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Household financial market participation

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ABSTRACT

This study investigates the determinants of households' participation in non-retirement investments (stocks, bonds, mutual funds) and for the first time tests the direct effect of being mistreated by financial institutions on the probability of holding non-retirement investments. Using the data from a representative survey from the United States (N=5621) the study reports that, in line with previous literature, older people who are living with a partner and have a higher level of income are more likely to hold non-retirement investments. Furthermore, high levels of financial literacy, optimism, and social interactions are positively associated with the decision to hold stocks, bonds, and shares of mutual funds. At the same time, the effect of gender on participation is weak. While men seem to have a higher probability of participating in financial markets, this link disappears or becomes less statistically significant when additional controls are added to regression specification. Finally, households that have felt mistreated by financial services have a lower probability of holding non-retirement investments.

Keywords: Behaviour Finance, Household Finance, Participation Puzzle

INTRODUCTION

The equity premium is the difference in returns between risky and risk-free assets. (Mehra, Prescott 1985) Despite the high-risk premium, only a part of households' participate in the stock market. Many studies have tried to solve this phenomenon, and it is therefore also called the non-participation puzzle (Guiso, Jappelli 2005). The equity premium puzzle tries to explain the large gap between the returns of risk-free and risky assets. The standard finance theory of investors' risk aversion alone cannot explain the massive difference in returns.

This thesis will explore which household characteristics might explain households' limited participation in non-retirement investments, such as stocks, bonds, and mutual funds, despite their historically high returns. Even though this topic has been widely studied before, this study aims at filling a gap in the prior literature by analyzing the direct effect of mistreatment on the probability of holding non-retirement investments. In addition, the study extensively summarizes a range of socio-economic and behavioral factors related to non-retirement investments and test their durability while controlling for a large set of relevant demographic factors. Furthermore, this study uses a new dataset that has not priorly been examined in this context. In order to measure a household's behavior, this thesis will conduct an empirical study by using logistic regression analysis.

Based on an extensive review of prior literature in behavioral finance and household finance, I formulate and test the following hypotheses. (1) Households, who have felt mistreated by financial services, are less likely to hold non-retirement investments. (2) Households, who are more financially literate, are more likely to hold non-retirement investments. (3) Households, who are more optimistic about their future are more likely to hold non-retirement investments. (4) Households, who are more socially active are more likely to hold non-retirement investments.

The data used in this empirical study comes from the National Financial Well-Being Survey (NFWBS) which is gathered by the Consumer Financial Protection Bureau in 2017. The survey is a cross-sectional study of a representative sample of United States households. The sample size of

5,621 includes 217 survey questions related to financial status and different aspects of life. To the best of my knowledge, this is the first study to use NFWBS data in this context.

The empirical study conducted in this thesis is performed by logistic regression analysis, also known as the logit binary model. The dependent variable is whether households have held any non-retirement investments, such as stocks, bonds or mutual funds. Independent variables can be divided into socio-economic and behavioral variables. Socio-economic variables are age, gender, children, household size, whether respondents are living with a partner, and income level. Behavioral variables are financial literacy, optimism, and social interactions. Furthermore, I add a new variable, mistreatment, which has not previously been discussed in this context. I also control for household's ethnicity, education, employment, and geographical region.

The results support findings in previous studies but also shed light into new drivers of holding non-retirement investments. In contrast to previous studies that have produced rather mixed results, the analysis indicates that stock market participation increases with age. In line with previous literature, people who are living with a partner and who have a higher level of income are more likely to hold non-retirement investments, such as stocks, bonds or mutual funds. Also in line with prior studies, more financially literate, optimistic and socially interactive households are more likely to take part in financial markets. Finally, to the best of my knowledge, this is the first study to investigate the direct effect of being mistreated by financial institutions on participation. I hypothesized that households that have felt mistreated have a lower probability of holding non-retirement investments. The empirical analysis strongly supports this hypothesis.

The thesis is structured as follows. In the first section, I discuss the theoretical framework necessary to conduct this study. Specifically, I review the empirical evidence on stock market participation, and the determinants that have been found to affect it. Section 2 presents the data and methodology of the study. In section three I present the empirical findings. In the fourth section, I will discuss the highlights of this study and its contribution to the existing literature. Moreover, I will present further suggestions. Finally, I will end this thesis with a conclusion.

1. THEORETICAL FRAMEWORK

In this section, I build the theoretical basis for the study. First I overview indirect stock market participation in the United States and present the economic implications non-participation causes. Then I will continue by reviewing previous studies that built grounds for this thesis. Finally, I will conduct a literature review on stock market participation determinants.

1.1. Stock Market Participation in the United States

Panel Study of Income Dynamics in 1984 indicates that 27.6% of American households held stocks indirectly (Mankiw, Zeldes 1991). Figure 1 below illustrates the stock market ownership among American households from 1989 to 2001. The participation rate has steadily increased by 8.2 percentage points between 1989 and 2001. In 1989 only 13.1% of households held stocks whereas in 2001 already 21.3% of households held stocks. However, stock ownership varies highly between different income groups and Figure 1 which illustrates the average percentage among all income groups gives somewhat insufficient results.

Wolff (2000) studied the trends in wealth ownership between 1983 and 1998. In 1998 47% of American middle class held stocks directly or indirectly, whereas, among the rich, the number was 82%. Figure 2 below shows that indirect stock ownership among wealthier households is significantly higher than the average participation rate. However, Figure 2 takes into account also undirect stock ownership whereas Figure 1 considers only direct stock ownership. In 2001, 95% of the top one percent wealthiest households held stocks, and 85.2% of next 19 percent wealthiest households held stocks. Even among the middle three quintiles, 51.5% of households held stocks directly or indirectly. These numbers are significantly higher than the average participation rate of 21,3% in 2001.

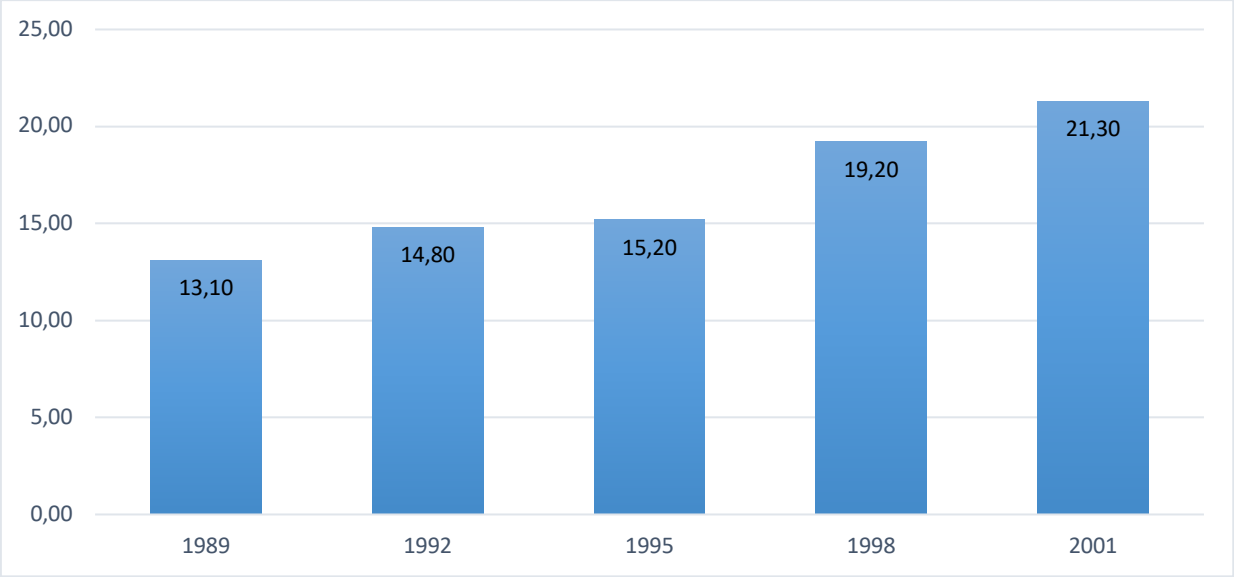

Figure 1. Stock ownership, 1989-2001, percentage of households holding stocks directly, Unites States households
Source: Wolff, E. N. (2000). Recent trends in wealth ownership, 1983-1998. *Jerome Levy Economics Institute Working Paper*, (300).

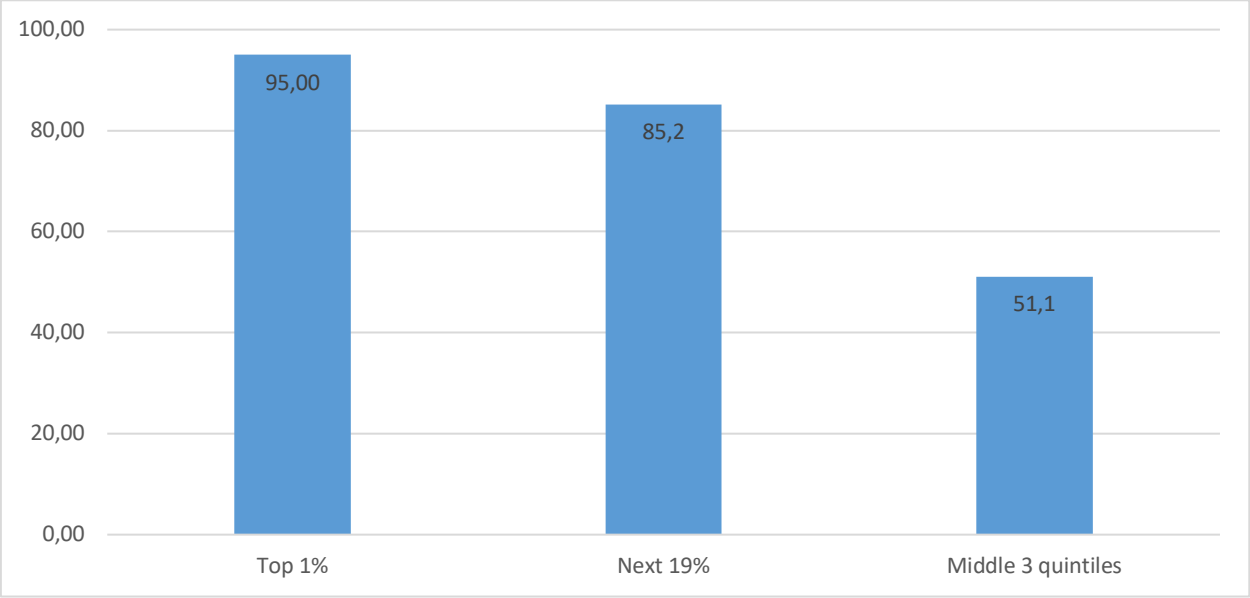

Figure 1.2. Stock ownership directly or indirectly by wealth class in 2001
Source: Wolff, E. N. (2000). Recent trends in wealth ownership, 1983-1998. *Jerome Levy Economics Institute Working Paper*, (300).

Furthermore, in 2016 52% of American households held stocks indirectly (Bricker et al. 2017). Compared to the study made in 1984 there has been a 24.4 percentage point increase in the stock ownership from 1984 to 2016. The indirect stock ownership of the middle class had increased to

around 70% in 2016 when it was only 47% in 1984. In the top income group, 94% held stocks indirectly in 2016. (Bricker et al. 2017) There has been an increase in stock holding of around ten percentage points among the rich within the past two decades. However, less than 30% of the low-income group held stocks in 2016 (Bricker et al. 2017).

This indicates that the allocation of household wealth between risky and risk-free assets has changed between the last two decades and the stock ownership has increased among all income groups. However, only 52% of American households held stocks in 2016 according to Bircker et al. (2017), and standard finance theories struggle explaining this phenomenon of the low participation rate.

The limited households' stock market participation has implications on both the micro and macro economy (Laakso 2010, Luotonen 2009). One micro level outcome is that stockholders have more volatile consumption compared to non-stockholding households. Stockholders' consumption is correlated to the changes in stock market appreciation. (Mankiw, Zeldes 1991) Another micro level outcome is that households who decide to participate in the stock market get wealthier and therefore increase the gap between households' wealth. This originates from that the high equity premium helps to grow wealth faster. (Mehra, Prescott 1985).

There are also multiple effects on the economy at large. On the macro level, it influences asset prices, equity premium and the volatility of markets (Mankiw, Zeldes 1991). Market efficiency would likely improve if more individuals participated in the financial markets. Higher participation rate would solve the equity premium puzzle, but that would lead to lowers returns and decrease interest towards stocks. Stock market participation affects consumption smoothing and household welfare (Cole, Shastry 2009). Finally, the annual welfare loss from non-participation in stock markets is up to 2% of GDP which has a high impact on both micro and macro levels (Cocco, Gomes, Maenhout 2005).

According to Peress (2005), participation costs have fallen in the last decades, which partly explains the increased stock ownership. Peress divided participation costs to information costs and entry costs. The amount of information available has rapidly increased after the internet era, but on the other hand, it is hard to evaluate which information is sufficient. Entry costs refer to commissions and fees, which have decreased after improved regulation. (Peress 2005) Information and entry costs are one of the main reasons for non-participating (Vissing-Jorgensen 2004).

1.2. Literature review

The equity premium is the difference in returns between risky and risk-free assets. Over the last century the risky assets, as stocks, have had 7% returns, whereas risk-free assets, like government bonds, have had around 1% returns. (Mehra, Prescott 1985) Despite the high-risk premium, only a part of households' participate in the stock market. Many studies have tried to solve this phenomenon, and it is therefore also called the non-participation puzzle (Guiso, Jappelli 2005). The equity premium puzzle tries to explain the large gap between the returns of risk-free and risky assets. The standard finance theory of investors' risk aversion alone cannot explain the massive difference in returns.

Mehra and Prescott (1985) introduced the equity premium puzzle, and it has been studied by multiple researchers ever since. Mankiw and Zeldes (1991) and Kandel and Stambaugh (1991) tried to explain the equity premium puzzle with volatile consumption. Households who have participated in the stock market have a high correlation in their consumption with stock market returns. Constantinides (1990) states that the equity premium puzzle does not bankrupt the rational expectations model, and the puzzle can be explained by habit persistence. Furthermore, Fama and French (2002) tried to explain the equity premium by dividends and earnings growth rates. They found out that the dividend growth model was similar to equity premium estimates and that the returns on average are profitable. Finally, Benartzi and Thaler (1995) tried to solve the puzzle by loss aversion and mental accounting.

Laakso (2010) investigated stock market participation and households characteristics in Europe and used a sample of 34,000 respondents across countries. The study found risk aversion to be the most robust explanation for the low participation rate. It indicated that social interaction and life satisfaction have a positive impact on the participation decision, whereas religiousness decreases the probability to hold stocks (Laakso 2010). Bassam (2010) used a Finnish sample of 3,400-5,000 respondents to study consumer attitudes, expectations, and financial market participation. The study found risk tolerance to have a high impact on the participation decision. In addition, more educated people and individuals who support right-wing political parties are more likely to participate in the financial markets. Social interaction and optimism were not statistically significant to have an impact on the participation decision. (Bassam 2010)

Gardini and Magi (2007) studied stock market participation among Italian households by cross-sectional regression analysis. They found that more educated, married males are more likely to hold stocks and that age has no effect on the participation decision (Gardini, Magi 2007). Georgarakos and Pasini (2011) used a cross-national survey across European countries to study how trust and sociability affect the participation decision, and they found both factors to have a positive impact. Almenberg and Dreber (2015) used a cross-sectional regression analysis over a Swedish sample of 1,300 individuals to examine how gender and financial literacy affects stock market participation. They found women to invest less due to higher risk aversion and found them being more financial illiterate than men (Almenberg, Dreber 2015).

The traditional demographic determinants such as age, gender, marital status, income, and education are widely studied in the previous literature. However, in this study, I add new demographic variables, region, and financial literacy, which have not been studied widely. Moreover, I will also study the effect of behavioral factors. I examine the influence of optimism and social interaction on the probability of holding non-retirement investments and finally, I will also add a new variable, mistreatment, which has not been studied before in this context.

Below I will shortly overview different determinants that are found to affect the decision whether to hold non-retirement investments.

- Age

Stock market participation increases with age. The increase of 11% between the age of 35 and 55 is quite substantial (Cole, Sharsty 2009). According to Shum and Faig (2006), the probability of holding stocks increases until age 61. Also, Chen (2006) states that older people participate more in the stock market. However, other studies argue with the previous statements. Stock market participation at age 30 should be around 70% and at age 70 around 30% (Ameriks, Zeldes 2004).

On the other hand, Benartzi and Thaler (1995) state: "An investor who wants mostly stocks in his portfolio as age 35 should still want the same allocation at age 64." According to their study age does not affect the participation decision. According to Zhong and Xiao (1995) the stock market participation rate increases from age 21 to 34 and reaches its peak at the age of 35-44, from where it decreases until the age of 64, before recovering close to the peak after the age of 65. As a conclusion, there is not enough information to say whether age has an impact on the participation decision or not.

- Gender

Women are found to participate less than men in the stock market. (Almenberg, Dreber 2015; Van Rooij, Lusardi, Alessie 2011) According to the study made by Almenberg and Dreber (2015) women are more risk-averse and financially illiterate than men. Also, Lusardi (2008) found women to be financially illiterate. Women are less aware of financial markets than men (Ford, Gent 2009). Barber and Odean (2001) studied stock market participation from 1991 to 1997 and found out that men trade 45% more than women. As a conclusion, multiple studies indicate that men participate more than women.

- Marital Status

Married people are more likely to hold stocks (Hurst et al. 1998). In 2001 the mean net worth of married households was 3 times higher than other types of households (Hanna, Lindamood 2005). The previous partly explains why married households have a higher participation rate. They hold a higher level of wealth which decreases the entry barriers. Also, the willingness to take risk is higher among married households where both husband and spouse are college graduates. (Hanna, Lindamood 2005) According to the previously mentioned also financial knowledge and education affect the participation decision.

A study made in 1989 with a sample of 973 respondents indicated that 68% of married households held stocks and only 32% of non-married held stocks (Zhong, Xiao 1995). The sample size is somewhat incompetent with too few respondents and distorts the real stock market participation rate. However, it well reflects the gap in participation among married and unmarried households.

- Family influence and children

Adults whose parents have held stocks have almost 50% higher probability of holding stocks than adults whose parents did not participate in the stock market (Chiteji, Stafford 2000). Households that have children are less likely to hold stocks (Hurst et al. 1998). Households with children have more expenses and might lack liquid capital.

- Ethnicity

White households have historically held more stocks than minority households (Hanna, Lindamood 2005). Non-black households have almost 70% higher probability of holding stocks

than African-American households (Chiteji, Stafford 2000). In addition to African-American households also Hispanic households are less likely to participate in the stock market (Hong, Kubik and Stein 2004). In 1994, 41% of non-black households held stocks, and only 14.3% of African-American households had stock ownership. (Hurst et. Al 1998)

In 1995, the Top 1% of wealthiest United States citizens were divided into four categories. White, non-Hispanic people filled 95.3% of this category. The share of black, non-Hispanic were 0.7%, Hispanic 0% and Asian and others 3.9%. (Wolff 1998) The inequality in wealth among races partly explains the difference in financial behavior. In 1989 African-American households had around 25,000 dollars less wealth compared to non-black households (Hurst et al. 1998). Despite the old reference, it gives a guideline for the situation today. The gap is quite substantial and partly explains why African-American households participate less in the stock market.

Hispanic and African-American households have a low level of financial literacy (Lusardi 2008). Lack of financial literacy leads to a lower level of stock market participation. Kumar (2009) found that Hispanic and African-American households participate more in a lottery than White, Non-Hispanic households. In light of the previous, risk aversion cannot explain the low participation rate among Hispanic and African-American households. Participation in the financial markets requires capital and information, whereas lottery participation does not. The low participation among Hispanic and African-American households can be explained by low wealth and lack of financial education.

- Education

Higher educated individuals participate more in the stock market than people with lower education. Hong, Kubik, and Stein (2004) and Chen (2006) state that 50% of college graduates hold stocks, whereas only around 20% of individuals with high school diploma decide to enter the stock market. College students are likely to be more educated about financial markets. Financial literacy lowers entry costs as they do not need to seek financial advice. Higher educated individuals might hold more information and knowledge, but also feel more confident to enter the markets.

Furthermore, low educated people are found to be financially illiterate (Lusardi 2008). Cole and Shastry (2009) state that one additional studying year in school has around 8% increased the probability to participate in the stock market. Also, Zhong and Xiao (1995) found out that one additional year in school increases the participation rate. Bernheim and Garret (2003) conducted a

study on employer-based financial education and found that it increased households' financial behavior.

- Wealth

Vissing-Jorgensen (2004) states that information and transaction costs are one of the main reasons for non-participating and on the annual level the price increases high enough to explain the non-participation (Vissing-Jorgensen 2002). High fixed participation costs decrease households' willingness to invest in stocks (Vissing-Jørgensen 2003; Haliassos, Michaelides 2003). Poorer and uneducated households are likely to avoid participation in the stock market (Guiso, Sodini 2013). Also, Polkovnichenko (2004) states that low labor income households do not participate in the stock market. According to Chen (2006) "liquidity, informational cost, and human capital" have the most significant influence on participation decision. All the previous mentioned require wealth.

Morover, Campbell (2006), Polkovnichenko (2004) and Mankiw and Zeldes (1991) indicate that the participation rate is substantially low even among wealthy households. In light of this, wealth does affect the participation decision but cannot fully explain why only a few households take part in the equity market. Information and transaction costs cannot explain the non-participation among wealthy households as they do not have entry costs barriers. However, Laakso (2010) states that entry barriers are rather psychological than monetary. This partly explains why the participation rate is substantially low even among the wealthiest households. As a conclusion, some households cannot afford to enter the stock market, whereas some household decides not to enter.

- Financial knowledge

Households with high-level financial knowledge are more likely to hold stocks than households with low financial knowledge (Rooij, Lusardi, Alessie 2011). A study made by Hogarth and Hilgert (2002) found that financial knowledge is positively correlated with higher education, higher income, and marital status. They found out that households with more financial knowledge hold more mutual funds and stocks (Hogarth and Hilgert 2002). Households with low financial knowledge are less likely to participate in the stock market and are found to have weak retirement plans. However, they have a higher level of borrowing compared to households with high financial knowledge. (Lusardi 2008)

According to Van Rooij, Lusardi and Alessie (2011) people with higher financial information invest more in stocks and have better retirement plans. Households with more knowledge are more

confident and more likely to participate in the stock market. According to a study made over Italian households, 35% of potential stock owners are unaware of stocks. (Guiso, Jappelli 2005) This partly explains why the participation rate is low even among wealthy and financially educated households. Shum and Faig (2006) found that people who received professional advice in investing are more likely to participate in the stock market. Lack of information seems to be a huge barrier to enter the markets.

- Optimism

Optimistic people are more likely to participate in the stock market (Kezdi, Willis 2009). Overconfident investors overvalue their knowledge and abilities. Overconfident people think they are better at making decisions than they are. (Nofsinger 2011) Optimism derives from overconfidence, but instead of overvaluing personal knowledge optimistic people assume future events to be positive (Baker, Nofsinger 2010). Also, Heaton (2002) states that optimistic investors overvalue future performance. Baker, Ruback, and Wurgler (2007) document households to invest more when the capital is cheap due to an optimistic vision about future events.

- Social interactions

According to Heimer and Simon (2012) socially active households are more likely to participate in the stock market. Also Hong, Kubik and Stein (2004) state that investors who communicate with each other tend to trade more. Social interaction can increase not only the interest in financial market participation but also the awareness of the whole possibility. Georgarakos and Pasini (2011) found that sociability usually leads to the sharing of information which lowers entry barriers. Sharing of information can include financial advice about how, when and where to invest or other people's experiences of high returns.

People trust more what they hear by word-of-mouth from their friends and mutual contacts than listening to professional information. (Guiso, Jappelli 2005) Also, Brown et al. (2008) state that word-of-mouth information has a tremendous influence on the participation decision. People are found to have critical thinking towards media and professional reports. Investors are more likely to trust the word of their family, friends or colleagues than some reputable source. People also like to choose similarly with family and friends (Reis, Collins, Berscheid 2000).

According to Hong, Kubik and Stein (2004) people who go to church have a higher stock market participation rate. People who live in areas with high social capital buy and sell more stocks

(Guiso, Sapienza, Zingales 2004). Households that have more interaction with their neighbors and community participate more in the stock market (Brown et al. 2008). In light of the previous, community, neighbors and the living area have a high impact on the participation decision. Community and neighbors might create peer pressure to act the same way as others. People want to feel accepted and acknowledged in a group.

- Trust

Guiso, Sapienza, and Zingales (2008) found that households with a high level of trust have a 50% higher probability of holding stocks. According to Matters (2008), there is a wide variance in trust between different countries and cultures. Nordic countries are known to be high-trust societies, whereas Southern European countries can be named as low-trust societies. The stock market participation in Nordic countries is found to be substantially higher. Households like to buy stocks of companies of which they have positive experiences or which they trust. (Byrne, Brooks 2008) Wealthy households have relatively same trust issues as non-wealthy households. (Guiso, Sapienza, Zingales 2008)

Table 1.2.1. Summary of prior research in stock market participation

Determinant	Impact	Prior research
Age	Mixed	Cole and Sharsty (2009) Benartzi and Thaler (1995)
Male Gender	Positive	Almenberg and Dreber (2015) Barber and Odean (2001)
Children	Negative	Hurst et al. (1998)
Married	Positive	Hurst et al. (1998) Zhonga and Xiao (1995)
Costs (information, entry)	Negative	Vissing-Jorgensen (2004) Haliassos and Michaelides (2003)
White race	Positive	Hanna and Lindamood (2005) Wolff (1998)
Education	Positive	Hong, Kubik, and Stein (2004) Chen (2006)

Financial Knowledge	Positive	Rooij et al. (2011) Hogarth and Hilgerth (2002)
Optimism	Positive	Kezdi and Willis (2009) Heaton (2002)
Social interaction	Positive	Heimer and Simon (2012) Brown et al. (2008)
Trust	Positive	Guizo, Sapienza and Zingales (2008) Matters (2008)

1.3. Hypotheses

The purpose of this thesis is to investigate whether specific household characteristics affect the decision to hold non-retirement investments. The hypotheses are based on previous literature, psychology, and common sense. The effect on financial literacy, optimism, and social interaction have been studied before, but I will investigate these determinants on a new, more extensive data-set. There is no prior research if mistreatment affects the decision to hold non-retirement investments, and therefore I am the first one to examine its effect in this context.

To follow the aim of this thesis, four hypotheses have been created:

1. Households, who have felt mistreated by financial services, are less likely to hold non-retirement investments.
2. Households, who are more financially literate, are more likely to hold non-retirement investments.
3. Households, who are more optimistic about their future are more likely to hold non-retirement investments.
4. Households, who are more socially active are more likely to hold non-retirement investments.

2. DATA AND METHODOLOGY

2.1. Data and variables

Data on National Financial Well-Being Survey (NFWBS) is gathered by the Consumer Financial Protection Bureau. It is a cross-sectional study on United States households. Cross-sectional data examines information among individuals during the same time period. The survey includes 217 questions related to financial status and different aspects of life. The data was collected in 2017. In this study, I will focus on demographic and socio-economic questions and on questions that examine respondents financial behavior.

The data consist of 6,389 respondents nationwide in the United States. However, due to missing data, the final sample size contains 5,621 observations. The survey covers nine different regions in the United States; New England, Mid-Atlantic, East-North Central, West-North Central, South Atlantic, East-South Central, West-South Central, Mountain, and Pacific. The highest amount of respondents are from South Atlantic with 1,296 respondents (20.3%), Pacific with 1,045 respondents (16.3%) and East-North Central with 1,001 respondents (15.7%). In East-South Central only 308 and New England only 322 households participated in the survey.

The largest group of respondents (1,116) were between the age of 25-34 and the second largest group of respondents (1,075) were between the age 45-54. Smallest groups of respondents were 18-24 years old with 414 respondents and 70-74 years old with 496 respondents. Thus, there is a wide variety of age among the respondents which implies that the results will be statistically significant. Distribution among gender is almost equal in this study as male respondents fill 51.4% of the sample and female respondents 47.6%.

In addition to different aspects of socio-economic life, NFWBS dataset contains detailed information on the household's financial behavior. In this study, I will concentrate on survey questions related to optimism, social interaction, and mistreatment. It also includes information on

the household's financial assets on both retirement investments (401K and IRA) and non-retirement investments (stocks, bonds, and mutual funds). This study uses indirect stock ownership to analyze the determinants of stock market participation, due to the absence of direct stock ownership in the dataset.

A most significant limitation of the cross-sectional study design is that exposure and outcome occur at the same time. Therefore there is no general evidence of the causal relationship between the two. Time series study is needed to establish a real causal relationship between exposure and outcome. Therefore with our cross-sectional data, we have to focus more carefully on causal interpretation than in time-series set up. (Solen 2015) It is necessary to evaluate the determinants thoroughly with previous research so that they are statistically significant.

It is also necessary to take into account that even if the survey questions are carefully designed, some questions might still be unable to give the right answers. Some questions are presented as self-evaluations and affected by human behavior and biases and therefore highly subjective. In addition, there is no evidence if the mental state of the respondents might have affected the answers.

I will describe the critical determinants used in the cross-sectional study in Appendix 1. I present a table of the questions used in the National financial well-being survey. The dependent variable is whether individuals hold non-retirement investments such as stocks, bonds or mutual funds. Independent variables are age, gender, household size, children, partner, income, financial literacy, optimism, social interaction and mistreatment, controlled for ethnicity, education, employment and geographical region. Independent variables are chosen based on previous studies. Demographic variables are used in the analysis to investigate whether relationships between behavioral variables and non-retirement investment occur.

Table of variables and their definitions are in Appendix 1.

2.2. Descriptive statistics

In this study, I use cross-sectional regression analysis for investigating why only a few households hold non-retirement investments. Table 2.3.1 below shows the descriptive statistics of the dependent variable and independent variables used in the regression analysis.

Savings variable shows whether the respondents have non-retirement investments such as stocks, bonds or mutual funds or not. The mean is 0.32 and the median is 0, which display that only less than one-third of the respondents hold any non-retirement investments.

Age mean is 4.33 which refers to age category number 4 where respondents are 45-54 years old. Median is 4 represents exactly the age category number 4. This indicates that the majority of the respondents fit in the working ages. Mean in gender is 0.53 and the median is 1. This implies that there are nearly the same amount of male and female respondents with a slight superiority by men.

In this study, ethnicity has been used as a dummy variable. Mean is 0.71 for white, 0.10 for black, 0.14 for Hispanic and 0.05 for others. Median is 1 for white and 0 for the rest of the categories. These figures indicate that white people are the largest ethnicity in the sample, followed by black, Hispanic and other, respectively. Household size is a continuous variable and it has a mean of 2.57 and a median of 2. This displays that largest fraction of the sample are households with two persons.

Variable that studies whether respondents financially support children or not is named "Children". The mean for this variable is 0.37 and the median is 0. This shows that less than half of the respondents do not financially support children.

Partner variable was originally "Marital status" in the dataset. It had five categories; 1 Married, 2 Widowed, 3 Divorced/Separated, 4 Never married and 5 Living with a partner. However, I changed the variables to a dummy variable in order to run binary logistic regression. I combined 1 Married and 5 Living with a partner to one variable stating "Yes" to question if live with partner and the rest to variable stating "No" if lives alone. The mean is 0.66 and the median is 1. This indicates that over half of the sample lives with a partner.

Table 2.3.1 Descriptive statistics

Variable	Mean	Median	S.D.	Min	Max
Non-Retirement Investments	0,32	0	0,47	0	1
Age	4,33	4	2,10	1	8
Gender	0,53	1	0,50	0	1
Dummy ethnicity					
White	0,71	1	0,46	0	1
Black	0,10	0	0,30	0	1
Hispanic	0,14	0	0,34	0	1
Other	0,05	0	0,23	0	1
Size	2,57	2	1,24	1	5
Children	0,37	0	0,48	0	1
Partner	0,66	1	0,47	0	1
Dummy education					
Less than high school	0,07	0	0,25	0	1
High school	0,24	0	0,43	0	1
Some college	0,30	0	0,46	0	1
Bachelor's degree	0,21	0	0,41	0	1
Graduate	0,18	0	0,38	0	1
FinLiteracy	4,72	5	1,17	1	7
Income	5,56	6	2,66	1	9
Dummy employment					
Self employed	0,07	0	0,25	0	1
Full time	0,42	0	0,49	0	1
Part time	0,07	0	0,25	0	1
Homemaker	0,06	0	0,24	0	1
Student	0,04	0	0,19	0	1
Out of labor force	0,04	0	0,20	0	1
Unemployed	0,04	0	0,20	0	1
Retired	0,27	0	0,44	0	1
Dummy region					
New England	0,05	0	0,22	0	1
Mid-Atlantic	0,13	0	0,34	0	1
East-North Central	0,23	0	0,42	0	1
South Atlantic	0,20	0	0,40	0	1
East-South Central	0,05	0	0,21	0	1
West-South Central	0,10	0	0,30	0	1
Mountain	0,07	0	0,26	0	1
Pacific	0,17	0	0,37	0	1
Optimism	5,43	6	1,41	1	7
Interactions	2,86	3	1,02	1	5
Mistreated	1,82	2	0,80	1	4

N=5612

A dummy variable was created for education. Highest mean is for "Some college" with 0.30. This means that most of the respondents have an education level of college. Second highest means are 0.24 for high school and 0.21 for the Bachelor's degree. Only a few respondents are Graduates with a mean of 0.18. The number of high school dropouts is quite significant with a mean of 0.07.

Financial literacy is a continuous variable with seven categories. Respondents were asked how they would asses their overall financial knowledge on a scale from zero to seven, where seven is very high. The mean is 4.72 and the median is 5. This indicates that most of the respondents locate themselves in a high-level category and consider themselves to be financially literate. According to Van Rooij, Lusardi and Alessie (2011), financially literate people invest more in stocks and have better retirement plans. However, the results of this dataset display that only around 30% have any non-retirement investments. According to Nofsinger (2011) investors are found to overvalue their knowledge and abilities. In the NFWBS survey, people were asked to self-evaluate their financial knowledge instead of have questions that would examine their level of financial knowledge. Therefore the results are in this way unreliable. Income is a continuous variable with nine categories of different level of household income. The mean of 5.56 and a median of 6 implies that most of the respondents have a yearly income of $60,000 to $74,999.

A dummy variable was created for employment. The full-time variable has the highest mean of 0.42 which indicates that most of the respondents work full time. Second highest mean is 0.27 which displays retired people. Self-employed and part-time have a mean of 0.07 and homemaker has 0.06. Smallest categories among the respondents are people out of labor force, students and unemployed with a mean of 0.04. Thus a majority of the respondents have labor income.

A dummy variable was created for the region. The largest amount of respondents are from East-North Central with a mean of 0.23. Second largest areas where respondents come from are South Atlantic with a mean of 0.2 and from Pacific with 0.17. The smallest group of respondents are from New England and from East-South Central with a mean of 0.05.

Optimism is a continuous variable and people were asked whether they are optimistic about their future on a scale from one to seven, where seven means strongly agree. The mean of 5.43 and median of 6 implicate that most of the respondents have a high level of optimism. According to Kezdi and Willis (2009) and Barber and Odean (2001) more optimistic people are more likely to hold stocks. Thus, the high level of optimism among the respondents is contradictory with the

results of how only a few respondents hold any non-retirement investments. However, individuals' answers might change a lot based on how the question is framed. If respondents were asked about are how optimistic they are about their financial future the results might be significantly different. Also, self-evaluation layout in questions and general human behavior affect the results.

Interactions variable describes whether respondents ask other people their opinions before making decisions involving money. It is a continuous variable with a scale from one to five, where five means always. The mean 2.86 and median 3 implies that most of the respondents have interactions only sometimes. Multiple studies show that households who are more socially active are more likely to participate in the stock market (Heimer, Simon 2012, Brown et al. 2008).

Mistreated variable examines if respondents frequently felt not respected or mistreated with financial services. It is a continuous variable with a scale from one to four, where four is often. The mean of 1.82 and median of 2 displays that on average respondents feel mistreated only rarely. This implies that this variable is unable to explain the low participation rate.

2.3. Regression analysis

The cross-sectional study examines data at a single point of time. The cross-sectional regression analysis studies which factors have an effect on the participation decision. It examines the relationship between dependent and independent variables.

In this study, the dependent variable will be whether respondents hold non-retirement investments like stocks, bonds or mutual funds. The independent variables will be divided into socio-economic and behavioral variables. Independent variables will be age, gender, household size, children, partner, income, financial literacy, optimism, social interaction and mistreatment, controlled for ethnicity, education, and region. As the data has 5,621 respondents over 218 questions it is sufficient to use cross-sectional regression analysis over population.

The econometric regression model used will be a binary logit model which is good when modeling dummy variable outcomes. The regressions will be controlled for ethnicity, education, employment, and geographical region.

3. EMPIRICAL RESULTS

In this thesis I have created four models. All four models represent the results of logistic regression. The dependent variable used is whether respondents have non-retirement investments such as stocks, bonds or mutual funds. Age is a levels variable that increases with higher age. Gender dummy takes a value of one is that the respondent is a male and zero if the respondent is a female. Size is a levels variable that increases with a larger size of a household. Children dummy takes a value one if the respondent financially supports children and zero if not. Partner dummy takes a value of one if the respondent is living with a partner and zero if the respondent is living alone. Income variable is a levels variable and increases with higher income. The regressions are controlled for ethnicity, education, employment, and region in model 3 and model 4. Optimism, interactions and mistreated are levels variables that increase with a higher level of optimism, a higher level of social interaction and a higher level of mistreatment, respectively. ***, ** and * represent the significance level of 0.01, 0.05 and 0.1, meaning 1 %, 5 % and 10 % respectively. There are 5,612 respondents in all models. The adjusted R2 increases from model 1 to model 4 and implies that meaning that model 4 is superior to model 3, thus the addition of behavioral variable increases explanatory power of the models. I have run additional regressions which are not displayed here, but I will discuss them where relevant.

Age has a strong effect on the participation decision in all four models. The positive coefficient indicates that age has a positive effect on the probability of holding stocks and the results are statistically significant at 1% level in all models. Thus, the participation rate increases with age and older people are more likely to invest in stocks than younger people. This result supports some earlier research that the stock market participation rate increases with age (Cole, Shastry 2009; Shum, Faig 2006; Chen 2006). However, it differs from other studies which implied that it is impossible to say whether age has an effect on the participation decision.

The results show that male respondents are more likely to participate in non-retirement investments. This result agrees with previous studies (Alberg; Dreber 2015; Barber, Odean 2001). The effect of gender is statistically significant at 1% level in both models 1 and 2. However, in

models 3 and 4 gender the effect of gender becomes not statistically significant (model 3) or drops substantially (model 4). This means that the effect of gender observed is models 1 and 2 is a result of other factors that are not taken into account in these models.

The results whether respondents support children financially are not statistically significant, and therefore it is impossible to say whether it affects the participation decision. Household size has a strong negative effect on the participation decision which originates from the negative coefficient. The effect is substantial and has a high statistical significance at 1% level in the model where only demographic variables are taken into account. However, in models 3 and 4 the effect disappears.

Living with a partner increases the participation decision in all models. The coefficients of the variable were positive in all three models, and the results are statistically significant at 1% level. This supports previous literature that married people are more likely to invest in non-retirement investments (Hurst et al. 1998; Zhong, Xiao 1995).

Income level has a strong positive effect on the participation decision in both models. The positive coefficients indicate that higher income level leads to a higher level of savings. The results are statistically significant at 1% level in both models. These findings strongly support previous research. Wealthier households are found to invest more (Guiso, Sodini 2013) and Figure 2 displays the vast difference in direct or indirect stock ownership between wealth class (Wolff 2000). Higher income levels also lower entry barriers, that Vissing-Jorgensen (2004) found to be one of the main reasons for non-participation.

In order to investigate financial literacy household's were asked to self-evaluate their level of financial literacy. Financial literacy has a positive effect on the decision to hold non-retirement investments when controlled for ethnicity, education, employment, and region. The positive coefficient is statistically significant at 1% level. The results strongly support my hypothesis and previous research. According to multiple studies more financially literate people are more likely to participate in the stock market (Rooij et al. 2011; Hogard, Hilgert 2002).

Optimism is a forward-looking prospective variable and has a high positive impact on stock market participation decision when controlled for ethnicity, education, employment, and region. The variable was measured by asking households to self-evaluate how optimistic they are about their future. The coefficient is positive, and it has a high statistical significance at 1% level. This favors

my hypothesis and previous studies that more optimistic individuals are more likely to participate in the stock market (Kezdi, Willis 2009; Heaton 2002).

Table 3.1 Regression results

	Model 1		Model 2	
Variables	Coefficient	St.Errors	Coefficient	St.Errors
const	-2,035	(0,08) ***	-1,958	(0,13) ***
Age	0,244	(0,01) ***	0,209	(0,02) ***
Gender	0,303	(0,06) ***	0,248	(0,06) ***
Size			-0,129	(0,03) ***
Children			0,013	(0,07)
Partner			0,624	(0,07) ***
N	5612		5612	
Adj. R2	4,6%		5,7%	
	Model 3		Model 4	
Variables	Coefficient	St.Errors	Coefficient	St.Errors
const	-3,451	(0,33) ***	-4,702	(0,39) ***
Age	0,224	(0,02) ***	0,244	(0,02) ***
Gender	0,084	(0,07)	0,124	(0,07) *
Size	-0,045	(0,04)	-0,051	(0,04)
Children	-0,039	(0,08)	-0,038	(0,08)
Partner	0,329	(0,08) ***	0,280	(0,08) ***
Income	0,261	(0,02) ***	0,238	(0,02) ***
Ethnicity FE	YES		YES	
Education FE	YES		YES	
Employment FE	YES		YES	
Region FE	YES		YES	
FinLiteracy			0,277	(0,03) ***
Optimism			0,164	(0,03) ***
Interactions			0,197	(0,03) ***
Mistreated			-0,110	(0,04) **
N	5612		5612	
Adj. R2	14,9%		16,1%	

Income and optimism variables can be viewed in a specific way. Income can be interpreted as individuals retrospective feeling whereas optimism can be seen as individuals prospective expectations. These back and forward-looking variables must have a significant role in individuals decision-making process concerning financial market participation. These results favor my hypothesis that forward-looking prospective variables like optimism are needed in regression in addition to backward-looking retrospective variables like income. Both history and future have to be implemented in the model to achieve the full information of the household decision making.

To measure social interaction households were asked how likely they are to ask advice from other people. Social interaction has a positive effect on the investment decision when controlled for ethnicity, education, employment, and region. The coefficient is positive, and it has a high level of significance at 1% level. Previous studies display that more socially active households are more likely to participate in the stock market (Heimer, Simon 2012; Hong, Kubik Stein 2004; Brown et al. 2008). Thus, this result supports my hypothesis and previous research.

The mistreatment was measured by household's self-reported level whether they have felt mistreated by financial services. Mistreatment has a negative impact on the participation decision, due to its negative coefficient, when controlled for ethnicity, education, employment, and region. It is statistically significant at 5% level. The result supports my hypothesis that people who have felt mistreated by financial services are more likely to avoid non-retirement investments.

4. DISCUSSION

In this section, I will discuss the hypotheses and conclusions, based on logistic regression analysis and National Financial Well-Being Survey. I will highlight the contribution of this thesis and compare my findings to previous studies. Moreover, I will critically discuss the limitations and challenges of the data and methodology employed in this study. Finally, I will present suggestions for future research on this topic.

This study uses cross-sectional regression analysis to examine which factors affect households' financial market participation. Depend variable is binary. The dependent variable used is whether households have non-retirement investments, such as stocks, bonds or mutual funds. Age, gender, children, household size, living with partner, income, financial literacy, optimism, social interaction, and mistreatment are independent variables. The study has a sample size of 5,621 over 218 survey questions.

The cross-sectional study design generates a significant limitation in the sense that exposure and outcome occur at the same time. This makes it difficult to conclude the causal relations between the two. In the lack of time-series study, we have to focus more carefully on choosing of independent variables. These variables have to have a strong foundation in previous research. Furthermore, some variables used are self-evaluations which might create a personal bias.

Results are derived from four models estimated from the logistic model. Age has a strong effect on the participation decision in all four models. The positive coefficient indicates that age has a positive effect on the probability of holding stocks and the results are statistically significant at 1% level in all models. Gender as an independent variable has no explanatory power in the final model.

The first hypothesis indicated that households, who have felt mistreated by financial services, are less likely to hold non-retirement investments. This phenomenon has not been priorly investigated and thus has no support from previous literature. However, results from my regression analysis strongly support this hypothesis that mistreated variable has a negative impact on the participation

decision. The results are statistically significant at 5% level with a negative coefficient. It is only logical that people who have felt mistreated by financial services are more likely to avoid non-retirement investments. As a conclusion, these results are consistent with the hypothesis.

The second hypothesis implied that households, who are more financially literate, are more likely to hold non-retirement investments. The hypothesis makes sense since households who are more educated about financial services have lower entry barriers and are likely to be more confident about investing and thus more likely to participate in the financial markets. This phenomenon has been priorly studied and previous research supports my hypothesis. The results from my regression analysis indicate that financial literacy has a positive effect on the decision to hold non-retirement investments and it is statistically significant at 1% level with a positive coefficient. Thus these results are consistent with the hypothesis.

The third hypothesis stated that households, who are more optimistic about their future are more likely to hold non-retirement investments. Multiple previous studies support this hypothesis. As optimism is a forward-looking prospective variable that studies households view of their life and future, it would be only natural that more optimistic individuals are more likely to participate in the financial markets. Optimism was measured by household's self-evaluation about how optimistic they are about their future, which might have led to subjective answers. Results from my regression analysis state that optimism has a high positive impact on financial market participation decision and it has a high statistical significance at 1% level.

In addition, income and optimism variables are given a new interpretation in this study. Income is viewed as an individual's retrospective feeling whereas optimism is seen as an individual's prospective expectations. These back and forward-looking variables are likely to have a significant impact on individuals deciding to take part in the stock market. These results favor my hypothesis that forward-looking prospective variables as optimism are needed in regression in addition to backward-looking retrospective variables as income. Both past and for-coming have to be implemented in the model to achieve the full information of the household decision making. As a conclusion, these results are consistent with the hypothesis.

The fourth hypothesis indicated that households, who are more socially active are more likely to hold non-retirement investments. This hypothesis is supported by previous research that social interaction increases the probability to participate in financial markets. Also, my results strongly

support both the hypothesis and the findings from previous literature. As social interaction is found to lower the entry barriers as information is shared among other people, it is only logical that it increases the probability to participate. Household's self-evaluation measured social interaction by how likely they are to ask advice from other people. The results were statistically significant at 1% level with a positive coefficient. Thus these results are consistent with the hypothesis.

As a conclusion, based on empirical results from logisticc regression analysis controlled for ethnicity, education, employment, and region all of these results are consistent with the four hypotheses.

Further suggestions are to study financial markets participation puzzle and concentrate on comparing retrospective and prospective variables as explanatory variables using panel data. The causal effect between dependent and independent variables can be evaluated more efficiently this way. Then it is not necessary to stress the significance of previous research when choosing the explanatory variables.

CONCLUSION

Among many puzzles highlighted first by behavioral finance and more recently by household finance participation puzzle stands out. It refers to a households' tendency to not participate in the stock market (or financial markets in general) despite stocks earn a positive risk premium and had historically 6% higher return over the returns of risk-free assets. This phenomenon has been found to have an enormous impact on the household level but also the economy at large.

The purpose of this thesis is to shed light into the existing literature of household finance by investigating which determinants influence households' decision to participate in the financial markets. In addition, this is the first study to examine if mistreatment has a direct effect on households' decision to hold non-retirement investments. In this thesis, I have used a new, extensive data-set to investigate which household characteristics affect the probability of holding non-retirement investments while controlling relevant demographic variables.

The data used in this thesis is a cross-sectional survey conducted by the National Financial Well-Being Survey (NFWBS) in 2017. It has a sample size of 5,621 nationwide among United States households. The survey includes 218 questions related to financial status and different aspects of life. I have examined this data by regression analysis by using logic binary model. The binary dependent variable used is whether households hold non-retirement investments. Independent variables are age, gender, children, household size, income, financial literacy, optimism, social interaction and mistreatment, controlled for ethnicity, education, employment, and region.

Based on an extensive review of prior literature in behavioral finance and household finance, I formulate and test the following hypotheses. (1) Households, who have felt mistreated by financial services, are less likely to hold non-retirement investments. (2) Households, who are more financially literate, are more likely to hold non-retirement investments. (3) Households, who are more optimistic about their future are more likely to hold non-retirement investments. (4) Households, who are more socially active are more likely to hold non-retirement investments.

This study supported all four hypotheses. I found out that more financially literate, optimistic and socially interactive people are more likely to hold non-retirement stocks. In addition, I investigated a new variable, mistreatment, which has not been studied priorly in this context. The results are strongly supported by hypothesis and households who have felt mistreated by financial services are less likely to participate in the equity market. The purpose of this thesis to investigate factors that influence households financial market participation was met.

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APPENDICES

Appendix 1. Table of variables and their definitions

Variable	Definition	Original variable code	Levels
Dependent variable			
Savings	Have non-retirement investments (stocks, bonds, mutual funds)	PRODHAVE_6	Dummy variable. 0 - No; 1 - Yes.
Socio-economic variables			
Age	Age	agecat	Levels: 1 - 18-24; 2 - 25-34; 3 - 35-44; 4 - 45-54; 5 - 55-61; 6 - 62-69; 7 - 70-74; 8 - 75+
Gender	Gender	PPGENDER	Dummy variable. 1 - male, 0 - female; original variable: male - 1, female - 2.
Ethnicity	Race / Ethnicity	PPETHM	Levels: 1 - White; 2 - Black; 3 - Other; 4 - Hispanic
Size	Household Size	PPHHSIZE	Levels: 1 to 5+
Children	Financial support for children	KIDS_NoChildren	Dummy variable. 0 - No. 1 - YES. Original variable is reversed.

Partner	Living with partner	PPMARIT	Dummy variable. 0 - No. 1 - YES. Original variable has 5 levels.
Education	Education	PPEDUC	Levels from 1 - less than high school to 5 - graduate
FinLiteracy	Financial Knowledge	SUBKNOWL1	Levels from 1 - very low to - 7 very high
Income	Household Income	PPINCIMP	Levels from 1 - lowest to 9 - highest
Employment	Employment	EMPLOY	Levels: 1 Self-employed; 2 Full-time; 3 Part-time; 4 Homemaker; 5 Student; 6 Out of workforce; 7 Unemployed; 8 Retired
Region	Region	PPREG9	Levels: 1 - 9, different US regions
Behavioral variables			
Optimism	Optimism	SWB_2	I am optimistic about my future, 1 to 7, 7 means strongly agree
Interactions	Social interaction	ASK1_2	People ask for an advise, 1 to 5, 5 means always
Mistreated	Mistreated	CONSPROTECT1	Mistreated by financial organizations, 1 to 4, 4 means often