

## **Financial Literacy**

**The importance of future orientation and financial literacy for  
the asset management of pension saving**

ALEXANDER ADEN  
KASRA BIDARMANESH

**SUPERVISOR**  
Ellen Katrine Nyhus

**University of Agder, 2020**  
School of Business and Law  
Department of Management

## I. Foreword

This thesis is written as a final part of the Master's program in Business Administration at the University of Agder. The study comprises 30 credits, which is one semester and is completed in the last semester of the program.

We are two students who throughout our education have had our interest in investment methods. Men, women, young people, and older people are vulnerable to financial disabilities as they rank lowest in terms of financial knowledge. At present, it is becoming more and more attractive to research the area and the various factors that influence or have a connection with economic understanding. Lack of financial knowledge may be due to inadequate information from institutes, and lack of early learning, either through school or from parents.

During our time as students we noticed that even many fellow students do not have a clue about how to invest and why someone should start to save money early instead of spending all. This also corresponds with our experience from working in a bank, as an accountant and as a financial consultant. Our goal is to contribute in a meaningful way. We do not just want to earn the master's degree with our thesis, in fact we want to help people of getting a clear understanding of investment for pension saving. Furthermore, a focus is set on financial knowledge and future orientation, to see how this affects consumers' choice between different portfolio alternatives, and to give advice to those who need it or can change the current situation (political and financial institutions). In this context, we have had the opportunity to combine our knowledge from the courses "Research Methods in Business" and "Econometrics" in our thesis.

We would like to take this opportunity to thank our supervisor Professor Ellen Katrine Nyhus, for the great advice, help and follow-up during the semester. We also want to thank Doctor Miquelle Marchand for good help in accessing all necessary data. Furthermore, we want to thank our families, especially our girlfriends, for their support during this intensive project.

## II. Abstract

The purpose of this study is to find out whether financial knowledge, consideration of future consequences and risk attitude have an impact on portfolio choice.

With today's inflation, it has never been as important to think about the future as before. Good financial knowledge is crucial to how individuals can meet the unexpected expenses. In order to make your own financial decisions, it is important to think about the future. Developments in the financial market and in welfare schemes allow consumers to make an increasing number of major financial decisions in an increasingly complex financial market. It is important to make sure that everyone has the necessary knowledge to make good decisions that will be of the best for their own welfare.

The study uses a survey with the target groups in the Netherlands. The sample consists of 834 men and 674 women, with an average age of 50 years. It has been found that those who are risk averse, do not necessarily hold risky investment. At the same time, we find that it does not matter whether someone is financially literate or not to own a portfolio consisting of savings account, mutual funds or even stocks. The outcome also proves that our target group is future oriented, regardless of which portfolios they have chosen to invest in. The trend shows that those with higher financial knowledge choose a savings account as an investment rather than mutual funds or stocks. Comparing men to women the average score shows a higher level of financial knowledge for men. When it comes to financial behaviour, the results show that the elderly prefer a risk-free investment.

We hope our master's study will be an interesting read and can provide ideas about the importance of savings, especially for young adults' attention. At the same time, our thesis has highlighted the importance of increasing young adults' financial knowledge, about risk taking and the need for further work on measures to regulate investment ways further.

# Table of Contents

I.	Foreword .....	I
II.	Abstract .....	II
III.	List of tables .....	V
IV.	List of figures .....	V
V.	List of abbreviations .....	VI
1	Introduction .....	1
1.1	research problem .....	1
1.2	goal/objective and limitation .....	5
2	Literature review .....	6
2.1	Theory .....	6
2.1.1	Portfolio choices .....	6
2.1.2	Financial capability .....	9
2.1.3	Financial literacy .....	10
2.1.4	Consideration of future consequences .....	11
2.2	Previous findings.....	12
2.2.1	Portfolio choices.....	12
2.2.2	Financial literacy .....	15
2.2.3	Consideration of Future Consequences .....	17
2.2.4	Risk.....	19
2.3	Problem definition .....	21
2.3.1	Hypotheses .....	21
3	Data .....	22
4	Methods .....	24
4.1	research process.....	24
4.2	Unit selection.....	25
4.3	Procedure.....	26
4.4	Reliability and validity.....	32
4.4.1	Reliability.....	32
4.4.2	Validity .....	34
5	Results .....	35
6	Conclusion.....	43
6.1	Discussion.....	43
6.1.1	Risk.....	43
6.1.2	Financial literacy .....	44
6.1.3	Consideration of Future Consequences .....	45
6.2	Main finding and recommendations .....	45

7	References .....	48
VI.	Reflection Paper.....	55
VI.I	Reflection note – Alexander Aden.....	55
VI.II	Reflection note – Kasra Bidarmanesh.....	58
VII.	Appendix.....	61

### III. List of tables

Table 1, Question on how to measure Financial Literacy	27
Table 2, Overview of participants in all surveys	31
Table 3, Overview of missing value of participants in all surveys	31
Table 4, Overview of respondents' answers to question on Financial Literacy	35
Table 5, Overview of t-test	37
Table 6, results of the regression analysis	38
Table 7, Overview of hypothesis testing	38
Table 8, Overview of group division	39
Table 9, Overview of women and men attendance in portfolios	46

### IV. List of figures

Figure 1, Overview short and long-term interest rates	1
Figure 2, Overview of gender in groups	40
Figure 3, Overview of education in groups	40
Figure 4, Overview of monthly income after tax in groups	41
Figure 5, Overview of CFC score in groups	41
Figure 6, Overview of portfolio ownership in groups	42

## V. List of abbreviations

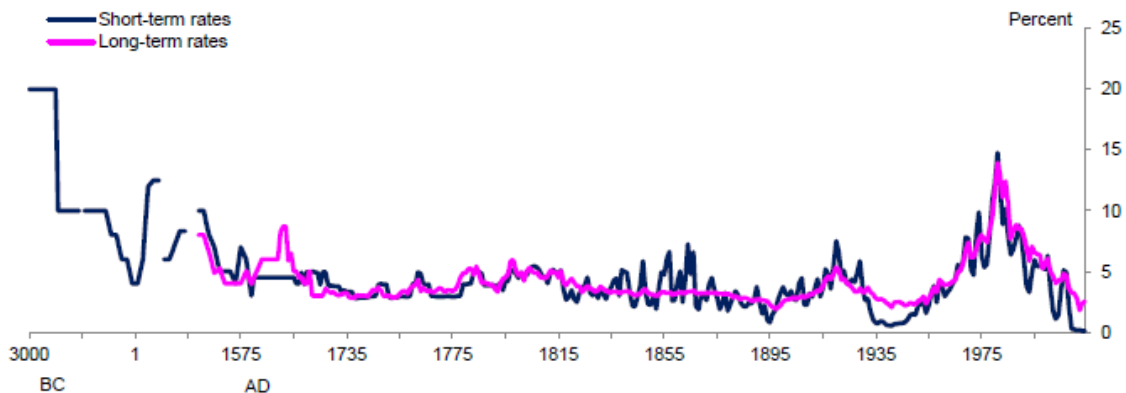
CFC	Consideration of Future Consequences
DHS	Dutch Household Survey
DNB	De Nederlandsche Bank
IAS	International Accounting Standards
ID	Identification Code
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
OECD	Organization for Economic, Co-operation and Development
ROI	Return On Investment
SHARE	Survey of Health, Ageing and Retirement in Europe

# 1 Introduction

The purpose of our study is to investigate the role of financial literacy, the risk attitude and future orientation for people's investment choice. Are individuals investing into savings accounts or do they participate at the stock market with mutual funds or stocks? We consider a long-term perspective when it comes to "how" to save and focus mainly on individuals pension saving.

## 1.1 research problem

This study is motivated by the historically low interest rate levels (Haldane (2015)). Haldane studied the development of interest rates since 3000 B.C. The most important financial market in the respective epochs was analysed, and the interest rate development was presented in a graph which is depicted below (Haldane (2015)).



Sources: Homer and Sylla (1991); Heim and Mirowski (1987); Weiller and Mirowski (1990); Hills, Thomas and Dimsdale (2015); Bank of England; Historical Statistics of the United States Millennial Edition, Volume 3; Federal Reserve Economic Database. Notes: the intervals on the x-axis change through time up to 1715. From 1715 onwards the intervals are every twenty years. Prior to the C18th the rates reflect the country with the lowest rate reported for each type of credit: 3000BC to 6th century BC - Babylonian empire; 6th century BC to 2nd century BC - Greece; 2nd century BC to 5th century AD - Roman Empire; 6th century BC to 10th century AD - Byzantium (legal limit); 12th century AD to 13th century AD - Netherlands; 13th century AD to 16th century AD - Italian states. From the C18th the interest rates are of an annual frequency and reflect those of the most dominant money market: 1694 to 1918 this is assumed to be the UK; from 1919-2015 this is assumed to be the US. Rates used are as follows: Short rates: 1694-1717- Bank of England Discount rate; 1717-1823 rate on 6 month East India bonds; 1824-1919 rate on 3 month prime or first class bills; 1919-1996 rate on 4-6 month prime US commercial paper; 1997-2014 rate on 3month AA US commercial paper to non-financials. Long rates: 1702-1919 - rate on long-term government UK annuities and consols; 1919-1953, yield on long-term US government bond yields; 1954-2014 yield on 10 year US treasuries.

Figure 1, Overview short and long-term interest rates



The general trend in interest rates goes so far as banks use their overnight deposit with the central bank (deposit facility (European Central Bank (2016))) sanctioned and currently pay -0.50% penalty interest (Deutsche Bundesbank (2019)). This fact has enormous consequences for savers. Banks should be more motivated for granting loans for a low-interest rate because this is better than paying penalty interest with the Central Bank. Therefore, financial institutions are not willing to get additional money from savers or at least offering that low interest to savers that it is not attractive (Redaktionsnetzwerk Deutschland (2019)), which also encounter pension savers.

Another development that has motivated this study is that in several countries in Europe pension reforms are making the public pension systems less generous. This means for individuals that their private saving becomes more important to ensure income adequacy in old age (d'Addio, Roger & Savignac (2020)). Demographic shifts exert additional pressure on the national pension systems. Therefore, especially younger people have to save significantly more for their retirement to reach the pension benefits today's retirees are enjoying (Amaglobeli et al (2019)). It is stated that more people are saving for their retirement, but not that much that they will reach close to current pensioners level. In the United Kingdom, for example, it is said that an auto-enrolment into a pension scheme, and a total contribution of eight per cent of the earnings is way too less for guarantying an adequate retirement income. Fifteen per cent are claimed so that citizens do not have to work until they are 77 years old (Hawthorne (2017)). And even in a generous pension system, like in Norway, people need to save more money if they do not want to retire with an older age. With a standardized retirement age, persons that are born in 1970 have to work until they are 70 years old to earn enough pension. This means for younger generations that they have to work even longer to retire comfortably (Amundsen (2019)).

Additional to the interest rate issue, the inflation rate plays an essential role in long-term investments, like retirement saving. In April 2020, the inflation, based on the Dutch consumer price index, is at a normal level of 1,19% in the Netherlands (inflation.eu (2020)). The rate of inflation describes how much goods become more expensive over a while. The general objective is that the inflation rate should be below, but close to 2% (Deutsche Bundesbank (2020)). Today's Dutch inflation rate provided; an investment needs to yield at least 1,19% so that the invested money is not getting less worth its purchase power. Since pension saving is a long-term operation, an investment should provide a return of around 2% according to the

general objective goals. But exactly the combination of low-interest rates and the current inflation rate makes it difficult for pension savers (own statement).

William F. Sharpe, a Nobel Prize winner, has worked on portfolio choices and the issue of retirement. His suggestion is to invest in a combination of low-risk inflation-securities and low-cost index funds. Last-named can be one or more, depending on the individual's profile. The index funds should represent a global portfolio of stocks and bonds. Furthermore, as longer the retirement savers investment horizon is, as more they should invest into more risky portfolios – depending on the individuals' risk profile. The potential sources of risk can significantly be reduced by diversification. Splitting the money across many risky investments is the best tactic. In the end, there is only the risk of doing badly in bad economic times, as a major fall in markets worldwide. Major falls that are caused by fears or the experience of an upcoming recession, a financial crisis or other catastrophes (Sharpe (2011)). Often people fail to follow this type of advice. Governments have noticed that problem and offer financial education as a subject that is getting taught at schools (Aksje Norge (2016)). But it is not only local governments such as Australia, Great Britain, Germany, Russia, Brazil, France, and many more that are mentioned alongside the United States of America and Canada (Zokaityte (2017)). International organisations such as the World Bank (Xu & Zia (2012)), the International Monetary Fund (IMF) (Barajas, Cihak & Sahay (2017)), the Organisation for Economic Co-operation and Development (OECD) (OECD (2015)) and the G20 (OECD (2016)) also have an interest in the financial capability of the population.

Changes in the possibilities and more extensive possibilities have also changed the importance of money for consumers. The reduction of social benefits of the public institution increases the need to take private provision. To be privately insured, or to rely not only on legal support for retirement provision and worker protection, is now another task of one's own money. More extensive consumer rights and financial services that are becoming more complex also require a "financial general education" from households. How the existing money is used is therefore more important (Schelhove & Thormählen-Hopgood (2010)).

In many countries people are not investing enough in stocks and participating directly from the stock market. Wealthy households also lack to invest in shares and are getting advised to diversify their portfolio (Ke (2018)). Even when there are a lot of other opportunities of how to invest the money, it is important for growth that people are willing to take the risk and put their money in businesses that are listed at the stock exchange. People should be able to monitor

and manage their own portfolios. Furthermore, they should know how to increase their returns on their investments or at least know how the investments are working which they are holding. Either way, investing and participating form the stock market requires knowledge. Some of the knowledge can be sourced out. For example, by holding mutual funds where a funds manager is doing the specific investments. But knowledge about risk and the funds structure is needed before deciding which portfolio to choose. As stated before, the low interest rate in combination with the inflation rate is a problem for people who are saving money, especially in the long-term view. Higher return on the people's investments need to be earned to reduce the probability of working until the age of 70 or even longer (own presentation).

In this master thesis we are focussing on portfolio choice with respect to the retirement and long-term saving issue by the current low-interest rates. The goal is to investigate how individuals are saving. Therefore, the Consideration of Future Consequences plays a significant role to determine the future planning. We want to study; how future orientation is influencing portfolio choice. Just like with the individual's financial knowledge. Our intention is to state if financially literate people invest differently to those who have little financial education.

To be able to make statements about our research question, first we are going to have a look at the literature. We will explain the terms portfolio choice, financial capability, financial literacy, and the consideration of future consequences. In addition, we review what was done so far and how our master thesis can contribute. Thereby our hypothesis will be stated. In the second step we explain our data set, how it was collected, the structure of the participants, and what the strengths and weaknesses of the used data set are. Ongoing we are describing our research process, who the target group is and how the data was prepared. We also explain which questions we used to measure financial literacy, the participants future orientation and their willingness to take risks. Also, we are going to give an overview about the number of answers that are given at the different questions and state how reliable our methods are and the validity of it. In the next step we are presenting our results, whereby some of them are presented in diagrams that are easy to understand. At the end of our master thesis we will conclude our research, state the main findings, and give a recommendation about what further studies and policy makers can focus on.

## 1.2 goal/objective and limitation

The portfolio choice is an essential key for long-term saving and an important tool for policy makers to focus on, by giving a clear indication of what can be done to improve people's financial situation when they are retired. Financial and political institutions can have an enlighten impact. Indirect by giving more financial education in schools or direct with certain campaigns. Individuals can increase their welfare when they get to know our master thesis and therefore optimize their "financial literacy". It can help with the development towards "financial competence" (own presentation). Thus, "financial competence" is the goal to be achieved through "financial general education" (Reifner (2016)) For this purpose, skills "that aim at or involve structural and functional knowledge must be taught" (Loerwald & Retzmann (2016)).

## 2 Literature review

In the last decade, financial literacy got more into the focus of politicians and researchers, especially because of the financial crises in 2008-2009 and its influences on the consumers. In the literature review, we will have a look at definitions that are needed to get a better understanding of our thesis and which is provided in section 2.1. Before our hypothesis will be stated (section 2.3) we are going to highlight what was done before and is the starting point for our Master Thesis (section 2.2).

### 2.1 Theory

Since the financial behaviour has already been scientifically investigated under various terms, a distinction needs to be done to get a clear understanding of the different expressions we are using in our master thesis.

#### 2.1.1 Portfolio choices

For most people that are working in the financial sector “portfolio choice” is a daily expression. Whether we realize it or not, almost every one of us has a financial portfolio. By portfolio choice, it is meant how investors decide or should decide which way to go with their savings and investments (Sharpe (2011)). Therefore, different determinants are essential:

##### - Assets

The term asset describes something valuable that an individual, an organization or a business is owing. In the economic context, it is referred to and represents money (which is paid into bank accounts for example), property, or land and can also be an investment into a financial instrument like shares (Cambridge Dictionary (2020a)). A distinction can be made between different types of assets and its asset classes, like if the investment is risky (Alessie, Hochguertel & van Soest (2000)). One type of asset with less risk is the **savings account**, which gives interest from the day on money was paid in. Riskier investments are mutual funds or shares. **Mutual funds** offer the opportunity to invest in joint investments. Furthermore, it is spreading the investments of the individual saver. The saver can also choose between different types of funds, like “share-funds”, “bonds-funds” or other combinations (CentERdata (2016)). This form of investment is suitable for retail investors, as shares can be acquired with already low capital input. The orientation of the fund ranges from low risk to speculative and

depends on the fund structure. It is invested in equities, bonds, commodities, bank deposits or other investment funds, depending on the orientation. Investment funds are a cost-effective way of sharing the benefits of diversification (risk diversification) (Oesterreichische Nationalbank (2020)). **Shares** are representing participation in the capital of a company. The owners of the company are all shareholder together, who benefiting when profit was made. Then the shareholder receives a dividend (CentERdata (2016)). When classical values are acquired, they protect against inflation (Lindmayer & Dietz (2018)). Which is because the shareholder owns a stake in the company.

#### - Risk

How much risk individuals are willing to take when it comes to their own financial decisions is crucial for their strategy they are choosing. Thereby, risk defines the relationship between how high the expected income of the investment should be and its portfolio choice. Bonds, growth funds and deposits are close to risk-free assets while stocks and mutual funds (typically portfolios of stocks) are riskier (Alessie et al (2000)). The taken risk can greatly be reduced by diversification (Lindmayer & Dietz (2018)).

#### - Diversification

With diversification, like investing the money into different types of assets, the risk can be lowered (Cambridge Dictionary (2020b)). As a practical explanation, it can be stated that this is the principle of “do not lay all your eggs in one basket” (own presentation). The diversification is a multifaceted distribution of assets. You can reduce risk by investing in different sectors, such as different markets or regions. Such diversification can also be achieved by selecting different asset classes or financial instruments (Lindmayer & Dietz (2018)). Financial instruments can represent different items or capital goods. In accordance to the International Accounting Standards (IAS) or International Financial Reporting Standards (IFRS), financial instruments include all items on the balance sheet that are in contact with means of payment (Breuer & Breuer (2020)). A safer return is likely on diversification. It is to be expected that the return will also be consistent and permanent (Lindmayer & Dietz (2018)).

## - Volatility

The volatility describes the extent of fluctuation of prices, share and foreign exchange rates, interest rates or even entire markets within a short period of time (Duden (2020)). It is used, among other things, for the valuation of market risk in the case of equity values or portfolios (Neusser (2011)). By diversification, the standard deviation (volatility) of an investment can be reduced. This is achieved in equities, e.g. by investing in several values of different industries and markets (Lindmayer & Dietz (2018)). The empirical standard deviation describes, mathematically, the root of the mean square deviation from the average determined value. It is an absolute measure of variation, expressed in numbers (Kurzahls (2015)).

## - Asset pricing

The asset pricing, a term that explains finding the price of a financial property, considering the relationship between the risk the investor is willing to take and the expected return of this investment. Asset pricing is part of the investors' process to make the right decision when it comes to their portfolio choice (Sharpe (2011)). Property or substance assets can be shares, various fund variants (e.g. stocks or real estate), real estate or land, commodities or business holdings (Lindmayer & Dietz (2018)).

Furthermore, different asset classes can be part of a portfolio. A portfolio is a collection of financial assets. Company shares and other investments can be part of the collection that a particular person or an organization owns, and that represents the portfolio (Cambridge Dictionary (2020c)). However, there are three recommendations to follow when investing in equities. It is better to invest (firstly) in the long term and (secondly) in values and industries that you understand. In addition, (thirdly) a wide dispersion is advisable (Lindmayer & Dietz (2018)).

The growth depends on how aggressively you are willing to invest (Alessie, Hochguertel & van Soest (2000)) or in other words, how much risk are you willing to take. It is the uncertainty that causes the savings money to fluctuate in value. Considerable fluctuations in investment can be described as high-risk esterification. An investment with little or no fluctuations being the opposite is referred to as low-risk esterification. A rule of thumb is that the higher the risk you have on your investments, the higher the return should be (Corter & Chen (2006)).

### 2.1.2 Financial capability

Financial capability can be understood as how the individuals perform when it comes to financial decision-making. This can be divided into four different parts of the financial capability scores; staying informed, planning ahead, choosing products and managing money (Atkinson, McKay, Kempson & Collard (2006)).

- "Managing money" is the key of financial capability and includes two issues. On the one hand being able to manage the earned money that well, that the people are at least able to get along with the salary until the end of the month. On the other hand, staying within their means, which means that these people are in line with their budgets (Atkinson et al (2006)).
- "Planning ahead" is about knowing which financial commitments are coming, which is an important point. Not just short-term but also long-term, like planning the retirement or at least be aware of the fact that this event will come up and needs to be planned, are be considered as planning ahead. Those who have this mindset are also prepared for uncertain, unexpected events (Atkinson et al (2006)).
- What do individuals know about financial products, what is their position about risk and how do they choose adequate financial products. On those questions, it was focused on in the section "choosing products" to get valid statements about the people's habits, assurance and participations with the financial service market (Atkinson et al (2006)).
- "Staying informed" goes hand in hand with "choosing products". It is essential to know the current status of the economy if new financial products are available, and the current ones need to be changed. As well as to know where to ask for help and where to get advice (Atkinson et al (2006)).



### 2.1.3 Financial literacy

In the sections above, the mentioned terms are understood as indicators that explain the needed input of knowledge to reach financial outcomes (in investing, debt behaviour and savings) and explains its variation (Huston (2010)). Furthermore, "financial literacy" refers to the transfer of knowledge. The "financial competence", on the other hand, not only describes the transfer of knowledge but also includes an ability that this knowledge can be used (Reifner (2011)).

The World Bank encompasses the above term with financial awareness and knowledge, including knowledge of financial products, their institutions, and their concepts. Further, it combines "financial literacy" skills such as interest rate calculation and financial opportunities in terms of how to handle money, and financial planning in general (Xu & Zia (2012)).

In her book "Financial Literacy Education" (Zokaityte (2017)), the scholar Asta Zokaityte defines financial literacy as an ability to manage personal finances, thus reflecting the World Bank's view. It is about being aware of your financial situation and feeling obliged to plan it. Especially in an increasingly advertised market, this ability is a serious and profound procedure for protecting against wrong decisions. People become their own financial manager. It makes it clear that the financial education of consumers is currently a little-studied area of research. However, schools and universities are teaching their learners how to manage the complex world of the financial market (Zokaityte (2017)). This is shown, for example, by Ontario in Canada. Pupils in grades four to twelve are taught in their financial knowledge so that they can make informed financial decisions and train their "financial competence" (Ontario Ministry of Education (2020)). Governments, such as the United States, have also been increasingly concerned with this issue for years. The United States has convened a commission, which is a merger of a wide range of US authorities, to work out the national financial literacy strategy (Financial Literacy & Education Commission (2006)). A Commission is a pre-advised parliamentary committee (Das Schweizer Parlament (2020)). One goal of the Financial Literacy & Education Commission is to move the public debate from consumption to saving. Another objective is to provide financial education for children and to provide their teachers with the appropriate tools and training to do so (Financial Literacy & Education Commission (2006)).

Nevertheless, it is not only local governments such as Australia, Great Britain, Germany, Russia, Brazil, France, and many more that are mentioned alongside the United States of America and Canada (Zokaityte (2017)). International organisations such as the World Bank (Xu & Zia (2012)), the International Monetary Fund (Barajas et al (2017)), the Organisation

for Economic Co-operation and Development (OECD (2015)) and the G20 (OECD (2016)) also have an interest in the financial capacity of the population.

In our master thesis financial literacy is measured by knowledge questions from a Dutch panel data set. It will be clear in our data section where the financial literacy questions are presented.

#### 2.1.4 Consideration of future consequences

To be able to determine to what extent individuals consider the future impact of their current decisions, the Consideration of Future Consequences (CFC) scale was designed in 1994. Individuals with a low CFC are more valuing their present needs and focussing on satisfying these. The extreme form of it is that these people even do not consider the future consequences of their current actions. On the other hand, people with a high CFC are considering the future impact of their present actions that much, that they use these distant goals as guidance for their current decision (Strathman, Gleicher, Boninger & Edwards (1994)). The Consideration of Future Consequences scale consisted of two different factors – the immediate one with seven items and the future one with five items. In 2012 two new future scale items were added. With it, the CFC scale should be improved and strengthen the structural validity and the psychometric properties (Joireman & King (2016)).

CFC had been found to relate to a lot of different types of intertemporal choices, like health decisions, criminal behaviour etcetera. Everywhere where an individual has to consider its current choice for their future consequences. It has found to be predictive for these types of behaviour, including the financial decision-making process, like borrowing or saving.

## 2.2 Previous findings

For our master thesis we were interested in “how” people save. Therefore, it will be stated what the status of research is. We will have a look at the Dutch Household Survey (DHS) data set, which we are using for our analysis, to investigate what was done regarding portfolio choice. Since we stated at our title page the purpose to figure out the asset management for pension saving, we will also do research on what was found. Pension savings are worth considering because in our opinion, it stands for long-term investments, and this long-term view could change the investment strategy of an investor.

### 2.2.1 Portfolio choices

To construct an optimal portfolio for a given level of risk, Harry Markowitz was the first person who combined different patterns of returns and published his idea in the *Journal of Finance* under the title "Portfolio selection" in 1952. This was the start of the modern portfolio theory and was extended by James Tobin six years later. Tobin's separation theorem stated that every investor holds the same portfolio of risky assets. Depending on each investor's risk affinity, the stake of risky assets can vary within the total portfolio (van Nouhuijs (2018)). Since that time, much different research on portfolio choice has been done.

A Chinese study analysed the effect of financial literacy on the portfolio choice (represented by choice between mutual funds and stocks) of Chinese households. The utilised survey contained question that measured basic and advanced financial literacy, and which made it possible to find evidence. Households with lower financial literacy invested their money themselves and had the tendency to hold only stocks. In comparison, high financial literate households invested in mutual funds and tended to transmit parts of their portfolio to experts (Chu, Wang, Xiao & Zhang (2017)).

By looking at a rich data set, the Dutch Households Survey, it was investigated how the portfolio allocation has changed in the past twenty years (in this case from the year 1980 to 2000). In the 1980s a common family would tend to save their money on a savings account since it is risk free and a capital market investment (like shares or bonds) are just for the adventurous and rich people. In the 1990s this opinion changed, and more people invested into the stock market and its risky assets, like mutual funds and stocks. Furthermore, all kinds of financial institutions offered a great number of products, combined with their free advice for all kinds of income. By sides, owing bonds – and there is no distinction between long-term and

short-term or governmental and private companies – is not usual among private households. With shares, the Dutch data set differentiates between two different types because of tax reasons. One is published by a substantial holding (treated as business capital and income from it is taxed by 25% when it exceeds the first tax bracket of 37.3%). And the second one is issued by private companies (no treatment as business capital and taxable when income from it exceeds an exemption threshold from 1,000 Euro for singles and 2,000 for couples; capital gains are not taxed). It was found that there was a dramatic change in the Dutch allocation of household portfolios. While safe investments remained stable over time, the ownership rates of risky investments have considerably increased. This result goes along with the trend in other European countries. But the level of diversification is not following. Dutch portfolios show a better diversification than those in Italy or the United Kingdom, but they are inferior towards the German ones (Alessie et al (2000)). This part is important for our thesis, since it needs to be understood that when referring to shares, we refer to those from private companies since this type of shares are not seen as business capital and the benefits that comes along with it. Furthermore, this previous finding is getting essential in the context of our later conclusion and the importance of a correct interpretation of our results (own explanation).

An Italian study concentrated on the relationship between portfolio choice and people's cognitive abilities. The survey that was used is similar to our DHS data with its participant structure. Individuals from eleven European countries took part in the Survey of Health, Ageing and Retirement in Europe (SHARE) and were aged 50 and above. The study measured verbal fluency, recall, and mathematical skills as cognitive abilities and offered detailed data on portfolio composition. It was found the tendency for stock investments related strongly with the cognitive abilities of a person—both for the indirect stock market participation through mutual funds and retirement accounts, and the direct participation. In comparison, there are less cognitive abilities needed when it comes to investing in less information-intensive assets and therefore, a less strong relationship between the cognitive skills of an individual and the portfolio choice. The main reason for not investing into financial assets like mutual funds or stocks are the transaction and information costs since the costs to process and gather information is higher for low skilled individuals (Christelis, Jappelli & Padula (2010)).

The DHS data was also used to describe asset shares, the ownership rates, and the portfolio diversification (Alessie et al (2000)). During the years 1993 to 1998 around 95% of the households owned savings or transactions accounts. The missing 5% were explained by reporting errors, since everyone should have an account to participate in financial transactions and execute them, like receiving income or pay the bills. Participating in the financial market became more important during these years too. The stock ownership rose from 11% to more than 15% and mutual funds became even more popular. Its ownership rate rose from 14% to almost 22%. This is explained by good marketing and a successful introduction by many financial institutions. Positive points to hold these managed investment accounts are the availability; many individual investors instead of some big ones who can decide and have the power of change; and the low risk due to diversification. But most of the participants, as it was concluded, did not participate due to information costs and monetary transaction costs. Therefore, it was said that the share of risk-free financial assets and risky financial assets (stocks and mutual funds) was around one third, whereby these risky assets exceeded the share of risk-free ones. Proof of an increasing trend over time. The diversification of the households' financial portfolios underlines this statement. Over the investigated period the participants that just owned risk-free assets decreased from almost 40% to around 31%. On the other hand, those who owned a diversified asset combination (consisting of risk-free, fairly safe and risky investments) increased from almost 16% to 22% of the allocation (Alessie et al (2000)). A portfolio can also include pension saving. With this, the investment horizon is usually long-term. Olivia Mitchell and John Piggott analysed portfolio choices in retirement funds. A significant proof was found that a lack of action happens when workers are automatically registered for their retirement plans by their employers. Also, because there is a lack of knowledge, and these workers are not confident enough to choose an asset composition that fits them best. So, they will choose the standard set-up of their employers' advice. Furthermore, looking at trades for over two years, just 20% of these plan members have executed any trade. Ongoing, it was figured out how active groups tend to be when it comes to their pension investments. Employees with longer tenure and higher-paid ones are more likely to invest in equities. Also, they are more active and aggressive in their portfolio choice management. Older members are more active in managing their assets, but they are owing less risky portfolios. That fits to the Australian observation, that young individuals are more risk averse than older ones. Another point is that women in comparison to men choosing more conservative retirement plans (Mitchell & Piggott (2016)).

### 2.2.2 Financial literacy

Financial literacy is not a new subject, there have been done several research studies in this area such as for example “Financial literacy and retirement planning in the Netherlands” (van Rooij, Lusardi & Alessie (2011)). The focus has been on the relation between retirement planning and financial knowledge, whereby a strong and positive relationship between these two factors was found. Those who have a higher financial knowledge are also having a higher probability to plan their retirement. Furthermore, there is a causal nexus which goes from financial literacy to planning instead of the other way around (van Rooij et al (2011)). To come to this conclusion a large household survey on financial literacy, the De Nederlandsche Bank (DNB) Household Survey, was used where the authors were able to measure financial knowledge in the Netherlands (CentERdata (2016)).

A similar survey was sent out in many other countries (such as the United Kingdom, New Zealand, Ireland, and the United States). A significant heterogeneity in the financial behaviour was found. The researchers showed that those people with a better planning of their retirement are also having higher financial knowledge. On the other hand, it was also stated that a common household is not able to manage its finances well (Atkinson et al (2006)).

“Financial literacy around the world” (Klapper, Lusardi & van Oudheusden (2015)) focused on finding and measuring the financial knowledge around the world. It was concluded that the European Union, especially northern Europe, leads in financial literacy in comparison to the rest of the world. The authors also stated why financial competence is so important. The results from the Standard & Poor’s Ratings Services Global Financial Literacy Survey of 2014 showed the lack of financial knowledge of those who participated. Further, it can be concluded that without an understanding of basic economic knowledge, people are unable to make a smart financial decision (Klapper, Lusardi & van Oudheusden (2015)).

Another research with the focus on financial literacy among university students had the purpose of studying and measuring financial literacy to find out if there is a relationship between education and financial knowledge. Unique about the study was that it took place in European countries such as Estonia, Germany, Italy, Netherlands, Poland, Romania, the Russian Federation and Turkey. The results of the analyses appeared that 72.2% of students answered correctly to the survey, which represents a medium level of financial knowledge. It also proves that education and financial knowledge have a relation with each other (Ergün (2018)).

The Royal House of the Netherlands has notified this relationship between financial literacy and education. Queen Máxima, puts much effort in the improvement of Financial Inclusion for children and their parents. It is essential to build financial education. The purpose of financial education is to give people the tools to make complex decisions easily and let them develop financial awareness and responsibility. Financial education is one of the pillars of Financial Inclusion. Well-informed consumers make well-informed decisions (Royal House of the Netherlands (2017)).

Annamaria Lusardi and Asta Zokaityte researched in this area too. Moreover, they make clear that it is essential – especially in a more and more complex world – to be able to handle your own money in a personally efficient way. Money is a finite source (in the sense of what a person is earning each month) and by being able to handle this money in an efficient way means that more products, services or goods can be bought (also in the meaning of “buying” a product an individual can save with, like a pension plan) (own presentation). “Financial Literacy Education” points out that the financial education of consumers is currently a little-studied area of research (Zokaityte (2017)).

The Organization for Economic, Co-operation and Development has done several surveys about financial literacy and its drivers. They have shown that there is a lack of knowledge and understanding of specialized, financial concepts and its terms. With the familiarity of these concepts the risk of an investment, and the return of it, is meant. Also, the concept of portfolio diversification and inflation, even when more people are more definite about inflation than the other concepts. Risk understanding and its management or the ability to make decisions about an uncertain future is a big issue that not that many consumers are able to do. Not expected life events and the potential risks that come along with it, are usually underestimated, or even completely ignored by some people. Furthermore, the OECD Survey of Adult Skills is showing that consumers have a lack when it comes to an understanding, evaluating, using, and engaging written texts. Often this lack matches with a lack of higher-order cognitive skills, like handling, understanding, and acquiring knowledge. Other financial literacy surveys and tests showed that their participants revealed a lack of numeracy skills. In particular, bad mathematical skills were shown when it came to the calculation of probabilities and fractions in the consumer decision-making process (Zokaityte (2017)).

In addition to what has been found out in the literature about portfolio choice and financial literacy, we want to connect that knowledge with the Consideration of Future Consequences and examine all together.

### 2.2.3 Consideration of Future Consequences

How people plan their future and their ability to think ahead is essential for their financial planning, especially when it comes to their retirement. The Consideration of Future Consequences measures this trend. Much literature focuses on CFC, and it needs to be said that CFC had been found to relate to a lot of different types of intertemporal choices (Joireman & King (2016)). Health decisions and criminal behaviour are just two examples. CFC covers everything where an individual must consider the future consequences of their current actions. Furthermore, it has been found to be predictive for these types of behaviour, including financial decisions like borrowing and saving money (own presentation).

How high the expected outcome of an action is, is a core aspect of human's behaviour and decision-making (Adams & Nettle (2009)). The concept of CFC, which was developed in 1994, measures this aspect (Toepoel (2010)). It has been tested on the influences on people's attitudes, their behaviour, and their information processing. Alan Strathman and colleagues found out that high CFC individuals were accepting current disadvantages when there are advantages in the future. People with a low consideration of future argued exactly the other way around – they prefer advantages in the present, regardless of the disadvantages in the future. Furthermore, the predictive ability of CFC was demonstrated (Strathman et al (1994)). In the literature, the Consideration of Future Consequences overlaps with many different topics that also deals with financial literacy and portfolio choices. Some even highlight the importance of earmarking. Today's investments and future spending are sticking together and need a good strategy (Sharpe, Scott & Watson (2007)). Annamaria Lusardi states that around one-third of current workers know how much they have to save for a retirement that is comfortable for them. She acknowledges that many households differ substantially in how they are planning their retirement, also because of different ways of learning and different costs on learning. Lusardi points out that people who are thinking about pensions, saving more than others and recommends reading books on saving for retirement and financial planning. She adds that many books are out there, which give proper instructions (Lusardi (2003)). Further, it was found a relationship between savings behaviour and the consideration of future consequences. People with higher future orientation are saving more money than those who are more interested in their well-being at present. Moreover, even when there is a weak influence, but parental orientations have a clear impact on their children's economic behaviour. The parental future orientation and conscientiousness influence the children's habits up to their adulthood (Webley & Nyhus (2006)).



The DHS data set, with its money-saving behaviour explaining variables, was used to investigate if the consideration of the future is a changeable construct. It was hypothesized that time perspective attitudes could vary, for example, when individuals have finished their education and change from being a student to having a job or when a couple is becoming parents. The internal consistency over time and the stability of the Consideration of Future Consequences scale were confirmed by this study. Nevertheless, the analysis of 11 waves in the Dutch Household Survey (1996 - 2006) showed also, that CFC is a changeable construct. Furthermore, it can be stated that education has an effect on the consideration of future consequences. The fact that there was a repeating interview with this panel did not affect the respondent's answers for this CFC section (Toepoel (2010)).

Lisa Murphy and colleagues have tested in which degree the Consideration of Future Consequences differ across five different areas that are substantial in our life: health, work, money, college, and the environment. Further evidence was found for the distinction between CFC and the present behavioural outcomes of the five different areas. In the financial domain, a strong correlation between the CFC-money immediate subscale and behaviour was found. Due to the awareness of saving and financial planning is driving the ability to overcome the present thinking factors, like compulsive spending (Murphy, Cadogan & Dockray (2019)). The individual differences in the CFC have been linked to several areas. The motivation, the goal pursuit, the decision-making, and the behaviour across the five mentioned life domains (Joireman & King (2016)).

We want to figure out if the consideration of future consequences, together with financial literacy, influences the portfolio choice. To make the correct choice when it comes to portfolios is important because the Return on Investment (ROI) is crucial for how much money is available at the time when being retired. Furthermore, as more risk, the individual is willing to take, as higher should be the expected return.

#### 2.2.4 Risk

As stated in the theory part, “risk” is a crucial determinant for the portfolio choice of an individual. How much risk investors are willing to take also has something to do with each individual cognitive skills, which is one of the major influence. Furthermore, the cognitive abilities are essential for the awareness of risk. If the skill level is low, investors can overestimate the accuracy of their information. A negative relation between stockholding and cognitive skills prefigures an overconfident investor. Who is taken more risk and trading more than rational ones, that have an impartial view (Christelis et al (2010)).

Uncertainty is one of the most common risks when investing money. One study investigated how the portfolio choice is influenced by risk attitudes, namely the illusion of control, and the avoidance of short-term loss and uncertainty. Furthermore, it was tested the effect of those attitudes on the level of investment and if the participants are willing to pay a small amount of money to avoid uncertainty, gain more control, or to have more various possibilities to choose the investment level. It was found out that having “control” is not an issue when it comes to investment behaviour and almost disappeared when payment could be made to gain control. The level of investment was not influenced by the level of ambiguity, even when individuals were willing to pay for having less uncertainty. Finally and although previous research has shown that individuals who invest not that much money in risky assets, are willing to pay money to have the opportunity to change their portfolio more frequently (Charness & Gneezy (2010)).

Risk attitudes were also investigated by a study of CentER at the Tilburg University. Different types of people got asked about various choices of uncertain income streams and quite a few questions of ad hoc measures. The motivations for this study were to test the empirical portfolio models and investigate if heterogeneity in individuals risk preferences is considered in these models. Ongoing a reasonable quantity should be explained by economic theory when it comes to the influence of risk preferences on portfolio allocation. These economic theories are tested on its predictive power and validity for portfolio allocation. It has been found that those questions on the choice between uncertain income streams do not provide much explanatory power. In comparison, ad hoc measures appear to be substantially better, and a highly significant influence on portfolio allocation is shown. In line with economic theory, risk preferences variables that are measured individually, are helping to explain the portfolio shares of a household's portfolio allocation model (Kapteyn & Teppa (2002)).

An analysis of precautionary motives for saving money assumed willingness of taking financial risks as the primary determinant. When households facing extra risks that can not be avoided, they tend to reduce the potential for other risks. It does not matter that there is no statistically significant correlation between the different types of risk. With investing in mainly safe assets, there is no need for protection against unexpected financial losses in the future. Therefore, the amount of precautionary saving should be lower than those who are holding risky assets in their portfolio. The results showed that this is the case, and a strong correlation exists (Deidda (2013)).

The biggest mistakes what the majority of the population is doing is not to hold fully diversified portfolios, even when an increasing number of households owning risky assets (Kapteyn & Teppa (2002)).

### 2.3 Problem definition

As presented above, it was found out and recommended that depending on individual risk attitude people should invest in more risky portfolios. At the same time, research proved that there is a positive relationship between financial knowledge and financial management (how to handle your own money). In addition to that, the Consideration of Future Consequences scale predicts how individuals are thinking about the future. When they have a high CFC score, they are just considering the future outcome of their current actions, unlike low scoring participants. Based on previous findings, our model is that financial literacy and the prospective view affects individuals' attitudes, attitudes that are driving the portfolio choice. Both, financial literacy, and the future orientation have been found related to the portfolio choice individuals are taking. To the best of our knowledge, our paper is the first one that empirically demonstrate the joint impact of these two variables on the portfolio choice.

#### 2.3.1 Hypotheses

In addition to our model, we want to figure out the importance of CFC and financial literacy for portfolio choice. In order to be able to answer this question, we have decided to use the following hypotheses:

##### Hypothesis 1:

Individuals that are holding stocks are more positive to risk than people who do not have stocks.

##### Hypothesis 2:

The ownership of stocks is not determined by financial literacy.

##### Hypothesis 3:

Individuals that are holding stocks are more future oriented than people who do not have stocks.

### 3 Data

We have used data from the DHS in 2005. Since 1993, CentERdata has collected annual financial data through a panel of more than 1500 households. This so-called DNB Household Survey (formerly known as the CentER Savings Survey) aims to study the impact of economic and psychological factors on household saving behaviour, which initially started as part of the VSB-CentER Savings (CentERdata (2016)). VSB-CentER Savings Project was established in 1990 with the primary goal to study households' saving behaviour (Nyhus (1996)).

The data was collected through the CentERdata internet panel, also called the CentERpanel, but there have been some challenges. Not all Dutch citizens had access to a computer with an internet connection, which also applied to some of the participants of our data collection. Those who did not have a computer or internet access received a simple machine from the DNB Household Survey on loan and an internet connection so they could participate in the survey. Those computers, also called SimPC, had limited options. SimPC has a browser to fill out the questionnaires and offers simple software such as word and email programs. The DNB household survey questionnaire has been divided into six sub-surveys. Namely these sub-surveys are General Information on the Household, Household and Work, Accommodation and Mortgages, Health and Income and Assets and Liabilities. The data have been collected yearly from approximately 1500 Dutch households which represent the Dutch population (van Els, van den End & van Rooij (2005)).

Beside of using data from DNB household survey, we also used a data set from two other modules. The modules were designed by Maarten van Rooij and colleagues, where the main focus was to measure financial literacy (van Rooij, Lusardi & Alessie (2007)). They were added to the survey in 2005 and 2006 with two additional sub-surveys, with a particular focus on financial literacy: Economic and psychological concepts (CentERdata (2016)).

Future orientation is a concept we are interested in to include in our analysis. It helps us to see how individuals respond to the questions, while they are considering the future or not. Consideration of Future Consequences is a set of questions related to the concept. Participants were able to rate themselves on a scale from 1 to 7, where 1 indicates present-oriented and 7 future-oriented. This type of question is called assessment questions, which helps us to explain how much each individual think about the future and whether the future is influencing the portfolio choice when it comes to savings. CFC questions, in the form of claims, are taken from

the DNB Household Survey (CentER data) and are used to measure future orientation decisions (CentERdata (2016)). De Nederlandsche Bank Household Survey is conducted by the Dutch company CentERdata, which is an expert in data collection and analysis. Since 1993, they have collected annual financial data to study economic and psychological factors affecting household savings. Further, they used large scales to measure each concept (Strathman et al (1994)). However, we had to limit the number of claims for each term due to time constraints.

The survey on financial literacy was sent out together with DHS's annual survey for the first time on September 23, 2005. Both had a timeline for five days to be answered. One week after the deadline expired, the survey resubmitted so that those who did not participate would have an opportunity to participate. A total of 1,508 from 2,028 participated in the survey on financial literacy. The participants had an age from 22 to 90, with an average age of 50. The gender of the participants was also distributed at 55% male and 45% female, where 46% had higher professional education (van Els et al (2005)).

The Dutch Household Survey is a rich data set in many areas with a high quality of the data collection. When it comes to the strengths, we can mention that the collection is neat and well-organized. DHS has made it easy when it comes to merging and linking the data by giving respondents an identification code (ID) so that each individual can be anonymous. Although the Dutch Household Survey has done an excellent job of collecting the data, there is still room for improvement. One weakness of the data, we have come across, is the amount of the questions and the close similarity to each other, which makes it hard to understand. Another weakness we can mention in the data is the errors created by respondents, since participants asked to answer long questions in the survey, the error can occur if participants choose to respond quickly to the survey without reading the questions carefully. A further point worth to mention is that the panel structure could have had a "negative" influence on how the participants were supposed to answer. This history effect could cause a change in the way it was answered since the attendants participated in the survey each year (which is the logic of a panel). This fact could let them think about their financial behaviour. It would be logical if those individuals keep thinking about their financial strategy and change it in accordance to the structure of the questionnaire.

## 4 Methods

This chapter explains the methodological approach chosen to test the above hypotheses. The chapter begins with a presentation of the choice of method and research design. In the next step a choice of units' selection for the survey is presented. Furthermore, a description of the method and procedure for the data collection is provided. The following section explains the limitations of the study program before we go into the reliability and validity aspects of the study.

### 4.1 research process

In our master's study, we have chosen to use a quantitative method. Quantitative methods use data collection techniques to produce numeric data. The numerical data will be used in the statistical calculation and hypothesis testing. It will allow us to describe, map, analyse and explain phenomena in quantitative quantities, which in turn makes it possible to generalize from the sample to population (Lamont & White (2005)).

There are two ways to categorize data, Primary and Secondary data. Both are useful for clarifying the concept. Primary data is data that is collected to provide answers to a clearly defined and relevant issue. To find the answers we need, we need to have a look at the survey, physically or digitally, and ask the participants. Therefore, primary data is also called survey data, which in other words, means we will do a survey study. There are three methods of survey studies which are most commend to use when we are talking about market research. Therefore, we distinguish between three ways of gathering information when conducting primary surveys such as observation, experiment, and interview. They can be used individually or together to get the most accurate picture of reality (Rabianski (2003)).

Secondary data can be described as a data source that already exists when we search in secondary sources. It can be market research that has been done before in a company or an organization. We can find this kind of information in magazines and newspapers or public records. There are both state and municipal bodies and private companies that produce statistics and overviews. The Nielsen Company is an example of an international group that specializes in market information. The company creates consumer statistics, reports on trends in society, market developments and so on. When companies conduct a market survey, they will most often start and see how much information is possible to find. If they get the answers they need,

a field study is probably not necessary. Market research is a costly step, so it is essential to research secondary sources before proceeding (Rabianski (2003)).

The research design is the overall plan used to relate the research problem to relevant and applicable empirical research. The choice of research design depends on the research problem and is important for obtaining useful research results (Sajjad Kabir (2016)). With our research question, we want to uncover how the dependent variable ‘‘portfolio choice’’ is influenced by the independent variables ‘‘CFC, risk attitude and financial literacy’’. Furthermore, the research question seeks to uncover the connection between financial knowledge and portfolio choices and the relationship between financial knowledge and personal characteristics such as future orientation and risk attitude.

We take into account that we do not include all the factors that might influence the consumer’s choice between different saving methods and other factors that might have been included in our analysis. There will also be limitations related to the DHS, we do not have the time or resources to complete full scales related to the assessment questions. Another factor that must be pointed out here is that the data from financial literacy is 15 years old, and no new study has been repeated in this area with the same survey.

#### 4.2 Unit selection

To make a selection of units, the researcher must first identify the target audience. The sample frame defines the population from which the sample was drawn. Selection units are the respondents who are collected from the sample frame. Random sample errors may occur that make respondents less representative of the group they are deducted. In addition, errors may also appear such as non-response. This type of error will further reduce the sample until the correct answer is left. With the actual sample of the unit selection it will be a non-probability sample, meaning the probability that a random individual from the population is selected is unknown (Zikmund & Carr (2013)).

The target group in our master’s thesis are the respondents in the survey which were sent out on September 23 by the Dutch Household Survey. The reason we chose to use this data set is its uniqueness, the rich data collection and specific question about financial literacy, and their method and thought of saving.



### 4.3 Procedure

As mentioned earlier we have used secondary data which was collected by the DNB Household Survey and the data set on financial literacy from wave 2005 created by Maarten van Rooij and colleagues. Our goal for this section is to create an overview of participants based on their financial competence, future orientation, portfolio choices and how willing they are to take risk, then our hypotheses will be tested.

This section begins with a presentation of variables and the design, then follows a presentation of how we have built the analysis. To achieve the goal, we have used variables such as “Savings account”, “Mutual funds”, “Stocks”, “Risk attitude”, and “Consideration of Future Consequences”. In addition to our main variables mentioned above, we have decided to use control variables to have a better understanding of the results. The control variables are such as “Gender”, “Age”, “Education”, “monthly Netto Income” (income after taxes in euros). Both data sets, financial literacy and the one collected by the DHS, can be merged and matched with the right participants using the provided formula in the codebook:  $[(nohold \times 100) + nomem = Responded\ ID]$  in each data section (CentERdata (2016)).

We started the analysis by merging the variables on both data sets using Microsoft Office Excel. In the next step, we looked at the questions of the study of financial knowledge (van Rooij et al (2007)) . A total of 16 questions were asked, and 1508 participated in the survey. The questions were then divided into two categories, which 5 of them are basic financial questions and 11 advanced ones. The exact questions can be read in the table below:

Basic questions:	Answer
11. Suppose you had €100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?	(i) More than €102 (ii) Exactly €102 (iii) Less than €102 (iv) Do not know (v) Refusal
12. Suppose you had €100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total?	(i) More than €200 (ii) Exactly €200 (iii) Less than €200 (iv) Do not know (v) Refusal
13. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?	(i) More than today (ii) Exactly the same (iii) Less than today (iv) Do not know (v) Refusal
14. Assume a friend inherits €10,000 today and his sibling inherits €10,000 3 years from now. Who is richer because of the inheritance?	(i) My friend (ii) His sibling (iii) They are equally rich (iv) Do not know (v) Refusal
15. Suppose that in the year 2010, your income has doubled, and prices of all goods have doubled too. In 2010, how much will you be able to buy with your income?	(i) More than today (ii) The same (iii) Less than today (iv) Do not know (v) Refusal
Advanced questions:	Answer
p1. If the interest rate falls, what should happen to bond prices?	(i) Rise (ii) Fall (iii) Stay the same (iv) None of the above (v) Do not know (vi) Refusal
p2. Buying a company stock usually provides a safer return than a stock mutual fund. True or false?	(i) True (ii) False (iii) Do not know (iv) Refusal

p3. Stocks are normally riskier than bonds. True or false?	(i) True (ii) False (iii) Do not know (iv) Refusal
p4. Considering a long time period (for example 10 or 20 years), which asset normally gives the highest return?	(i) Savings accounts (ii) Bonds (iii) Stocks (iv) Do not know (v) Refusal
p5. Normally, which asset displays the highest fluctuations over time?	(i) Savings accounts (ii) Bonds (iii) Stocks (iv) Do not know (v) Refusal
p6. When an investor spreads his money among different assets, does the risk of losing money:	(i) Increase (ii) Decrease (iii) Stay the same (iv) Do not know (v) Refusal
p7. If you buy a 10-year bond, it means you cannot sell it after 5 years without incurring a major penalty. True or false?	(i) True (ii) False (iii) Do not know (iv) Refusal
d1. Which of the following statements describes the main function of the stock market?	(i) The stock market helps to predict stock earnings (ii) The stock market results in an increase in the price of stocks (iii) The stock market brings people who want to buy stocks together with those who want to sell stocks (iv) None of the above (v) Do not know (vi) Refusal
d2. Which of the following statements is correct? If somebody buys the stock of firm B in the stock market:	(i) He owns a part of firm B (ii) He has lent money to firm B (iii) He is liable for firm B's debts (iv) None of the above (v) Do not know (vi) Refusal

<p>d3. Which of the following statements is correct?</p>	<p>(i) Once one invests in a mutual fund, one cannot withdraw the money in the first year</p> <p>(ii) Mutual funds can invest in several assets, for example invest in both stocks and bonds</p> <p>(iii) Mutual funds pay a guaranteed rate of return which depends on their past performance</p> <p>(iv) None of the above</p> <p>(v) Do not know</p> <p>(vi) Refusal</p>
<p>d4. Which of the following statements is correct? If somebody buys a bond of firm B:</p>	<p>(i) He owns a part of firm B</p> <p>(ii) He has lent money to firm B</p> <p>(iii) He is liable for firm B's debts</p> <p>(iv) None of the above</p> <p>(v) Do not know</p> <p>(vi) Refusal</p>

Table 1, Question on how to measure Financial Literacy

After the financial knowledge questions, we will provide an overview of the questionnaires, which helped us to categorize the participant's future orientation. A total of 2,417 people participated in the survey from 2005. They could indicate on a scale from 1 to 7 to what extent they agree or disagree to the statements, where 1 indicates 'totally disagree' and 7 indicates 'totally agree'. The exact questions are from the codebook of 2005 (CentERdata (2016)) and are named below:

- I think about how things can change in the future and try to influence those things in my everyday life.
- I often work on things that will only pay off in a couple of years.
- I am only concerned about the present because I trust that things will work themselves out in the future.
- With everything I do, I am only concerned about the immediate consequences (say a period of a couple of days or weeks).
- Whether something is convenient for me or not, to a large extent determines the decisions that I take or the actions that I undertake.
- I am ready to sacrifice my well-being in the present to achieve certain results in the future.
- I think it is important to take warnings about negative consequences of my acts seriously, even if these negative consequences would only occur in the distant future.
- I think it is more important to work on things that have important consequences in the future, than to work on things that have immediate but less important consequences.
- In general, I ignore warnings about future problems because I think these problems will be solved before they get critical.

- I think there is no need to sacrifice things now for problems that lie in the future, because it will always be possible to solve these future problems later.
- I only respond to urgent problems, trusting that problems that come up later can be solved in a later stage.
- I get clear results in my daily work; this is more important to me than getting vague results

The Consideration of Future Consequences questions are divided into two groups, five questions focusing on the future and seven questions on the present time. Since our main focus is to have statements that consider the future, we reversed the seven present oriented questions, so that we can calculate an average on all answered questions and have a valid statement on how future oriented the respondents are. In practice this means that when the participants answered “disagree” (in the original present-oriented question) it was automatically registered as an “agree” (in the reversed question), in case of the participant being future oriented. Stata 16.0 was used to reverse-coding and the codes can be found in the appendix (*1. Procedure: code used for CFC to make the future oriented*). Now that we only have opinions focused on the future, we calculated an average value of 12 questions and used it in our analysis.

In the next step, we will look at the question, which helped us to understand the risk attitude of each participant. A total of 2,417 participated in the survey. The exact question from the codebook 2005 (CentERdata (2016)) was asked as followed:

- “What would you say was the risk factor that you have taken with investments over the past few years? If you haven’t made any investments, choose ‘not applicable’.”
  - 1 I have taken no risk at all
  - 2 I have taken small risk every now and then
  - 3 I have taken some risks
  - 4 I have sometimes taken great risks
  - 5 I have often taken great risks
  - 6 not applicable
  - 7 don’t know

After that, we created an overview of our dependent variables, participants' savings method and portfolio choices. We have decided to use three variables, the first one, ‘Savings account’ which indicates a safe method of saving and ‘Mutual funds’ and ‘Stocks’ which indicates a riskier savings method. A total of 2,084 responded to the ownership of either one or all three accounts. In the table below we will make it easy to have an overview of how many participants we had in all the surveys we want to include in the analysis:

Surveys	N participated
Financial literacy	1,508
Consideration of Future Consequences	2,417
Risk attitude	2,417
Savings method/portfolio choices	2,048

Table 2, Overview of participants in all surveys

As mentioned earlier in unit selection, we are interested in the participants who participated in the study of financial literacy. Therefore, we created a formula by using Excel and which can be looked up in the appendix (2. Procedure, excel formula used for match ID in all sections with each other). We were able to find and match the correct ID in all surveys, but not all participants participated in the survey on 'Financial literacy'. We assume the missing value here indicates that participants did not answer the questions. In the table below we present an overview of the missing value of participants in all surveys:

Surveys	Missing value
Financial literacy	0
Consideration of Future Consequences	287
Risk attitude	287
Savings method/portfolio choices	361

Table 3, Overview of missing value of participants in all surveys

Now that we have an overview of our dependent and independent variables, and our missing values, we need to make it easier to interpret and analyse the data. We decided to create dummy variables by giving value '0' and '1' to the respondents. Dummy variable is a numerically coded variable used to select categories. For example, it can encode the gender category "Male" with '1' and the "Female" category with '0', thus expressing gender in numerical form. The coded variable can later appear in statistical calculation, such as regression analysis (Draper & Smith (1998)). All coded dummy variable can be looked up in the appendix (3. Procedure, overview of dummy variables). By having an overview of dummy variables, we can start the analysing of the data and test our hypotheses. This will take place under the results section.

#### 4.4 Reliability and validity

In this section we will explain why our research is reliable and why we think the research is valid.

##### 4.4.1 Reliability

Reliability refers to the trustworthiness in the measurements. It is determined by how the survey was conducted and the accuracy of the various operations in this process. If repeated measurements using the same method to give comparable results, then there is a high degree of reliability. When a measurement is valid, it is also reliable. If it is not reliable, then it can not be valid. But if it is reliable, it can or can not be accurate according to the systematic errors (Steinkühler (2010)). Another point is that it can be discussed in relation to measuring instruments, data collection and data processing. The reliability of the measuring instrument is based on whether we measure what we want to measure through the survey. Perfect reliability is rarely found, and it may be due to error sources that interfere with the results. Possible sources of error are misunderstood questions, the respondent's knowledge of what is asked for and the respondent's willingness to answer correctly (own understanding).

Some certain biases and errors can influence the reliability of our research. The first one is the participant error. Any factor which adversely alters how a participant performs. As an example, if the participants in the survey had received the survey early in the morning and had one hour to respond, and by giving the same participants the same survey but with the difference that they had a week to respond, we would get a different response to the survey. Participants with a seven days deadline would have plenty of time to think and would give a more reliable answer to the survey rather than participants with a one-hour timeframe (Steinkühler (2010)). In the survey on financial literacy sent by the Dutch Household Survey and Maarten van Rooij and colleagues, the participants had a week to respond to the survey. The same survey was sent a week later so that those who did not participate in the first one, would still have the opportunity to participate (van Rooij et al (2007)).

The second one is participant bias, any factor which produces a false response. This type of bias can easily occur when participants provide incorrect information to the survey, which makes it difficult to take into account. For example, participants may be afraid to provide their

sensitive information with the idea it will be published (Steinkühler (2010)). Still, the benefit of the survey we have used, participants have had the opportunity not to answer a single question if it was desired, this will reduce false responses

The third one is researcher error, any factor which alters the researchers' interpretation. This type of error can easily occur if participants have to answer too many questions in the survey. The participant will more likely get tired and thus choose to respond as quickly as possible, without thinking through each question, as a consequence will be that errors occur in the survey. To be able to prevent this type of error, the participant could choose to respond to the survey over several days (Steinkühler (2010)).

The fourth and the last one, which is the most common one, is the researcher bias. Any factor which induces a bias in the researchers recording of responses. As researchers, we can easily be objective when we are analysing, to avoid this kind of error we must avoid being objective to our participants (Steinkühler (2010)). The benefit in our data set is that we have only the ID of the participants, and we do not know who each participant is.



#### 4.4.2 Validity

Reliability is a prerequisite for validity. Validity means whether we measure what we want to measure. There are various forms of validity. In our study, we have three different kinds of validity to look on: construct validity, internal validity, and external validity (Steinkühler (2010)).

The first one is the construct validity. Conceptually validity is important when someone wants to measure abstract concepts and go out on the questions, we use to measure the phenomena we actually want to measure. This type of validity is commonly used when referring to operationalizations to test attitudes, abilities, and personality (Steinkühler (2010)).

The second one is internal validity. Internal validity is central to hypotheses dealing with causal effects. Internal validity refers to whether we can imply that a causal relationship exists between two or more variables. Internal validity refers to the ability by attributing the effect of what was observed to the variable used in the experiment, and not to foreign variables (Steinkühler (2010)). We will investigate whether there is a relationship between future orientation and risk attitude of each participant that can affect their savings method. We test our theory by having CFC as an independent variable and portfolio choices as dependent variables.

The third one is external validity, which is concerned with whether a study's research findings can be generalised to other relevant settings or groups. External validity is about being able to generalize from a variety of units we have studied, to a larger population we have not studied. The outcome can be expected to occur in other situations, or whether we can generalize to other sentences (Steinkühler (2010)). As we mentioned earlier, in the section on unit selection, it is possible that the relationships we find in our selection units will even be greater in the population. Our sample for this study is a mix of high and low financial knowledge population, which helps us to have a more credible data collection.

## 5 Results

The collected data has been analysed with using the statistical analysis tool Stata 16 and Microsoft Office Excel to create the overviews. The chapter starts with an overview over questionnaires on financial literacy and testing of hypotheses. Following by a further study of participants responded to the financial literacy questionnaires. Then an overview of distribution between gender, age and monthly income follows.

We started the analysis by looking at the basic and advanced questions about financial literacy that were asked in the survey. In the table below, we have created an overview of the respondents' answers:

N = 1,508

Questions	Correct	Wrong	Didn't answer
Basic questions:			
<i>Suppose you had €100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?</i>	93%	4%	3%
<i>Suppose you had €100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total?</i>	80%	17%	3%
<i>Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?</i>	85%	8%	7%
<i>Assume a friend inherits €10,000 today and his sibling inherits €10,000 3 years from now. Who is richer because of the inheritance?</i>	75%	22%	4%
<i>Suppose that in the year 2010, your income has doubled, and prices of all goods have doubled too. In 2010, how much will you be able to buy with your income?</i>	71%	26%	3%
Advance questions:			
<i>If the interest rate falls, what should happen to bond prices?</i>	27%	39%	34%
<i>Buying a company stock usually provides a safer return than a stock mutual fund. True or false?</i>	52%	24%	24%
<i>Stocks are normally riskier than bonds. True or false?</i>	64%	14%	22%
<i>Considering a long time period (for example 10 or 20 years), which asset normally gives the highest return?</i>	51%	29%	20%
<i>Normally, which asset displays the highest fluctuations over time?</i>	72%	12%	16%

<i>When an investor spreads his money among different assets, does the risk of losing money:</i>	67%	17%	16%
<i>If you buy a 10-year bond, it means you cannot sell it after 5 years without incurring a major penalty. True or false?</i>	28%	37%	36%
<i>Which of the following statements describes the main function of the stock market?</i>	69%	14%	17%
<i>Which of the following statements is correct? If somebody buys the stock of firm B in the stock market:</i>	65%	26%	10%
<i>Which of the following statements is correct? (investment)</i>	70%	11%	18%
<i>Which of the following statements is correct? If somebody buys a bond of firm B</i>	60%	17%	23%

Table 4, Overview of respondents' answers to question on Financial Literacy

As it can be seen from table 4, the majority has answered the basic financial literacy questions correctly and the responds rate was quite high. With the advanced questions the responds rate decreased and at some questions even more than one-third refused to answer. The difficulty of an advanced question can also be observed by its rate of correct answers. Especially the questions regarding to bonds were answered correctly by a minority of the respondents.

Before we begin testing our hypotheses, we had to run a t-test. A t-test is used to determine if two data sets are different from each other. It compares the two datasets and their means. The assumption by the t-test is the data follow a normal distribution and variances of the two groups of data to be equal. It uses a null and alternative hypothesis, where the null hypothesis says that there is no difference between the groups. The value resulting from a t-test tells us how likely the difference between the two groups could have been by accident. This value is called the p-value. If we have a 0.05 p-value or less, there is a statistically significant difference between the two groups<sup>1</sup> (Hinton (2014)). In the table below we present the test results:

---

<sup>1</sup> Ha:  $\text{diff} \neq 0$  was used for the test and which is the most common tester for the alternative hypothesis

	Saving account	Mutual funds	Stocks
	$\Pr( T  >  t )$	$\Pr( T  >  t )$	$\Pr( T  >  t )$
d1	0.00	0.00	0.00
d2	0.00	0.00	0.00
d3	0.00	0.00	0.00
d4	0.00	0.00	0.00
p1	0.00	0.00	0.00
p2	0.00	0.00	0.00
p3	0.00	0.00	0.00
p4	0.00	0.00	0.00
p5	0.00	0.00	0.00
p6	0.00	0.00	0.00
p7	0.00	0.00	0.00
11	0.00	0.00	0.00
12	0.00	0.00	0.00
13	0.00	0.00	0.00
14	0.00	0.00	0.00
15	0.00	0.00	0.00
mean_cfc	0.0011	0.0011	0.0011
besch(risk)	0.001	0.001	0.001

Table 5, Overview of t-test

Table 5 indicates that the variables in our datasets are different from each other.

To be able to answer our hypotheses, we ran a binary regression on the data. Regression analysis is a statistical analysis method to describe the relationship between one or more independent variables and a dependent variable. It is done by finding a function, that is an approximate expression or a simplified mathematical description of the real context. The function makes it possible to determine the value of the dependent variable  $y$  when you know the values of the relevant independent variables  $x_1, x_2$  and so on (Freedman (2009)). The results from the regression analysis showed that hypothesis 1 and hypothesis 3 have significant results. When it comes to our second hypothesis, we can state that the results are not significant. The regression analysis results can be seen in the table below:

	Saving account		Mutual funds		Stock	
	Odds Ratio	P>z*	Odds Ratio	P>z*	Odds Ratio	P>z*
Risk attitude	1.000177	0.00	1.00014	0.00	1.000106	0.002
CFC	1.000177	0.00	1.00014	0.00	1.000106	0.002
Financial literacy:						
dum_d1	1.038486	0.786	0.7533333	0.21	0.756461	0.253
dum_d2	1.004381	0.971	0.9676381	0.869	0.8676721	0.509
dum_d3	0.9863223	0.922	1.046838	0.845	0.84551	0.499
dum_d4	1.014907	0.909	0.926655	0.721	1.049986	0.835
dum_p1	1.050194	0.703	1.380256	0.115	0.80668	0.347
dum_p2	1.136617	0.281	1.232465	0.294	1.169369	0.471
dum_p3	1.025718	0.858	0.8126047	0.372	1.252288	0.386
dum_p4	0.9702911	0.805	0.9136174	0.654	0.9256749	0.727
dum_p5	0.9710875	0.848	1.160166	0.56	0.9635252	0.894
dum_p6	1.193343	0.186	1.13199	0.581	1.238764	0.387
dum_p7	0.8657569	0.252	0.9698768	0.883	1.153249	0.527
dum_l1	1.369359	0.173	2.454082	0.075	3.02184	0.051
dum_l2	0.9524049	0.736	0.7978768	0.33	1.089919	0.747
dum_l3	0.9208247	0.629	1.180372	0.579	0.8700527	0.646
dum_l4	1.058236	0.665	1.22675	0.368	0.08429887	0.46
dum_l5	1.183309	0.152	0.9965734	0.986	0.9914285	0.968

\*p-value used for significant testing is 0.05  
Table 6, results of the regression analysis

To make it easier and to keep track of our hypothesis testing, we choose to create an overview in the table below. It will be used to describe and conclude in the conclusion section:

Null hypothesis	Status, At 5% Sig. Level
H1: Individuals that are holding stocks are more positive to risk than people who do not have stocks.	Reject
H2: The ownership of stocks is not determined by financial literacy.	Fail to reject
H3: Individuals that are holding stocks are more future oriented than people who do not have stocks.	Reject

Table 7, Overview of hypothesis testing

With the hypotheses testing we tested our statements in regard to the whole population. Since we failed to reject our second hypothesis, we decided to further study this area. Therefore, we started by looking at the numbers of the correct answers to the financial literacy questionnaires and then decided to divide the respondents into four groups. “Group 1” is representing the most financial literate individuals and “group 4” the less financial literate ones. We formed a group from one to four based on how many times participant answered correct to the financial literacy questions that were stated before in the section 4.3 (*Table 1, Question on how to measure Financial Literacy*):

N:1481

Group	Correct answers	N	Mean age
1	16 to 13	34,02%	52
2	12 to 9	36,80%	50
3	8 to 5	20,03%	48
4	4 to 1	7,4%	46

*Table 8, Overview of group division*

As the table of the overview of group division shows, more than two-third of the participants has a good financial knowledge. All the groups show with an average age of around 50 years a stage of life where it is likely to think about pension.

To get a better understanding of the participants financial literacy we also used some control variables. In the charts below we illustrate the distribution of gender, the participants education level, their monthly income (in euro after taxes), the peoples CFC score and the ownership of portfolios in each group:

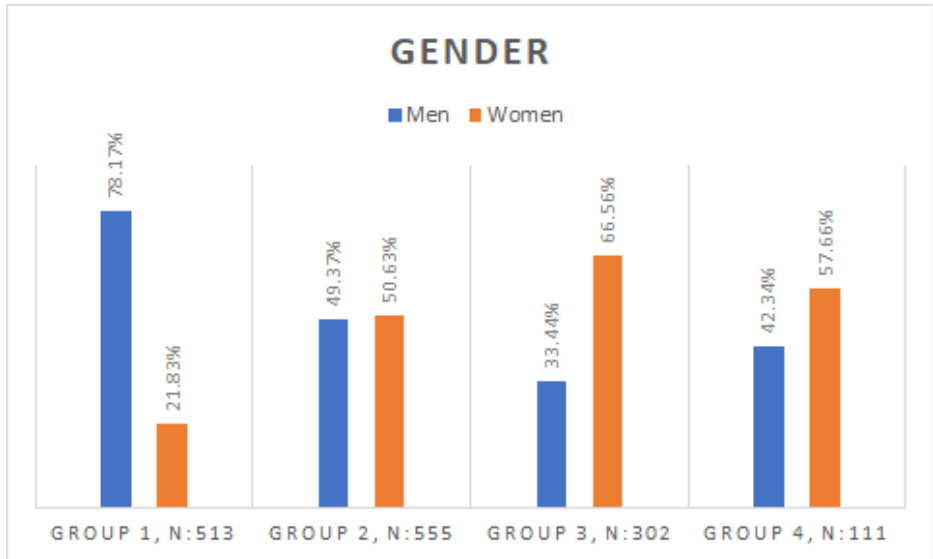


Figure 2, Overview of gender in groups

By looking at the “overview of gender in groups” the graph shows that around 78 per cent of the 513 participants in the financial literate group are men. In group 2 the allocation is almost even, whereby women have a higher share in group 3 and 4. The gender distribution shows that men have a better financial knowledge than women.

N = 1,481

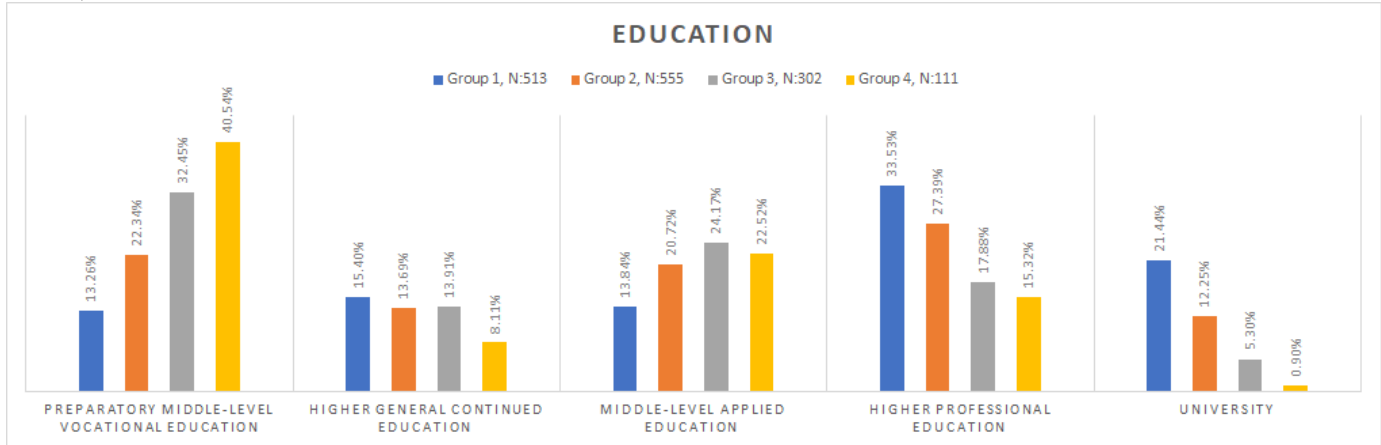


Figure 3, Overview of education in groups

The overview of the participants education (figure 3) is visualising that financial illiterate individuals are more likely to have lower education. On the other hand, those who are financial literate are having a higher probability for a higher education. Figure 3 will also be used to look closely at the context of our second hypothesis. The exact categorization of the education can be found in the appendix (4. Results, explanation of education code).

N = 1,481

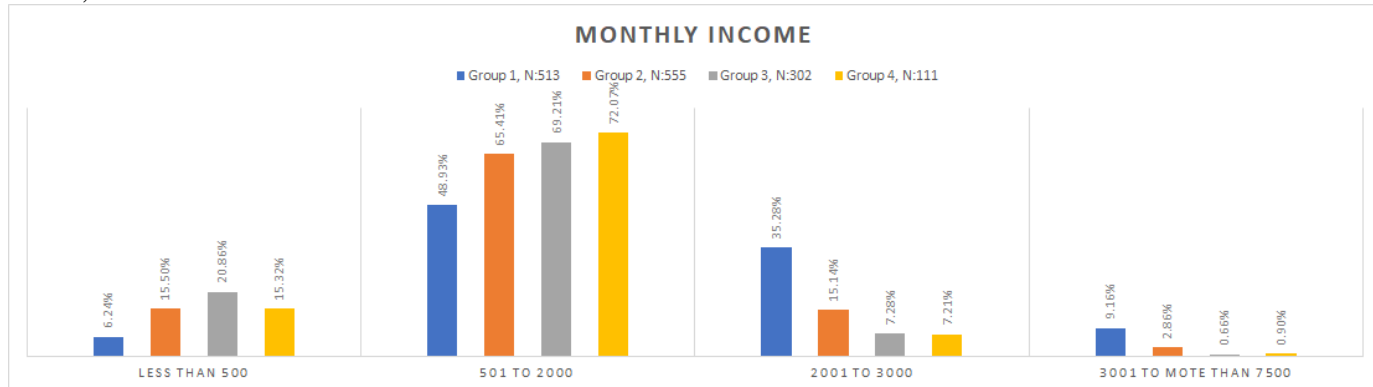


Figure 4, Overview of monthly income after tax in groups

The figure about the monthly income illustrates that the majority of the 1,481 participants are earning up to 2,000 Euro after tax. As the figure tells us, people that show less financial knowledge are within this category. Individuals with financial literacy are more likely to have a salary up to 3,000 Euro a month or even more than 7,500 Euro in a smaller grad. The exact categorization of the monthly income can be found in the appendix (5. Results, explanation of monthly income code).

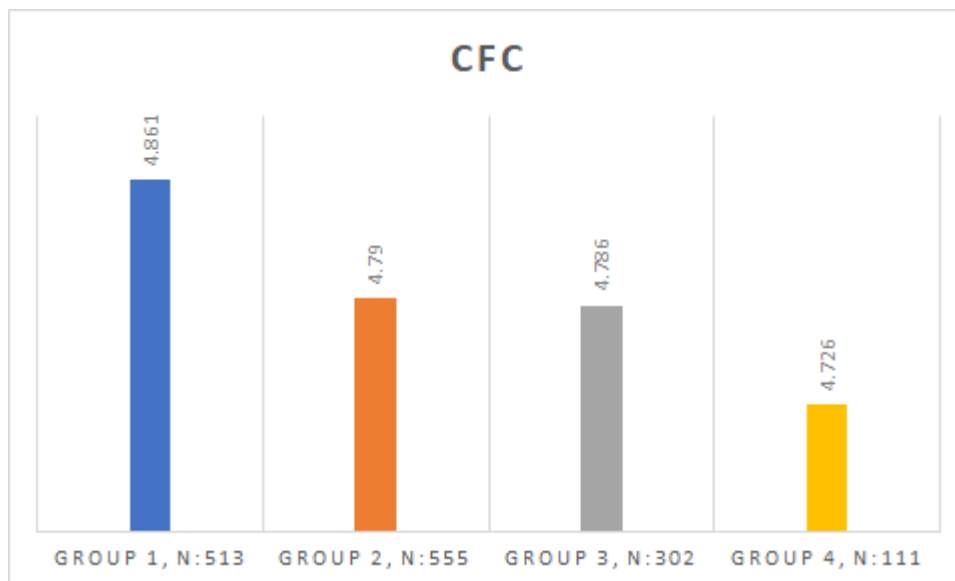


Figure 5, Overview of CFC score in groups

With the consideration of future consequences, it can be said that the average CFC value of the whole population was 4.8 (on a scale from 1 to 7). In comparison to the average, only the first group was a bit more future oriented. Even when all groups are showing an orientation towards the future, group 2 to 4 are under the average value in a descending order.



N = 1,481

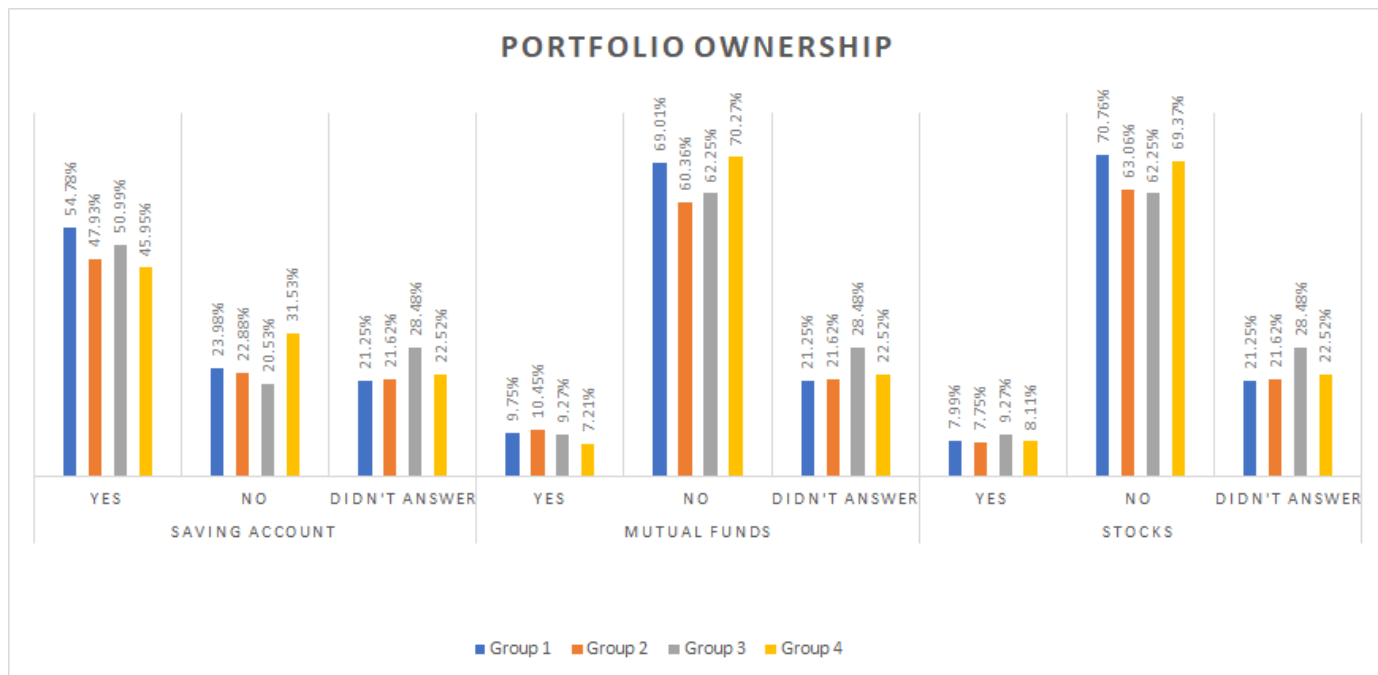


Figure 6, Overview of portfolio ownership in groups

1,481 individuals answered the questions about owing saving accounts, mutual funds, and stocks. Figure 6 shows that most ownership goes towards the saving account. Furthermore, the figure show us that the majority do not own mutual funds or stocks and that the responds rate over all three assets are more or less the same. For the absolute numbers of the portfolio ownership please see appendix (6. Results, explanation of the portfolio choice table in absolute numbers). In the following chapter we will use the charts to interpret and conclude our results.

## 6 Conclusion

The purpose of this study was to investigate what effect our selected variables: risk attitude, financial literacy and consideration of future consequences can have when it comes to the way individuals invest. Furthermore, we wanted to investigate whether the level of financial knowledge varies between education and income, and whether the level of financial knowledge can explain individual differences in personal characteristics. This chapter includes a discussion of the results against theory and previous research. To substantiate the theory, a methodological reflection will be given. The chapter is rounded off with recommendations and further research.

### 6.1 Discussion

Based on our analysis and our hypotheses, we will now discuss and interpret our results. The order of discussion will follow the same order as our hypotheses in the thesis.

#### 6.1.1 Risk

When investing in saving accounts, there will be no vast risk to take. A savings account is known as a safe investment. On the opposite side, there are riskier investments such as mutual funds or stocks. To enter the stock markets takes courage, since there are many variables which influence the success of an investment. As we have learned from previous findings, the ability to invest in the stock market also requires cognitive skills and knowledge. But risk is an essential element of investment. Risk attitude defines how aggressively one will invest. Some are more willing to take a higher risk than others. To be able to clarify the statement, we decided to formulate our first hypothesis as; *Individuals that are holding stocks are more positive to risk than people who do not have stocks*. As it was stated before, we were able to reject the null hypothesis, which means that a person does not necessarily need to hold stocks to be risk affine.

### 6.1.2 Financial literacy

Our second hypothesis; *The ownership of stocks is not determined by financial literacy*, was meant to find if there is a relationship between financial literacy and the participants' way to invest. The outcome of the binary regression turned out not to be significant, which means there is no difference between a person's financial knowledge and the choice of investment. Financial literacy is about understanding the parameters, the issues involved in financial decisions, the type of information that is needed and understanding of where to get the information from. Therefore, we decided to extend the analysis with a closer look at the population itself. As mentioned earlier in the previous chapter, we have divided the participants into four groups following with an overview of gender, education, monthly income after tax, a score of their future orientation and an overview of portfolio ownership.

In general, before investing in any portfolios, a few key elements are important to take into account—financial capability and financial knowledge about where to invest. In figure 6 in the preceding chapter, we can see that very few participants own mutual funds or stocks, but rather own a savings account. By looking at figure 5, which indicates how future-oriented a person is, all groups scored near the average. The result proves that all participants are thinking about the future and do have the motive for saving. This leads us to the first factor, their financial capability.

Section “2.1.2 financial capability” explained that four factors need to be considered. Since the CFC score indicates a future orientation for our population, the factor “planning ahead” can be affirmed. “Choosing products” describes picking an adequate financial product for one’s specific purpose and his/her own perception. Since saving account, mutual funds or stocks are chosen this element can be supported. The majority of the population has a good financial knowledge, “staying informed” can therefore be assumed. For “managing money” we are interested in looking at individual’s income. As mentioned earlier, it has been found that the wealthy population invests more in mutual funds or stocks. The average monthly income after tax in the Netherlands 2005 was € 2,122 (Parent (2020)), and our calculation in figure 4 in the previous chapter shows almost the same. With an average salary, it will be challenging to spend money on a risky investment. According to Deidda, it is generally true that income risk tends to be lower in the number of risky assets that households have. Which further leads us to assume that one of the reasons why our second hypothesis fails to reject was the participants' income (Deidda (2013)).

The second factor is the financial knowledge about where one should invest. Although we have addressed this factor in our hypothesis testing and found a negative relationship, we are

interested in looking at their educational level in group form. As mentioned before, the distribution of groups was based on the number of correct answers to financial knowledge questions. By looking at figure 3 in the preceding chapter we can see that the participants in group 1 has the highest education in comparison with other groups. In the earlier chapter, it was also found that there is a positive relationship among university students (representing higher education) and financial knowledge, which also matched with our results. Another reason that may have an impact on the choice between investing in portfolios could have been the participants' perspective for long-term or short-term investment. If they had a long-term plan for investment, they would have chosen mutual funds or stocks, but as the results tells us, they have chosen savings account over the other alternatives. Even though, it has been found that the level of investment in the stock market has an increasing tendency, it can still be increased. An additional potential explanation that households do not own stocks could be the cost of participating in the stock market (Vissing-Jorgensen (2002)).

Therefore, we conclude that the reason for not choosing to invest in mutual funds or stocks could have been financial capability, not having a long-term perspective of investment or the cost of participating in the stock market.

### 6.1.3 Consideration of Future Consequences

Consideration of Future Consequences is another essential element in all contexts. Our intention in using this term was to identify whether there is a difference between future-oriented individuals and those who are present-oriented. We formulated the third hypothesis: *Individuals that are holding stocks are more future oriented than people who do not have stocks*; and found that it does not matter if persons are holding stocks or not, they are future oriented (more or less) either way.

## 6.2 Main finding and recommendations

A similar data set, which we have used in our master's thesis, has also been used in other countries such as the US and Italy. The studies has revealed that older members are more likely to manage their assets and actively select less risky portfolios; for the United States (Agnew,Balduzzi & Sundén (2003)), and for Italy (Cappelletti,Guazzarotti & Tommasino (2014)). In comparison with our study, we have chosen to assume that the age group of 50 years or older is calculated to be old, since the average age of our participants is 50-years. By

looking at our senior participants we have found that they have also chosen a risk-free investment, which in our case is represented as a savings account. Out of the whole population (1,508) 26 % of the seniors owned savings accounts, followed by mutual funds 6% and stocks 4%.

Another study in both the US and Australia was based on the fact that women are generally more cautious about pension investors than men, where the results in both countries proved to be the same; for Australia (Watson & McNaughton (2007)), and for the United States (Agnew & Szykman (2011)). By comparison with our results represented below, we can confirm that most participants who answered yes to savings accounts, mutual funds and stocks have following gender:

N: 1,508

Savings account	Women: 23%	Men: 29%
Mutual funds	Women: 4%	Men: 6%
Stocks	Women: 3,8%	Men: 4,4%

*Table 9, Overview of women and men attendance in portfolios*

In the report by Alessie et al (2000), it was found that most households in the Netherlands have at least one type of traditional savings account. In comparison owning bonds is not that common among the population. We have seen from our results that there is a significant relationship between portfolio choice and the risk participants are willing to take. Furthermore, we found out that individuals do think about mutual funds or stocks. If they are ready to take risk, then they are willing to invest in risky investments. We found that ownership of risky portfolios does not require financial knowledge. Deeper insights from dividing different stages of financial knowledge into groups reveals that the financially educated one do not hold as many risky portfolios as we have expected them to. It also appeared that men were more financially competent than women. Furthermore, it is proved that financial literate individuals have a higher education level, are more likely to earn more money and are slightly more future-oriented than the average. To explain why most of our participants do not own risky investments may have been due to their financial tightness or the perspective of a long-term investment. In general, we can observe that when it comes to risky investments, mutual funds are a bit more frequent than stocks. It is interesting to observe that those who do not have high financial knowledge are more likely to invest into stocks than those with financial literacy.

Which leads us to the assumption that financial illiterate individuals do not know what they are doing.

In our master thesis we focussed on people's financial literacy and their future consideration to investigate its roles on portfolio choice. During our work we gathered information that can provide a basis for further research. People are having low stock market participation rates. A critical aspect of our thesis is that the participant's age structure can be considered as old. As we have learned from previous research, older generations manage their portfolios more actively, but investing into risk-free portfolios. Future research promises to yield additional insights, if our results correspond with the results, where only the young generations are taken into consideration.

Another important contribution can be made to the decision-making processes for policy makers. Our research showed that the financially literate population rather owns savings accounts than participating in the financial market. Public discussion is held towards if more financial education should be taught in school. Nevertheless, our results show that the portfolio choice is not necessarily influenced by financial education. Therefore, we support William Sharpe's claim for channelling the public focus on the importance for private retirement and the willingness to take more risk. The Nobel laureates' names two reasons why especially young people should be interested in financing their retirement, even when they have not start working yet. It is most likely that the later pensioners will receive one kind of a social, maybe governmental, retirement payment. But this will only provide money for a minimum standard of living. Therefore, a considerable part of the salary needs to be saved to prevent this scenario and guarantee a living standard that is known from times when the individual was actively working (Sharpe (2012)). Institutions, like policy makers and financial ones, could focus more one campaigns that encourage its citizens to start more early for saving for their retirement and considering taking more risk to achieve the goal of having a good standard in their old age.

Finally, it is important to mention that our data set is from 2005 and therefore 15 years old. As everyone knows, the financial crisis in 2008/2009 changed many people's opinion about the stock market and its effect on the world economy. An important task for future research is to investigate if this drastic event had an influence on the individuals stock market participation with respect to their financial literacy and future orientation.

## 7 References

- Adams, J. & Nettle, D. (2009). *Time perspective, personality and smoking, body mass, and physical activity: an empirical study*. *British journal of health psychology*. 2009 (. 14. Pt 1). 83–105. retrieved from <https://onlinelibrary.wiley.com/doi/pdf/10.1348/135910708X299664>. 03.03.2020.
- Agnew, J., Balduzzi, P. & Sundén, A. (2003). *Portfolio Choice and Trading in a Large 401(k) Plan*. *American Economic Review*. 2003 (. 93. 1). 193–215. 03.05.2020.
- Agnew, J. & Szykman, L. (2011). *Annuities, Financial Literacy, and Information Overload*. Mitchell, Olivia S.; Lusardi, Annamaria. *Financial literacy. Implications for retirement security and the financial marketplace* (. 158–178). Oxford, New York. Oxford University Press. 10.1093/acprof:oso/9780199696819.003.0009. 9780199696819.
- Aksje Norge (2016). *Nasjonal kartlegging av finansiell kompetanse. - På bakgrunn av OECDs internasjonale undersøkelse*. Aksje Norge. retrieved from <http://aksjenorge.no/wp-content/uploads/2016/04/Rapport-Resultater-fra-OECDs-kartlegging-av-Finansiell-Kompetanse-i-Norge-ved-AksjeNorge.pdf>. 22.05.2020.
- Alessie, R., Hochguertel, S. & van Soest, A. (2000). *Household Portfolios in the Netherlands*. 2000 (. 55. 0924-7815). retrieved from <https://pure.uvt.nl/ws/portalfiles/portal/535786/55.pdf>. 2020-03-11.
- Amaglobeli, D., Chai, H., Dabla-Norris, E., Dybczak, K., Soto, M. & Tieman, A. (2019). *The Future of Saving. The Role of Pension System Design in an Aging World*. International Monetary Fund (. SDN/19/01). retrieved from <https://www.imf.org/~media/Files/Publications/SDN/2019/SDN1901.ashx>. 20.05.2020.
- Amundsen, B. (2019). *Norwegians have substantial pension capital - so why should the retirement age be increased?*. sciencenorway. retrieved from <https://sciencenorway.no/retirement-welfare-state/norwegians-have-substantial-pension-capital--so-why-should-the-retirement-age-be-increased/1609097>. 15.12.2019. 20.05.2020.
- Atkinson, A., McKay, S., Kempson, E. & Collard, S. (2006). *Levels of Financial Capability in the UK: Results of a baseline survey*. 2006. retrieved from [http://www.pfrc.bris.ac.uk/publications/Reports/Fincap\\_baseline\\_results\\_06.pdf](http://www.pfrc.bris.ac.uk/publications/Reports/Fincap_baseline_results_06.pdf). 27.02.2020.
- Barajas, A., Cihak, M. & Sahay, R. (2017). *A Broader Reach. When more people and more firms have access to financial services, the whole society can benefit*. F&D; Finance and development - International Monetary Fund. 2017 (. Volume 54. Number 1). 34–36. retrieved from <https://www.imf.org/external/pubs/ft/fandd/2017/03/pdf/fd0317.pdf>. 03.02.2020.
- Breuer, C. & Breuer, W. (2020). *Finanzinstrumente. Definition*. Gabler Wirtschaftslexikon. retrieved from <https://wirtschaftslexikon.gabler.de/definition/finanzinstrument-32391/version-255934>. 15.02.2018. 26.05.2020.

Cambridge Dictionary (2020a). *Asset. Definition*. Cambridge Dictionary. retrieved from <https://dictionary.cambridge.org/dictionary/english/asset>. 30.04.2020.

Cambridge Dictionary (2020b). *Diversification. Definition*. Cambridge Dictionary. retrieved from <https://dictionary.cambridge.org/dictionary/english/diversification>. 30.04.2020.

Cambridge Dictionary (2020c). *Portfolio. Definition*. Cambridge Dictionary. retrieved from <https://dictionary.cambridge.org/dictionary/english/portfolio>. 02.05.2020.

Cappelletti, G., Guazzarotti, G. & Tommasino, P. (2014). *The effect of age on portfolio choices: evidence from an Italian pension fund*. Journal of Pension Economics and Finance. 2014 (. 13. 4). 389–419.

CentERdata (2016). *DHS Survey 2005. SpaarOnderzoekCodebook\_2005\_en\_2.0*. Institute for data collection and research. retrieved from <https://www.centerdata.nl/en/databank/dhs-data-access>. 25.03.2020.

Charness, G. & Gneezy, U. (2010). *Portfolio choice and risk attitudes: an experiment*. Economic Inquiry. 2010 (. 48. 1). 133–146. retrieved from <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1465-7295.2009.00219.x>. 18.05.2020.

Christelis, D., Jappelli, T. & Padula, M. (2010). *Cognitive abilities and portfolio choice*. European Economic Review. 2010 (. 54. 1). 18–38.

Chu, Z., Wang, Z., Xiao, J.J. & Zhang, W. (2017). *Financial Literacy, Portfolio Choice and Financial Well-Being*. Social Indicators Research. 2017 (. 132. 2). 799–820. retrieved from <https://link.springer.com/article/10.1007/s11205-016-1309-2#article-info>. 14.05.2020.

Corter, J.E. & Chen, Y.-J. (2006). *Do Investment Risk Tolerance Attitudes Predict Portfolio Risk?*. Journal of Business and Psychology. 2006 (. 20. 3). 369–381. retrieved from <https://link.springer.com/content/pdf/10.1007/s10869-005-9010-5.pdf>. 2020-03-11.

d’Addio, A., Roger, M. & Savignac, F. (2020). *Pension and household savings. cross-country heterogeneity in Europe*. European Central Bank (. No 2372). retrieved from <https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2372~2565732234.en.pdf>. 20.05.2020.

Das Schweizer Parlament (2020). *Die Kommissionen*. Die Bundesversammlung. Das Schweizer Parlament. retrieved from <https://www.parlament.ch/de/organe/kommissionen>. 29.01.2020.

Deidda, M. (2013). *Precautionary Saving, Financial Risk, and Portfolio Choice*. Review of Income and Wealth. 2013 (. 59. 1). 133–156. retrieved from <https://onlinelibrary.wiley.com/doi/full/10.1111/roiw.12001>. 18.05.2020.

Deutsche Bundesbank (2019). *ECB’s deposit facility rate. /End of month*. Deutsche Bundesbank. retrieved from <https://www.bundesbank.de/en/statistics/money-and-capital-markets/interest-rates-and-yields/ecb-interest-rates-626986>. 18.09.2019. 24.05.2020.



- Deutsche Bundesbank (2020). *Inflation. Glossary*. Deutsche Bundesbank. retrieved from <https://www.bundesbank.de/action/en/729724/bbksearch?firstLetter=I>. 24.05.2020.
- Draper, N.R. & Smith, H. (1998). *Applied regression analysis* (. 3). Wiley series in probability and statistics. Texts and references section. New York, Chichester. Wiley. 10.1002/9781118625590. 0471170828.
- Duden (2020). *Volatilität. Definition*. Duden. retrieved from <https://www.duden.de/rechtschreibung/Volatilitaet>. 01.05.2020.
- Ergün, K. (2018). *Financial literacy among university students: A study in eight European countries*. International Journal of Consumer Studies. 2018 (. 42. 1). 2–15. retrieved from <https://onlinelibrary.wiley.com/doi/full/10.1111/ijcs.12408>. 19.01.2020.
- European Central Bank (2016). *What is the deposit facility rate?*. European Central Bank. retrieved from <https://www.ecb.europa.eu/explainers/tell-me/html/what-is-the-deposit-facility-rate.en.html>. 10.03.2016. 24.05.2020.
- Financial Literacy & Education Commission (2006). *Taking Ownership of the Future. The National Strategy for Financial Literacy*. Financial Literacy & Education Commission. retrieved from <https://www.treasury.gov/about/organizational-structure/offices/Domestic-Finance/Documents/Strategyeng.pdf>. 29.01.2020.
- Freedman, D.A. (2009). *Statistical models*. Cambridge. Cambridge University Press. 0521743850. 29.01.2020.
- Haldane, A.G. (2015). *Speech by Andrew G. Haldane at Open University, Milton Keynes. interest rates since 3000BC*. Bank of England. retrieved from <https://www.bankofengland.co.uk/-/media/boe/files/speech/2015/stuck.pdf?la=en&hash=3247D34307D99E8E4E11E5B890837AD6C6CAEFFB>. 24.05.2020.
- Hawthorne, S. (2017). *Retirement: more people are saving, but too little*. retrieved from <https://www.raconteur.net/hr/retirement-more-people-are-saving-but-too-little>. 31.05.2017. 20.05.2020.
- Hinton, P.R. (2014). *Statistics explained*. London, New York. Routledge. 9781317753902.
- Huston, S. (2010). *Measuring Financial Literacy*. Journal of Consumer Affairs. 2010 (. 44. 2). 296–316. retrieved from <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1745-6606.2010.01170.x>. 27.05.2020.
- inflation.eu (2020). *Inflatie Nederland - actuele Nederlandse inflatie*. inflation.eu. retrieved from <https://nl.inflation.eu/inflatiecijfers/nederland/inflatie-nederland.aspx>. April 2020. 24.05.2020.
- Joireman, J. & King, S. (2016). *Individual Differences in the Consideration of Future and (More) Immediate Consequences: A Review and Directions for Future Research*. Social and Personality Psychology Compass. 2016 (. 10. 5). 313–326. retrieved from <https://onlinelibrary.wiley.com/doi/full/10.1111/spc3.12252>. 09.05.2020.
- Kapteyn, A. & Teppa, F. (2002). *Subjective Measures of Risk Aversion and Portfolio Choice*. CentER, Tilburg University. retrieved from

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.320.8575&rep=rep1&type=pdf>. 18.05.2020.

Ke, D. (2018). *Cross-Country Differences in Household Stock Market Participation: The Role of Gender Norms*. University of South Carolina. retrieved from [http://www.dakefinance.com/wp-content/uploads/2018/10/aea\\_pp.pdf](http://www.dakefinance.com/wp-content/uploads/2018/10/aea_pp.pdf). 22.05.2020.

Klapper, L., Lusardi, A. & van Oudheusden, P. (2015). *Financial Literacy Around the World. INSIGHTS FROM THE STANDARD & POOR'S RATINGS SERVICES GLOBAL FINANCIAL LITERACY SURVEY*. 2015 (. 17). 1–28. retrieved from [https://responsiblefinanceforum.org/wp-content/uploads/2015/12/2015-Finlit\\_paper\\_17\\_F3\\_SINGLES.pdf](https://responsiblefinanceforum.org/wp-content/uploads/2015/12/2015-Finlit_paper_17_F3_SINGLES.pdf). 09-Jan-20.

Kurzahls, R. (2015). *Vorlesung Statistik*. University of Applied Sciences Münster. Autumn semester 2015/2016

Lamont, M. & White, P. (2005). *Workshop on interdisciplinary standards for systematic qualitative research. Cultural anthropology, Law and Social Science, Political Science and Sociology Programs*. 2005 (). 29. retrieved from [https://www.nsf.gov/sbe/ses/soc/ISSQR\\_rpt.pdf#page=29](https://www.nsf.gov/sbe/ses/soc/ISSQR_rpt.pdf#page=29). 2020-05-08.

Lindmayer, P.K.M. & Dietz, H.-U. (2018). *Geldanlage und Steuer 2018*. Wiesbaden. Springer Gabler. 10.1007/978-3-658-18796-5. 9783658187958.

Loerwald, D. & Retzmann, T. (2016). *Falschberatung durch Banken als Gegenstand des Ökonomieunterrichtes?* Retzmann, Thomas. Deutsche Gesellschaft für Ökonomische Bildung; Jahrestagung. Deutsche Gesellschaft für Ökonomische Bildung. *Finanzielle Bildung in der Schule. Mündige Verbraucher durch ökonomische Bildung* (. Didaktik der ökonomischen Bildung. 2). s.l. Wochenschau Verlag. 9783899746570. 24.05.2020.

Lusardi, A. (2003). *Planning and Saving for Retirement*. Dartmouth College. retrieved from [https://www.dartmouth.edu/~alusardi/Papers/Lusardi\\_pdf.pdf](https://www.dartmouth.edu/~alusardi/Papers/Lusardi_pdf.pdf). 07.05.2020.

Mitchell, O. & Piggott, J. (2016). *Workplace-Linked Pensions for an Aging Demographic*. Piggott, John; Woodland, Alan. *Handbook of the economics of population aging*. (. Handbooks in economics. 1. 865–904). Amsterdam, Boston, Heidelberg, London, New York, Oxford, Paris, San Diego, San Francisco, Singapore, Sydney, Tokyo. Elsevier North-Holland. 10.1016/bs.hespa.2016.08.001. 9780444634054.

Murphy, L., Cadogan, E. & Dockray, S. (2019). *The Consideration of Future Consequences: Evidence for Domain Specificity Across Five Life Domains*. *Personality & social psychology bulletin*. 2019. 146167219873478. retrieved from <https://journals.sagepub.com/doi/10.1177/0146167219873478>. 27.02.2020.

Neusser, K. (2011). *Zeitreihenanalyse in den Wirtschaftswissenschaften* (. 3). Wiesbaden. Vieweg+Teubner Verlag / Springer Fachmedien Wiesbaden GmbH Wiesbaden. 10.1007/978-3-8348-8653-8. 9783834818461.

Nyhus, E.K. (1996). *VSB-CentER Savings Project. The VSB-CentER Savings Project: Data collection methods, questionnaires and sampling procedures*. 1996 (. 42. 0924-7815). retrieved from [https://www.centerdata.nl/sites/default/files/bestanden/centerdata\\_progress\\_report\\_42\\_1996.pdf](https://www.centerdata.nl/sites/default/files/bestanden/centerdata_progress_report_42_1996.pdf). 2020-02-12.

OECD (2015). *OECD/INFE Core competencies framework on financial literacy for youth*. OECD. retrieved from <https://www.oecd.org/finance/Core-Competencies-Framework-Youth.pdf>. 03.02.2020.

OECD (2016). *G20/OECD INFE Core competencies framework on financial literacy for adults*. OECD. retrieved from <https://www.oecd.org/finance/Core-Competencies-Framework-Adults.pdf>. 03.02.2020.

Oesterreichische Nationalbank (2020). *Factsheet Investmentfonds*. Oesterreichische Nationalbank. retrieved from [https://www.oenb.at/docroot/risiko\\_ertrag/wissensboerse/factsheets-investmentfonds.html](https://www.oenb.at/docroot/risiko_ertrag/wissensboerse/factsheets-investmentfonds.html). 25.05.2020.

Ontario Ministry of Education (2020). *Financial Literacy Education in Ontario Schools*. Ontario Ministry of Education. retrieved from <http://www.edu.gov.on.ca/eng/surveyLiteracy.html>. 28.01.2020.

Parent, B. (2020). *Netherlands Average Salary Income - Job Comparison*. Worldsalaries.org. retrieved from <http://www.worldsalaries.org/netherlands.shtml>. 15.05.2020. 15.05.2020.

Rabianski, J.S. (2003). *Primary and secondary data: concepts, concerns, errors, and issues*. The Appraisal Journal; Chicago. retrieved from <https://www.thefreelibrary.com/Primary+and+secondary+data%3A+concepts%2C+concerns%2C+errors%2C+and+issues...-a096694281>. 29.02.2020. 25.03.2020.

Redaktionsnetzwerk Deutschland (2019). *Von Sparer bis Kreditnehmer: Das bedeutet die EZB-Entscheidung für Sie. Wir erklären, wer davon profitiert - und wer draufzahlt*. Redaktionsnetzwerk Deutschland. retrieved from <https://www.rnd.de/wirtschaft/von-sparer-bis-kreditnehmer-das-bedeutet-die-ezb-entscheidung-fur-sie-TWHD2002YZA4TC4JGMS2XBV52M.html>. 12.09.2019. 27.05.2020.

Reifner, U. (2011). *Finanzielle Allgemeinbildung und ökonomische Bildung*. Retzmann, Thomas. Deutsche Gesellschaft für Ökonomische Bildung; Jahrestagung. Deutsche Gesellschaft für Ökonomische Bildung. *Finanzielle Bildung in der Schule. Mündige Verbraucher durch Konsumentenbildung* (. Wochenschau Wissenschaft. 9–30). Schwalbach/Ts. Wochenschau-Verl. 978-3-8974657-0. 22.01.2020.

Reifner, U. (2016). *Finanzielle Allgemeinbildung und ökonomische Bildung*. Retzmann, Thomas. Deutsche Gesellschaft für Ökonomische Bildung; Jahrestagung. Deutsche Gesellschaft für Ökonomische Bildung. *Finanzielle Bildung in der Schule. Mündige Verbraucher durch ökonomische Bildung* (. Didaktik der ökonomischen Bildung. 2). s.l. Wochenschau Verlag. 9783899746570. 24.05.2020.

Royal House of the Netherlands (2017). *Inclusive finance for development*. Royal House of the Netherlands. retrieved from <https://www.royal-house.nl/documents/speeches/2017/05/24/speech-by-her-majesty-queen-maxima-of-the-netherlands-launch-of-the-oecd-pisa-2015-financial-literacy-assessment-of-students-paris>. 22.01.2020.

Sajjad Kabir, S.M. (2016). *BASIC GUIDELINES FOR RESEARCH: An Introductory Approach for All Disciplines*. 978-984-33-9565-8.

- Schelhove, A. & Thormählen-Hopgood, I. (2010). *Anforderungen an die finanzielle Allgemeinbildung. Geld an sich ist nichts, aber ohne Geld geht nichts*. Die SparkassenZeitung. 2010 (. Nr.38). 16. retrieved from [https://www.hb.fh-muenster.de:2054/document/DSZ\\_20100924055/toc/50?all=](https://www.hb.fh-muenster.de:2054/document/DSZ_20100924055/toc/50?all=). 20.05.2018.
- Sharpe, W. (2011). *Investors and Markets*. Princeton lectures in finance. Princeton. Princeton University Press. 10.2307/j.ctt7sb7b. 9781400830183.
- Sharpe, W., Scott, J. & Watson, J. (2007). *Efficient Retirement Financial Strategies*. retrieved from <https://web.stanford.edu/~wfs Sharpe/retecon/ERFS.pdf>. 07.05.2020.
- Steinkühler, D. (2010). *Delayed Project Terminations in the Venture Capital Context* (. 1. N.F., Bd. 15). Venture capital und investment banking. Lohmar, Köln. Eul. 9783899369861.
- Strathman, A., Gleicher, F., Boninger, D. & Edwards, S. (1994). *The consideration of future consequences: Weighing immediate and distant outcomes of behavior*. Journal of Personality and Social Psychology. 1994 (. 66. 4). 742–752. retrieved from <https://psycnet.apa.org/record/1994-29658-001>. 27.02.2020.
- Toepoel, V. (2010). *Is consideration of future consequences a changeable construct?*. Personality and Individual Differences. 2010 (. 48. 8). 951–956. retrieved from [https://www.researchgate.net/publication/222409036\\_Is\\_consideration\\_of\\_future\\_consequences\\_a\\_changeable\\_construct](https://www.researchgate.net/publication/222409036_Is_consideration_of_future_consequences_a_changeable_construct). 27.02.2020.
- van Els, P., van den End, J.W. & van Rooij, M. (2005). *Financial behaviour of Dutch households: analysis of the DNB Household Survey 2003*. retrieved from <https://www.bis.org/publ/bppdf/bispap22c.pdf>. 19.02.2020.
- van Nouhuijs, A. (2018). *The impact of life changing events on Dutch households' asset allocation. Thesis submitted for the Master of Science in Financial Economics*. (Master Thesis). Erasmus Universiteit Rotterdam; Erasmus School of Economics. retrieved from <https://pdfs.semanticscholar.org/319a/74fb41a568b6a52b19596055ff0f33191b71.pdf>.
- van Rooij, M., Lusardi, A. & Alessie, R. (2007). *Financial Literacy and Stock Market Participation*. SSRN Electronic Journal. 2007 (. 3. 146). 48.
- van Rooij, M., Lusardi, A. & Alessie, R. (2011). *Financial literacy and retirement planning in the Netherlands*. Journal of Economic Psychology. 2011 (. 32. 4). 593–608. retrieved from <http://www.sciencedirect.com/science/article/pii/S0167487011000195>.
- Vissing-Jorgensen, A. (2002). *Towards an Explanation of Household Portfolio Choice Heterogeneity: Nonfinancial Income and Participation Cost Structures*. Cambridge, MA. National Bureau of Economic Research. 10.3386/w8884. 20-05-2020.
- Watson, J. & McNaughton, M. (2007). *Gender Differences in Risk Aversion and Expected Retirement Benefits*. Financial Analysts Journal. 2007 (. 63. 4). 52–62. 02.05.2020.
- Webley, P. & Nyhus, E.K. (2006). *Parents' influence on children's future orientation and saving*. Journal of Economic Psychology. 2006 (. 27). 140–164. retrieved from <https://home.uia.no/ellenkn/WebleyNyhus2006.pdf>. 08.05.2020.

Xu, L. & Zia, B. (2012). *Financial literacy around the world. an overview of the evidence with practical suggestions for the way forward*. World Bank (. WPS6107). retrieved from <http://documents.worldbank.org/curated/en/264001468340889422/Financial-literacy-around-the-world-an-overview-of-the-evidence-with-practical-suggestions-for-the-way-forward>. 01.06.2012. 21.01.2020.

Zikmund, W.G. & Carr, J.C. (2013). *Business Research Methods* (. 9). Cengage Learning. 9781285202068.

Zokaityte, A. (2017). *Financial literacy education*. Springer International Publishing AG. Cham, Switzerland. Palgrave Macmillan. 9783319550176. 08.01.2020.

## VI. Reflection Paper

### VI.I Reflection note – Alexander Aden

In collaboration with my fellow student Kasra Bidarmanesh this thesis was done to earn the master's degree after the two-years Master of Science in Business Administration at the University of Agder.

During my time as a bank clerk and a financial consultant I noticed that many people do not have a solid financial knowledge which is fundamental for a carefree life within the scope of everyone's financial situation. Also, research has focused on the individual's financial and economical knowledge and confirm what I experienced during my work activities. Our analysis goes along with several other research, but differences need to be distinguished in regard to the population that was observed. Our analysis focused on a Dutch data set where around one-third showed a good financial knowledge. Whereby women's financial literacy is not that high than the one of the male participants. By looking at the populations investment behaviour it was noticed that most individuals prefer to hold conservative investments. Therefore, we made clear that the public's focus should turn towards an openness for risk taking. Also, because a higher return on investment needs to be earned to guaranty an acceptable living standard during when being retired.

Our master thesis contributes to the existing academic work to the extent, that best to our knowledge no one combined individual's financial literacy with their consideration of future consequences. In combination with a long-term view for saving, our research problem was stated as "The importance of future orientation and financial literacy for the asset management of pension savings". We have learned that even with a tendency towards future orientation, the population decides to hold risk-free rather than risky investments. Financial education can help to reconsider the investment decisions and earn more money in the long run. With financial education not just pure education is meant, but the knowledge about the intercorrelation of risk, time (long-term) and diversification. The reason why even financial literate people do not invest into risky investment could also be their salary. With limited financial capabilities individuals are not willing enough to "risk" their money. Our results are setting the foundation for further research.

### International trends

Nowadays financial education is getting more into the focus of several groups: the public, politics, different organisations, and businesses. Since the financial crisis in 2008/2009 news around the world reporting about financial issues on a daily basis. Due to this crisis and the effects that came along with it, the interest rates around the world decreased and are even negative. Saving money profitably is getting harder more and more. And the still existing Corona pandemic keeps us reminding that financial literacy is more important than ever before. States are getting heavily indebted, business facing revenue cuts, and many people losing their jobs or at least earning less. In comparison the stock markets are increasing, driven by the cheap money available.

Our thesis is asking about “*The importance of future orientation and financial literacy for the asset management of pension savings*”, a topic that is also more important than ever before. Due to an ageing society even generous pension systems, like in Norway, can not provide enough money for a comfortable life when being retired. Generations have to rethink their investment behavior and need to take “risk” to earn a sufficient pension. As stated before, the international stock markets are still rising in value. With a good financial knowledge, for example about the principle of diversification and therefore reducing the risk significantly, and a long-term view in mind, the current situation can be used to increase the value of the personal portfolio. And even when facing a cut in salary, financial literacy could help to overcome the income gap. For example, assuming a future orientation and good financial knowledge would have led to essential savings and an efficient way to handle this savings to overcome the personal income gap.

### Innovation

As innovation can be seen the combination of financial literacy and the consideration of future consequences in our master thesis. Different research has been done about the people’s financial knowledge and it was found that inter alia men have a higher financial literacy than women and older people are investing more conservative. This also goes along with our findings. The analysis showed a future orientation of the population but even with a good financial knowledge, the individual’s invest their money conservative. Therefore, it can be analysed if this outcome was because of the age structure of our participants (around 50-years old) and if just a younger sample was taken out for the analysis, these results would have changed. Furthermore, we analysed one wave in 2005. It could be possible to investigate

similarities over the years by taken several years into account. Previous research found out that the investment quote for risk-free assets were constant over the years but those of risky assets, like mutual funds or stocks, increased over the time. To have in general a higher investment quote, especially in risky assets, financial knowledge can be taught more intensively at schools, universities and other vocational training and further training institutions – next to economic correlations, with the focus on risk taking and that diversification helps to reduce risk significantly. Political decision maker can also decide of making stock market investments more attractive for the broad population, with higher tax thresholds for capital gains and dividends for example.

### Responsibility

Even when pension is an important part of life and definitive worth to think about as early as possible, it is not everything. People want to enjoy their life's and not just save every Euro they earn. Apart from that, spending money also helps the economy to create new workplaces. It is in our all interest and our responsibility that it will stay like this. Prognoses are stating that future generations have a way higher probability to be poor when they are getting retired, there is still (hopefully) a social system existing that guarantees a better standard than “just surviving”. So, a balance needs to be found between spending money and saving money. Therefore, financial literacy can be very helpful. When individuals know how to save in a efficient way, then enjoying life and saving for the future do not have to be mutually exclusive. Rather there is the problem about who will have the knowledge and who not. Knowledge is an essential part why poor people are staying poor and rich people are getting richer. Because rich people do have the knowledge about how to handle money within the realms of possibility. Therefore, it is important to teach people from a young age on about money – just a prosperous society is a guaranty for happiness and ground for many other positive influences, like better environment standards.

Also, our master thesis can be part of this, since it is setting the foundation for further investigation in the area. It is the responsibility of us researcher to share our knowledge with the public and strengthen the societies financial capability from within.



## VI.II Reflection note – Kasra Bidarmanesh

The master's thesis was written in collaboration with Alexander Aden as a conclusion to the five-year study program for economics and administration at University of Agder.

A good deal of research has focused on economic knowledge in general, and so it has focused on specific areas of economic knowledge. Previous research has found that there is too low level of financial knowledge around the world. It is true that the Netherlands has an average level of economic knowledge, but our population stands out because we have found that most of our population do have high financial knowledge. We have also seen that Dutch men have on average a significantly higher level of financial knowledge than Dutch women. We have also looked at the way our participants have chosen to invest, in different group form, based on their financial knowledge. At the end of the thesis, we made a statement about the importance of investment perspective not only among young adults, but generally everyone who is about to invest.

There is little previous research that answers what can be done to reduce gender inequality in economic knowledge, along with a collection of how future-oriented individuals choose their saving method. The main problem for the Master's study is therefore: "The importance of future orientation and financial literacy for the asset management of pension savings". The conclusion on our issue is that financial education can help influence the choices of each individual when it comes to saving method. In the report, we also present that a significant proportion choose not to invest in risky investments such as equities and funds, which we conclude that the knowledge in this area is insufficient. We have also come to a conclusion that our participants do have a high education, and do think about future, but the reason behind not investing in mutual funds or stocks is their income. The average income is not enough to invest in risky investment. Our thesis is a basis for the opportunity for further research at a later date, to see if there are any changes in our measurements.

### International trends

At present, it is becoming more and more attractive to research the area and the various factors that influence or have a connection with economic knowledge. Although the study was written focusing on the Dutch population, researchers can use a similar method to investigate whether the findings are supported by respondents from their research countries, and I would therefore say that our thesis may have international relevance. Although there is a lack of financial

knowledge among our participants, it is nevertheless interesting to study both gender and other differences in other countries in the same way we have done so that any measures can be implemented.

It is important to have financial knowledge no matter which country you are in. Internationalization or globalization is a phenomenon that causes land borders to become ever smaller for the years to come. This is partly due to the use of the internet and short travel times that connect people from different cultures and countries together. Globalization has also contributed to increased and better research as new information and discoveries become more accessible.

Based on internationalization, our study will be useful internationally, because high economic knowledge is important no matter which country you are in. Our results can also help other countries that face the same challenges with a lack of economic knowledge mixed with their population. The world is constantly changing and how the future will be is hard to predict, but with great financial knowledge, you have a good foundation. Good financial knowledge enables one to save efficiently for retirement, enter the housing market or could have a financially worry-free life.

### Innovation

Our study is a contribution to the research area where it was previously a gap as we have found support that both real and formal competence contribute to reducing the vulnerability of our participants with low financial knowledge and can possibly be interpreted as innovative in itself. If the task can be a real contribution to politicians becoming aware of the importance of compulsory personal finance education, and in fact improving curricula in this area, there is another form of innovation, given that financial knowledge has never been needed in this degree. The results of the thesis show that the introduction of both theoretical and practical financial education in primary school can raise the financial knowledge of individuals and reduce the lack of financial understanding.

### Responsibility

Men and women, young people and older people are vulnerable to financial disabilities as they rank lowest in terms of financial knowledge. Older people are often the ones who are exposed to scams and lose money on this. We have tested that age differences in economic knowledge are reduced for those with financial education or financial work, but since real and formal competence helps to reduce gender differences in economic knowledge, it is conceivable that it also helps to reduce the age difference in economic knowledge. In this way we ensure that both men, women, young people and the elderly become less vulnerable groups in society.

The Netherlands, like many other countries in the world, has the most private debt, and if the interest rate on mortgages goes up by some percentage, it will hit many private individuals who in turn will cost the economy. In addition, financial problems are known to lead to stress, which can lead to many people struggling with mental health and workplaces due to high sickness absence due to this. Since we have concluded that gender differences are reduced by real / formal competence, I will place a responsibility on politicians to introduce private economics into the curricula as soon as possible. Many may think that it is the parents' responsibility to teach the children about personal finance, and I would agree to some extent. First, of course, not all parents are good at learning what they are capable of doing. Secondly, it is clear from our report that not all parents have good financial knowledge themselves, and then it will not be easy to learn it regardless of how educationally one is.

## VII. Appendix

### 1. Procedure: code used for CFC to make the future oriented:

gen toek03\_future = 1 if toek03 == 7

replace toek03\_future = 2 if toek03 == 6

replace toek03\_future = 3 if toek03 == 5

replace toek03\_future = 4 if toek03 == 4

replace toek03\_future = 5 if toek03 == 3

replace toek03\_future = 6 if toek03 == 2

replace toek03\_future = 7 if toek03 == 1

### 2. Procedure, excel formula used for match ID in all sections with each other:

'[IF(logical\_test, [value\_if\_true], [value\_if\_false]), MATCH(lookup\_value, lookup\_array, [match\_type])]'

### 3. Procedure, overview of dummy variables:

Financial literacy	Dummy value
Correct answer	0
Wrong answer	1
Missing value	9999

Gender	Dummy value
Male	1
Female	0
Missing value	9999

Savings account	Dummy value
Yes	0
No	1
Missing value	9999

Mutual funds	Dummy value
Yes	0
No	1
Missing value	9999

Stocks	Dummy value
Yes	0
No	1
Missing value	9999

#### 4. Results, explanation of education code:

Education: N = 1,481

- 1 Primary education
- 2 Preparatory Middle-level Vocational Education
- 3 Intermediate vocational
- 4 Secondary pre-university
- 5 Higher vocational
- 6 University

5. Results, explanation of monthly income code:

Income monthly : N = 1,481

- 1 less than 500
- 2 between 501 - 1000
- 3 between 1001 - 1500
- 4 between 1501 - 2000
- 5 between 2001 - 2500
- 6 between 2501 - 3000
- 7 between 3001 - 3500
- 8 between 3501 - 4000
- 9 between 4001 - 4500
- 10 between 4501 - 5000
- 11 between 5001 - 7500
- 12 more than 7500
- 13 don't know
- 9999 don't want to say

6. Results, explanation of the portfolio choice table in absolute numbers:

	Saving account			Mutual funds			Stocks		
	Yes	No	Didn't answer	Yes	No	Didn't answer	Yes	No	Didn't answer
<b>Group 1</b>	281	123	109	50	354	109	41	363	109
<b>Group 2</b>	266	127	120	58	335	120	43	350	120
<b>Group 3</b>	154	62	86	28	188	86	28	188	86
<b>Group 4</b>	51	35	25	8	78	25	9	77	25