having greater access to financial resources and being more likely to invest in the stock markets which can lead to higher usage of investing apps.

Klapper et al. (2015) found that individuals with a higher SES tend to have more experience with investing and this group receives more education. Furthering one's education leads to higher rates of financial literacy. This is because when individuals receive more financial education, they will be more likely to become interested in finances and in such a way, they will

become more comfortable with investing (Grable & Joo, 2004). For example, receiving a higher level of education is also found to be significantly positively correlated with investing in stocks and mutual funds (Ranganathan, 2006).

The relationship between SES and the use of investment apps is also influenced by one's social networks and peer influence. The social stratification theory states that one gets influenced by peers from the same socio-economic background in such a way that their lives become similar (Grusky, 2019). This is due to the interconnected institutions that they are a part of. Higher SES individuals often have networks that include other investors and knowledgeable financial professionals. The social ties could increase exposure to investments and encourage the usage of investing apps. According to a study by (Smith & Smith, 2016), social networks had a significant impact on investment choices. This suggests that people with higher SES are more likely to be exposed to and influenced by talks about investments. For individuals with lower SES, they have less access to investment possibilities and feel less peer pressure to use investing apps.

### **2.13 The Relationship between Risk Willingness and Investing**

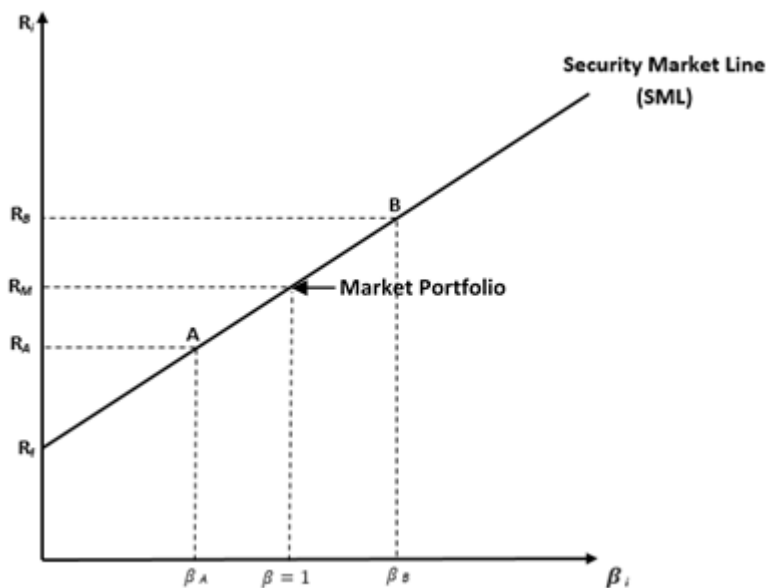
Making use of investing apps involves risk. There is always a possibility that investments will perform worse than expected which leads to financial losses (Shleifer & Summers, 1990). Due to this chance, risk willingness plays an important role regarding making investment decisions. Risk willingness is an individuals' readiness to take financial risks in pursuit of gain. It is a degree of an individual's tolerance for volatility in investment decisions (Weinstein & Martin, 1969). This kind of willingness is influenced by several factors, including personal traits (e.g., age, gender, and socioeconomic status), financial literacy and investment experience. People with a higher risk tolerance are more likely to take on risky investments (Sung & Hanna, 1997).

Risk preferences determine how likely one is to make use of an investing app. Individuals who are risk-seeking are more likely to invest in assets with a potential larger return (Hoffmann et al., 2015). People with a higher risk-preference are more likely to invest in risky assets compared

to individuals who are more risk-averse (Guiso & Paiella, 2004). Therefore, people who are more risk-seeking are more likely to make use of investing apps.

There is a positive relationship between risk willingness and investing. Risk-seeking individuals are likely to invest in stocks. Stocks offer high returns, which comes at a price of taking on more risk. The CAPM (Capital Asset Pricing Model) is a model which explains the relationship between risk and expected return (Kisman, n.d.). The expected return on an investment is proportional to the level of risk. Therefore, riskier investments offer higher returns to investors to compensate for risk this group takes on. This relationship can be seen in the graph below. The security market line shows that when people take on more risk ( $\beta$ ), the return ( $R_i$ ) increases.

GRAPH 1: RELATIONSHIP RATE OF RETURN ( $R_i$ ) AND RISK-LEVEL ( $\beta$ )



How much risk a person is willing to take is affected by psychological biases (Baker & Nofsinger, 2002). Biases are systematic deviations from rational choices. They are mental heuristics (cognitive short cuts) which our brains accept to quickly absorb information and make decisions (M. Ahmad & Wu, 2023). These biases can help simplifying complex information, but

they can also result in mistakes and irrational choices. There are a few psychological biases which especially play a role regarding risk preferences in the use of investing apps.

There are several biases which play a role regarding risk willingness and investing, especially about investing on the applications. The two most important biases which play a negative role are herd mentality and home bias.

Herd mentality is the tendency to imitate behaviours a larger group without conducting independent research (Bikhchandani & Sharma, 2001). On investing apps, one of the offered services is that people can copy investing strategies from others. This is called copy trading; People can find professional traders and copy their portfolio without conducting their own research (Apesteguia et al., 2020). This leads to risky behaviour the individuals do not critically think themselves but depend on others, who can also make mistakes.

One benefit of investing apps is that people can invest in a broad arrangement number of stocks (G. Lee & Raghu, 2014). There is a way broader choice of stocks to invest in compared to traditional investing. Since diversification leads to a lower risk-level (Chang & Thomas, 1989), it would be rational to invest in different kinds of companies in different parts of the world. However, people prefer to invest in what they know. Therefore, individuals are more likely to invest in companies which are based in their own country. This is called a home bias (Karlsson & Nordén, 2007).

Next to biases, there is another phenomenon playing a role in determining the relationship between risk and return, ambiguity. The overlap between risk and ambiguity is that in both cases, individuals know there is an uncertain outcome. However, with risk, one can know how large the chance is that they will have a lucky or unlucky outcome. Ambiguity means that there is a chance that people lose money however, they don't know what the chance is (Wakker, 2010). When ambiguity is involved in the model, the outcomes can be more uncertain. Since

uncertainty is rewarded with a higher possible return, this further strengthens the relationship between risk and return (Brenner & Izhakian, 2018).

#### **2.14 The Interaction Effect between SES, Risk Willingness and Investing**

The combined effect of SES and risk willingness on the use of investing apps can manifest in different ways. Individuals with higher SES tend to have greater financial stability which leads to a higher willingness to invest (Sheehy-Skeffington, 2020). They have more financial resources available, which provides them with numerous investment opportunities. Additionally, their larger financial cushion and ability to take on more risk enables them to pursue riskier investments (Gatot et al., 2020)

However, risk preferences of individuals can also play a role in the usage of investing apps. Higher SES individuals may show higher levels of financial confidence, making them more likely to use investing apps. Individuals with higher incomes have higher risk tolerance and confidence in their investment decisions (Hanna et al., 2011). Conversely, individuals with lower SES might be more cautious regarding investing due to the lower number of financial resources and economic insecurity. This can create a risk-averse mindset as this group is less able to withstand potential losses. Furthermore, this group might be less likely to take on risk as they are less financial literate and since they have limited access to information. People with a lower SES might prefer preserving financial stability over pursuing potentially higher returns through investments.

SES is also determined by the level of education one has received. The higher the SES level, the more education one has received. The difference in learning experience explains how individuals perceive investments risks in diverse ways. Once individuals have become more experienced in investing, they are also more likely to take on investment risk (Menkhoff et al., 2006). So, individuals who have received a lot of financial education might be more risk compared to individuals who have received a lot of financial education are more likely to make

risky investment decisions. This can apply to risky decisions regarding what to invest in but also regarding the decision to make use of an investing app, on which one can lose money.

## 2.15 Hypotheses

Based on the literature which states that SES is positively correlated with investing as individuals with a higher SES have more access to financial resources, gained more (financial) education, have better access to technology and network effects, the first hypothesis of this thesis is:

*H<sub>10</sub>: There is no significant positive relationship between SES and the usage of investing apps.*

*H<sub>1A</sub>: There is a significant positive relationship between SES and the usage of investing apps.*

People who are more willing to take on risk are more likely to actively look for investment opportunities and explore new opportunities for profit. As a result, people with higher risk tolerance may be more likely to make use of investing applications because they offer easy access to a variety of investment possibilities. Therefore, the second hypothesis is:

*H<sub>20</sub>: There is no significant positive relationship between risk-seeking behaviour and the usage of investing apps, when including SES in the model.*

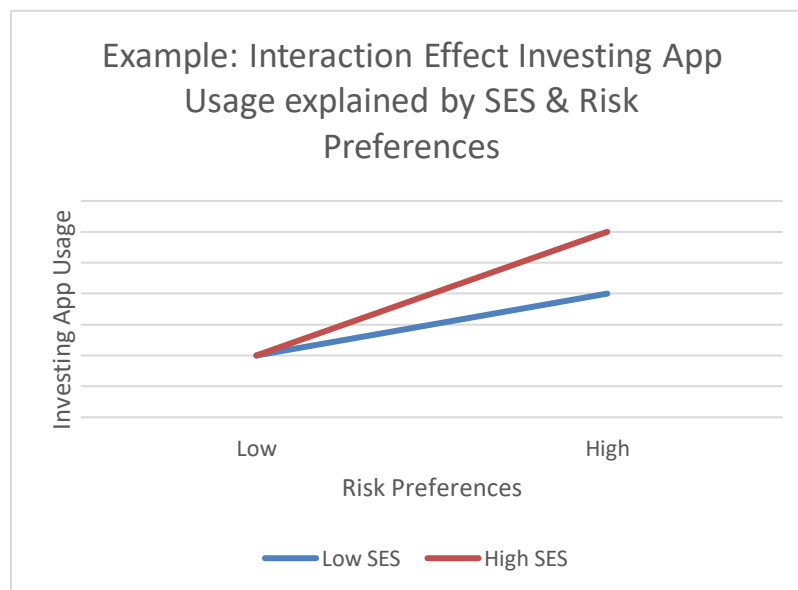
*H<sub>2A</sub>: There is a significant positive relationship between risk-seeking behaviour and the usage of investing apps, when including SES in the model.*

People with higher SES may be more risk-seeking because they have more financial resources available, and they have gained more financial education compared to individuals with a lower SES. Due to these factors, individuals with higher SES are more likely to take on investments, including more risky ones and therefore, make use of investment apps. As a result, the third hypothesis is:

*H<sub>3O</sub>: There is no significant positive interaction effect between SES, risk-seeking behaviour, and the usage of investing apps.*

*H<sub>3A</sub>: There is a significant positive interaction effect between SES, risk-seeking behaviour, and the usage of investing apps.*

GRAPH 2: EXAMPLE INTERACTION EFFECT



### 3 Methodology

#### 3.1 Overview Research

This study investigates the impact of how social economic status and risk willingness interact and affect whether people make use of investing apps or not.

Cross-sectional research will be conducted by collecting data from the participants at one point. The data is collected with a survey. This method of collecting data was chosen as a survey is helpful to reach a large population and so have great statistical power (Kelley et al., 2003). Moreover, as there is not a lot of quantitative research available either about investing app users, this research can be used to compare to other quantitative results to find out whether the results are similar.

The 148 participants have been acquired via the help of social media and by asking people in the train to fill in the survey. Most of the participants are economics students. There are two subgroups in this participant pool; people who make use of investing apps and people who do not. To find out how many participants of each sub-group are necessary to be able to derive conclusions from the analysis, a power analysis was conducted. Below this paragraph, the results of this analysis can be found.

TABLE 2: POWER ANALYSIS

#### Power Analysis

Number of groups	k	2
<b>Number of observations</b>	n	<b>16.71472</b>
<b>necessary <u>per group</u></b>		
Effect size	f	0.5
Significance level	p	0.05
Power level	power	0.8

The power analysis is based on the following information. There are two groups being compared with one another. Since the interaction effect of SES and risk preferences on investing app usage has not been tested before, there is no data to rely on how large the effect will be. A common practice then is to make use of an effect size of 0.5, which indicates a moderate to large effect (MEERA, n.d.). Moreover, the power level is 0.8, which means that a chance of 80% is taken that a Type II error will not be made (Maier & Lakens, 2022).

### 3.2 Overview Variables

Below here is an overview based on the variables used in this thesis.

TABLE 3: OVERVIEW VARIABLES

	<b>Name</b>
<b>Dependent variable</b>	Investing app usage
<b>Independent variables</b>	<p><i>SES</i></p> <ul style="list-style-type: none"> <li>- Education</li> <li>- Financial support from government</li> </ul> <p><i>Risk preferences</i></p> <ul style="list-style-type: none"> <li>- Thought experiment.</li> <li>- Described risk willingness</li> </ul>
<b>Control variables</b>	<ul style="list-style-type: none"> <li>- Age</li> <li>- Gender</li> <li>- Financial literacy</li> <li>- Parental use investing app</li> <li>- Parents work in financial sector</li> <li>- Living situation parents</li> <li>- Education parents</li> <li>- Parental financial support</li> </ul>

### 3.3 Dependent Variable Investment Usage

To find out whether the relationship between SES, risk preferences and the usage of investing apps, it is important to ask the participants of the survey whether they make use of an app or not. Question 7 in the survey asks whether people have downloaded the app. Then, the answers “No, I have not” and “I’ve only downloaded the app but never used it” have been put together and the value 0 has been ascribed to it. For the other possible answers, ranging from “I use it less than once per month” till “I use it multiple times per week”, the value 1 has been described to them. In other words, a dummy variable has been implemented to find out whether people do or do not make use of an investing application.

### 3.4 Independent Variable: SES

To recap the definition of SES, it refers to the socio-economic standing of a person or group in society. This position is based on multiple factors, mainly education, income, occupation and location and type of residence. For this research, education and type of parental residence were asked out. Below here are the reasons why these two factors are asked out and why the others were not asked out:

- **Education** is the most often asked out factor to measure SES so that is why this thesis will also include this. The level of education that one has received is a strong indicator of measuring an individual's knowledge and intellectual development, determine the future economic opportunities and social mobility. Moreover, education is correlated with job opportunities and income level. Therefore, it is a useful proxy for economic well-being. In general, individuals who have received more education are more likely to want to take on risks compared to people who have lower levels of education (Grable & Joo, 2004). Through the received education, individuals learn about financial concepts and investment strategies (Lusardi, 2008). As a result, individuals who have received more education are more likely to be comfortable with investing (Guiso & Paiella, 2004).
- **Government support** was asked out as well. This is not a fixed indicator of measuring out SES. However, since most participants are students, this is a good proxy for finding out the wealth of the parents of the students. In case parents make less than certain

threshold of euros, their children who will study will receive a supplementary loan from the government. Moreover, until the academic year 2015/2016, students would receive a basisbeurs from the government to be able to pay for their living costs (LSVb, n.d.). Since that year until 2023, students can receive a loan from the government to pay for their expenses. Most people only ask for a loan when they do not have enough income available to make it through the months. There is a group who does ask for a loan to use it as extra income to invest. However, since this group is quite small (numbers), this potential problem can be ignored.

The following measures of SES were not used in the analysis and the reasons why are mentioned below:

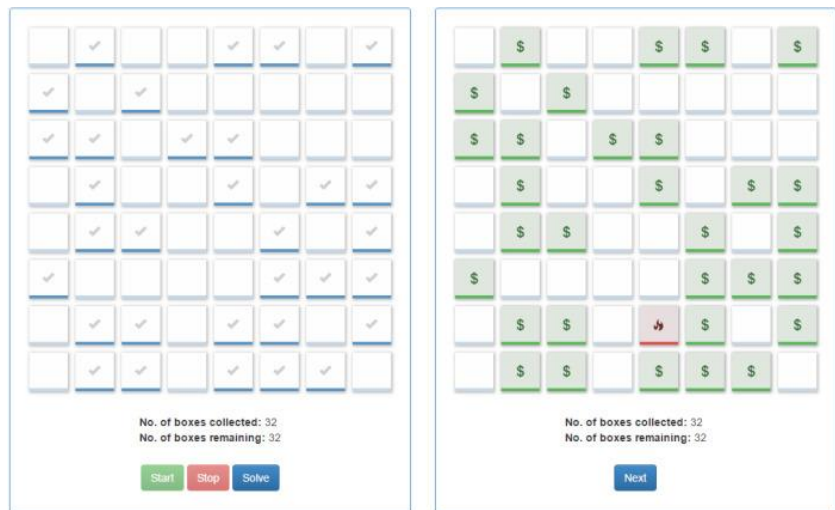
- **Income** and **occupation** were not asked out since there is a high chance that people think it is too personal and therefore, will decide to not fill in the rest of the survey. Moreover, since the research is based on students, a large part of the group has not gained their full-time earning potential yet. Therefore, the income of the parents could be asked out. However, there are a lot of people who do not discuss finances within their family in such detail. To prevent people not filling in the survey, income was neither asked out of the participants nor their parents.
- **Location of residence** was asked out in the survey. CBS has data available about the SES score of people based on the municipality they live in. However, due to the participants not all being Dutch and to people filling in their province instead of municipality, this data cannot be used to find out the SES score.
- **Type of residence** could be asked out. However, most Dutch students live in a student complex, regardless of their financial situation. Therefore, the parental residence was asked out.

#### 3.4.1 Independent Variable SES: Risk-Preferences

The risk preference is measured in two ways. The most important way of asking out the risk preference is by providing a “Bomb” Risk Elicitation Task (BRET) to the participants in the form of a question. The BRET is an intuitive procedure which focuses on measuring risk attitudes. This risk measure was chosen since part of the group has no experience with investing and therefore, it is hard for them to imagine how they would invest in real life.

PICTURE 1: BRET EXPERIMENT

Crosetto & Filippin (2013) have made an experiment which shows 100 boxes to the participants. The participants know that for every box that they open, they receive a point. The goal of the experiment is to gain as many points as possible. The catch is that there is one exception; one box has a bomb in it. If they open the box with the bomb, they will lose all their points. Now that there are more consequences of opening the box, just as with deciding to invest, this could lead to a representative conclusion of how risk willing people are regarding if and how much to invest.



There are two versions of the BRET: a dynamic and static version. The dynamic version introduces a more intuitive example of probabilities and outcomes that makes it easy to understand the experiment. However, this version requires electronic support and therefore it is more suitable for laboratory experiments. The static version of the BRET experiment consists out of giving some background information about the task and then asking a question about how many boxes to open. This can easily be administered in the field as well as in questionnaires and surveys. Moreover, an added benefit of using the dynamic version of the BRET experiment is that it is better suited for subjects with low numeracy skills. However, since

most participants are students who study economics, this should not be a problem. As the goal of this experiment was to gather as many responses as possible, a static version of the BRET experiment was administered.

As a proxy, a question about the self-perceived risk-willingness was included as well. According to Dohmen et al., (2011), asking participants how likely they are to take on risk represents actual risk-taking behaviour quite well. The only limitation of this question is that since two groups of people are compared (participants who do and who do not invest), there is a chance that the choices of the latter group are less representative than of the former group. Therefore, the results of both measures could deviate from each other.

### **3.5 Control Variables Affecting Investing**

The survey will consist out of questions about the factors from which there is research available, which proves that there can be a correlation between them and risk willingness. These factors are age, gender, financial literacy, parental use investing app, parents work in financial sector, living situation parents, education level parents and parental financial support.

#### **3.5.1 Age**

The first questions will discuss the personal characteristics of the participants. Overall, younger individuals are in general more willing to invest than older people (Rolison et al., 2014). When individuals become older, they often will get more financial responsibilities (Attias-Donfut et al., 2005). The older people may become more risk-averse over time to protect their financial stability (Schildberg-Hörisch, 2018). Overall, older individuals are more focused on protecting their wealth. Since younger individuals have more years in front of them, they have more time to recover if they would suffer a potential financial setback. This will decrease the amount of stress that the young individuals have over the future. Therefore, the group of younger people is more risk-taking. France (2000) also suggests that the younger individuals are more tolerant regarding taking risks as they have taken less risks and so also experienced fewer negative

results of risk-taking. Therefore, younger people have experienced fewer investing losses in their time than older people which leads to the former group being more comfortable with investing than the latter.

### 3.5.2 Gender

Gender is also a crucial factor affecting how much individuals invest. Men can be more willing to take risks than women due to cultural factors (Bozkurt et al., 2015). Boys are encouraged from a young age to make risky decisions and to focus on competitive activities. On the other hand, girls learn more to take more risk-averse decisions (Timlin-Scalera et al., 2003). Hormones may also play a role in determining the risk behaviour. Testosterone has been linked to risk tolerant behaviour and this chemical is typically present in higher levels in men than in women (Lemaster & Strough, 2014). As risk-taking behaviour is positively linked with investing, gender can play a key role regarding the usage of investment apps.

### 3.5.3 Financial Literacy

Lastly, as mentioned previously, an individual's understanding of finance can also affect the risk-willingness. This is also called financial literacy. People who have a higher level of financial literacy might be more comfortable making investment decisions (Montford & Goldsmith, 2016). Higher financial literacy increases the chances for people understanding the comprehending the advantages and disadvantages of investing, which allows enables them to make wise decisions. This group of people who are more financially literate, they are more likely to understand how investment apps work. This increases the feelings of comfort and confidence when they use the platforms. On the other hand, people with lower levels of financial literacy might be less likely to use investing applications because they have a harder time understanding them and because of this, they can be afraid of making bad investment decisions.

### 3.5.4 Parental Use Investing App

Whether parents invest can have a big impact on how their children act and feel about investing. When parents actively invest, it stimulates discussions about finances, which increases the financial literacy of their children. Furthermore, parents who make use of the apps are more likely to share knowledge and their experiences with their kids. The children can learn from this, and this can spark financial curiosity in the kids. Moreover, with the parental guidance, this can inspire the children to make use of investing apps as well (Sundarassen et al., 2016).

### 3.5.5 Parents Work in Financial Sector

The experience that parents gain throughout their life is one they often share with their children. This also counts for parents who work in the financial industry as they can share their knowledge about investing. These parents often have specific financial knowledge and expertise, which they can educate their kids about (Sohn et al., 2012). Their children's interest in investment apps can be encouraged by the exposure to financial concepts and discussions about investing. Next to this, having parents who work in the financial industry may create a more encouraging environment for learning about investing (Jorgensen & Savla, 2010). This access to knowledge and advice about the field helps children to become more comfortable with investing. Therefore, they will be more likely to use investing applications.

### 3.5.6 Parental Living Situation

Another way parents influence whether their children make use of investing applications is with their living situation. The living situation of parents can give an indication of how wealthy they are. Based on this, it can be derived which SES people belong to. This is an indirect way of asking out the wealth level of the parents. Since the research is focused on students, most of the people have not achieved their fulltime earnings potential yet. Therefore, the students are more depending on the wealth of their parents than on their own wealth. When parents are wealthy and have a more comfortable living situation, they will be more likely to make use of investing and in such a way, teach their children about investing. People from wealthier families

might have easier access to financial resources and learning resources about investment (Zumbuehl et al., 2013). Even if the parents make use of a financial broker, due to young people being quite tech-savvy, the latter group will still be likely to make use of investing applications.

### 3.5.7 Parental Education

Higher educated parents typically received more knowledge and have adopted critical thinking skills which they can pass along to their kids. In this way, the parents can show their kids how to use investing apps and also teach them about the benefits of investing (Lusardi et al., 2010). Contrarily, parents with less education may have had less exposure to financial concepts themselves, which may have a negative impact on their children's use of investment apps.

### 3.5.8 Parents Financial Support

Wealthy parents might be able to teach their kids more about finances than parents with less resources available. Moreover, this first group is better able to provide financial aid to their children than the second group. However, financial aid from parents can decrease the likelihood of children investing, as they may rely more on parental support to survive compared to finding ways yourself to earn money, such as by investing (Chawla et al., 2022). The children can depend more on their parents with a higher SES which makes living easier. Therefore, they do not look for ways to gain more money themselves, such as by investing their wealth.

### 3.6 Analysis

To analyse the results, four clusters of regressions are run:

TABLE 4: CLUSTERS OF REGRESSIONS

Dependent Variable	Independent Variable SES	Independent Variable Risk-Preference	Regressions
Investing App Usage	Education	Thought experiment	1 – 4
Investing App Usage	Government support	Thought experiment	5 – 9
Investing App Usage	Government support	Self-described risk-preferences	10 – 14
Investing App Usage	Education	Self-described risk-preferences	15 - 20

For every cluster, five regressions are run:

- (1) **SES** on investing app usage
- (2) SES, **risk-preferences** on investing app usage
- (3) SES, risk-preferences, the **interaction effect** of SES and **risk-preferences** on investing app usage,
- (4) SES, risk-preferences, the interaction effect of SES and risk-preferences, **individual control variables**
- (5) SES, risk-preferences, the interaction effect of SES and risk-preferences, individual control variables and **group level control variables**

In the next chapter, the results of clusters 1 and 2 are shown. The results of clusters 3 and 4 are put down in appendix A due to the number of regressions.

### 3.7 Regressions

In the table below, all the formulas used for the thesis can be found.

TABLE 5: ALL CLUSTERS AND THEIR FORMULAS

Cluster	Formula
<b>Cluster 1</b>	(1) $app_i^1 = \beta_0 + \beta_1 * edu^2$
	(2) $app_i = \beta_0 + \beta_1 * edu + \beta_2 * thought^3$
	(3) $app_i = \beta_0 + \beta_1 * edu + \beta_2 * thought + \beta_3 * edu * thought$
	(4) $app_i = \beta_0 + \beta_1 * edu + \beta_2 * thought + \beta_3 * edu * thought + \beta_4 * age + \beta_5 * gender + \beta_6 * finlit^4$
	(5) $app_i = \beta_0 + \beta_1 * edu + \beta_2 * thought + \beta_3 * edu * thought + \beta_4 * age + \beta_5 * gender + \beta_6 * finlit + \beta_7 * edupar^5 + \beta_8 * house^6 + \beta_9 * finsec^7 + \beta_{10} * parsup^8 + \beta_{11} * parapp^9$
<b>Cluster 2</b>	(6) $app_i = \beta_0 + \beta_1 * govsup^{10}$
	(7) $app_i = \beta_0 + \beta_1 * govsup + \beta_2 * thought$
	(8) $app_i = \beta_0 + \beta_1 * govsup + \beta_2 * thought + \beta_3 * govsup * thought$
	(9) $app_i = \beta_0 + \beta_1 * govsup + \beta_2 * thought + \beta_3 * govsup * thought + \beta_4 * age + \beta_5 * educ + \beta_6 * finlit$
	(10) $app_i = \beta_0 + \beta_1 * govsup + \beta_2 * thought + \beta_3 * govsup * thought + \beta_4 * age + \beta_5 * gender + \beta_6 * finlit + \beta_7 * edupar + \beta_8 * house + \beta_9 * finsec + \beta_{10} * parsup + \beta_{11} * parapp$
<b>Cluster 3</b>	(11) $app_i = \beta_0 + \beta_1 * govsup$
	(12) $app_i = \beta_0 + \beta_1 * govsup + \beta_2 * risk^{11}$
	(13) $app_i = \beta_0 + \beta_1 * govsup + \beta_2 * risk + \beta_3 * govsup * risk$
	(14) $app_i = \beta_0 + \beta_1 * govsup + \beta_2 * risk + \beta_3 * govsup * risk + \beta_4 * age + \beta_5 * educ + \beta_6 * finlit$
	(15) $app_i = \beta_0 + \beta_1 * govsup + \beta_2 * risk + \beta_3 * govsup * risk + \beta_4 * age + \beta_5 * gender + \beta_6 * finlit + \beta_7 * edupar + \beta_8 * house + \beta_9 * finsec + \beta_{10} * parsup + \beta_{11} * parapp$

**Cluster 4**

$$(16) \text{ app}_i = \beta_0 + \beta_1 * \text{edu}$$

$$(17) \text{ app}_i = \beta_0 + \beta_1 * \text{edu} + \beta_2 * \text{risk}$$

$$(18) \text{ app}_i = \beta_0 + \beta_1 * \text{edu} + \beta_2 * \text{risk} + \beta_3 * \text{edu} * \text{risk}$$

$$(19) \text{ app}_i = \beta_0 + \beta_1 * \text{edu} + \beta_2 * \text{risk} + \beta_3 * \text{edu} * \text{risk} + \beta_4 * \text{age} + \beta_5 * \text{educ} + \beta_6 * \text{finlit}$$

$$(20) \text{ app}_i = \beta_0 + \beta_1 * \text{edu} + \beta_2 * \text{risk} + \beta_3 * \text{edu} * \text{risk} + \beta_4 * \text{age} + \beta_5 * \text{gender} + \beta_6 * \text{finlit} + \beta_7 * \text{edupar} + \beta_8 * \text{house} + \beta_9 * \text{finsec} + \beta_{10} * \text{parsup} + \beta_{11} * \text{parapp}$$

---

The factors in these formulas are:

<sup>1</sup>app measures whether people make use of an investing app/program.

<sup>2</sup>educ means the highest level of education that the participant has reached.

<sup>3</sup>thought means the static Bret experiment.

<sup>4</sup>finlit means financial literate. Participants must state with how many statements they agree regarding what they know. Based on how many statements they agree with, the participants get assigned a grade.

<sup>5</sup>edupar means the level of parental education of the participants. In case the parents had different levels of education, the highest level was considered.

<sup>6</sup>house means the current/most recent living situation of the parents of the participants.

<sup>7</sup>finsec refers to whether people's parents work in the financial sector.

<sup>8</sup>parsup measures whether people receive financial support from their parents for their studies

<sup>9</sup>parapp refers to the parental experience with investing apps.

<sup>10</sup>govsup measures whether people receive government support for their studies.

<sup>11</sup>risk means the self-prescribed risk level with investing, given by the participants.

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More details about the questions and the answers are put in the appendix.

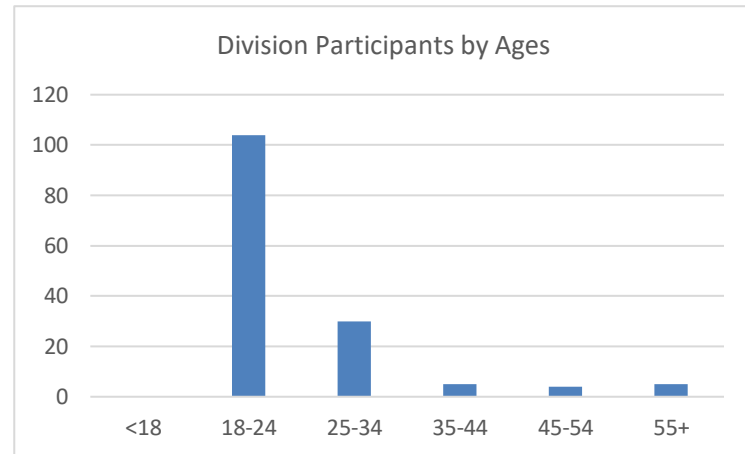
On the next page, the results of the regressions can be found.

## 4 Results

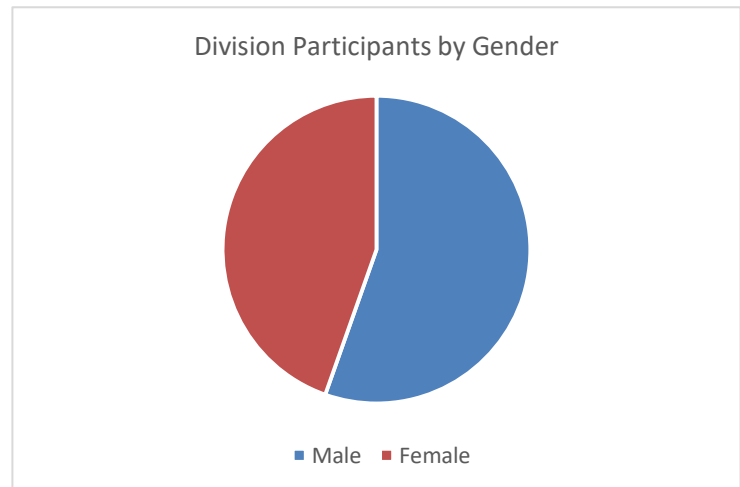
### 4.1 Description Data

In this paragraph, one can find information about the participants. The characteristics based on ages, gender, education and investing app usage have been split out and shown here.

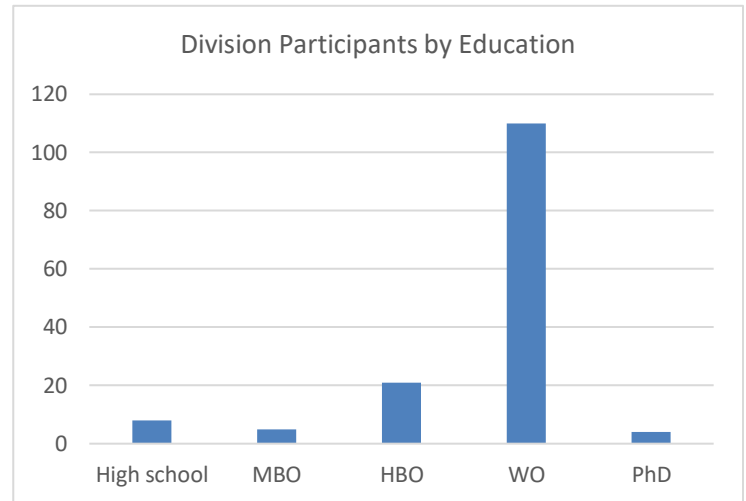
From the 148 respondents, around 70% of them are between 18-24 years old. Since this survey was spread around in student group texts, a large proportion of this group can be determined to be students. Therefore, the results of the survey are mostly applicable to the student population. For future research, people could send out surveys to a more diverse population to see if there are differences in responses. Since the younger generation is tech-savvy, there is a larger chance for them to have an investing app compared to the older generations.



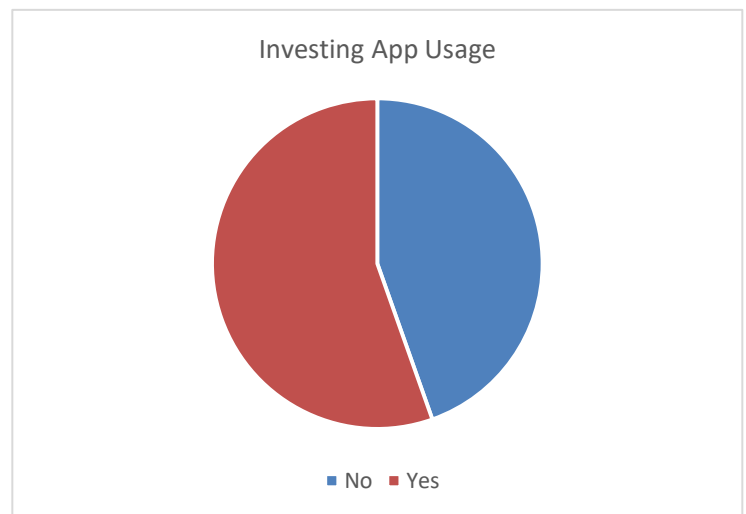
Regarding the differences in gender between the respondents, the number of men and women who have responded is quite equal; 55% of the respondents are male.



For most respondents, WO is the highest level of education that they have received. Since 74% of the participants have received a WO education, there could be a bias in the dataset. This should be kept in mind in case others would like to delve deeper into this subject.



Since the thesis is about comparing the groups who do make use of an investing app and who do not, here it is possible to see the division between the participants in the two groups. When the survey was sent, a comment was placed to make sure that people would respond who do make use of an investing app. This helped in such a way that the group who does have an investing app is bigger than the group who does not have the app.



## 4.2 Results Cluster 1

In the table below, the results can be found based on the regressions run in cluster 1.

TABLE 6: REGRESSIONS EDUCATION & RISK-LEVEL THOUGHT EXPERIMENT ON INVESTING APP USAGE

	<i>Dependent variable</i>				
	Investing App Usage				
	(1)	(2)	(3)	(4)	(5)
Education-level Participant	0.103*	0.086	-0.010	-0.039	-0.030
	(0.049)	(0.049)	(0.018)	(0.101)	(0.100)
<i>Risk-level Thought Experiment</i>		0.004*	-0.005	-0.008	-0.006
		(0.002)	(0.009)	(0.008)	(0.008)
Age Participant				-0.042	0.021
				(0.041)	(0.044)
<i>Gender Participant</i>				-0.256**	-0.267**
				(0.090)	(0.089)
Financial Literacy Level Participant				0.066*	0.072**
				(0.027)	(0.027)
<i>Highest Received Education Level Parents</i>					0.049
					(0.039)
Living Situation Parents					0.018
					(0.037)
<i>Parents Work Financial Sector</i>					-0.152
					(0.105)
Financial Support from Parents					0.041
					(0.080)
<i>Parents Use Investing Apps</i>					-0.148
					(0.047)
<b>Interaction Education: Risk</b>			<b>0.002</b>	<b>0.002</b>	<b>0.002</b>
			<b>(0.002)</b>	<b>(0.002)</b>	<b>(0.002)</b>
Constant	0.177	0.051	0.405	0.902	1.034
	(0.185)	(0.191)	(0.403)	(0.480)	(0.547)
Observations	148	148	148	148	148

R <sup>2</sup>	0.029	0.062	0.069	0.247	0.329
Adjusted R <sup>2</sup>	0.022	0.049	0.049	0.215	0.275
Residual Std. Error	0.493	0.486	0.486	0.442	0.425
	(df = 146)	(df = 145)	(df = 144)	(df = 141)	(df = 136)

Notes: \*\*\* Significant the at the 1 percent level. \*\* Significant at the 5 percent level. \* Significant at the 10 percent level. Source: Author calculations.

In column 1, the education level of the participants is regressed against their investing app usage. The results show that when the education level increases of the participants with 1, there is a 10.3% chance that the participants will make use of the investing applications. However, this is only the case when the p-value is 10%. The adjusted R<sup>2</sup> that comes along with it is only 2.2%. However, as only two variables are regressed against each other, the low value makes sense. The (adjusted) R<sup>2</sup> squared states how much of the deviation in the independent variable can be explained with the dependent and control variables added to the model.

In column 2, the risk-level of the participant based on the number of boxes they chose to open in the BRET experiment is added to the regression. Then the results change since education is no longer significantly positively related to the investing app use, but risk-level is. So, in this case, the more boxes the participant opens, the chance increases significantly, but only with 0.4%, that a participant will use an investing app. The R<sup>2</sup> increases a little bit to 4.6%.

In column 3, when adding the interaction effect to the regression, this leads to insignificant results. Moreover, the dependent variables now also have insignificant values. Therefore, these three coefficients give too little information to explain the deviation of the investing app usage. This can also be seen by the R<sup>2</sup>; adding the interaction effect only increases the R<sup>2</sup> with 0.3%.

In column 4, the dependent variables and the interaction effect are still not significant. However, gender and financial literacy do have a significant effect on investing app usage. For the variable gender, a dummy variable was used. The assigned value for men was 0 and for women 1. With

this dummy variable, the chance of investing decreases with 25.6% when the participant is a woman instead of a man. This is consistent with what is found in literature that men are more risk-seeking than women. Moreover, the more financially literate level a person is, the higher the chance that people make use of an investing app (namely with 6.3%). From literature, the conclusion has been found that the higher the level of financial literacy, the more comfortable people feel with making (risky) finance decisions, such as investing on an app. These results are significant for p-values of 5% and 10%. Moreover, now that the individual control variables are added to the regression, the adjusted  $R^2$  has increased quite a bit to 21.5%.

In column 5, the parental control variables have been added to the regression. The results regarding which variables are significant and insignificant are the same compared to before. However, there is one interesting none of the three previously analysed effects are significant. When at least one parent makes use of an investing app, the chance that their child will make use of an investing app decreases significantly with 14.8% for p-values of 5% and 10%. A possible reason explaining this phenomenon is that the child could perceive the use of investing apps as a potential risk. The parents of the child could have lost some money due to the app and the child wants to prevent this. On the other hand, it could also have to do with the participants that took part in the survey. Most of them are students, who grew up with technology while their parents did not. Therefore, it might be a bigger step for the parents to make use of the apps compared to their children. This is an interesting topic which requires further research. Coming back to the regression, since investing apps are quite easy in use, this can decrease the perceived danger level of losing money on investments. The  $R^2$  of this model is 27.5, which means that the coefficients explain a small to moderate effect of the model.

All in all, the variables that are the focus of this thesis (risk-preferences and SES) cannot significantly explain the variance in investing app usage. Gender, financial literacy and whether one's parents make use of an investing app (although in the opposite way of what was expected) do play a part in explaining the variance.

### 4.3 Results Cluster 2

Below here, the results of cluster 2 have been added. For SES, instead of the education-level of the participants, the variable has been swapped for financial support from government.

TABLE 7: REGRESSIONS FINANCIAL SUPPORT FROM GOVERNMENT & RISK-LEVEL THOUGHT EXPERIMENT ON INVESTING APP USAGE

	<i>Dependent variable</i>				
	Investing App Usage				
	(1)	(2)	(3)	(4)	(5)
Government Support	-0.018	-0.017	-0.142	-0.107	-0.146*
	(0.031)	(0.031)	(0.078)	(0.072)	(0.072)
<i>Risk-level Thought Experiment</i>		0.005*	0.002	-0.001	-0.002
		(0.002)	(0.002)	(0.002)	(0.002)
Age Participant				-0.022	0.048
				(0.040)	(0.044)
<i>Gender Participant</i>				-0.236**	-0.257**
				(0.089)	(0.087)
Financial Literacy Level				0.075**	0.073**
Participant				(0.026)	(0.026)
<i>Highest Received Education</i>					0.040
<i>Level Parents</i>					(0.038)
Living Situation Parents					0.044
					(0.038)
<i>Parents Work Financial Sector</i>					-0.199
					(0.101)
Financial Support from					0.046
Parents					(0.079)
<i>Parents Use Investing Apps</i>					-0.154**
					(0.047)
<b>Interaction Education: Risk</b>			<b>0.002</b>	<b>0.002</b>	<b>0.003*</b>

			<b>(0.001)</b>	<b>(0.001)</b>	<b>(0.001)</b>
Constant	0.573***	0.360***	0.483***	0.747**	0.915**
	(0.052)	(0.098)	(0.121)	(0.242)	(0.334)
Observations	148	148	148	148	148
R <sup>2</sup>	0.002	0.044	0.064	0.246	0.345
Adjusted R <sup>2</sup>	-0.005	0.031	0.045	0.213	0.292
Residual Std. Error	0.500	0.491	0.488	0.442	0.420
	(df = 146)	(df = 145)	(df = 144)	(df = 141)	(df = 136)

Notes: \*\*\* Significant the at the 1 percent level. \*\* Significant at the 5 percent level. \* Significant at the 10 percent level. Source: Author calculations.

The difference between cluster 1 and 2 is that the SES is measured by education in cluster 1 and by financial support from the government in cluster 2. Every participant got a number assigned to them based on how much support they received from the government; 1 for no financial support, 2 for a loan, 3 for a basisbeurs and 4 for receiving a loan and a basisbeurs. The range is based on how much people depend on the financial support from the government; from not necessary to very necessary.

In column 1, the results can be found that government support is insignificantly negatively correlated with the investing app usage. This explains why the R<sup>2</sup> squared is very low and the adjusted R<sup>2</sup> squared is even negative.

In column 2, the risk-level from the participants based on the BRET experiment is added to the regressions. In this column, the risk-level is positively correlated with the investing app usage. The effect is very small however, since when the risk-level of the participants increases with one, the probability that people make use of the investing app increases with only 0.5%. However, there is now a positive R<sup>2</sup> of 3.1%. Therefore, this model is a little better at explaining what the investing app usage is determined by.

In column 3, the interaction effect is added to the regression. Once again, when only the independent variables and the interaction effect are considered, all the coefficients are not significantly correlated with investing app usage.

In column 4, again, the coefficients and the interaction effect are insignificant. However, just as with cluster 1, gender and financial literacy are significantly correlated with investing app usage. In this sample, the probability of one making use of an investing app decreases with 23.6% when a woman invests compared to a man. Moreover, when one is more financially literate, they are 7.5% more likely to invest. The adjusted  $R^2$  of 21.3% shows that the dependent and independent variables can explain moderately what influences whether people make use of investing applications or not.

In column 5, interesting results are shown. Receiving financial support from the government is now significantly correlated with investing application use. When one receives more financial support from the government, the chance decreases with 14.6% that the participant will make use of the application. This can be explained as the more financial support people get from the government, the more likely that the individuals are dependent on this sum of money to survive. Therefore, they will not have any amount over which can be put into investing. Gender and financial literacy are still negatively/positively correlated with investing. Lastly, again the result is shown that when the parents of the participants make use of investing apps, the participants will be less likely to make use of investing apps. The chance that they will make use of investing apps decreases then with 15.4%. This model has a  $R^2$  of 29.2%; therefore, the model explains less than 30% of the variation in investing app usage. Therefore, this is a weak model.

All in all, the coefficient of the interaction effect is significant by itself. However, since the coefficient of the risk measure is insignificant, the interaction does not make sense. Therefore, there is not enough evidence to state that there is a significant interaction effect between SES, risk and investing app usage.

#### 4.4 Results Clusters 3 and 4

For clusters 3 and 4, instead of the risk-level based on the thought experiment, the self-described risk-attitude is used. These results are put down in the appendix B. The most important results are discussed down in the next paragraph.

#### 4.5 Overview Conclusions All Clusters

In the table below, the most important results from the clusters can be found.

TABLE 8: OVERVIEW CONCLUSIONS ALL CLUSTERS

Cluster	<i>Independent Variables</i>	<i>Significant Relationships to Investing App Usage</i>
1	<ul style="list-style-type: none"> <li>• Risk: Thought Experiment</li> <li>• SES: Education</li> </ul>	<ul style="list-style-type: none"> <li>• Individually, SES is positively correlated to app usage.</li> <li>• Together, SES and risk-preferences are not significantly correlated.</li> <li>• <b>Interaction effect is not significant.</b></li> <li>• Including control variables: <ul style="list-style-type: none"> <li>- Gender is negatively correlated.</li> <li>- Financial literacy level is positively correlated.</li> <li>- Investing app usage parents is negatively correlated.</li> </ul> </li> </ul>
2	<ul style="list-style-type: none"> <li>• Risk: Thought Experiment</li> <li>• SES: Government support</li> </ul>	<ul style="list-style-type: none"> <li>• Individually, risk is positively related to investing app use</li> <li>• <b>Interaction term is only barely positively significantly correlated when control variables are added.</b></li> <li>• <b>Interaction effect is significant in one case, but the risk level coefficient is not. Therefore, this interaction effect does not make sense.</b></li> </ul>

- 
- |   |  |  |
|---|--|--|
|   |  | <ul style="list-style-type: none"><li>• Including control variables:<ul style="list-style-type: none"><li>- Financial support from government is negatively correlated.</li><li>- Gender is negatively correlated.</li><li>- Financial literacy level is positively correlated.</li><li>- Investing app use parents is negatively correlated.</li></ul></li></ul>  |
| 3 | <ul style="list-style-type: none"><li>• Risk: Self-Described</li><li>• SES: Education</li></ul>          | <ul style="list-style-type: none"><li>• Individually and with other variables added to the model, risk-preferences is positively correlated</li><li>• Education is never significantly correlated</li><li>• The interaction is never significant</li><li>• Including control variables:<ul style="list-style-type: none"><li>- Financial support from government is negatively correlated.</li><li>- Gender is negatively correlated.</li><li>- Financial literacy level is positively correlated.</li><li>- Investing app use parents is negatively correlated.</li></ul></li></ul> |
| 4 | <ul style="list-style-type: none"><li>• Risk: Self-Described</li><li>• SES: Government Support</li></ul> | <ul style="list-style-type: none"><li>• Individually, risk and education positively related to investing app use</li><li>• <b>Interaction term is never significant</b></li><li>• Including control variables:<ul style="list-style-type: none"><li>- Financial support from government is negatively correlated.</li><li>- Gender is negatively correlated.</li><li>- Financial literacy level is positively correlated.</li><li>- Investing app use parents is negatively correlated.</li></ul></li></ul>  |

All in all, risk and education are correlated individually with investing app use. The interaction effect is never significant, which answers our research question. However, there are some control variables which always have a significant result once all of them are added to the regression, gender, financial literacy and investing app use parents play an important role.

#### 4.6 Answering Hypotheses and Research Question

The first hypothesis is shown below and will be discussed:

*H<sub>10</sub>: There is no significant positive relationship between SES and the usage of investing apps.*

*H<sub>1A</sub>: There is a significant positive relationship between SES and the usage of investing apps.*

In two of the four clusters, there is a positive significant relationship between SES and the usage of investing apps; thus the higher the social economic status of the participants, the more likely they are to make use of an investing app. However, with the two clusters which had significant results, the measure of SES was once education and for the other time, it was financial support from the government. Therefore, there is not enough evidence to reject the first null hypothesis.

Now, the second hypotheses will be discussed:

*H<sub>20</sub>: There is no significant positive relationship between risk-seeking behaviour and the usage of investing apps, when including SES in the model.*

*H<sub>2A</sub>: There is a significant positive relationship between risk-seeking behaviour and the usage of investing apps, when including SES in the model.*

In the last cluster, there is a case that risk and education are both significantly positively correlated with the usage of investing applications. However, since for the other three clusters this is not the case, there is not enough evidence to reject the second null hypothesis.

Lastly, the last hypotheses will be discussed:

*H<sub>3A</sub>: There is a significant positive interaction effect between SES, risk-seeking behaviour, and the usage of investing apps.*

*H<sub>3A</sub>: There is a significant positive interaction effect between SES, risk-seeking behaviour, and the usage of investing apps.*

Lastly, only in cluster 2, a significant result has been found between the interaction effect of SES, risk-seeking behavior, and the usage of investing apps. Therefore, the third null hypothesis can neither be rejected.

Based on this information, the research question can be answered. The research question is: *How do social economic status of individuals and their risk willingness interact and determine whether they make use of investing apps?*

The answer on the research question is that there not enough evidence to be sure to show that there is a significant interaction effect between SES, risk preferences and the usage of investing applications.

## 5 Discussion and Conclusion

This part will consist out of three parts, namely a summary, implications, and limitations.

### 5.1 Summary

Since the introduction of investing apps, the amount of users has grown to 130 million users in 2021. Due to the accessibility of the app, it becomes easy for people from different kinds of social economic status (SES) to start investing as there is no minimum requirement necessary to pay before starting, compared to traditional investing. However, the people with a lower SES could come into financial trouble when the stocks do not make the profit they expected. Therefore, it should be analyzed whether this group of people is more or less likely to invest than people with a higher SES. Next to the financial situation, personal preferences regarding investing can also play a role, such as risk-preferences. In case there is an interaction effect between the two groups, such as the group with a lower SES being more risk-seeking and therefore more likely to invest, this could mean that more warnings or more regulations should be implemented to protect certain groups of people. Therefore, the research question is: *How do social economic status of individuals and their risk willingness interact and determine whether they make use of investing apps?*

The applications have many benefits such as low costs, easy accessibility, speed of execution and low level of financial literacy necessary. However, this also leads to some drawbacks. The advice which are given are not very personal so perhaps there are other plans which would the personal risk preferences better. Moreover, due to the easiness in use of the apps, people need to have more self-control and focus on critical thinking to make sure whether they should invest or not.

To find out whether there is an interaction effect between SES, risk preferences and investing app use, a survey was conducted. 148 participants have taken part in it. Four clusters of regressions were run with the independent variables for SES (education or financial support from the government) and risk-preferences (based on the BRET experiment or the self-described risk-

preferences). The reason that four clusters were run is that two independent variables are used and for both, two different measures were implemented. Only for two of the cluster regressions, SES is positively correlated to the usage of investing apps. In one case, SES is only positively correlated individually so without control variables to investing applications, so it is not a very significant result. Secondly, risk-preferences, when including SES in the model, are only positively correlated to investing app usage in one cluster. Therefore, there is no positive significant relationship between risk preferences and investing app usage, when holding SES constant. Thereby, one significant interaction effect has been found between the three variables. However, since education itself was not significantly correlated with investing app usage, this interaction is nonsensical. Next to this, there were three variables which were significantly correlated with investing app usage. Men are more likely to make use of investing apps than women and people who are more financially literate are more likely to use the apps. These results were expected. However, there was one surprising significant result which is that individuals whose parents use the investing app, are less likely to use the app compared to people whose parents do not have experience with the app. Lastly, coming back to the research question “How do social economic status of individuals and their risk willingness interact and determine whether they make use of investing apps?”, the answer is that the coefficients do not interact in a significant way to determine how to make use of investing apps, at least based on this sample.

## 5.2 Implications

There are several implications that can be derived from this research:

- 1) For policymakers:
  - a. First, SES only plays a significant role regarding determining when one makes use of an investing app when no other factors are added to the regression. As SES and risk preferences do not have a significant effect on investing app use, investing apps do indeed lower the threshold of starting to invest compared to traditional investing. Therefore, this research confirms investing apps makes investing appealing to both people with a high SES but also with a low SES. As a result, the

difference in wealth inequality between the two groups can decrease over time by promoting investing apps and healthy ways of investing.

- b. Since the risk preferences of the groups of people are not very different from each other, there is no sub-group, at least based on their SES, which needs to be protected more. Therefore, no extra precautions are necessary to warn people with a lower SES to keep an eye on what they invest in.
- c. The SES that people have influences their risk tolerance; how much risk are individuals able to take on based on the number of resources they have. However, since there is no significant interaction effect between SES and risk-preferences on investing apps usage, risk tolerance seems to not play a big role here regarding whether people make use of the apps. This is an assumption which could be investigated in further research.

2) For academic research:

- a. Moreover, traditional banking is mainly available to people with a higher SES. Since no result has been found which states that people with a lower SES are more likely to make use of investing apps, it can be assumed that investing apps are a good contender for traditional banking. Perhaps the role of traditional banking will reduce in the future. This could be an interesting topic to investigate further.
- b. The surprising result that individuals whose parents make use of investing apps are less likely to use the apps themselves is a finding which is not easy to find back in current literature. Therefore, this could be an intriguing research proposal for a researcher to delve deeper into.
- c. Lastly, in the regressions, it was found (although with insignificant results), that when children receive financial support from their parents, that they are less likely to invest. To grasp better what the relationship looks like, for further research, the researcher could ask how much financial support students get and for which purpose.

### 5.3 Limitations

There are several limitations which could be improved on in future research:

- 1) Asking out government support can lead to results showing how much extra finances the people get to survive. However, there are also exceptions to the rule that people only borrow money to survive. Some only borrow money to invest while they have enough resources to live day to day.
- 2) Moreover, since the type of financial support from the government changes over the years (loan vs gift), it is quite difficult to compare how much people need to the financial support with this indicator. Instead of asking out financial support from the government, a question could be asked referring to whether students have a side job and how much they depend financially on this employment.
- 3) Most participants are between 18-24 years old, so a lot of control questions are asked towards the parents' financial situation as the participants themselves have not reached their full earning potential yet. However, there could be a case of social mobility playing a role affecting the SES of people. Therefore, when giving out a similar kind of survey to an older audience, more questions could be asked about the financial situation of the participants self to prevent this problem from coming up.

## 6 Bibliography

AFM. (2021, December 14). *Bijna 2 miljoen huishoudens aan het beleggen*.

<https://www.afm.nl/nl-nl/consumenten/actueel/2021/december/2-miljoen-mensen-aan-beleggen>

Ahmad, M., & Wu, Q. (2023). Heuristic-driven biases as mental shortcuts in investment management activities: A qualitative study. *Qualitative Research in Financial Markets, ahead-of-print*(ahead-of-print). <https://doi.org/10.1108/QRFM-10-2022-0167>

Aldridge, I., & Krawciw, S. (2017, February). *Real-Time Risk: What Investors Should Know About FinTech, High-Frequency Trading, and Flash Crashes* | Wiley. Wiley.Com. Retrieved from <https://www.wiley.com/en-us/Real+Time+Risk%3A+What+Investors+Should+Know+About+FinTech%2C+High+Frequency+Trading%2C+and+Flash+Crashes-p-9781119318965>

Apesteguia, J., Oechssler, J., & Weidenholzer, S. (2020). Copy Trading. *Management Science*, 66(12), 5608–5622.

Assia, Y. (2016). EToro – Building the World’s Largest Social Investment Network. In *The FinTech Book* (pp. 196–197). John Wiley & Sons, Ltd. <https://doi.org/10.1002/9781119218906.ch51>

Attias-Donfut, C., Ogg, J., & Wolff, F.-C. (2005). European patterns of intergenerational financial and time transfers. *European Journal of Ageing*, 2(3), 161–173. <https://doi.org/10.1007/s10433-005-0008-7>

Baker, H. K., & Nofsinger, J. R. (2002). Psychological biases of investors. *Financial Services Review*, 11(2), 97–117.

Bikhchandani, S., & Sharma, S. (2001). Herd Behavior in Financial Markets. *IMF Staff Papers*, 47, 1–1.

Birdthistle, W. A. (2008). *The Fortunes and Foibles of Exchange-Traded Funds: A Positive Market Response to the Problems of Mutual Funds* (SSRN Scholarly Paper No. 1267466).  
<https://papers.ssrn.com/abstract=1267466>

Bouck, T. (2022, March 31). *“Is Robinhood a Smart Way to Invest?” by Tanner Bouck*.  
<https://scholarsarchive.byu.edu/marriottstudentreview/vol5/iss2/8/>

Bozkurt, V., Tartanoglu, S., & Dawes, G. (2015). Masculinity and Violence: Sex Roles and Violence Endorsement among University Students. *Procedia - Social and Behavioral Sciences*, 205, 254–260. <https://doi.org/10.1016/j.sbspro.2015.09.072>

Brenner, M., & Izhakian, Y. (2018). Asset pricing and ambiguity: Empirical evidence  *Journal of Financial Economics*, 130(3), 503–531. <https://doi.org/10.1016/j.jfineco.2018.07.007>

Chang, Y., & Thomas, H. (1989). The impact of diversification strategy on risk-return performance. *Strategic Management Journal*, 10(3), 271–284.  
<https://doi.org/10.1002/smj.4250100306>

Chaudhry, S., & Kulkarni, C. (2021). Design Patterns of Investing Apps and Their Effects on Investing Behaviors. *Designing Interactive Systems Conference 2021*, 777–788.  
<https://doi.org/10.1145/3461778.3462008>

Chawla, D., Bhatia, S., & Singh, S. (2022). Parental influence, financial literacy, and investment behaviour of young adults. *Journal of Indian Business Research*, 14(4), 520–539.  
<https://doi.org/10.1108/JIBR-10-2021-0357>

Chiong, C., & Shuler, C. (2010). *Learning: Is there an app for that?*

Considine, G., & Zappalà, G. (2002). The influence of social and economic disadvantage in the academic performance of school students in Australia. *Journal of Sociology, 38*(2), 129–148. <https://doi.org/10.1177/144078302128756543>

Cook, J. M., Clark, M., Wojcik, K., Nair, D., Baillargeon, T., & Kowalik, E. (2020). A 17-Year Systematic Content Analysis of Social Class and Socioeconomic Status in Two Counseling Journals. *Counseling Outcome Research and Evaluation, 11*(2), 104–118. <https://doi.org/10.1080/21501378.2019.1647409>

Crosetto, P., & Filippin, A. (2013). The “bomb” risk elicitation task. *Journal of Risk and Uncertainty, 47*(1), 31–65.

Curry, D. (2023, January 9). *Stock Trading & Investing App Revenue and Usage Statistics (2023)—Business of Apps*. <https://www.businessofapps.com/data/stock-trading-app-market/>

Darskuvienė, V., & Lisauskiene, N. (2021). Linking the Robo-advisors Phenomenon and Behavioural Biases in Investment Management: An Interdisciplinary Literature Review and Research Agenda. *Organizations and Markets in Emerging Economies, 12*(2), 459–477.

Di Mauro, C., & Maffioletti, A. (2004). Attitudes to risk and attitudes to uncertainty: Experimental evidence. *Applied Economics, 36*(4), 357–372. <https://doi.org/10.1080/00036840410001674286>

DNB. (2022, March 24). *Dutch households' investments grew to over EUR 180 billion in 2021*. <https://www.dnb.nl/en/statistical-news/snb-2022/dutch-households-investments-grew-to-over-eur-180-billion-in-2021/>

- Dobbins, M., Robeson, P., Ciliska, D., Hanna, S., Cameron, R., O'Mara, L., DeCorby, K., & Mercer, S. (2009). A description of a knowledge broker role implemented as part of a randomized controlled trial evaluating three knowledge translation strategies. *Implementation Science*, 4(1), 23. <https://doi.org/10.1186/1748-5908-4-23>
- Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., & Wagner, G. G. (2011). Individual Risk Attitudes: Measurement, Determinants, and Behavioral Consequences. *Journal of the European Economic Association*, 9(3), 522–550. <https://doi.org/10.1111/j.1542-4774.2011.01015.x>
- Fernando, W. A. M., Jayawardena, C., & Rajapaksha, U. U. S. (2022). Developing A User-Friendly Interface from Robotic Applications Development. *2022 International Research Conference on Smart Computing and Systems Engineering (SCSE)*, 5, 196–204. <https://doi.org/10.1109/SCSE56529.2022.9905084>
- France, A. (2000). Towards a Sociological Understanding of Youth and their Risk-taking. *Journal of Youth Studies*, 3(3), 317–331. <https://doi.org/10.1080/713684380>
- Galobardes, B., Shaw, M., Lawlor, D. A., & Lynch, J. W. (2006). Indicators of socioeconomic position (part 2). *Journal of Epidemiology and Community Health*, 60(2), 95–101. <https://doi.org/10.1136/jech.2004.028092>
- Gatot, A., Ari, W., & Irna, L. (2020). FINANCIAL RISK TOLERANCE ANALYSIS OF INDONESIAN RETAIL INVESTORS. *Humanities & Social Sciences Reviews*, 8, 852–875. <https://doi.org/10.18510/hssr.2020.8484>
- Gomber, P., Kauffman, R., Parker, C., & Weber, B. (2018). On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial

Services. *Journal of Management Information Systems*, 35, 220–265.

<https://doi.org/10.1080/07421222.2018.1440766>

Grable, J. E., & Joo, S.-H. (2004). *Environmental and Biophysical Factors Associated with Financial Risk Tolerance* (SSRN Scholarly Paper No. 2260471).

<https://papers.ssrn.com/abstract=2260471>

Gramitto Ricci, S. A., & Sautter, C. M. (2022). *The Educated Retail Investor: A Response to “Regulating Democratized Investing”* (SSRN Scholarly Paper No. 4189670).

<https://papers.ssrn.com/abstract=4189670>

Grusky, D. B. (2019). *Social Stratification: Class, Race, and Gender in Sociological Perspective* (4th ed.). Routledge. <https://doi.org/10.4324/9780429494642>

Guiso, L., & Paiella, M. (2004). *The Role of Risk Aversion in Predicting Individual Behaviors* (SSRN Scholarly Paper No. 608262). <https://papers.ssrn.com/abstract=608262>

Hanna, S., Waller, W., & Finke, M. (2011). The Concept of Risk Tolerance in Personal Financial Planning. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1923409>

Haslem, J. A. (2010). *The New Reality of Financial Advisors and Investors* (SSRN Scholarly Paper No. 1717085). <https://papers.ssrn.com/abstract=1717085>

Hentzen, J., Hoffmann, A., & Dolan, R. (2022). Which Consumers are More Likely to Adopt a Retirement App and How Does it Explain Mobile Technology-Enabled Retirement Engagement? *International Journal of Consumer Studies*, 46.

<https://doi.org/10.1111/ijcs.12685>

- Hoffmann, A. O. I., Post, T., & Pennings, J. M. E. (2015). How Investor Perceptions Drive Actual Trading and Risk-Taking Behavior. *Journal of Behavioral Finance*, 16(1), 94–103.  
<https://doi.org/10.1080/15427560.2015.1000332>
- Jorgensen, B. L., & Savla, J. (2010). Financial Literacy of Young Adults: The Importance of Parental Socialization. *Family Relations*, 59(4), 465–478. <https://doi.org/10.1111/j.1741-3729.2010.00616.x>
- Jung, D., Glaser, F., & Köpplin, W. (2019). Robo-Advisory: Opportunities and Risks for the Future of Financial Advisory: Recent Findings and Practical Cases. In *Contributions to Management Science* (pp. 405–427). [https://doi.org/10.1007/978-3-319-95999-3\\_20](https://doi.org/10.1007/978-3-319-95999-3_20)
- Karlsson, A., & Nordén, L. (2007). Home Sweet Home: Home Bias and International Diversification among Individual Investors. *Journal of Banking & Finance*, 31, 317–333.  
<https://doi.org/10.1016/j.jbankfin.2006.04.005>
- Kaustia, M. (2010). Disposition effect. In *Behavioral finance: Investors, corporations, and markets* (pp. 171–190). John Wiley & Sons.  
<https://research.aalto.fi/en/publications/disposition-effect>
- Kelley, K., Clark, B., Brown, V., & Sitzia, J. (2003). Good practice in the conduct and reporting of survey research. *International Journal for Quality in Health Care: Journal of the International Society for Quality in Health Care*, 15(3), 261–266.  
<https://doi.org/10.1093/intqhc/mzg031>
- Kim, P. H., Aldrich, H. E., & Keister, L. A. (2006). Access (Not) Denied: The Impact of Financial, Human, and Cultural Capital on Entrepreneurial Entry in the United States. *Small Business Economics*, 27(1), 5–22.

- Kisman, Z. (n.d.). *The Validity of Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT) in Predicting the Return of Stocks in Indonesia Stock Exchange*. Retrieved June 30, 2023, from [https://www.academia.edu/35658404/The\\_Validity\\_of\\_Capital\\_Asset\\_Pricing\\_Model\\_CAPM\\_and\\_Arbitrage\\_Pricing\\_Theory\\_APT\\_in\\_Predicting\\_the\\_Return\\_of\\_Stocks\\_in\\_Indonesia\\_Stock\\_Exchange](https://www.academia.edu/35658404/The_Validity_of_Capital_Asset_Pricing_Model_CAPM_and_Arbitrage_Pricing_Theory_APT_in_Predicting_the_Return_of_Stocks_in_Indonesia_Stock_Exchange)
- Klapper, L., Lusardi, A., & van Oudheusden, P. (2015). *Financial Literacy Around the World*.
- Kuyen, D. O. van. (2021, August 2). *Robinhood-oprichters ondanks matige beursgang toch dik miljardair*. Quote Net. <https://www.quotenet.nl/financien/beurs/a37197258/robinhood-oprichters-ondanks-matige-beursgang-toch-dik-miljardair/>
- Lee, G., & Raghu, T. S. (2014). Determinants of Mobile Apps' Success: Evidence from the App Store Market. *Journal of Management Information Systems*, 31(2), 133–170. <https://doi.org/10.2753/MIS0742-1222310206>
- Lee, I., & Shin, Y. J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. *Business Horizons*, 61(1), 35–46. <https://doi.org/10.1016/j.bushor.2017.09.003>
- Lemaster, P., & Strough, J. (2014). Beyond Mars and Venus: Understanding gender differences in financial risk tolerance. *Journal of Economic Psychology*, 42, 148–160. <https://doi.org/10.1016/j.joep.2013.11.001>
- Light, B., Burgess, J., & Duguay, S. (2018). The walkthrough method: An approach to the study of apps. *New Media & Society*, 20(3), 881–900. <https://doi.org/10.1177/1461444816675438>

- Lourenço, C. J. S., Dellaert, B. G. C., & Donkers, B. (2020). Whose algorithm says so: The relationships between type of firm, perceptions of trust and expertise, and the acceptance of financial robo-advice. *Journal of Interactive Marketing, 49*, 107–124. <https://doi.org/10.1016/j.intmar.2019.10.003>
- LSVb. (n.d.). Het oude stelsel en studiefinanciering | LSVb. *Landelijke Studentenvakbond*. Retrieved June 30, 2023, from <https://lsvb.nl/dossiers/studiefinanciering/het-oude-stelsel/>
- Lusardi, A. (2008). *Financial Literacy: An Essential Tool for Informed Consumer Choice?* (Working Paper No. 14084). National Bureau of Economic Research. <https://doi.org/10.3386/w14084>
- Lusardi, A., Mitchell, O. S., & Curto, V. (2010). Financial Literacy among the Young. *Journal of Consumer Affairs, 44*(2), 358–380. <https://doi.org/10.1111/j.1745-6606.2010.01173.x>
- Lusardi, A., Samek, A., Kapteyn, A., Glinert, L., Hung, A., & Heinberg, A. (2017). Visual tools and narratives: New ways to improve financial literacy. *Journal of Pension Economics & Finance, 16*(3), 297–323. <https://doi.org/10.1017/S1474747215000323>
- Luskin, F., Aberman, R., & DeLorenzo, A. (2005). *The Training of Emotional Competence in Financial Advisors*. [https://www.eiconsortium.org/reports/emotional\\_competence\\_training\\_financial\\_advisors.html](https://www.eiconsortium.org/reports/emotional_competence_training_financial_advisors.html)
- Maier, M., & Lakens, D. (2022). Justify Your Alpha: A Primer on Two Practical Approaches. *Advances in Methods and Practices in Psychological Science, 5*(2), 25152459221080396. <https://doi.org/10.1177/25152459221080396>

- MEERA. (n.d.). *Power Analysis, Statistical Significance, & Effect Size | Meera*. Retrieved June 30, 2023, from <https://meera.seas.umich.edu/power-analysis-statistical-significance-effect-size.html>
- Menkhoff, L., Schmidt, U., & Brozynski, T. (2006). The impact of experience on risk taking, overconfidence, and herding of fund managers: Complementary survey evidence. *European Economic Review*, *50*(7), 1753–1766.
- Mitchell, W., Wray, R., & Watts, M. (2019, February 25). *Macroeconomics*. Bloomsbury. <https://www.bloomsbury.com/us/macroeconomics-9781137610669/>
- Montford, W., & Goldsmith, R. E. (2016). How gender and financial self-efficacy influence investment risk taking. *International Journal of Consumer Studies*, *40*(1), 101–106. <https://doi.org/10.1111/ijcs.12219>
- Otuteye, E., & Siddiquee, M. (2013). *Overcoming Cognitive Biases: A Heuristic for Making Value Investing Decisions* (SSRN Scholarly Paper No. 2297170). <https://papers.ssrn.com/abstract=2297170>
- Pal, A., Indapurkar, K., & Gupta, K. (2021). Gamification of financial applications and financial behavior of young investors. *Young Consumers*, ahead-of-print. <https://doi.org/10.1108/YC-10-2020-1240>
- Peres da Costa, S. (2020). *On Purpose: Towards a Unified Theory of Responsible Investment* (SSRN Scholarly Paper No. 3736422). <https://doi.org/10.2139/ssrn.3736422>
- Puspitasari, I., Utami, F., & Raharjana, I. (2022). *Determinants of Continuance Intention to Use Mutual Fund Investment Apps: The Changing of User Behavior During the Pandemic Crisis*. 1–5. <https://doi.org/10.1109/BESC57393.2022.9995170>

- Raghubir, P., & Das, S. R. (2009). *Long and Short of It: Why Are Stocks with Shorter Runs Preferred?* | *Journal of Consumer Research* | Oxford Academic.  
<https://academic.oup.com/jcr/article-abstract/36/6/964/1863524>
- Ranganathan, K. (2006). *A Study of Fund Selection Behaviour of Individual Investors Towards Mutual Funds—With Reference to Mumbai City* (SSRN Scholarly Paper No. 876874).  
<https://doi.org/10.2139/ssrn.876874>
- Richards, D. W., & Safari, M. (2021). *Disclosure Effectiveness in the Financial Planning Industry* (SSRN Scholarly Paper No. 3928258). <https://papers.ssrn.com/abstract=3928258>
- Rigby, C., & Ryan, R. (2018). Self-Determination Theory in Human Resource Development: New Directions and Practical Considerations. *Advances in Developing Human Resources*, 20, 133–147. <https://doi.org/10.1177/1523422318756954>
- Rolison, J. J., Hanoch, Y., Wood, S., & Liu, P.-J. (2014). Risk-taking differences across the adult life span: A question of age and domain. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, 69(6), 870–880. <https://doi.org/10.1093/geronb/gbt081>
- Sachdeva, M., Lehal, R., Gupta, S., & Gupta, S. (2022). Influence of contextual factors on investment decision-making: A fuzzy-AHP approach. *Journal of Asia Business Studies*, 17. <https://doi.org/10.1108/JABS-09-2021-0376>
- Schildberg-Hörisch, H. (2018). Are Risk Preferences Stable? *Journal of Economic Perspectives*, 32(2), 135–154. <https://doi.org/10.1257/jep.32.2.135>
- Sheehy-Skeffington, J. (2020). The effects of low socioeconomic status on decision-making processes. *Current Opinion in Psychology*, 33, 183–188.  
<https://doi.org/10.1016/j.copsyc.2019.07.043>

- Shleifer, A., & Summers, L. H. (1990). The Noise Trader Approach to Finance. *Journal of Economic Perspectives*, 4(2), 19–33. <https://doi.org/10.1257/jep.4.2.19>
- Shrier, D., Canale, G., & Pentland, A. (2016). *Mobile Money & Payments: Technology Trends*.
- Siegel, J. J. (2014). *Stocks for the long run: The definitive guide to financial market returns & long-term investment strategies* (Fifth edition). McGraw-Hill Education.
- Simpson, P., & Jenkins, P. (n.d.). *Gamification and Human Resources: An overview*.
- Smith, J. K., & Smith, R. L. (2016). Socially Responsible Investing by Universities and Colleges. *Financial Management*, 45(4), 877–922. <https://doi.org/10.1111/fima.12125>
- Sohn, S.-H., Joo, S.-H., Grable, J., Lee, S., & Kim, M. (2012). Adolescents' Financial Literacy: The Role of Financial Socialization Agents, Financial Experiences, and Money Attitudes in Shaping Financial Literacy among South Korean Youth. *Journal of Adolescence*, 35, 969–980. <https://doi.org/10.1016/j.adolescence.2012.02.002>
- Spenke, M. te. (2017, September 9). *Determinants of customer experience in digitized private banking* [Info:eu-repo/semantics/masterThesis]. University of Twente. <https://essay.utwente.nl/73745/>
- Sundarasan, S., Sundarasan, D., Rahman, M., & Danaraj, J. (2016). Impact of Financial Literacy, Financial Socialization Agents, and Parental Norms on Money Management. *Journal of Business Study Quarterly*, 8.
- Sung, J., & Hanna, S. D. (1997). *Factors Related to Risk Tolerance* (SSRN Scholarly Paper No. 8284). <https://papers.ssrn.com/abstract=8284>
- Symons, D., & Pierce, R. (2019). Programs, Packages, and Apps: Some Guidance for Investment in Technology. *Australian Primary Mathematics Classroom*, 24(1), 3–6.

- Thurman, N. (2011). Making “The Daily Me”: Technology, economics, and habit in the mainstream assimilation of personalized news. *Journalism: Theory, Practice & Criticism*, 12(4), Article 4. <https://doi.org/10.1177/1464884910388228>
- Timlin-Scalera, R. M., Ponterotto, J. G., Blumberg, F. C., & Jackson, M. A. (2003). A grounded theory study of help-seeking behaviors among White male high school students. *Journal of Counseling Psychology*, 50(3), 339–350. <https://doi.org/10.1037/0022-0167.50.3.339>
- Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, 23(3), 263–280. <https://doi.org/10.1037/a0032359>
- Wahyuni, A. N., & Astuti, Y. P. (2021). *The Influence of Demographic Factors on Investment Decisions in Indonesia in the Pandemic Time Covid-19*. 350–355. <https://doi.org/10.2991/aebmr.k.210311.070>
- Wakker, P. P. (2010). *Prospect Theory: For Risk and Ambiguity*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511779329>
- Wang, S. (2021, March 2). “Consumers Beware: How Are Your Favorite ‘Free’ Investment Apps Regulated.” <https://scholarship.law.duke.edu/dltr/vol19/iss1/3/>
- Weinstein, E., & Martin, J. (1969). Generality of willingness to take risks. *Psychological Reports*, 24(2), 499–501. <https://doi.org/10.2466/pr0.1969.24.2.499>
- Wilska, T.-A. (2002). Me -- A Consumer? Consumption, Identities and Lifestyles in Today’s Finland. *Acta Sociologica*, 45(3), 195–210.
- Zhao, Z., & Balague, C. (2015). Designing branded mobile apps: Fundamentals and recommendations. *Business Horizons*, 25. <https://doi.org/10.1016/j.bushor.2015.01.004>

Zumbuehl, M., Dohmen, T., & Pfann, G. (2013). *Parental Investment and the Intergenerational Transmission of Economic Preferences and Attitudes* (SOEPpapers on Multidisciplinary Panel Data Research No. 570). DIW Berlin, The German Socio-Economic Panel (SOEP).  
[https://econpapers.repec.org/paper/diwdiwsop/diw\\_5fsp570.htm](https://econpapers.repec.org/paper/diwdiwsop/diw_5fsp570.htm)

## 7 Appendix

### 7.1 Appendix A: Questionnaire

# Effect of SES & RA on Usage of Investing Applications

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#### Start of Block: Block 1

Thank you for participating in this experiment! Your time and willingness to participate in this survey is greatly appreciated. The goal of this survey is to gather insights on the use of investing applications.

Your responses to this survey will remain completely anonymous and confidential.

In case you have any questions, or you would like your data to be deleted, you can contact me via [hanneke.kuipers@ru.nl](mailto:hanneke.kuipers@ru.nl).

The survey will take approximately 5 minutes to complete. Please read each question carefully and answer to the best of your ability.

#### End of Block: Block 1

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#### Start of Block: Block 2

Page Break

Q1 What is your age?

<18 years (1)

- 18 - 24 years (2)
  - 25 - 34 years (3)
  - 35 - 44 years (4)
  - 45 - 54 years (5)
  - 55+ years (6)
- 

Q2 What is your gender?

- Male (1)
  - Female (2)
  - Other (3)
- 

Q3 What is the highest level of education that you have received?

- High school (1)
  - MBO (2)
  - HBO (3)
  - University (4)
  - PhD (5)
-

Q4 With which statements do you agree? You can choose multiple answers.

- I know the difference between stocks and bonds. (1)
- I know how to diversify an investment portfolio. (2)
- I am familiar with the concept of risk and return in investing. (3)
- I understand the difference between a mutual fund and an index fund. (4)
- I know how to calculate the return on investment. (5)
- I don't agree with any of these statements. (6)

---

Page Break

Q5 If you were to invest, how much risk would you be willing to take on?

- A lot of risk if the potential rewards are high enough. (1)
  - A high level of risk if I felt like I had a good understanding of what I was investing in. (2)
  - It depends on the investment. For something that seems stable, I'd be willing to take on more risk. But for something new, I'd want to play it safe. (3)
  - A moderate level of risk. I want to earn a decent return on my investment, but I don't want to lose everything. (4)
  - I don't know if I would be comfortable taking on any risk at all. The idea of investing is kind of scary to me. (5)
-

Q6 What kind of experience do you have with investing?

- I have no experience (1)
  - A financial broker invests for me (2)
  - I choose an investing program at a bank and the bank invests for me (3)
  - I make use of an investing application (4)
- 

Q7 Investing applications, also known as investment apps, are mobile or web-based platforms that allow individuals to invest in various financial products, such as stocks, bonds, exchange-traded funds (ETFs), and mutual funds. Examples of these tools are DeGiro, Etoro, Bux (Zero).

Do you make use of investing applications on your phone or laptop? Please choose the statement that suits you best.

- I have never downloaded an investing application (1)
  - I have downloaded an app, but I have not made use of it (2)
  - I use the app rarely (once per month or less) (3)
  - I use the app regularly (between once per week and once per month) (4)
  - I use the app often (more than once a week) (5)
- 

Q8 How much investment applications experience does your parent/guardian or do your parents/guardians have? Multiple answers are possible. If you don't know for sure, please pick

the answer that is most probable.

- Expert, they often use the investing application more than once per week (1)
  - Intermediate, they use the application, but between once per week and once per month (2)
  - Novice, they rarely make use of the app, around once per month or less (3)
  - None, they don't have an investing application (4)
- 

Q9 Do(es)/Did your parent(s)/guardian(s) work in the financial sector?

- No (1)
  - Yes (2)
- 

Page Break

**End of Block: Block 2**

---

**Start of Block: Block 3**

Q10 In what country were you born?

- The Netherlands (4)
  - Other (5)
- 

*Display This Question:*

*If in, what country were you born? = The Netherlands*

Q11 In what municipality ("gemeente") do you live?

---

*Display This Question:*

*If in, what country were you born? = The Netherlands*

Q12 In what municipality ("gemeente") do your parents/guardians live/used to live?

In case you have more than one answer, please write in in the following format: "municipality 1 / municipality 2".

---

Q13 What is/was the most recent living situation of each of your parents/guardians? Multiple answers are possible.

- Both parents/guardians have/had a house that they bought (1)
  - Both parents/guardians live(d) in a house that they rent (2)
  - One parent/guardian lives/lived in a bought house (3)
  - One parent/guardian lives/lived in a rental house (4)
- 

Q14 What is the highest level of education your parent(s)/guardian(s) has/have received?

- High school or less (1)

- MBO (2)
  - HBO (3)
  - University (4)
  - PhD (5)
  - I don't know (6)
- 

Q15 Did or do you receive financial support for your studies? You can choose multiple answers.

- Yes, I receive(d) a basis scholarship ("basis beurs") (1)
- Yes, I receive(d) a supplementary loan ("aanvullende beurs") (2)
- Yes, I receive(d) another loan (3)
- Yes, I receive(d) financial support from my parents/caretakers (4)
- No, I do not (5)

**End of Block: Block 3**

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**Start of Block: Block 4**



Q16 Now we are going to look at a thought experiment.

Imagine there are 100 boxes. There are 99 boxes which are each worth 1 point and there is 1 box with one bomb. You want to gain as many points as possible.

You do not know in which box the bomb is, but you know that the bomb can be in any place with equal probability. When you open the box with the bomb, you will lose all your points.

You can win as long as the amount of boxes you collect is lower than the number of the box with the bomb.

So the more boxes you open, the higher the possible amount of points to gain, but also the higher the chance that you will lose your points.

How many boxes would you collect?

Please fill in a number between 0 - 100

Answer (1) \_\_\_\_\_

---

*Display This Question:*

*If now we are going to look at a thought experiment. Imagine there are 100 boxes. There is 9... Text Response Is Less Than 76*

Q31 Congratulations! The bomb was in box 76. Therefore, you can keep your points.

---

*Display This Question:*

*If now we are going to look at a thought experiment. Imagine there are 100 boxes. There is 9... Text Response Is Greater Than or Equal to 76*

Q32 Unfortunately, the bomb was in box 76. Therefore, you have 0 points.

**End of Block: Block Experiment**

## 7.2 Appendix B

The results from the tables of clusters 3 and 4 are shown here. The main difference between clusters 1 & 2 and these clusters are that the variable measuring risk-preferences has changed from the observed value based on a BRET experiment to a self-described risk-preferences level (measured by a range; from not risk-seeking to very risk-seeking).

### 7.2.1 Cluster 3

In the table below, one can find the results of the regressions from cluster 3.

TABLE 9: FINANCIAL SUPPORT FROM GOVERNMENT AND RISK-LEVEL THOUGHT EXPERIMENT

	Dependent variable				
	Investing App Usage				
	(1)	(2)	(3)	(4)	(5)
Financial Support Government	-0.018 (0.031)	0.001 (0.028)	0.075 (0.100)	0.026 (0.097)	0.120 (0.097)
<i>Risk-level Thought Experiment</i>		0.207*** (0.034)	0.189*** (0.041)	0.123** (0.043)	0.089* (0.043)
Age Participant				-0.022 (0.040)	0.025 (0.042)
<i>Gender Participant</i>				-0.182* (0.088)	-0.194* (0.086)
Financial Literacy Level Participant				0.055* (0.024)	0.057* (0.024)
<i>Highest Received Education Level Parents</i>				-0.037 (0.038)	0.034 (0.037)
Living Situation Parents					0.018 (0.036)
<i>Parents Work Financial Sector</i>					-0.181 (0.100)
Financial Support from Parents					0.066 (0.076)
<i>Parents Use Investing Apps</i>					-0.140** (0.046)
<b>Interaction Education: Risk</b>			<b>-0.022</b> <b>(0.028)</b>	<b>-0.011</b> <b>(0.027)</b>	<b>-0.034</b> <b>(0.027)</b>
Constant	0.573*** (0.052)	1.221*** (0.115)	1.161*** (0.139)	0.977** (0.297)	1.166** (0.353)
Observations	148	148	148	148	148
R <sup>2</sup>	0.002	0.208	0.211	0.308	0.382

---

Adjusted R <sup>2</sup>	-0.005	0.197	0.195	0.273	0.332
Residual Std. Error	0.500	0.447	0.447	0.425	0.408
	(df = 146)	(df = 145)	(df = 144)	(df = 140)	(df = 136)

---

Notes: \*\*\* Significant the at the 1 percent level. \*\* Significant at the 5 percent level. \* Significant at the 10 percent level. Source: Author calculations.

In column 1, financial support from the government is regressed against investing app usage. However, no significant results have been found. Since this SES factor is the only one regressed against the dependent variable and it is not significant, this explains why the R<sup>2</sup> is below zero.

In column 2, education is still does not hold a significant relationship with investing app usage. However, risk-preferences is now added and this factor is positively related to investing app usage. Thus, when the participants state they are more likely to invest in risky stocks, the probability that they make use of investing applications increases very significantly with 20.7%. Moreover, due to this, the R<sup>2</sup> increases from -0.5% to 19.7%, regarding the ability of the model to explain the variance of the dependent variable.

In column 3, when the interaction effect is added to the regression, risk preferences is still significantly correlated with the investing app usage. However, the interaction effect itself is not.

In column 4, risk-preferences are still positively correlated with investment app usage. However, now that the individual control variables are also added to the regression, there are more variables significantly related to the dependent variable. The variables are, again, gender, financial literacy.

Lastly, in column 5, surprisingly risk-preferences are still significantly positively related to investing app usage. Gender and financial literacy are also again correlated to usage of investment apps and parental use of the apps is also again negatively correlated to the usage as well. The R<sup>2</sup> is 33.2% thus the model weakly explains the dependent variable.

### 7.2.2 Cluster 4

Below here, the results can be found of the regressions from cluster 4.

TABLE 10: REGRESSIONS EDUCATION AND RISK-LEVEL THOUGHT EXPERIMENT

	Dependent variable				
	Investing App Usage				
	(1)	(2)	(3)	(4)	(5)
Education-level Participant	0.103*	0.040	-0.011	0.073	-0.028
	(0.049)	(0.046)	(0.173)	(0.174)	(0.174)
<i>Risk-level Thought Experiment</i>		0.200**	0.249	0.88	0.152
		(0.034)	(0.165)	(0.167)	(0.165)
Age Participant				-0.041	0.020
				(0.040)	(0.044)
<i>Gender Participant</i>				-0.177*	-0.196*
				(0.088)	(0.087)
Financial Literacy Level Participant				0.053*	0.057*
				(0.088)	(0.025)
<i>Highest Received Education Level Parents</i>					0.039
					(0.037)
Living Situation Parents					0.016
					(0.036)
<i>Parents Work Financial Sector</i>					-0.154
					(0.100)
Financial Support from Parents					0.057
					(0.077)
<i>Parents Use Investing Apps</i>					-0.134**
					(0.046)
<b>Interaction Education: Risk</b>			<b>0.013</b>	<b>-0.012</b>	<b>0.010</b>
			<b>(0.043)</b>	<b>(0.043)</b>	<b>(0.043)</b>
Constant	0.177	1.051***	1.244	0.883	1.353
	(0.185)	(0.225)	(0.668)	(0.650)	(0.695)
Observations	148	148	148	148	148
R <sup>2</sup>	0.029	0.212	0.213	0.304	0.375

---

Adjusted R <sup>2</sup>	0.022	0.202	0.197	0.274	0.325
Residual Std. Error	0.493	0.446	0.447	0.425	0.410
	(df = 146)	(df = 145)	(df = 144)	(df = 141)	(df = 136)

---

Notes: \*\*\* Significant the at the 1 percent level. \*\* Significant at the 5 percent level. \* Significant at the 10 percent level. Source: Author calculations.

In cluster 3, financial support from government is used as an indicator for SES and the self-described risk perception as the risk preference measure.

In the first column, education is a significant indicator for investing app usage. However, in the following columns, this is no longer the case. The adjusted R<sup>2</sup> is quite low, being 2.2%.

In column 2, risk preferences are positively correlated with investing app usage, which is in according with the found literature; if one is more risk-seeking, then they are more likely to make use of investing apps. The R<sup>2</sup> has increased a lot however, with 18% to 20%.

In column 3, when adding the interaction effect, neither that effect nor the coefficients are significantly correlated with each other. Moreover, the adjusted R<sup>2</sup> even decreases. Normally, when new variables are added to the regression, this leads to a higher R<sup>2</sup>. However, since there is overlap between the interaction effect and SES / risk-preferences, this explains the lowering of the R<sup>2</sup>.

In column 4, when the individual control variables are added, none of the independent nor dependent variable is significant. However, again, gender and financial literacy have a significant negative / positive effect on the usage of investing applications. Moreover, the R<sup>2</sup> has increased quite a bit again, now to 27.4%.

In column 5, as the parental control variables are also added to the regression, there are almost no changes regarding the significance of values on investing app usage. There is only one variable which now is significantly correlated with the use of investing apps. This is namely parental use

investing apps. So, when parents do use investing apps, this decreases the probability that their children will make use of them with 13.4% (for a p-value of 0.10).

In conclusion, the interaction effect is not significant. When adding more variables, risk preferences and SES both also have an insignificant relationship with investing app usage. Gender, financial literacy, and parental use of investing apps are the variables which are still significantly correlated with the dependent variable.