



Doctoral Thesis

# **Do Personality Traits, Trust and Fairness Shape the Stock-Investing Decisions of an Individual?**

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## List of Abbreviations

SMP	Stock Market participation
PANDA	Preferences Attitude Norms and Decisions in Asia
SIA	Social Inequality Aversion
SAF	Skepticism About Fairness
Wstock	Willingness to invest in stocks

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## **Abstract**

This thesis is comprised of three projects, all of which are fundamentally connected to the choices that individuals make about stock investments. Differences in stock market participation (SMP) across countries are large and difficult to explain. The second chapter focuses on differences between Germany (low SMP) and East Asian countries (mostly high SMP). The study hypothesis is that cultural differences regarding social preferences and attitudes towards inequality lead to different attitudes towards stock markets and subsequently to different SMPs. Using a large-scale survey, it is found that these factors can, indeed, explain a substantial amount of the country differences that other known factors (financial literacy, risk preferences, etc.) could not. This suggests that social preferences should be given a more central role in programs that aim to enhance SMP in countries like Germany.

The third chapter documented the importance of trust as well as herding for stock ownership decisions. The findings show that trust as a general concept has no significant contribution to stock investment intention. A thorough examination of general trust elements reveals that in-group and out-group trust have an impact on individual stock market investment. Higher out-group trust directly influences a person's decision to invest in stocks, whereas higher in-group trust increases herding attitudes in stock investment decisions and thus can potentially increase the likelihood of stock investments as well.

The last chapter investigates the significance of personality traits in stock investing and home bias in portfolio selection. Findings show that personality traits do indeed have a significant impact on stock investment and portfolio allocation decisions. Despite the fact that the magnitude and significance of characteristics differ between two groups of investors, inexperienced and experienced, conscientiousness and neuroticism play an important role in stock investments and preferences. Moreover, high conscientiousness scores increase stock investment desire and portfolio allocation to risky assets like stocks, discouraging home bias in asset allocation. Regarding neuroticism, a higher-level increases home bias in portfolio selection and decreases willingness to stock investment and portfolio share. Finally, when an investor has no prior experience with portfolio selection, patriotism generates home bias. For experienced investors, having a low neuroticism score and a high conscientiousness and openness score seemed to be a constant factor in deciding to invest in a well-diversified international portfolio



# 1 Introduction

Over the course of the 20th century, financial studies were conducted about how people invest in financial markets by using models based on the idea that investors are rational. Classical financial theory holds that investors are rational utility maximizers who stick to the norms of modern financial theory. A definition like this suggests that all financial decisions, like investing in stocks, generally involve a trade-off between risk and return. In spite of the fact that classical financial models such as the capital asset pricing model and the arbitrage pricing theory can assist with the valuation of securities and shed light on expected risks and returns, these models are unable to address participation puzzles or explain anomalies in the stock market. Currently, it is known that humans frequently behave irrationally and make forecasting mistakes (Nofsinger, 2017). Moreover, multiple research indicate that non-economic aspects, such as psychology (Hens and Meier, 2015), belief (D'Acunto, 2018, Flori, 2019) and emotions (Aren and Hamamci, 2020) influence the financial decisions of individuals. Given the importance of stock investments to individual well-being (Bagliano et al., 2014) and the functioning of financial systems(Thomas and Spataro, 2016), people' decisions concerning stock investing have both macro and micro effects. This study aims to contribute to the existing literature in behavioral finance by demonstrating the significance of individual personality, trust, and fairness for their attitude toward stock investment.

The second chapter contributes to the expanding body of research that has been carried out on the low participation in stock market. Regardless of individual differences in risk aversion, individuals should put some of their wealth into the stock market and other potentially risky investments(Merton, 1969). Aside from the greater return on investment in the stock market, a sizable number of households continue to use traditional saving and investing approaches. From the standpoint of maximizing individual utility, a larger portfolio return moves the budget constraint to the right and in favor of higher utility. Therefore, it would be logical to expect that individuals hold a sizable portion of their assets in the form of stocks, bonds, or other securities. As indicated in Table 1-1, cross-country research in the explanation of the market-participation puzzle show that a larger proportion of individuals avoid equity investment. As is shown the percentage of individual stock ownership ranged from less than 1% to about more that 42%.

Furthermore, a sizable proportion of sample nations have household stock ownership of less than 20%.

Table 1-1: Cross-country studies about household participation in stock market

	Number of Countries	Ratio of stock investment	Countries with less than 20% participation	Stock ownership in Germany
Guiso et al. (2000)	5	4%-20%	3	9.7%-10.5%
Guiso et al. (2003b)	7	7.7%-42%	2	17%
Badunenko et al. (2009)	5	7.6%-42.3%	4	-
Giannetti and Koskinen (2010)	25	1.2%-40%	13	8.9%
Barasinska and Schäfer (2013)	4	7%-25%	3	-
Badarinza et al. (2016)	13	0.8%-34.5%	9	10.6%

Kaustia and Torstila (2011) argue that value-expressive reasons, vague feeling towards the stock market and a poor image of the stock market keep certain individuals out of the stock market. Participating in the stock market, in some ways, contradicts the individual's set of personal principles. Attitudes against the stock market might come from an individual's perception of core beliefs such as unfairness and injustice (Keller and Siegrist, 2006b). The findings of Riedl and Smeets (2017) indicate that ordinary investors with a high social concern are likely to give up financial benefits in order to invest in harmony with their social preferences. The second chapter investigates the possibility that some people avoid investing in the stock market because they feel that doing so is incompatible with their personal values and beliefs. To be more exact, we will investigate whether many people avoid investing in stocks because of biases they hold against the stock market, and whether these biases have any relation to societal notions of fairness and equality.

In recent years, the literature on behavioral finance has paid a lot of attention to how non-economic aspects like trust and sociability affect stock investing. These factors have the potential to shed light on the reasons for the large stockholding differences among people who have comparable wealth and income (Georgarakos and Pasini, 2011). Previous research in this field can be divided into two forms of trust: institutional and individual. According to the first school of thinking, people's stock investment levels are closely tied to their trust in the market and in government regulation (Balloch et al., 2015). The second group of studies (Tao, 2006, Guiso et al., 2008) looks into the relationship between social trust and stock ownership. A lack of trust in others has a detrimental impact not just on the information transfer among individuals (Sjöberg, 2001) but also on individual's assessment of risk (De Luca and Rubio, 2018). After establishing social categories, individuals are able to identify the groupings to which they belong (i.e., in-groups) and those to which they do not (i.e., out-groups). As a result, in-group members are seen more favorably than out-group members are. This form of in-group bias can

appear in a variety of ways, including trust. Several studies have shown that trust is an important factor in people's financial decisions, although it is not clearly understood which kinds of trust lead to stock investments. This study examines the causal effect of trust in others on financial market investment and decomposes generalized trust into in-group and out-group trust.

Herding is a type of behavioral bias that involves imitating the actions of others in a group. Behavioral biases are cognitive factors that influence investors' financial decisions. Furthermore, herding behavior may be viewed as a representation of social learning in economic activity and financial decision-making. This study shows that the herding and trust attitudes of individual investors affect their willingness to participate in the stock market. In the third chapter, an improved theoretical model and empirical analysis are utilized to determine the relationship between trust in the group and trust in other groups and stock market participation.

Researchers in the fields of social science, economics, and cognitive psychology study human behavior with the goal of figuring out where different choices come from and what causes people to do different things. Ajzen (1991) theory of planned behavior provides a useful framework for comprehending the key elements of human behavior and illustrates the relationship between decisions and personality traits. The central thesis is that attitudes shape conduct and that future behavior is affected by perceived behavioral control, subjective standards, and personalities. An increasing body of studies show a substantial relationship between people's personality traits and their financial decisions (Asebedo et al., 2019, Chitra and Sreedevi, 2011, Gambetti and Giusberti, 2019). In a similar spirit, the fourth chapter of this dissertation seeks to evaluate the influence of individual personality dimensions on financial decisions, particularly those relevant to stock investing. The purpose of this study is to provide a thorough understanding of how differences in the Big Five personality traits affect the decisions that an individual makes about stock participation, risky assets in their portfolio, and home bias. In addition to personality factors, this study investigates the impact of uncritical patriotism on the preference for national equities over stocks from other nations. Blind patriotism, also known as uncritical patriotism, is described as "a refusal to both criticize and accept criticism" of the nation, and is typified by remarks like "We should fight for our country whether it is right or wrong"(Huddy and Khatib, 2007).

Last but not least, the contributions of the other authors to this dissertation's topics should be noted. Regarding the second chapter, Dr. Amin Zokaei Ashtiani has made an equal contribution to the analysis and has provided a draft, although Prof. Rieger has provided insightful comments

on the study's planning and interpretation. The studies in chapters 3 and 4 were conducted with the assistance and supervision of Professor Rieger, and I provided 90% of the research. You may find further details concerning the contributions made by co-authors in the attachment that is included in the appendix.

## **2 The Effect of Social Preferences and Personal Values on Stock Market Participation: a Cross-Country Study**

### **2.1 Introduction**

A growing literature in economics and finance has explored the linkage between individuals' beliefs and their heterogeneous attitudes towards stock market participation (SMP). In line with this literature, in this study, we focus on two factors, namely fairness and equality, and we explore whether differences in SMP across individuals and countries can be explained by these factors.

Historically, the greater part of the financial wealth of households has been held in the form of liquid and low-return assets, and participation in the stock market has been limited to a small segment of the population (Campbell, 2006). However, owing to the increasing availability of new technologies and information, increasing financial literacy, and more individuals acting on their own initiatives for their retirement investments (Clark-Murphy and Soutar, 2004), the rate of participation in stock markets have risen (Stout, 2010). Yet, in many countries, the percentage of households investing in stocks is still relatively low, and substantial disparities can be witnessed across countries (Campbell, 2006, Dimmock and Kouwenberg, 2010, Christelis et al., 2013, Badarinza et al., 2016).

Several studies show that limited participation in stocks, in the long run, leads to welfare losses for both households (Bagliano et al., 2014) and financial systems (Brav et al., 2002, Thomas et al., 2014, Thomas and Spataro, 2016). Consequently, a growing body of literature has tried to reveal the determinants of stock market participation and to remove the barriers that might prevent participation in this investment opportunity. Among others, demographic, socioeconomic, and other tangible determinants such as wealth (Calvet and Sodini, 2014, Fagereng et al., 2017), financial literacy (Guiso and Jappelli, 2005, Christelis et al., 2010, Van Rooij et al., 2011, Yoong, 2011, Arrondel et al., 2014), education (Bertaut, 1998, Cole and Shastry, 2008), human capital investment (Bertaut and Starr-McCluer, 2000, Cole and Shastry, 2008), gender (Van Rooij et al., 2011, Almenberg and Dreber, 2015), financial awareness (Guiso and Jappelli, 2005), information costs (Mankiw and Zeldes, 1991), participation cost (Vissing-Jørgensen and Attanasio, 2003, Guiso et al., 2003a, Alan, 2006), risk preference (Campbell, 2006, Dohmen et al., 2011), political uncertainty (Agarwal et al., 2019), institutional quality

(Asgharian et al., 2019), internet access (Bogan, 2008), IQ scores (Grinblatt et al., 2011), cognitive capacity (Agarwal et al., 2009), home ownership (Vestman, 2019), social interaction (Hong et al., 2004, Liang and Guo, 2015b), and investor protection in the country (Giannetti and Koskinen, 2010), have been studied as factors explaining stock market participation.

Whereas most studies on the effect of behavioral determinants on stock market participation have concentrated on determinants such as trust (Guiso et al., 2008, Chuah and Devlin, 2010, Giannetti and Wang, 2016), trust in financial institutions (Georgarakos and Pasini, 2011), social capital (Guiso et al., 2004, Bricker and Li, 2017) and peer effects in social circles (Brown et al., 2008, Hvide and Östberg, 2015, Girshina et al., 2019, Haliassos et al., 2020) there are few empirical studies available on behavioral determinants, such as individual norms and cultural values that could contribute to explaining the heterogeneity in stock market participation across countries.

In line with the previous studies, in this study we attempt to explore whether a portion of individuals tend not to invest in the stock market because they believe stockholding contradicts their values and norms. More precisely, we will explore whether a substantial number of people avoid investing in stocks because of their perception of and prejudice against the stock market and whether this might stem from their perceptions of fairness and equality within the society. Therefore, the primary objectives of this article are (i) to identify and construct conceptual indicators to measure prejudices against stocks, (ii) to examine the relationship between these indicators and stock market participation. By using an extensive international survey, we will provide new evidence for the determinants of households' stock market participation in several European and East Asian countries.

## **2.2 Social norms and SMP**

Akerlof (1980) defined a social norm as an act whose utility to the agent performing it depends in some way on the beliefs or actions of other members of the community. Social norms and personal values are assumed partly to be exogenous. They are partially genetically transmitted (Alford et al., 2005), evident in early childhood (Block and Block, 2006), and have a neurocognitive basis (Amodio et al., 2007).

There is a wide body of literature that has tried to reveal the linkage between social norms and economics and finance. Classical studies have demonstrated the effect of social norms on consumption decisions (Vinson et al., 1977) and economic behavior (Becker, 1957, Arrow,

1972, Akerlof, 1980, Romer, 1984). Over the past two decades, several studies have explored the relationship between social norms and the way individuals invest in stock markets. Heinkel et al. (2001) find that ethical investing leads to polluting firms' stocks being held by fewer investors since green investors avoid them. Bollen (2007) finds that the monthly volatility of investor cash flows is lower in socially responsible funds than in conventional funds. Hong and Kacperczyk (2009) find that social norms affect the prices and returns of "sin" stocks (publicly traded companies involved in producing alcohol, tobacco, and gaming). Sin stocks have higher expected returns than other comparable stocks.

More recently, an emerging line of research has explored the effect of social norms and personal values on stock market participation decisions. By developing a money attitude scale, Keller and Siegrist (2006b) find that the extent to which an individual sees the stock market as a casino forecasts its investment behavior. By using cross-sectional survey data, Dobni and D. Racine (2015) reveal that there is a wide variation in the image and perception of stock holding between retail investors that influence their investing behaviors. Kaustia and Torstila (2011) find that left-wing voters and politicians are less likely to invest in stocks. In another study, Ke (2018) shows that households in countries with more traditional gender norms are less likely to invest in the stock market. Laudenbach et al. (2018) show the long-term effects of living under communism on households' financial decisions. They find that, long after Germany's reunification, there are still considerable differences between East Germans and West Germans in terms of investment in the stock market: East Germans invest significantly less than West Germans, and when they invest, they are more likely to invest in stocks of companies in communist countries (China, Russia, Vietnam), compared to American companies. They also show that the rate of SMP is even lower for individuals living in regions with pro-communist views or regions where the communist doctrine of the German Democratic Republic was more widely promulgated. In a similar study, D'Acunto et al. (2018) show the long-term effects of antisemitism on SMP. They find that households in German counties with high historical antisemitism invest less in stocks. Finally, D'Acunto (2018) finds that the likelihood of investment in incentivized risky opportunities, framed as investments in stocks, is lower among individuals exposed to anti-finance rhetoric and they tend to invest lower amounts conditional on investing.

The present study adds to this growing literature on the determinants of stock market participation (SMP), by focusing on two concepts related to social norms and personal values: (i) Social Inequality Aversion (SIA) and (ii) Skepticism About Fairness (SAF).

SIA refers to the extent to which an individual is averse to inequality and differences in social classes in society. According to Fehr and Schmidt (1999), “Inequity aversion means that people resist inequitable outcomes; i.e., they are willing to give up some material payoff to move in the direction of more equitable outcomes.”

SAF can be defined as the degree to which each individual sees something—the world, the market, and the stock market—as not being fair.

Fairness, a core concept in morality, is an elusive concept which can incorporate different notions of sameness, deservedness and need (Reeskens and Van Oorschot, 2013). Jetten and Peters (2019) in *The Social Psychology of Inequality*, describes the notion of sameness as the equality of outcome, deservedness as the notion that the reward should be equal to the amount of work put in (Son Hing et al., 2011), and need as taking into consideration pre-existing disadvantages (Reeskens and Van Oorschot, 2013). There are several studies showing the association between fairness and individual decision making (Babicky, 2003, Cappelen et al., 2013). For instance, D’Acunto et al. (2018) show that beliefs about the fairness of the financial sectors are able to shape individuals’ investment decisions.

We compare individuals from several European and East Asian countries (Germany, Estonia, Japan, Taiwan, Vietnam, and China) and explore how differences in SIA and SAF may affect their investment decisions. Therefore, this study also contributes to the growing literature of international comparative household finance (Guiso et al., 2003b, Giannetti and Koskinen, 2010). The international view that takes into account cultural differences is important since it allows to detect cultural and societal differences concerning investing in stocks and to distinguish them from idiosyncratic differences on the individual level.

This study also relates to the literature of psychological biases in behavioral finance (Tversky and Kahneman, 1974) that explores the effect of individual psychological biases, such as beliefs, judgments, preferences (Shefrin, 2002, Pompian, 2006), and systematic errors in judgment (Kahneman and Riepe, 1998) on investment decisions. Sahi et al. (2013), for instance, defined the “tendency to invest with the viewpoint of socially responsible investing” as a measure for behavioral bias that influences an individual’s financial investment decisions. Finally, this study, in relation to the identity economics literature, pioneered by Akerlof and Kranton (2000) and Akerlof and Kranton (2010), stresses that identity is fundamental to consumer decisions.



### 2.3 Mechanism and hypothesis

Kaustia and Torstila (2011) state that a group of people do not participate in the stock market because of “value-expressive reasons”, “vague sense of prejudice against the stock market”, or “a negative image of the stock market”. In a certain sense, participating in the stock market is not consistent with the individual’s set of personal values. Prejudices against the stock market can stem from an individual’s understanding of concepts such as greed, unfairness, and immorality (Keller and Siegrist, 2006a). They could also be associated with an individual’s attitudes towards gambling (Keller and Siegrist, 2006b) towards social irresponsibility (Sahi et al., 2013) or towards an act that aggravates inequality in the society. Therefore, for some individuals, there is a considerable mismatch between their personal values and investing in the stock market which tends to create an additional participation cost. This mechanism is called “stock market aversion” by Kaustia and Torstila (2011). In this study, we construct and measure SIA and SAF as conceptual indicators for stock market aversion.

We conjecture that a higher SIA and a higher degree of SAF cause an additional participation cost through the mismatch between personal values and actions, and, therefore, prevent the individual from participating in the stock market.

In order to get a better insight into fairness, we construct four different dimensions for SAF. The dimensions are (i) skepticism about fairness in the world (SAF in the world); (ii) skepticism about fairness in markets (SAF in markets); (iii) ex-ante skepticism about fairness in stocks (ex-ante SAF in stocks); (iv) ex-post skepticism about fairness in stocks (ex-post SAF in stocks).

Our hypotheses are:

- *H1: Individuals with higher SIA are less likely to invest in stocks.*
- *H2: Individuals with a higher degree of SAF are less likely to invest in stocks.*

Our identification strategy is as follows: consider a person who has enough resources to invest in stocks to maximize utility according to standard models. This individual might still choose not to invest due to reasons such as low financial literacy, risk aversion, low return expectation, high social inequality aversion (SIA), and a high degree of skepticism about fairness (SAF). The last two possible reasons that are predicted by value-expressive hypotheses are the focus of the present study. Consider a regression, in which stock market participation is being regressed on SIA and SAF. Negative coefficients on SIA and SAF are consistent with the value-

expressive hypotheses. To isolate the effect of SIA and SAF, however, we also need to control for demographic characteristics, as well as financial literacy, risk attitude, and other related variables. In this methodology, we assume that SIA and SAF are exogenous (reverse causality is not a concern).

It is also worth noting that the above-mentioned indicators, SIA and SAF, might not be the direct and immediate cause of prejudice against SMP, but are reliant on and stem from latent variables, in particular political preferences: Kaustia and Torstila (2011) find that left-wing voters and politicians are less likely to invest in stocks. They argue that left-wing voters rely mostly on social safety nets for a retirement income, whereas right-wing voters are more likely to treat retirement safety as a personal responsibility. On the other hand, left-wing voters are assumed to be more sensitive towards inequality. They are also assumed to be more skeptical about fairness in comparison to the right-wing voters.

The low rate of SMP in Germany has already been discussed in several articles (Guiso et al., 2002, Guiso et al., 2003b, Giannetti and Koskinen, 2010, Badarinza et al., 2016). Conversely, some East Asian countries have a surprisingly high rate of SMP. Our data comes from several European and East Asian countries (Germany, Estonia, Japan, Taiwan, Vietnam, and China). It is, therefore, very well suited to investigate, and potentially explain these discrepancies.

As mentioned before, several socioeconomic factors in literature can explain the heterogeneity in stock market participation across countries. In our study, however, none of those factors can explain the lower rate of SMP in Germany as compared to other countries, since the levels of wealth, education, financial literacy, trust, etc. are relatively high in Germany. Therefore, we take a closer look at other differences, particularly the differences in social and personal attitudes. As we will see, social inequality aversion and skepticism about fairness are considerably higher among Germans than in other countries. This leads us to conjecture the following hypothesis:

- *H3: Social inequality aversion and skepticism about fairness can partially explain the difference in stock market participation between Germany and other countries.*

## **2.4 Data and methodology**

### 2.4.1 Measuring SMP on individual level

Aggregate data of SMP fails to give a comprehensive answer to the question of whether cross country variation in SMP is attributable only to differences in demographic and socioeconomic variables or whether differences across individuals in terms of personal values play a role as well (Guiso et al., 2003a). The survey data we use in this study provide solutions to these concerns, as we can simultaneously elicit several variables of interest. As part of the study “Preferences, Attitudes, Norms and Decisions in Asia” (PANDA), we conducted online surveys and collected data from more than 2000 participants in six countries: Germany, Japan, Estonia, Taiwan, Vietnam and China (Rieger et al., 2020). The surveys were conducted in the official language of countries<sup>1</sup>.

In order to get a better understanding of individuals’ investment behaviors, we elicit SMP in two ways:

- *Willingness for future investment in stock market, and*
- *Hypothetical investment decisions in an incentivized game.*

The main dependent variable is the willingness to invest in stocks (“*wstock*”). To elicit “*wstock*”, we use the following question: “How likely is it that you would invest money in stocks or funds in the future, provided you had a reasonable amount of savings?” Individuals could choose from one of the four options: (i) Very likely; (ii) Likely; (iii) Not likely; (iv) Very unlikely, where *wstock* takes values from 1 (very unlikely) to 4 (very likely).

Another dependent variable is hypothetical investment decisions in an incentivized game (“invest in stocks”). To elicit *invest in stocks*, we provide an incentivized game and asked, for example, German individuals: “Suppose you go back to the past through the time machine any time between 2002 and 2012. The time will be randomly chosen. You will receive 100€ as a start-up capital, you can deposit the money for five years, and the final amount you may receive will be the value of the principal after five years. How would you divide your 100€ into the following investments?”

- a. into a savings account
- b. into government bonds with a term of 5 years

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<sup>1</sup> Besides in Estonia where it was conducted in English.

- c. into the stock index of Germany
- d. into all stocks of the American S&P 500

The “invest in stocks”, is the sum of investment in the local stock market and investment in S&P 500. The initial capital of 100€ in each country is normalized according to purchasing power. Also, the country name in option “c” changed accordingly.

In the next section, we introduce the methods we used to elicit and construct our main explanatory variables.

### **2.4.2 Explanatory variables**

Our main explanatory variables are related to personal values. As we explained before, we employ two concepts, inequality aversion and fairness, to explain the differences in SMP across individuals and across countries.

To elicit Social Inequality Aversion (SIA), we asked individuals “Would you support the following plan: Suppose the government wants to undertake a reform to improve the productivity of the economy. As a result, everyone will be better off, but the improvement in life will not affect people equally. A million people (people who respond energetically to the incentives in the plan and people with certain skills) will see their incomes triple while everyone else will see only a tiny income increase, about 1%.” Individuals could answer in one of two ways: (1) Yes, (2) No.

As we also explained before, we construct four dimensions for skepticism about fairness (SAF): (i) SAF in the world; (ii) SAF in markets, (iii) ex-ante SAF in stocks; (iv) ex-post SAF in stocks.

*SAF in the world* represents the individuals’ attitude towards fairness in the world. To elicit this indicator, we asked individuals the following question: “To what extent do you agree or disagree with the following statement: When people have failed in life, it is often their own fault.” Individuals could answer in one of five ways: (1) Strongly agree; (2) Agree; (3) Neither agree nor disagree; (4) Disagree; (5) Strongly disagree.

*SAF in markets* represents the attitudes towards the fairness of the free market. To elicit this indicator, we asked individuals the following question: “On a holiday, when there is a great demand for flowers, their prices usually go up. Is it fair for flower sellers to raise their prices like this?” Individuals could answer in one of two ways: (1) Yes, (2) No. This question is taken from Shiller et al. (1990).

*SAF in stocks* represents the attitudes towards fairness in stock markets. Inspired by Cappelen et al. (2013), we divide this indicator into two categories: ex-ante and ex-post. The ex-ante view focuses on stock market structure, while the ex-post view focuses on outcomes.

To elicit *ex-ante SAF in stocks*, we asked individuals the following question: “To what extent do you agree or disagree with the following statement: Investing in stocks is only for gamblers”. To elicit *ex-post SAF in stocks*, we asked individuals the following: “To what extent do you agree or disagree with the following statement: It is morally questionable to earn money with stocks because whatever I gain, somebody else must lose”. Individuals could answer each question in one of five ways: (1) Strongly agree; (2) Agree; (3) Neither agree nor disagree; (4) Disagree; (5) Strongly disagree.

### **2.4.3 Control variables**

We also elicit other related variables widely used in literature to explain stock market participation. Variables such as risk aversion, loss aversion, ambiguity aversion, financial literacy, self-fairness, optimism, and herding. In Appendix A, we describe the methodology we used to measure different indicators by evaluating the answers of the surveys. This includes showing how the relevant measures were derived from the participants’ responses to the survey and an overview of the variables. Here, we only demonstrate our methodology for eliciting three variables: self-fairness, optimism, and herding.

Höchtel et al. (2012) emphasize the role of fair-minded individuals on redistribution of outcome where a greater number of fair-minded people have a significant impact on fair preferences toward the distribution of payoff. In order to identify fairness attitude, we include a question asking individuals to rank five characteristics: fairness, politeness, honesty, courage and responsibility. The score of fairness is captured by the rank of fairness among the five characteristics where the first position has 5 scores and the last gets 1 score. To capture the impact of fair-minded individuals, we adopted the variable of self-fairness by subtracting individual fairness scores from the mean of the country. In case the fairness score is less than the mean of the country, the self-fairness value is equal to zero.

In stock markets, optimism refers to a higher expectation regarding stock return. There are several studies that show the impact of optimism towards financial markets on decisions regarding investing in stocks (Bonaparte et al., 2014). Puri and Robinson (2007) show that optimists are more likely to participate in financial markets, and when they participate, they

choose riskier securities. By including questions in the survey, we also construct the optimism variable. We asked individuals to what extent they agree or disagree with the following statement: “On the long run, stocks give a good return.” Individuals could answer the question in one of five ways: (1) Strongly agree; (2) Agree; (3) Neither agree nor disagree; (4) Disagree; (5) Strongly disagree.

In stock market, herding is defined as the tendency to follow and copy what other investors do. There are several studies that explore the effect of herding on stock market participation (Choi and Sias, 2009, Demirer and Kutan, 2006). In this study, to elicit herding, we asked individuals to what extent they agree or disagree with the following statements: (i) I make financial decisions by myself; (ii) If my friend buys stocks, I would also consider doing it. Individuals could answer each question in one of five ways: (1) Strongly agree; (2) Agree; (3) Neither agree nor disagree; (4) Disagree; (5) Strongly disagree. Table 2-1 shows the summary statistics of the variables used.

Table 2-1: Summary statistics

Variable	No	Mean	Std. Dev.	Min	Max
wstock	1929	3.01	0.83	1.00	4.00
Age	1929	23.97	6.21	18.00	58.00
Female	1929	0.59	0.49	0.00	1.00
Bachelor	1929	0.66	0.47	0.00	1.00
Risk Aversion	1929	5.67	3.31	0.00	10.00
Loss Aversion	1929	0.09	0.29	0.00	1.00
Ambiguity Aversion	1929	0.70	0.46	0.00	1.00
Financial Literacy	1929	2.33	0.78	0.00	3.00
Self-Fairness	1929	0.53	0.73	0.00	2.36
Optimism	1929	3.15	0.88	1.00	5.00
Herding	1929	-0.80	1.30	-4.00	4.00
SIA	1929	1.32	0.47	1.00	2.00
SAF in the world	1929	3.11	1.02	0.00	5.00
SAF in markets	1929	1.19	0.39	1.00	2.00
ex-ante SAF in Stocks	1929	2.17	0.89	1.00	5.00
ex-post SAF in stocks	1929	2.23	0.95	1.00	6.00

Table 2-2: Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)
(1) SIA	1.000				
(2) SAF in the world	0.112* (0.000)	1.000			
(3) SAF in markets	0.198* (0.000)	0.034 (0.141)	1.000		
(4) ex-ante SAF in stocks	0.174* (0.000)	-0.023 (0.314)	0.199* (0.000)	1.000	
(5) ex-post SAF in stocks	0.140* (0.000)	-0.026 (0.255)	0.133* (0.000)	0.351* (0.000)	1.000

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

## 2.5 Results

We focus on personal values to explain differences in willingness to invest in stocks across individuals and across countries.

### 2.5.1 Across individuals

We start by analyzing the impact of SIA and SAF on the willingness to invest in stocks on individual level. Table 2-3 presents the OLS estimate using the PANDA dataset. In this table, the dependent variable is “*wstock*”, the willingness to invest in stocks. In this table we control for a number of variables. We include various demographic and behavioral characteristics to account for possible differences in willingness to invest in stocks. We control for age, a female dummy, the level of education, and the field of education. These variables are widely used in SMP literature.

Model 1 presents the estimate of the basic specification. We found that demographic characteristics such as age, gender, and education can partially explain the differences in willingness to invest in stocks across individuals. In line with other findings in related literature, we found that younger individuals, men, more highly educated individuals, and those who hold a degree in economics or finance are more likely to invest in stocks.

We also control for individual behavioral characteristics, such as risk aversion, loss aversion, ambiguity aversion, financial literacy, self-fairness, herding, and optimism. The results confirm that risk-takers and individuals with higher financial literacy levels are more likely to invest in stocks. Moreover, we found that those individuals who have a higher tendency to follow and copy what other investors do (higher rate of herding) and individuals who have a higher expectation from investment in the stock market (higher rate of optimism) are more likely to invest in stocks. Finally, the willingness to invest in stocks among those individuals who explicitly express that fairness is important for them is low.

Models 2 to 7 present the results of analysis of various explanatory variables, by focusing on variables related to personal values.

We mention that our explanatory variables are not highly correlated (Table 2-2) and they do not show multi-collinearity, but in order to isolate the contribution of each factor while holding others constant, we ran OLS regressions for each variable separately.



Model 2 shows a negative and significant relationship between SIA and willingness to invest in stocks. That is, individuals who are more inequality averse, are, on average, less likely to invest in stocks. A one point reduction in inequality aversion decreases the probability of willingness to invest in stocks by 0.19 points.

In Models 3 to 7, we analyze the impact of different dimensions of SAF on willingness to invest in stocks. As we explained in Section 2.2, these dimensions are (i) SAF in the world; (ii) SAF in markets; (iii) ex-ante SAF in stocks; (iv) ex-post SAF in stocks.

We found that the effect of all dimensions of SAF on *wstock* is negative and statistically strongly significant.

Finally, in Model 7, we insert all explanatory variables into the regression model and observe a negative impact of SIA and all dimensions of SAF, except for ex-post SAF, on the willingness to invest in stocks.

In all models of Table 2-3, female dummy, education, risk aversion, financial literacy, self-fairness, herding, and optimism, all remain statistically significant. This confirms the existing literature on the importance of all these variables and shows that they are not mere proxies of SIA or SAF. At the same time, we find that personal values also explain a substantial part of the heterogeneity across individuals regarding the willingness to invest in stocks. We also observe that the R squared is substantially higher when we add our new variables.

This confirms our Hypothesis 1 and Hypothesis 2: individuals with a higher SIA and a higher degree of SAF are less likely to invest in stocks.

It seems that when there is a mismatch between the values individuals believe in and investing in the stock market, this creates additional participation costs and, therefore, decreases the likelihood of participation in the stock market.

Table 2-3: Regression across individuals.

<i>VARIABLES</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	wstock	wstock	wstock	wstock	wstock	wstock	wstock
<i>Age</i>	-0.007** (0.003)	-0.007*** (0.003)	-0.006** (0.003)	-0.006** (0.003)	-0.005* (0.003)	-0.006** (0.003)	-0.004* (0.002)
<i>Female</i>	-0.177*** (0.033)	-0.168*** (0.033)	-0.159*** (0.033)	-0.167*** (0.033)	-0.181*** (0.031)	-0.170*** (0.033)	-0.149*** (0.031)
<i>Bachelor</i>	-0.039 (0.036)	-0.045 (0.036)	-0.031 (0.036)	-0.038 (0.036)	-0.029 (0.035)	-0.038 (0.036)	-0.024 (0.034)
<i>Field</i>	0.266*** (0.023)	0.248*** (0.023)	0.255*** (0.023)	0.250*** (0.023)	0.221*** (0.022)	0.250*** (0.023)	0.190*** (0.023)
<i>Risk Aversion</i>	-0.011** (0.005)	-0.011** (0.005)	-0.011** (0.005)	-0.011** (0.005)	-0.010** (0.005)	-0.011** (0.005)	-0.010** (0.005)
<i>Loss Aversion</i>	-0.004 (0.057)	-0.008 (0.056)	-0.002 (0.056)	-0.003 (0.056)	-0.022 (0.054)	0.012 (0.056)	-0.015 (0.054)
<i>Ambiguity Aversion</i>	-0.013 (0.035)	-0.020 (0.034)	-0.010 (0.034)	-0.017 (0.034)	-0.020 (0.033)	-0.022 (0.034)	-0.025 (0.033)
<i>Financial Literacy</i>	0.121*** (0.020)	0.119*** (0.020)	0.129*** (0.020)	0.114*** (0.020)	0.088*** (0.020)	0.107*** (0.020)	0.090*** (0.020)
<i>Self-Fairness</i>	-0.070*** (0.022)	-0.067*** (0.021)	-0.066*** (0.022)	-0.065*** (0.021)	-0.056*** (0.021)	-0.067*** (0.021)	-0.047** (0.020)
<i>Herding</i>	0.136*** (0.013)	0.128*** (0.013)	0.137*** (0.013)	0.132*** (0.013)	0.112*** (0.012)	0.136*** (0.013)	0.106*** (0.012)
<i>Optimism</i>	0.258*** (0.019)	0.252*** (0.019)	0.251*** (0.019)	0.255*** (0.019)	0.226*** (0.018)	0.252*** (0.019)	0.215*** (0.018)
<i>SIA</i>		-0.190*** (0.035)					-0.116*** (0.034)
<i>SAF in the world</i>			-0.069*** (0.016)				-0.076*** (0.015)
<i>SAF in markets</i>				-0.196*** (0.041)			-0.103*** (0.040)
<i>ex-ante SAF in stocks</i>					-0.240*** (0.018)		-0.226*** (0.019)
<i>ex-post SAF in stocks</i>						-0.089*** (0.017)	-0.020 (0.017)
<i>Constant</i>	1.791*** (0.121)	2.106*** (0.133)	2.005*** (0.130)	2.066*** (0.133)	2.515*** (0.128)	2.055*** (0.130)	3.105*** (0.152)
<i>Observations</i>	1,929	1,929	1,929	1,929	1,929	1,929	1,929
<i>R-squared</i>	0.314	0.324	0.321	0.322	0.372	0.324	0.389

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

In order to better understand the mechanism by which SIA and SAF affect stock market participation, we concentrate on the simultaneous impacts of these variables. To do so, we construct four product terms which capture the interaction between SIA and each dimension of SAF. Table 2-4 contains the results.

The first product is “SIA x SAF in the world” that represents the interaction between SIA and *SAF in the world*. The effect of this product term on *wstock* is negative and statistically strongly significant (Model 2). Since the effect of both components of the interaction lose their significance after inserting the interaction term, we conclude that, in fact, neither SIA nor SAF in world are able to explain the willingness to invest in stocks. In other words, only if an individual is simultaneously inequality averse and skeptical about fairness in the world, then this individual is less likely to invest in stocks.

The same result is obtained by inserting the interaction terms between SIA and *SAF in markets* (Model 3).

However, when we insert the interaction variable between SIA and *ex-ante SAF in stocks* into the model, the outcome is slightly different (Model 4). Although simultaneous impact of SIA and *ex-ante SAF in stocks* decreases the probability of willingness to invest in the stock market, after inserting this variable into the model, the *ex-ante SAF in stocks* is still statistically remarkably significant. We conclude that *ex-ante SAF in stocks* is a strong factor for explaining the heterogeneity of stock market participation across individuals, even for individuals with low SIA. We did not find a statistically significant association between the interaction variable between SIA and *ex-post SAF in stocks* and *wstock* (Model 5).

Table 2-4: Regression across individuals.

<i>VARIABLES</i>	(1)	(2)	(3)	(4)	(5)
	wstock	wstock	wstock	wstock	wstock
<i>Age</i>	-0.004*	-0.004*	-0.004*	-0.004*	-0.004*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
<i>Female</i>	-0.149***	-0.149***	-0.148***	-0.145***	-0.149***
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)
<i>Bachelor</i>	-0.024	-0.027	-0.026	-0.024	-0.024
	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
<i>Field</i>	0.190***	0.190***	0.188***	0.188***	0.189***
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
<i>Risk Aversion</i>	-0.010**	-0.009**	-0.010**	-0.010**	-0.010**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
<i>Loss Aversion</i>	-0.015	-0.016	-0.017	-0.017	-0.016
	(0.054)	(0.054)	(0.054)	(0.054)	(0.054)
<i>Ambiguity Aversion</i>	-0.025	-0.022	-0.027	-0.026	-0.025
	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)
<i>Financial Literacy</i>	0.090***	0.089***	0.091***	0.091***	0.091***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
<i>Self-Fairness</i>	-0.047**	-0.046**	-0.047**	-0.046**	-0.047**
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
<i>Herding</i>	0.106***	0.104***	0.106***	0.103***	0.106***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
<i>Optimism</i>	0.215***	0.215***	0.214***	0.213***	0.214***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
<i>SIA</i>	-0.116***	0.144	0.067	0.076	-0.017
	(0.034)	(0.106)	(0.101)	(0.087)	(0.083)
<i>SAF in the world</i>	-0.076***	0.032	-0.075***	-0.075***	-0.076***
	(0.015)	(0.045)	(0.015)	(0.015)	(0.015)
<i>SAF in markets</i>	-0.103***	-0.101**	0.115	-0.098**	-0.100**
	(0.040)	(0.040)	(0.119)	(0.040)	(0.040)
<i>ex-ante SAF in stocks</i>	-0.226***	-0.225***	-0.225***	-0.111**	-0.226***
	(0.019)	(0.019)	(0.019)	(0.052)	(0.019)
<i>ex-post SAF in stocks</i>	-0.020	-0.020	-0.019	-0.020	0.039
	(0.017)	(0.017)	(0.017)	(0.017)	(0.048)
<i>SIA*SAF in the world</i>		-0.082***			
		(0.032)			
<i>SIA* SAF in markets</i>			-0.150*		
			(0.078)		
<i>SIA*ex-ante SAF in stocks</i>				-0.085**	
				(0.036)	
<i>SIA* ex-post SAF in stocks</i>					-0.043
					(0.033)
<i>Constant</i>	3.105***	2.767***	2.852***	2.852***	2.974***
	(0.152)	(0.200)	(0.200)	(0.185)	(0.182)
<i>Observations</i>	1,929	1,929	1,929	1,929	1,929
<i>R-squared</i>	0.389	0.391	0.390	0.390	0.389

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

### 2.5.2 Across countries

There is a wide difference in willingness to invest in stocks between Germany and other countries (Figure 2-1).

In the East Asian countries as well as Estonia, the mean of *wstock* is higher than in Germany: the mean of *wstock* in Germany is 2.4, while it is larger than 3 in all other countries.

In fact, 55% of German participants will unlikely or very unlikely invest, while this proportion is 20% for China, and lower for all other countries.

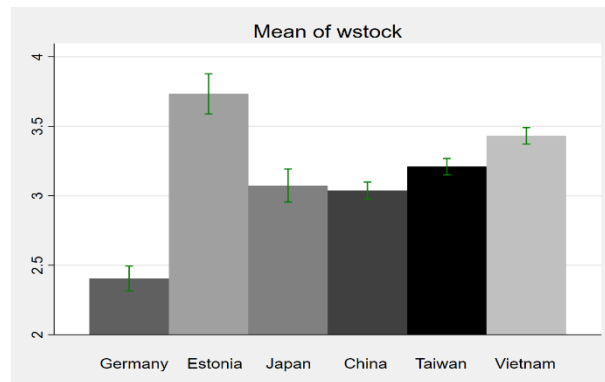
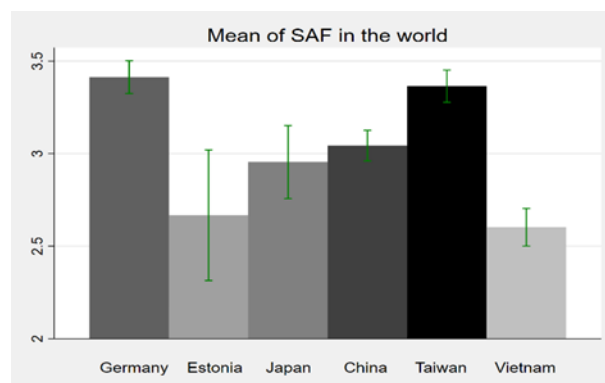


Figure 2-1: Mean of *wstock*, standard errors are marked

Can we explain this difference with the explanatory variables studied so far, in particular the new variables SIA and SAF?

In order to get a better insight into the differences, we plot the mean of our new explanatory variables across the countries (Figure 2-2).



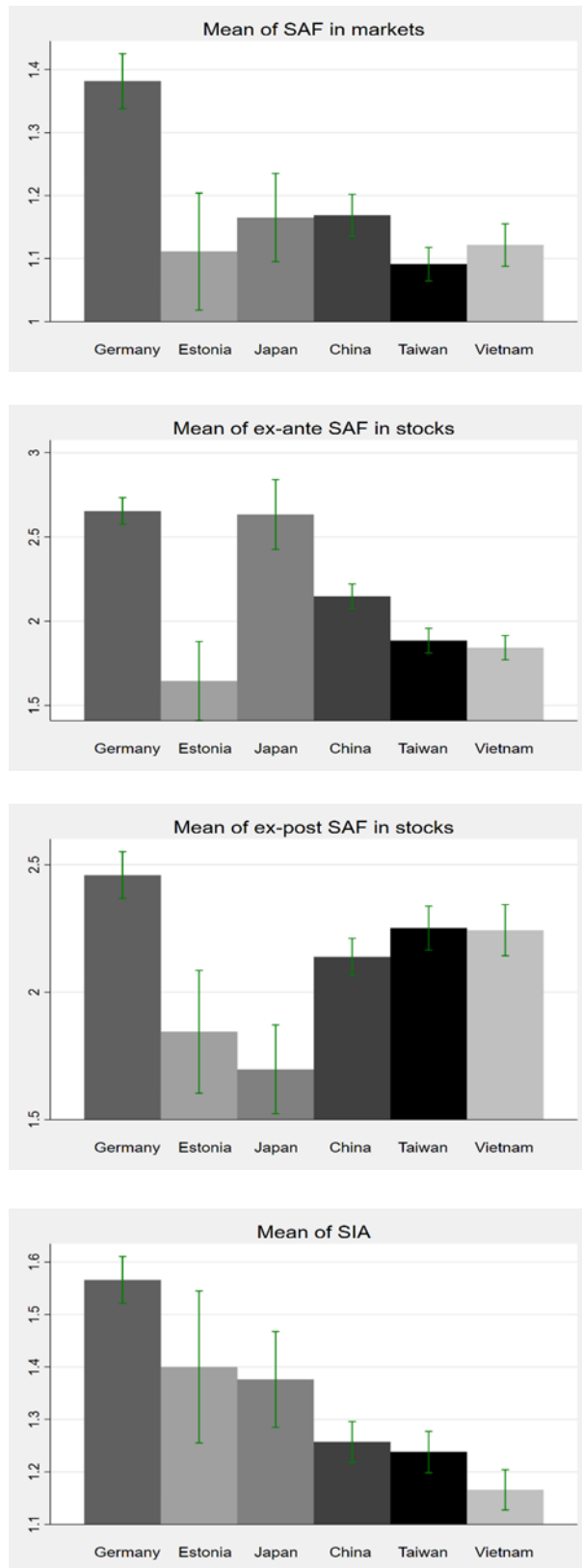


Figure 2-2: Mean of SAF in the world, SAF in markets, ex-ante SAF in stocks, ex-post SAF in stocks, and SIA, standard errors are marked.

As we can see, the mean of SIA is higher in Germany than in other countries. Also, the mean of *SAF in the world*, markets, and stocks is higher in Germany than in other countries. These observations support Hypothesis 3. We will now investigate whether these variables can explain the low SMP in Germany. To this end, we pool all countries and run a regression allowing for country effects (Table 2-5). We are interested in exploring the difference between Germany and other countries and, therefore, the excluded country dummy is for Germany.

In all models, the dependent variable is the willingness to invest in stocks.

Model 1 shows, as expected, that the willingness to invest in stocks is higher in all countries than in Germany. All results are statistically significant at the 1 percent level. As we have observed in Figure 2-1, the willingness to invest in stocks in Estonia is the highest among all countries.

The results remain significant after controlling for demographic factors, as we explain in the last section (Model 2).

We find that explanatory variables such as risk aversion, financial literacy, self-fairness, herding, and optimism can partially explain the variation of the willingness to invest in stocks across individuals (Model 3). We also observe that the magnitude of the country dummies decrease substantially, although they are still statistically significant.

In order to better understand the impact of ideological factors on willingness to invest in stocks, we also insert our explanatory variables into the model (Model 4). All the coefficients have the expected negative sign and, except for *ex-poste SAF in stocks*, they are all statistically significant. We conclude that a higher SIA causes a negative impact on willingness to invest in stocks. In addition, a higher degree of SAF in various dimensions—world, market, and ex-ante stock—negatively affect the willingness to invest in stocks.

Moreover, we observe that, although all the country dummies in Model 4 remain statistically significant, their magnitudes are considerably reduced, i.e. new explanatory variables are able to explain a substantial portion of the gap between Germany and other countries in SMP.

Table 2-5: Regression across countries.

	(1)	(2)	(3)	(4)
<i>VARIABLES</i>	wstock	wstock	wstock	wstock
<i>Taiwan_D</i>	0.804*** (0.049)	0.632*** (0.053)	0.347*** (0.053)	0.194*** (0.053)
<i>China_D</i>	0.632*** (0.048)	0.457*** (0.051)	0.302*** (0.050)	0.182*** (0.050)
<i>Vietnam_D</i>	1.026*** (0.052)	0.800*** (0.056)	0.640*** (0.054)	0.443*** (0.057)
<i>Estonia_D</i>	1.329*** (0.116)	1.057*** (0.115)	0.753*** (0.109)	0.559*** (0.107)
<i>Japan_D</i>	0.669*** (0.079)	0.339*** (0.083)	0.261*** (0.079)	0.240*** (0.078)
<i>Age</i>		-0.008*** (0.003)	-0.006** (0.003)	-0.003 (0.002)
<i>Female</i>		-0.214*** (0.034)	-0.182*** (0.032)	-0.163*** (0.031)
<i>Bachelor</i>		-0.005 (0.041)	0.005 (0.038)	0.019 (0.037)
<i>Field</i>		0.219*** (0.026)	0.148*** (0.025)	0.119*** (0.024)
<i>Risk Aversion</i>			-0.011** (0.005)	-0.010** (0.005)
<i>Loss Aversion</i>			-0.050 (0.055)	-0.043 (0.053)
<i>Ambiguity Aversion</i>			-0.014 (0.034)	-0.022 (0.032)
<i>Financial Literacy</i>			0.142*** (0.020)	0.110*** (0.020)
<i>Self-Fairness</i>			-0.074*** (0.021)	-0.056*** (0.020)
<i>Herding</i>			0.109*** (0.013)	0.098*** (0.012)
<i>Optimism</i>			0.213*** (0.019)	0.191*** (0.018)
<i>SIA</i>				-0.081** (0.034)
<i>SAF in the world</i>				-0.046*** (0.015)
<i>SAF in markets</i>				-0.066* (0.040)
<i>ex-ante SAF in stocks</i>				-0.194*** (0.020)
<i>ex-post SAF in stocks</i>				-0.025 (0.017)
<i>Constant</i>	2.405*** (0.034)	2.353*** (0.093)	1.793*** (0.117)	2.824*** (0.156)
<i>Observations</i>	1,929	1,929	1,929	1,929
<i>R-squared</i>	0.210	0.260	0.366	0.411

Standard errors in parentheses. \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1



As we discussed before in Table 2-4, we are interested in the mechanism by which SIA and SAF affect stock market participation. To this aim, we analyze the impact of interaction between SIA and SAF on the willingness to invest in stocks. By inserting the interaction variables, as we discussed in Table 2-4, we found that the country dummies remain statistically significant. All interaction variables are also statistically significant with expected signs (since the results are very similar to Table 2-4, we will not present them).

Since our dependent variable represents the willingness to invest in stocks and not the actual rate of participation, we do not control for quality of institutions and other country fixed effects.

In line with exploring the causes of difference between Germany and other countries, we ran another series of regression analyses. The results are reported in Table 2-6.

Model 1 is basically the same as Model 3 in Table 2-5. We just simplify slightly and substitute the country dummies with a Germany dummy. No surprise that the Germany dummy is negative and statistically significant, i.e. Germans, on average, are less willing to invest in stocks. In Model 2 to 6, we analyze more precisely the impact of our explanatory variables on *wstock* in Germany. To do so, in each model, we separately insert the interaction term between one explanatory variable and the Germany dummy.

The results show that except “*Germany x SAF in the world*”, the other interaction terms are negative and statistically significant at the 1 percent level. That is, those German individuals who are sensitive to inequality or fairness in the society are significantly less willing to invest in stocks.

We also observe an interesting finding by looking at the Germany dummies. While this dummy is negative and statistically significant in baseline model (Model 1), this appeared differently in other models after inserting the interaction terms: the Germany dummy is not statistically significant in Model 3 and Model 4 and it is positive in Model 2, Model 5, and Model 6. These results suggest that the remaining gap in SMP disappears if we assume that SIA or SAF somehow have a stronger effect on Germans’ than on other persons’ SMP.

In addition, we observe that after inserting the interaction term into each model, the related explanatory variable loses its significance. We conclude that the significance of SIA or SAF in the baseline model (Model 1) is rooted in German individuals’ attitude towards inequality and fairness.

To sum up, we found that our explanatory variables (except *SAF in the world*) are able to explain the difference in SMP between Germany and other countries. Therefore, we confirm Hypothesis 3 which states that SIA and SAF can partially explain the low rate of SMP in Germany.

Table 2-6: Regression across countries.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	wstock	wstock	wstock	wstock	wstock	wstock
<i>Germany_D</i>	-0.256*** (0.045)	0.324*** (0.112)	-0.163 (0.123)	0.055 (0.109)	0.243** (0.105)	0.171* (0.092)
<i>Risk Aversion</i>	-0.009** (0.005)	-0.009** (0.005)	-0.009** (0.005)	-0.009* (0.005)	-0.009* (0.005)	-0.009** (0.005)
<i>Loss Aversion</i>	-0.038 (0.053)	-0.041 (0.053)	-0.037 (0.053)	-0.042 (0.053)	-0.047 (0.053)	-0.051 (0.053)
<i>Ambiguity Aversion</i>	-0.037 (0.033)	-0.037 (0.032)	-0.037 (0.033)	-0.040 (0.033)	-0.041 (0.032)	-0.034 (0.032)
<i>Financial Literacy</i>	0.102*** (0.020)	0.104*** (0.019)	0.101*** (0.020)	0.104*** (0.020)	0.104*** (0.019)	0.106*** (0.019)
<i>Self-Fairness</i>	-0.051** (0.020)	-0.051** (0.020)	-0.050** (0.020)	-0.055*** (0.020)	-0.052*** (0.020)	-0.049** (0.020)
<i>Herding</i>	0.092*** (0.012)	0.088*** (0.012)	0.091*** (0.012)	0.090*** (0.012)	0.089*** (0.012)	0.087*** (0.012)
<i>Optimism</i>	0.199*** (0.018)	0.200*** (0.018)	0.199*** (0.018)	0.199*** (0.018)	0.201*** (0.018)	0.202*** (0.018)
<i>SIA</i>	-0.087** (0.034)	0.033 (0.040)	-0.086** (0.034)	-0.087*** (0.034)	-0.084** (0.034)	-0.084** (0.034)
<i>SAF in the world</i>	-0.065*** (0.015)	-0.059*** (0.015)	-0.058*** (0.017)	-0.063*** (0.015)	-0.059*** (0.015)	-0.055*** (0.015)
<i>SAF in markets</i>	-0.064 (0.040)	-0.057 (0.040)	-0.064 (0.040)	0.036 (0.051)	-0.046 (0.040)	-0.059 (0.040)
<i>ex-ante SAF in stocks</i>	-0.208*** (0.019)	-0.205*** (0.019)	-0.208*** (0.019)	-0.205*** (0.019)	-0.153*** (0.022)	-0.207*** (0.019)
<i>ex-post SAF in stocks</i>	-0.021 (0.017)	-0.019 (0.017)	-0.020 (0.017)	-0.022 (0.017)	-0.020 (0.017)	0.033* (0.020)
<i>Germany x SIA</i>		-0.404*** (0.072)				
<i>Germany*SAF in the world</i>			-0.029 (0.035)			
<i>Germany*SAF in markets</i>				-0.249*** (0.080)		
<i>Germany*ex-ante SAF in stocks</i>					-0.208*** (0.040)	
<i>Germany*ex-post SAF in stocks</i>						-0.185*** (0.035)
<i>Constant</i>	3.135*** (0.151)	2.958*** (0.153)	3.109*** (0.154)	3.019*** (0.155)	2.980*** (0.153)	2.968*** (0.153)
<i>Control variables</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Observations</i>	1,929	1,929	1,929	1,929	1,929	1,929
<i>R-squared</i>	0.399	0.409	0.399	0.402	0.407	0.408

Standard errors in parentheses. \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

### 2.5.3 Robustness

#### 2.5.3.1 Alternative dependent variable

As a check of robustness, we investigate results from regressions run separately for an alternative dependent variable: *invest in stocks* (Table 2-7). As we explained in section 2.2.2., we elicit this variable through a hypothetical investment in an incentivized game.

Model 1 presents the estimate of the basic specification. Demographic characteristics such as age, gender, and education as well as risk preferences can partially explain the likelihood of investing in stocks in the expected directions. Only the impact of ambiguity aversion is not statistically significant. We also find that financial literacy, herding, and optimism increase the likelihood of investing in stocks. The effects are statistically significant.

In Model 2 to Model 6, we analyze the impact of ideological factors on individuals' decisions regarding investment in stocks. Model 2 shows a statistically significant negative impact of inequality aversion on investment in stocks. The results confirm once more Hypothesis 1, which states that more inequality-averse individuals are less likely to invest in stocks.

We did not find a significant association between *SAF in the world* and investment decision. However, there are strong associations between other dimensions of SAF and the investment decision. That is, higher *SAF in markets* (Model 4) as well as higher ex-ante and ex-post SAF in stocks (Model 5 and Model 6) decrease the likelihood of investing in stocks. The results are statistically significant at the 1 percent level and the magnitudes of the effects are considerable.

Therefore, we again confirm Hypothesis 2 which states that individuals with a higher degree of SAF are less likely to invest in stocks (the hypothesis is rejected for “world” dimension).

In line with our previous analyses, we are also interested in exploring the differences between countries in terms of investment strategies. Figure 2-3 plots the mean of investment in stocks across countries. We observe a considerably lower level for Germany than for the other countries (and also an extremely high level for Estonia).

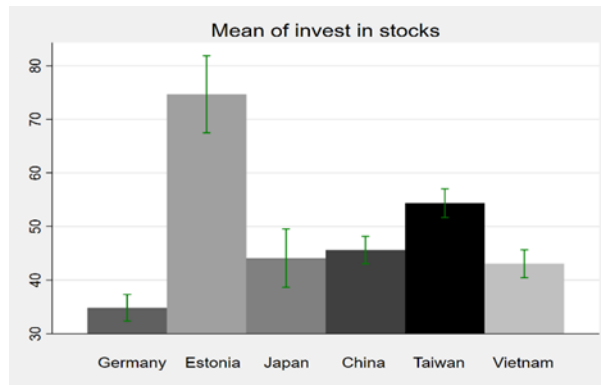


Figure 2-3: Mean of invest in stocks, standard errors are marked.

In order to have a better insight into this difference, we insert Germany dummy into the existing regression models in Table 2-7. The outcome of Model 7 confirms that German individuals, on average, invest less in stocks as compared to the other countries studied. The results are statistically significant at the 1 percent level.

Finally, in Model 8, we insert all variables into the model. We observed that SAF in the world, markets, and stocks remain statistically significant while SIA lost its significance. The Germany dummy is reduced so much that it is only significant at the 10 percent level.

This, again, confirms Hypothesis 3: the low SMP in Germany can be explained to a large degree by SAI and SAF.

### 2.5.3.2 Alternative explanation

The literature on SMP emphasizes the importance of income. In order to control for the effect of this variable, we included the following question in our survey: “How much money does your household have on average per month as total income (i.e. salary from jobs, income from a business, support from relatives or the state etc.)?”

Although our main dependent variable represents the willingness to invest in stocks, rather than the actual investment in stock market and, therefore, controlling for income does not seem so relevant, we are still interested to find out whether there is any significant difference across groups of individuals with different incomes in terms of SMP.

Table 2-7: Regression with an alternative dependent variable.

<b>VARIABLES</b>	<i>Invest in stocks</i>							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Age</i>	-0.223** (0.101)	-0.227** (0.101)	-0.224** (0.101)	-0.212** (0.101)	-0.198** (0.101)	-0.199** (0.100)	-0.206** (0.101)	-0.178* (0.100)
<i>Female</i>	-9.656*** (1.267)	-9.482*** (1.267)	-9.747*** (1.277)	-9.348*** (1.265)	-9.704*** (1.262)	-9.417*** (1.262)	-9.436*** (1.266)	-9.178*** (1.269)
<i>Bachelor</i>	3.179** (1.400)	3.064** (1.399)	3.137** (1.402)	3.220** (1.395)	3.299** (1.395)	3.215** (1.393)	2.316 (1.424)	2.715* (1.421)
<i>Field</i>	1.584* (0.895)	1.244 (0.903)	1.640* (0.900)	1.095 (0.900)	1.025 (0.901)	1.073 (0.898)	0.573 (0.949)	-0.108 (0.951)
<i>Risk Aversion</i>	-0.683*** (0.194)	-0.680*** (0.193)	-0.684*** (0.194)	-0.667*** (0.193)	-0.668*** (0.193)	-0.687*** (0.193)	-0.673*** (0.193)	-0.659*** (0.192)
<i>Loss Aversion</i>	-6.256*** (2.191)	-6.330*** (2.187)	-6.270*** (2.191)	-6.202*** (2.183)	-6.476*** (2.182)	-5.703*** (2.183)	-6.768*** (2.192)	-6.267*** (2.180)
<i>Ambiguity Aversion</i>	-0.585 (1.336)	-0.720 (1.335)	-0.600 (1.337)	-0.732 (1.332)	-0.680 (1.331)	-0.920 (1.331)	-0.875 (1.336)	-1.232 (1.328)
<i>Financial Literacy</i>	4.988*** (0.787)	4.949*** (0.786)	4.946*** (0.791)	4.768*** (0.787)	4.564*** (0.791)	4.517*** (0.790)	5.175*** (0.788)	4.297*** (0.797)
<i>Self-Fairness</i>	1.399* (0.833)	1.459* (0.832)	1.375* (0.835)	1.559* (0.831)	1.575* (0.831)	1.502* (0.829)	1.381* (0.831)	1.677** (0.828)
<i>Herding</i>	1.857*** (0.487)	1.692*** (0.490)	1.855*** (0.487)	1.732*** (0.486)	1.545*** (0.490)	1.828*** (0.484)	1.465*** (0.501)	1.275** (0.502)
<i>Optimism</i>	6.712*** (0.723)	6.600*** (0.723)	6.745*** (0.725)	6.616*** (0.720)	6.316*** (0.726)	6.533*** (0.720)	6.268*** (0.735)	6.035*** (0.734)
<i>SIA</i>		-3.621*** (1.349)						-1.927 (1.381)
<i>SAF in the world</i>			0.354 (0.614)					0.392 (0.617)
<i>SAF in markets</i>				-6.231*** (1.581)				-4.379*** (1.625)
<i>ex-ante SAF in stocks</i>					-3.033*** (0.725)			-1.625** (0.777)
<i>ex-post SAF in stocks</i>						-2.992*** (0.655)		-2.193*** (0.689)
<i>Germany_D</i>							-5.482*** (1.740)	-3.017* (1.830)
<i>Constant</i>	23.104*** (4.656)	29.118*** (5.160)	21.994*** (5.038)	31.865*** (5.143)	32.248*** (5.126)	32.034*** (5.028)	27.748*** (4.873)	45.231*** (6.143)
<i>Observations</i>	1,929	1,929	1,929	1,929	1,929	1,929	1,929	1,929
<i>R-squared</i>	0.155	0.158	0.155	0.162	0.163	0.164	0.159	0.175

Standard errors in parentheses.\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

To do so, we separated individuals into two groups: individuals who belong to the upper half and those who belong to the lower half of the income level in each country. Table 2-8 reports the results. In Model 1 and Model 2, the regression analyses are run for the low income group, while Model 3 and Model 4 are run for the high income group.

In all models, the Germany dummy is negative and statistically significant. However, this dummy is reduced substantially in the high-income group. We conclude that, although German individuals are, on average, less willing to invest in stocks as compared to individuals from other countries, the unwillingness of Germans is even stronger when we compare low-income Germans with low-income individuals in other countries. This is interesting because Germany is a relatively rich country as compared to some other countries in our study and, therefore, in line with the existing literature on the positive effect of income on SMP, we expect that the difference between Germany and other countries in terms of SMP among low-income groups should be smaller than the difference between Germany and other countries among high-income groups. By looking at the Germany dummy in Table 2-8, what we observe is exactly the contrary.

The impacts of gender, financial literacy, herding, and optimism on the willingness to invest in stocks are all significant but not different across low-income and high-income individuals.

The impact of risk aversion on the willingness to invest in stocks is only significant among low income individuals, although only at the 10 percent level.

When it comes to the impact of ideological factors, we observe more disparity between low-income and high-income individuals. Broadly speaking, the effect of SAF is more considerable among high-income individuals. A possible explanation is that the more effective variables among low-income groups are the ones with direct, immediate impact on *wstock*, such as risk aversion and financial literacy. The only exception among ideological factors is SIA whose negative effect on *wstock* is strong and statistically significant among low-income individuals, but not significant (and much less strong) among high-income individuals. It seems that the impact of SIA on SMP is more pronounced among the individuals who are prone to be negatively affected by inequality.

Finally, we observe that for both income groups the R squared is substantially higher when we add our new variables.

Table 2-8: Regression within high-income and low-income individuals.

<i>VARIABLES</i>	<i>low income</i>		<i>high income</i>	
	(1)	(2)	(3)	(4)
	wstock	wstock	wstock	wstock
<i>Germany_D</i>	-0.453*** (0.064)	-0.292*** (0.064)	-0.385*** (0.062)	-0.223*** (0.064)
<i>Age</i>	-0.003 (0.004)	-0.000 (0.004)	-0.008** (0.003)	-0.007** (0.003)
<i>Female</i>	-0.131*** (0.045)	-0.138*** (0.043)	-0.199*** (0.047)	-0.163*** (0.046)
<i>Bachelor</i>	-0.112** (0.050)	-0.083* (0.048)	-0.098* (0.053)	-0.051 (0.052)
<i>Field</i>	0.205*** (0.033)	0.159*** (0.032)	0.164*** (0.036)	0.137*** (0.035)
<i>Risk Aversion</i>	-0.012* (0.007)	-0.011* (0.007)	-0.008 (0.007)	-0.007 (0.007)
<i>Loss Aversion</i>	-0.052 (0.076)	-0.048 (0.073)	-0.033 (0.082)	-0.016 (0.080)
<i>Ambiguity Aversion</i>	-0.033 (0.047)	-0.023 (0.045)	-0.039 (0.050)	-0.057 (0.048)
<i>Financial Literacy</i>	0.110*** (0.027)	0.083*** (0.027)	0.168*** (0.030)	0.125*** (0.029)
<i>Self-Fairness</i>	-0.096*** (0.030)	-0.082*** (0.028)	-0.047 (0.030)	-0.020 (0.030)
<i>Herding</i>	0.090*** (0.018)	0.084*** (0.017)	0.124*** (0.018)	0.100*** (0.018)
<i>Optimism</i>	0.236*** (0.026)	0.201*** (0.025)	0.206*** (0.027)	0.193*** (0.026)
<i>SIA</i>		-0.104** (0.047)		-0.071 (0.049)
<i>SAF in the world</i>		-0.059*** (0.021)		-0.069*** (0.022)
<i>SAF in markets</i>		-0.073 (0.055)		-0.065 (0.058)
<i>ex-ante SAF in stocks</i>		-0.235*** (0.028)		-0.187*** (0.027)
<i>ex-post SAF in stocks</i>		0.014 (0.024)		-0.052** (0.024)
<i>Constant</i>	2.055*** (0.179)	3.076*** (0.216)	2.276*** (0.178)	3.242*** (0.217)
<i>Observations</i>	1,018	1,018	911	911
<i>R-squared</i>	0.344	0.402	0.351	0.403

Standard errors in parentheses. \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1



## **2.6 Conclusion and discussion**

The striking differences between SMP across countries have been a puzzle that leaves much to learn from: if we know why SMP in some countries is higher than in others, we can design programs to address these issues and raise the SMP to a level that increases long-term wealth accumulation of households. In our study, we have focused on data from countries from East Asia and Europe and tested whether cultural differences induced different attitudes towards stocks that affected the SMP. We found that this is, indeed, the case. Moreover, these factors are able to explain a large proportion of the between-country variations in SMP. In fact, we are roughly able to explain half of this variation with individual level parameters where social preferences explain more of it than traditional factors (financial literacy, risk preferences, etc.).

Our study has certainly some limitations that might be overcome in follow-up work: we have used comparable samples for the cross-country comparison (as typical in cultural finance) and chose university samples for this purpose. This poses the difficulty that stock market investments of students depend strongly on irrelevant factors (having enough money to invest). Many of those who have not invested yet will invest in the near future after finishing their studies and starting to earn money. We circumvented this problem by eliciting their future willingness to invest in stocks (provided they will have enough money to do so). This seems to us a good proxy for later SMP. Still, the variable might be criticized, since it is not incentivized. We, therefore, also elicited an incentivized variant in the form of a stock market game. Both variables led to very similar results, thus dispersing potential doubts about the elicitation method. Nevertheless, it might be interesting to test the effects with a broader, representative household sample, eliciting actual stock market investments together with social preferences.

Another potential concern about our findings might be that the connection between social preferences and stock market investments is not rationally founded: after all, not buying stocks does not help to reduce social inequality. We argue, however, that it is well known that a manifold of irrational reasons influences investment decisions, as the rich literature in behavioral finance has shown. A mere feeling of vague connections between social inequalities, capitalism and stock market investments might already deter people from buying stocks, and our empirical analysis demonstrates that this is, indeed, the fact. Even more: it seems to be not only a minor point, but also a central one for many investors. Future work could use our results to find ways to increase SMP in countries like Germany to reasonable levels.

### **3 Do individuals' attitudes toward trust and herding matter in stock market participation?**

#### **3.1 Introduction**

According to the classical portfolio selection model, regardless of individual differences in risk aversion, all individuals should invest a portion of their wealth in risky assets and stock markets (Merton, 1969). Despite the obvious excess return of investment in the stock market, a considerable portion of households stick to the traditional saving and investment methods, and participation in the stock market has been limited to a small segment of the population (Campbell, 2006). Even though, due to the increasing availability of new technologies and information as well as financial literacy during the last two decades, the amount of individuals that own stocks has increased considerably (Stout, 2010). Cross-country studies on limited participation in the stock market show the percentage of individual stock ownership ranging from 1% to 40% (Giannetti and Koskinen, 2010, Badarinza et al., 2016, Guiso et al., 2000, Barasinska and Schäfer, 2013), with stock ownership of households in the majority of countries at less than 20%. A growing body of literature has revealed determinant factors for low stock market participation, such as demographics, risk perception, socioeconomic elements, an individual's attitude and financial literacy. The specific objective of our study is to assess the role of herding and trust in an individual's decision to invest in the stock market.

In the long run, low participation in financial markets not only results in welfare losses for families (Bagliano et al., 2014), but it also has a negative influence on macro-level financial systems (Thomas and Spataro, 2016). Factors which influence stock ownership have been explored in several studies. It is now well established that knowledge-based criteria like financial literacy (Van Rooij et al., 2011, Yoong, 2011), stock market awareness (Sindambiwe, 2014), financial advice (Von Gaudecker, 2015), financial awareness (Guiso and Jappelli, 2005), information cost (Mankiw and Zeldes, 1991) and education (Cole and Shastry, 2008, Lusardi, 2008) play a pivotal role for investment.

Another group of authors take into account the importance of personality characteristics and demographic factors. They found that gender (Ke, 2018, Barasinska and Schäfer, 2018, Halko et al., 2012), age (Fagereng et al., 2017), language (Grinblatt and Keloharju, 2001), individual's intelligence (Grinblatt et al., 2011) and cognitive abilities (Christelis et al., 2010) have a sizable

effect on market participation. Furthermore, an individual's attitudes toward risk and uncertainty appear to be closely linked to stock ownership. This relationship could be explained by the level of risk aversion (Ainia and Lutfi, 2019, Barasinska et al., 2008, Vissing-Jørgensen and Attanasio, 2003), loss aversion (Dimmock and Kouwenberg, 2010, Hwang, 2016, Gomes, 2005, Rieger, 2020b), ambiguity aversion (Antoniou et al., 2015), political uncertainty (Agarwal et al., 2019) and investor protection in countries (Giannetti and Koskinen, 2010).

Besides all the above-mentioned determinants, a society's beliefs and attitudes towards others are important additional elements in the explanation of heterogeneity in stock market participation for both individual and country-level studies. Making the decision to invest in stocks requires not just an assessment of the risk-return information, but is also an act of trust in the reliability of the investment process (institutional trust) and the people (trust in person) who provide information on stocks and handle the investment. Moreover, trust has been shown to be a strong and positive predictor of liquidity and depth in the financial markets, and it is the most essential component of social capital for market growth (Ng et al., 2016).

Concerning the importance of trust in society, Arrow (1974) states: "trust has a very important pragmatic value if nothing else. Trust is an important lubricant of a social system. It is extremely efficient; it saves a lot of trouble to have a fair degree of reliance on other people's word".

Previous research in this field may be divided into two broad categories: trust in institutions and trust in other individuals. The first group argues that stock investment levels are dependent on an individual's level of belief in financial markets and legislation (Balloch et al., 2015, Giannetti and Wang, 2016, Asgharian et al., 2019, Kuffour and Adu, 2019). On the other hand, the second set of studies (Tao, 2006, Guiso et al., 2008) focuses on the link between trust in others and stock ownership.

Investors' choices are affected by behavioral biases, which have essentially roots in cognitive issues. There are several behavioral biases that influence investment decisions, and herding is a significant one. After the dot-com bubble crashed in the late 1990s, herding became renowned as a behavioral bias. It describes the phenomenon where a person mimics his peer's decisions in investment, e.g., in internet-based companies in stock markets. Such a behavior can be rational in uncertain information environments (Devenow and Welch, 1996) but is more often than not simply a bias. Bernheim (1994) argues that people may imitate their peers' conduct, adhering to social norms in order to bolster their social status. According to related studies on social interaction, herding and stock investing, individuals prefer to imitate the choices of their

friends and coworkers when it comes to entering the stock market (Brown et al., 2008, Hong et al., 2004), portfolio selection (Massa and Simonov, 2005) or investing in certain securities (Hvide and Östberg, 2014).

Altman (2014) argues that individuals engage with those they think are trustworthy, such as those in their close social circle or members of their community or cultural traditions. Trust may be reinforced if one party feels that the other will suffer financial or social consequences in the case of a breach of trust. In the presence of limited cognition and the Knight definition of uncertainty (Knight, 1921), uncertainty that cannot be quantified with any degree of accuracy, herding behavior might emerge. According to research by Gubaydullina and Spiwoks (2015), a large proportion of investors find it difficult to understand correlations of income return. Investors often run into problems when estimating the probability that an event will occur, claims Rieger (2012). Individuals tend to follow the people they trust and herd when they do not know, or are uncertain about, what to buy or sell. In the literature it has been shown that social interactions can encourage people in stock investment (Hong et al., 2004, Liang and Guo, 2015a, Lu and Tang, 2015) and lead to similarities in portfolio and investing behavior of individuals (Heimer, 2014, Baltakys et al., 2019, Duflo and Saez, 2002). This study adds to what is known about the link between social interaction and investing in stocks by showing that trust in the community is strongly linked to investing in the stock market through herding.

In line with prior research, this study will examine the simultaneous effect of herding and trust on stock market investing. As far as we know, prior research examined the impact of trust on stock ownership by using either generalized trust or institutional trust. In this study, we not only analyze the causal effect of trust in others on the decision to invest in financial markets, but we also decompose generalized trust into two key subgroups: in-group trust and out-group trust. According to Ellemers et al. (2012), an individual must recognize that he or she is a member of certain social groups (i.e., in-groups) but not others (i.e., out-groups). Furthermore the trusting attitude of individuals toward in-groups and out-groups is significantly different (Romano et al., 2017). According to Hirshleifer (2020) study on the topic of social transmission bias, social interactions are an important factor in the development of bubbles, return anomalies and booms. In addition, he stresses the importance of the social processes that shape individuals' perspectives on economics and their subsequent actions and outcomes in the form of financial choices. Our key contribution is to compare the effect of individual trust dimensions on the willingness to invest in equity markets. Lastly, we examine the causal relationship between an individual's trust and herding behavior. For this purpose, the study was conducted in the form

of a survey, with data being gathered from China, Japan, Vietnam, Taiwan, Germany and Estonia.

This study shows that the herding and trust attitudes of individual investors impact their willingness to participate in the stock market. Using an international survey data set of more than 1600 people, we find that *general* trust plays an insignificant role in investment intention. However, an increase in herding attitude encourages the propensity for stock ownership. Secondly, when looking at *more specific* types of trust, we find that out-group trust is directly positively associated with investing in stocks. In-group trust, however, increases herding attitudes of investors, and thus might have an indirect effect on stock market participation (Fig. 1). Overall, this research reinforces the existing literature on the link between herding, trust, and stock market participation and goes one step further by showing that there is both a direct and an indirect channel explaining the effect of trust on the likelihood of individuals' investment in the stock market. To summarize, a higher level of trust outside the group directly results in more investment in the stock market among individuals. On the other hand, greater trust within the group indirectly increases the willingness to make stock investments by affecting herding behavior.

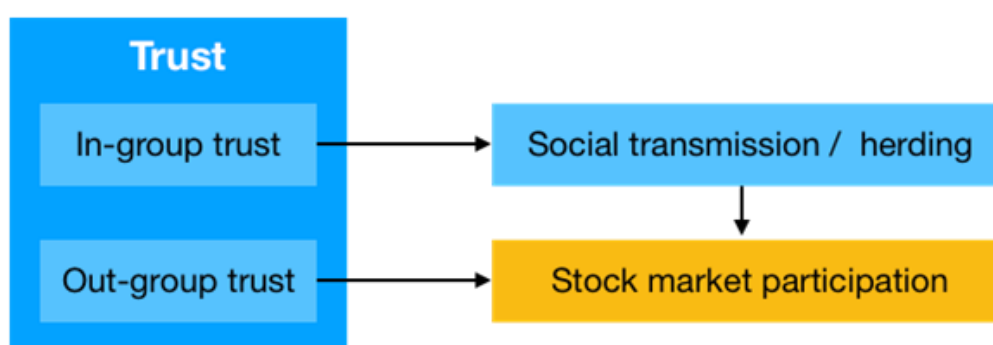


Figure 3-1: Schematic effects of trust on stock market participation.

This study is organized as follows. Section 3.2 outlines related literature. Section 3.3 describes theoretical background and hypotheses. Section 3.4 presents data and analysis approaches. Section 3.5 explains the findings and addresses association between the variables. Section 3.6 concludes the article.

## 3.2 Literature review

### 3.2.1 Social interaction, portfolio selection and stock market participation

Many human choices are fundamentally influenced by information obtained via socializing with family, friends, and colleagues (Hong et al., 2004, Heimer, 2014, Björklund and Salvanes,

2011). An early study by Hong et al. (2004) on the elderly argues that individuals who claim to "see their neighbors" or "frequently attend church" are more likely to invest in the stock market. Moreover, it was highlighted that being a member of communities with higher participation rates has a greater impact on stock ownership. Similarly, a study on elderly households in Europe revealed a positive association between social interaction and propensity for stock investment (Christelis et al., 2005). Besides the informational dimension of social interaction, the social multiplier effect also plays a critical role in stock ownership. While social contact has a favorable effect on household stock market involvement, Liang and Guo (2015a) note that access to the Internet mitigates the effect of social interaction. Changwony et al. (2015) analyzed social interactions under two classes – weak and strong ties. The findings show that both forms of social engagement, weak and strong ties, are distinct channels that positively influence the level of stock market participation among individuals. Ruoshi and Shihua (2020) note that online social interactions are not constrained by the confines of a restricted area or identical relations, and they assist rural households in obtaining diversified information while also encouraging investment in the financial market. This also has an impact on the desire of rural families to invest in high-risk financial assets and increase the return on their portfolios.

According to Ivković and Weisbenner (2007), evidence indicates that local knowledge diffusion among neighboring households results in similarities in portfolio choices. They also claim that being engaged in the community creates a stock of resources known as social capital that reduces the informational costs of investing in the stock market. As noted by Lu and Tang (2015), individuals are affected by the workplace environment and they increase the share of risky equity in their portfolio when they experience lower return in comparison to their colleagues. A broader perspective has been adopted by Heimer (2014) who argues that the likelihood of becoming an active investor increases with an increase in the degree of sociability.

### **3.2.2 Financial decisions and herding**

Herding has been classified in the literature as a kind of behavioral bias and is described as imitating the behavior of others in a community. Behavioral biases are cognitive variables that affect investors' investing choices in financial markets. In addition, in economic activity and financial decision-making, herding behavior may be seen as a reflection of social learning, although it is influenced by investor sentiment and psychological factors (Fransiska et al., 2018).

In financial markets, herding is usually defined as an investor's natural inclination to copy the activities of others, or as similarities in behavior in a community. As noted by Massa and Simonov (2005), individuals imitate the decisions of their former classmates in college in portfolio selection. They also highlighted the college base interaction as the strongest source of herding, in comparison to the other interaction forms. This view is supported by Hvide and Östberg (2015), who emphasize the role of social interaction in the workplace on investing in equity from same market and industry. There is substantial evidence that herding and overconfidence both have a causal role in investment decisions. Passive investors show more herding tendency, while aggressive investors exhibit more overconfidence (Jhandir and Elahi, 2014). A study by Aharon (2020) supports prior research on the relationship between portfolio selection and herding; furthermore, he demonstrates that herding is more prevalent when the market deteriorates.

### **3.2.3 Trust and financial decisions**

Previous studies discovered that trust in people (general trust) and trust in a society's institutions are key variables in individuals' choice to engage in the financial markets.

In one of the primary studies on general trust, Tao (2006) claimed that both social interaction and trust encourage household involvement in the stock market, whereas stock market losers have a detrimental influence on household investment through the peer group effect. In line with this, Georgarakos and Pasini (2011) conclude that both trust and sociability have a marginal positive effect on market participation. Furthermore, they find some evidence to imply that sociability can somewhat counteract the discouraging impact on stockholding caused by poor trust in the region of residence. In another study, Guiso et al. (2008) indicated that trusting others elevated the likelihood of investing in stocks by 50% and increased the percentage of one's portfolio invested in stock by 3.4 percent points.

Another group of studies emphasized the joint effect of general trust and financial literacy on stock ownership. Households with higher financial literacy and trust are more likely to invest in equities, as well as to invest a bigger proportion of their wealth in the stock market (Balloch et al., 2015). This view is supported by Cui and Zhang (2021), who emphasized the importance of trust in financial decision-making, particularly when it comes to investing in the stock markets. Additionally, it was shown that people with a higher level of financial literacy place less value on trust when it comes to capital market investment than those with a lower level of

financial literacy do. Conversely, research by Kuffour and Adu (2019) found that trust has no significant impact on stock participation, whereas financial literacy does. Bucciol et al. (2019) demonstrated that trust is an irrelevant factor unless the household is risk averse, in which case riskier investments are more prevalent in the presence of higher trust. In other words, trust in the presence of risk aversion is linked to more risky asset investing. They claim that trust compensates for an individual's risk aversion. Additionally, they note that although trust is crucial for investing in the stock market, it has no correlation with the percentage of risky assets chosen.

It is now well established from a variety of studies that trust plays a pivotal role in individuals' financial decisions, but a systematic understanding of which type of trust contributes to stock investment is still lacking. Research by Bowles and Gintis (2004) demonstrated that an individual's behavior can be affected by their social identity as well as their membership in a group. Because of the nature of our social life, we need to interact directly with members of our own group as well as members of other groups. Asadullah (2017) studied generalized trust levels alongside in-group trust and out-group trust, and noted that group affiliation matters for individual trust. Akerlof and Kranton (2000) argue that identities affect behavior, because individuals tend to act in line with the expectations of the groups in which they find themselves. Members of the same groups may benefit from this tendency because it encourages them to interact together more. According to Crepaz et al. (2017), individuals with more in-group trust participate more on elections than those with less in-group trust.

The existing body of research on trust and investment suggests that not only trust in others matters; trust in the institution also plays a significant role in investing in financial markets. Hagman (2015) shows that both organizational and personal trust are pertinent factors for explaining cross-country heterogeneity in stock ownership. A cross-sectional research study conducted by Asgharian et al. (2019) examined the relationship between institutional quality, household trust, and equity market participation. It discovered that institutional quality has a sizable impact on trust and stock market participation. Additionally, it demonstrated that although individual trust has a remarkable impact on participation, trust only mediates a tiny portion of the effect of institutional quality on equity ownership. Giannetti and Wang (2016) indicated that corporate fraud announcements reduce the likelihood of stock-market investment because of a loss of trust in the market.



### 3.3 Research question and hypothesis

While trust and herding as influencing factors for stock market participation have been examined in numerous studies (see Sections 2.2 and 2.3), their interconnection has surprisingly not been considered so far, although it seems very obvious that trust and herding are interrelated: if I don't trust a colleague talking about his stock market investments, it is less likely that his information is going to motivate me to enter the stock market as well. If I trust him, however, his experience could very well convince me to buy stocks, too. The kind of trust I need to have towards my colleague in this example differs from the trust I would need to have in the institutions on the stock market (companies, banks, stock exchange etc.). Thus, it is pivotal to study different types of trust: general trust, as well as in-group and out-group trust. The aim of this study is to differentiate between these types of trust and to study the potential connections between herding and trust in their impact on stock market participation.

While a variety of definitions of the term “generalized trust” have been suggested, this study will use the definition first suggested by Guiso et al. (2008), who saw it as “the subjective probability individuals attribute to the possibility of being cheated”. Individuals' generalized trust relates to whether they believe that other people are typically trustworthy or if they believe that they must be cautious while interacting with others. Generally, individuals intend to minimize social uncertainty, which may be accomplished by either general trust or optimistic expectations (Siegrist et al., 2005). Moreover, reduction of general trust in other people is adversely connected to perceived risk (Sjöberg, 2001) and knowledge transfer among individuals (De Luca and Rubio, 2018). Moreover, individuals cope with a lack of knowledge on a topic by relying on generalized trust to minimize the uncertainty they encounter. It should come as no surprise that trust has an impact on risk assessments when there is a lack of information and expertise on a subject. Consequently, the new risk perception has a significant impact on an individual's choices and behavior (Siegrist et al., 2005). Regarding the current study, the higher level of generalized trust in individuals should be positively associated. In line with studies on generalized trust, herding and stock market participation (Buccioli et al., 2019, Balloch et al., 2015, Cui and Zhang, 2021, Guiso et al., 2008), the first hypothesis is as follows:

- *H1: Generalized trust and herding are positively associated to the level of willingness to invest in the stock market among individuals.*

Using social categories to know about others has substantial implications for our judgment, expectations and general interactions. Once social categories are specified, individuals may identify that they belong to some status groupings (i.e., in-groups) and not to others (i.e., out-

groups) (Kawakami et al., 2017). Consequently, individuals have a more favorable attitude toward in-group members than members of the out-group. This kind of in-group bias may be shown in a wide variety of behaviors, including trust (Romano et al., 2017).

Generally, trust in others provides two dimensions of information: in-group trust and out-group trust. According to the Delhey and Welzel (2012), the term "in-group trust" refers to people's trust in known individuals such as family, friends, coworkers, classmates, neighbors and acquaintances. Meanwhile, out-group trust refers to trust in individuals with whom one is unfamiliar or who vary in terms of group identity features such as nationality, language or religion. For instance, individuals such as reporters, stockbrokers and financial advisers may be included in the out-group.

Generalized trust is the total of the scores for both in-group and out-group trust. We would like to discover which dimension is more relevant for stock market investing. Delhey and Welzel (2012) argue that in terms of in-group and out-group trust, there are two main theories: a) antagonism theory and b) alliance theory. According to the antagonism theory of trust, in-group trust and out-group trust are mutually exclusive. Meanwhile, the alliance theory of trust proposes that the elements of trust have a symbiotic connection. Considering the aforementioned theories, it is not possible to find a clear explanation for the amount of in-group and out-group trust for persons with a median score in generalized trust because it cannot be said whether this has a basis in a high score in one factor or an average score in both elements.

It is plausible that the level of out-group trust is linked to people's desire to invest in the stock market. There are two possible explanations for this. Firstly, individuals with high out-group trust are more easily convinced to invest in securities by financial advisors and stockbrokers. Furthermore, they perceive a lower chance of being deceived by strangers and engage in trusting actions when their risk tolerance has not been assessed. In light of this, the second hypothesis claims that;

- *H2: Increase in out-group trust leads to greater willingness to invest in stock markets*

Other people can affect an individual's decision to invest in the stock market through two main channels: social interaction and herding. Studies have confirmed a link between both of the above-mentioned phenomena and individual investment plans, although the reason for this link has not been investigated.

This study contributes to the existing literature on the relationship between social interaction, herding, and asset market participation by demonstrating that enhanced trust in the in-group encourages herding, which is highly associated with stock market participation. In explaining the reason for similarities in behavior among people, Banerjee (1992) emphasizes the role of observational learning and word-of-mouth in interaction and communication among people. Although a considerable portion of individuals' decisions are based on the information that they receive from their social connections like family, friends or coworkers (Lu and Tang, 2015), an individual's level of trust in financial markets is not always proportional to their level of equity market knowledge (Balloch et al., 2015). A possible explanation for this might be that people imitate the financial decision of in-group peers because they trust them. The evidence of herding in financial decisions among people in the same group of classmates (Massa and Simonov, 2005), neighbors (Changwony et al., 2015) or church attendants (Hong et al., 2004) might have its root in knowledge-based trust in group members. People imitate the actions of other group members by participating in the stock market, not only because they are aware of the others' intellectual capabilities, but also because they trust them. In other words, in-group trust might indirectly affect willingness to invest in the stock market through the herding behavior of individuals. In this regard, we examine the following hypothesis:

- *H3: Higher level of in-group trust encourages individual herding*

### **3.4 Data and methodology**

We use data from an international survey on Preferences, Attitudes, Norms and Decisions in Asia (PANDA) that was done in 2019 with over 2000 participants in China, Taiwan, Japan, Vietnam, Germany, and Estonia. Previous studies by Ashtiani et al. (2020) and Rieger (2020b) also used this dataset in their analysis. Data was collected using an online multi-language survey that was publicized at many universities in the listed countries. We utilized the data for our purposes as it contains questions regarding willingness to invest in stock markets, previous experience in securities investment, herding and general trust. Moreover, it includes several other questions that could be used as proxies for risk aversion, financial literacy, ambiguity aversion, and the big 5 personality traits. We excluded subjects with poor data quality (i.e., those who provided an unacceptable response to open-ended questions) and participants above

the age of 60 or under the age of 18. A total of 1678 observations were used in the following analysis.

Due to the sample's composition of young participants or students, it is conceivable that they lack significant savings. Thus, it is logical to assume that a substantial percentage of them are unable to invest in the stock market. To overcome this potential issue, we used the willingness to invest in stocks as a proxy for stock market participation. Additionally, in order to lessen the role of savings and more clearly capture participants' desire for stock ownership, the question said explicitly, "*assuming you had a reasonable amount of savings*".

The major dependent variable is an individual's willingness to invest in stocks, which is named "*willingness to stocks*". A four-point Likert scale question assessed the willingness to invest in stocks among participants, as shown below:

- "*How likely is it that you would invest money in stocks or funds in the future, provided you had a reasonable amount of savings?*"

Individuals could select one of four options: (A) Very likely; (B) Likely; (C) Not likely; (D) Extremely unlikely, where 'willingness to stocks' varies between four (extremely likely) to 1 (extremely unlikely).

Regarding the major independent variables of herding, general trust, in-group trust and out-group trust, the PANDA survey consisted of 14 questions.

Two of those were about herd behavior of individuals:

- *I make financial decisions by myself*
- *If my friend buys stocks, I would also consider it.*

Both of the above questions were answered on a five-point Likert scale: (1) Strongly agree; (2) Agree; (3) Undecided; (4) Disagree; (5) Strongly disagree.

The PANDA study also contained 8 items about attitudes toward generalized trust, which consisted of 4 questions each on in-group and out-group trust. Participants could select one of seven choices: (1) Disagree; (2) Disagree; (3) Partially disagree; (4) Undecided; (5) Partially agree; (6) Agree; and (7) Strongly agree. Each item was coded on a Likert scale from 1 to 7 for A to G accordingly. The sum of the score in all 8 questions defined the value for general trust.

They were asked to think about family and friends and to answer the following 4 items about in-group trust:

- *I trust them to keep their promises.*
- *They will gossip about me when I am absent.*
- *I am very happy to lend personal belongings (e.g., books, CDs) or money to them, when they are in need.*
- *If one of them asks me to lend a larger amount of money and promises to return it as soon as possible, I would hesitate, because he or she might not pay me back.*

Participants should think about the people that they do not know and answer four items about out-group trust:

- *I have faith in their promises.*
- *If they act in a friendly way towards me, they might be unfriendly behind my back.*
- *I would like to help them when they are in trouble, such as lending my cellphone to them to make a phone call.*
- *If I am alone and I see somebody who seems to be injured and in need of help, I would hesitate, because I would be afraid to be tricked.*

Additionally, we examined the consistency of the adapted questions for in-group and out-group trust, which have Cronbach alpha values of 0.718 and 0.723 respectively. A correlation value of 0.252, which is not statistically significant, implies that the in-group and out-group trust criteria are statistically unrelated and entirely independent. This conclusion is consistent with the assumption that there is no causal connection between the two variables. We also elicited additional key parameters that have been widely used in previous research to explain stock market participation. In our analysis, we adopted control variables such as demographics, ambiguity aversion, risk aversion, financial literacy, the big 5 personality traits and European country dummy. We replicated the approach of Rieger et al. (2015) in a simple binary question for the assessment of values in ambiguity and risk aversion. Furthermore, we employed the approach described by Ashtiani et al. (2020) to assess the level of financial literacy. Regarding the big 5 traits, we adopted the same questions and approach that was introduced by Rammstedt et al. (2010).

Table 3-1: Summary statistics

Variable	No	Mean	Std. Dev.	Min	Max
Age	1678	24.177	6.473	17	60
Household	1678	3.568	1.677	1	14
Financial literacy	1678	2.349	.777	0	3
Willingness to stocks	1678	3.089	.82	1	4
Herding	1678	5.237	.881	2	7
Trust	1678	35.838	6.025	8	54
In-Group Trust	1678	20.088	3.842	4	28
Out-Group Trust	1678	15.751	3.773	4	27
Risk Aversion	1678	2.477	.743	1	3
Openness	1678	6.874	1.769	2	10
Neuroticism	1678	5.997	1.729	1	10
Conscientiousness	1678	5.922	1.541	1	10
Agreeableness	1678	6.507	1.573	1	10
Extraversion	1678	5.969	1.687	1	10

Table 3-1 presents the descriptive statistics for all variables used in the analysis. As indicated, the average age of participants is less than 25 years, which is consistent with expectations since the questionnaires were advertised in universities and among students. In terms of gender, 961 participants (57%) are women and 717 (42%) are men, and this predominantly female participation is true in all countries.

### 3.5 Results and discussion

#### 3.5.1 General trust and stock market participation

We begin by investigating the impact of herding and general trust on individuals' propensity to invest in stocks. Table 3.2 shows the dataset's regression analysis. In the regression, alongside the major independent variables, we take into account variables such as people's financial literacy, risk aversion, and ambiguity aversion. Furthermore, we controlled for demographic parameters such as age, a female dummy, degree of education, number of households, and field of education. These variables are commonly used in the literature on stock market involvement.

According to the findings in Table 3.2, there is no statistically significant association between the level of general trust in people and the strong likelihood to invest in stock exchanges in the future. Individuals who are more open to trusting other people are more likely to be inclined toward equity ownership, according to the findings of prior publications (Cui and Zhang, 2021, Bucciol et al., 2019, Balloch et al., 2015). Contrary to expectations from previous studies, findings from table-2 demonstrates that general trust has no impact on individuals' decision to invest in a risky asset such as stocks. This finding goes against previous findings on the

relationship between accepting the risk of trusting others and accepting the risk of investing in security markets. A possible explanation for these findings is that prior research did not include an adequate number of questions to assess general trust, and the assessment of trust was limited to a single Likert-style question, which may only capture individuals' abstract self-evaluation of their trusting disposition. To tackle this issue and associated inaccurate information, we customized 12 questions on various elements of general trust for our study.

Regarding the association between herd behavior and stock participation, findings indicate that those who are more influenced by others in their decisions are more likely to invest in the markets. When independent variables are compared, it is revealed that the level of herding in individuals is significantly more important than factors such as financial literacy or educational background in the business field. This observation may support the hypothesis that people with higher herding tendencies value other people's decisions for stock market participation more than their own information such as financial literacy or academic knowledge in investment.

As shown in Table 3.2, two demographic variables, being female and European, have a negative impact on willingness to invest in the stock market. In other words, it could be said that Asians are more inclined to invest in equities than Europeans. However, there are strong country differences, even within each group (Ashtiani et al., 2020). Additionally, gender plays a significant role in the likelihood of market participation, where males are more motivated to invest in stock exchanges than females, as has already been found by Ashtiani et al. (2020). This finding corroborates previous findings by Ke (2018), Barasinska and Schäfer (2018) on the significance of gender norms for stock ownership.

Table 3.3 shows the results of a robustness test conducted on the findings about herding and general trust, in which non-experienced stock investors and experienced stock investors were analyzed separately. The findings support the idea that there is not a significant association between trust and stock market participation for both groups at the 10% statistical significance level. Regarding the herding effect, for both subgroups, a higher level of herd behavior increases the likelihood of stock participation, although the magnitude of the effect varies. The comparison of subgroups reveals that herding has a greater influence on the decision to invest in stocks for non-experienced participants than experienced participants. It could be argued that as people gain more knowledge and experience in the financial markets, they place less value on the decisions of others when it comes to stock investment. The results from Table 3.3 show that the difference between Europeans and Asians stems from previous experience in stock markets. In other words, attitudes of Asians and Europeans in stock investment are not different

when individuals have previously invested in financial markets. Among the non-experienced group, Europeans are roughly 40% less likely to invest in financial markets in the future.



Table 3-2: Willingness to invest in stocks

VARIABLES	Willingness to invest in stocks					
	(1)	(2)	(3)	(4)	(5)	(6)
Number of Households	0.035*** (0.013)	0.019 (0.012)	0.018 (0.012)	0.016 (0.012)	0.019 (0.012)	0.017 (0.012)
Dummy for Female	-0.252*** (0.037)	-0.261*** (0.036)	-0.262*** (0.036)	-0.232*** (0.036)	-0.215*** (0.037)	-0.212*** (0.037)
Dummy for Married	-0.014 (0.088)	-0.018 (0.085)	-0.024 (0.085)	-0.016 (0.084)	-0.041 (0.086)	-0.038 (0.086)
Dummy for European	-0.509*** (0.053)	-0.318*** (0.052)	-0.334*** (0.054)	-0.350*** (0.053)	-0.343*** (0.053)	-0.352*** (0.053)
Age	-0.006 (0.004)	-0.004 (0.004)	-0.004 (0.004)	-0.006 (0.004)	-0.004 (0.004)	-0.004 (0.004)
Dummy for Having Bachelor	-0.057 (0.045)	-0.058 (0.044)	-0.062 (0.044)	-0.057 (0.043)	-0.058 (0.044)	-0.055 (0.044)
Dummy for Major in Business	0.239*** (0.045)	0.181*** (0.044)	0.181*** (0.044)	0.150*** (0.044)	0.147*** (0.044)	0.143*** (0.044)
Herding		0.249*** (0.023)	0.249*** (0.023)	0.249*** (0.023)	0.246*** (0.023)	0.247*** (0.023)
General Trust	0.004 (0.003)		0.004 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
Financial Literacy				0.166*** (0.023)	0.164*** (0.023)	0.167*** (0.023)
Risk Aversion					-0.019*** (0.005)	-0.018*** (0.005)
Ambiguity Aversion						-0.076* (0.039)
Constant	3.256*** (0.151)	2.071*** (0.158)	1.925*** (0.192)	1.624*** (0.194)	1.701*** (0.199)	1.748*** (0.200)
Observations	1,678	1,678	1,678	1,678	1,678	1,678
R-squared	0.155	0.209	0.210	0.234	0.242	0.243

Standard errors in parentheses \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 3-3: Willingness for stock investment in subgroups.

VARIABLES	Previously invested in stocks				Non-experienced			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Number of Households	-0.018 (0.017)	-0.014 (0.017)	-0.018 (0.017)	-0.011 (0.017)	0.028* (0.015)	0.050*** (0.016)	0.028* (0.015)	0.021 (0.015)
Dummy for Female	-0.107** (0.053)	-0.112** (0.053)	-0.107** (0.053)	-0.092* (0.054)	-0.246*** (0.044)	-0.223*** (0.046)	-0.249*** (0.044)	-0.206*** (0.044)
Dummy for Married	-0.056 (0.098)	-0.036 (0.100)	-0.051 (0.099)	-0.051 (0.100)	0.007 (0.119)	-0.007 (0.124)	0.005 (0.119)	-0.038 (0.121)
Dummy for European	0.117 (0.079)	0.054 (0.077)	0.124 (0.080)	0.105 (0.082)	-0.403*** (0.062)	-0.627*** (0.064)	-0.433*** (0.064)	-0.449*** (0.064)
Age	-0.012*** (0.004)	-0.014*** (0.004)	-0.012*** (0.004)	-0.013*** (0.005)	-0.015*** (0.005)	-0.017*** (0.006)	-0.014*** (0.005)	-0.011** (0.005)
Dummy for Having Bachelor	-0.031 (0.068)	-0.023 (0.069)	-0.029 (0.069)	-0.047 (0.071)	-0.075 (0.051)	-0.078 (0.053)	-0.080 (0.051)	-0.069 (0.051)
Dummy for Major in Business	0.105* (0.059)	0.121** (0.059)	0.105* (0.059)	0.104* (0.060)	0.166*** (0.056)	0.238*** (0.057)	0.166*** (0.056)	0.132** (0.056)
Herding	0.110*** (0.035)		0.108*** (0.035)	0.117*** (0.036)	0.277*** (0.027)		0.277*** (0.027)	0.276*** (0.027)
General Trust		-0.004 (0.004)	-0.003 (0.004)	-0.002 (0.005)		0.007* (0.004)	0.007* (0.004)	0.006 (0.004)
Financial Literacy				0.096** (0.043)				0.116*** (0.027)
Risk Aversion				0.001 (0.008)				-0.023*** (0.007)
Ambiguity Aversion				-0.042 (0.059)				-0.066 (0.047)
Constant	3.335*** (0.230)	4.069*** (0.202)	3.435*** (0.288)	3.162*** (0.333)	2.007*** (0.202)	3.220*** (0.202)	1.775*** (0.240)	1.697*** (0.246)
Observations	509	509	509	509	1,169	1,169	1,169	1,169
R-squared	0.082	0.066	0.083	0.097	0.280	0.218	0.282	0.302

Standard errors in parentheses \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

### **3.5.2 Stock market participation, out-group and in-group trust**

Table 3.4 exhibits the results of the regression analysis of stock ownership willingness in association with trust factors and herding. The analysis of general trust components under two classes of in-group and out-group trust show that there is only a statistically significant relationship between out-group trust and stock investing. The findings support the second hypothesis that a higher level of out-group trust leads to greater desire for stock ownership. There are two possible explanations for this. First, those who have a high level of trust in others outside their social group are more likely to be persuaded to invest in financial products by stockbrokers and other financial professionals. Secondly, lack of risk assessment makes people more trusting of strangers and more vulnerable to being exploited, and they also have a more positive view of things. People who have a high level of out-group trust tend to underestimate the possibility of loss through investing in financial markets, so they are more prone to capital investment in the stock exchange. As indicated in the literature review and in a line with findings of Guiso et al. (2008), trusting others increases the likelihood of investing in stocks. Our finding is in accordance with the findings of Guiso et al. (2008) and underlines the fact that out-group trust, as an indicator of trust toward the unknown, is the only component of trust that encourages people to invest their money in stocks and bonds directly. In particular, out-group trust is significant in stock ownership when the impact of individuals' herd behavior is controlled.

Regarding the second explanatory variable employed in this study, the herding effect, the findings are also statistically significant and positive. Confirming earlier findings, this part shows that the separation of general trust into two subcategories has no effect on the preceding section's findings that herding has a direct impact on stock ownership.

Table 3.5 presents a comparison regression analysis for two groups of investors in the stock market: those with experience and those without experience. As shown, neither type of trust has a significant impact on experienced participants' financial decisions regarding stock ownership. For the second group of participants, non-experienced individuals, the findings indicate that out-group trust increases the willingness to engage with the stock market. Based on Table 3.4 and Table 3.5, we can conclude that out-group trust has a direct effect on stock ownership in the case of no prior stock market experience. An explanation for these findings could be a lack of sufficient knowledge and experience as a source of information. When a person does not have prior experience with a particular act, such as stock investing, they prefer

to rely on information provided by third parties. Thus, non-experienced investors with a higher level of trust in unknown parties are expected to be more inclined to include stocks in their portfolio.

These findings complement the findings of Kuffour and Adu (2019) by demonstrating that the existence of a direct effect of trust on market participation may be limited to out-group trust in the case of inexperienced investors.

Table 3-4: Stock market participation, in-group and out-group trust.

VARIABLES	Willingness to invest in stocks					
	(1)	(2)	(3)	(4)	(5)	(6)
Number of Households	0.019 (0.012)	0.017 (0.012)	0.034*** (0.013)	0.017 (0.012)	0.014 (0.012)	0.015 (0.012)
Dummy for Female	-0.261*** (0.036)	-0.258*** (0.036)	-0.247*** (0.038)	-0.256*** (0.036)	-0.223*** (0.036)	-0.205*** (0.037)
Dummy for Married	-0.018 (0.085)	-0.027 (0.085)	-0.015 (0.088)	-0.026 (0.085)	-0.018 (0.084)	-0.040 (0.085)
Dummy for European	-0.318*** (0.052)	-0.337*** (0.053)	-0.506*** (0.053)	-0.329*** (0.054)	-0.343*** (0.053)	-0.346*** (0.053)
Age	-0.004 (0.004)	-0.004 (0.004)	-0.006 (0.004)	-0.004 (0.004)	-0.005 (0.004)	-0.004 (0.004)
Dummy for Having Bachelor	-0.058 (0.044)	-0.058 (0.043)	-0.052 (0.045)	-0.055 (0.044)	-0.048 (0.043)	-0.048 (0.044)
Dummy for Major in Business	0.181*** (0.044)	0.180*** (0.044)	0.239*** (0.045)	0.180*** (0.044)	0.148*** (0.044)	0.140*** (0.044)
Herding	0.249*** (0.023)	0.251*** (0.023)		0.252*** (0.023)	0.253*** (0.023)	0.250*** (0.023)
Out-Group Trust		0.011** (0.005)	0.009* (0.005)	0.012** (0.005)	0.013*** (0.005)	0.012** (0.005)
In-Group Trust			-0.002 (0.005)	-0.004 (0.005)	-0.008 (0.005)	-0.006 (0.005)
Financial Literacy					0.170*** (0.023)	0.171*** (0.024)
Risk Aversion						-0.018*** (0.005)
Ambiguity Aversion						-0.073* (0.039)
Constant	2.071*** (0.158)	1.877*** (0.178)	3.275*** (0.152)	1.936*** (0.192)	1.629*** (0.193)	1.752*** (0.200)
Observations	1,678	1,678	1,678	1,678	1,678	1,678
R-squared	0.209	0.212	0.156	0.212	0.237	0.246

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

Table 3-5: In-group and out-group trust in subgroups.

VARIABLES	Previously Invested in Stocks				Non-experienced			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Number of Households	-0.017 (0.017)	-0.017 (0.017)	-0.014 (0.017)	-0.011 (0.017)	0.027* (0.015)	0.026* (0.015)	0.049*** (0.016)	0.019 (0.015)
Dummy for Female	-0.110** (0.053)	-0.109** (0.053)	-0.115** (0.053)	-0.094* (0.055)	-0.243*** (0.044)	-0.240*** (0.044)	-0.216*** (0.046)	-0.196*** (0.044)
Dummy for Married	-0.052 (0.099)	-0.051 (0.099)	-0.037 (0.100)	-0.051 (0.100)	-0.004 (0.119)	-0.006 (0.119)	-0.015 (0.124)	-0.047 (0.121)
Dummy for European	0.126 (0.080)	0.126 (0.080)	0.057 (0.077)	0.106 (0.082)	-0.432*** (0.062)	-0.419*** (0.064)	-0.620*** (0.064)	-0.435*** (0.064)
Age	-0.012*** (0.004)	-0.012*** (0.004)	-0.014*** (0.004)	-0.013*** (0.005)	-0.014** (0.005)	-0.014*** (0.005)	-0.017*** (0.006)	-0.011** (0.005)
Dummy for Having Bachelor	-0.029 (0.069)	-0.029 (0.069)	-0.023 (0.069)	-0.046 (0.071)	-0.072 (0.051)	-0.066 (0.051)	-0.068 (0.053)	-0.055 (0.051)
Dummy for Major in Business	0.104* (0.059)	0.104* (0.059)	0.120** (0.059)	0.103* (0.060)	0.162*** (0.055)	0.161*** (0.055)	0.235*** (0.057)	0.126** (0.056)
Herding	0.107*** (0.035)	0.107*** (0.035)		0.116*** (0.036)	0.280*** (0.027)	0.282*** (0.027)		0.281*** (0.027)
Out-Group Trust	-0.005 (0.007)	-0.005 (0.008)	-0.007 (0.008)	-0.004 (0.008)	0.017*** (0.006)	0.018*** (0.006)	0.015** (0.006)	0.017*** (0.006)
In-Group Trust		-0.000 (0.007)	-0.001 (0.007)	-0.001 (0.008)		-0.005 (0.006)	-0.001 (0.006)	-0.006 (0.006)
Financial Literacy				0.095** (0.043)				0.120*** (0.027)
Risk Aversion				0.001 (0.008)				-0.023*** (0.007)
Ambiguity Aversion				-0.042 (0.059)				-0.062 (0.046)
Constant	3.426*** (0.265)	3.431*** (0.288)	4.058*** (0.203)	3.163*** (0.334)	1.726*** (0.222)	1.802*** (0.240)	3.258*** (0.203)	1.716*** (0.246)
Observations	509	509	509	509	1,169	1,169	1,169	1,169
R-squared	0.083	0.083	0.066	0.097	0.286	0.286	0.220	0.306

Standard errors in parentheses \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

### 3.5.3 Herding, in-group and out-group trust

In this section, we will look into the third hypothesis, which is the possibility of an indirect effect of trust on stock market participation. As previously demonstrated, herding has a positive impact on individual stock market participation; this finding was also supported by the subgroup analysis. To accept the third hypothesis that in-group trust influences stock market participation through the herding channel, we need to see if in-group trust has a significant effect on herding. The big five personality traits were also included in our analysis because herding can be traced back to a person's personality traits, which we believe are essential.

The cultural background of the participants has the greatest influence on herding among the list of control variables included in the regression analysis shown in Table 3.6. Europeans are less likely to follow others' decision than Asians. This may be partially explained by the cultural norms of the Asian and European groups. In other words, in comparison to Europeans, Asians are more likely to make decisions based on group norms and imitate them. One of the most striking aspects of the figures in Table 6 is that academic education in finance, economics, or other business majors has a positive effect on individuals' herd behavior. This finding contradicts our expectations that higher levels of knowledge in decision-making and economics would reduce herding for financial decisions among individuals.

Except for agreeableness, the other four major dimensions of personality affect people's herding behavior. It is possible that the positive effect of extraversion is related to the findings of previous authors regarding social interaction and ownership of stock. Extraversion reflects the degree of engagement with the external world; individuals with higher extraversion scores have greater interactions in societies. The role of social interaction has been discussed in the literature review, and we know that social interaction is linked to people's investing in the stock market (Changwony et al., 2015, Christelis et al., 2005) and choosing similar portfolios (Ivković and Weisbenner, 2007, Lu and Tang, 2015).

As shown in columns 3-6 of Table 3.6, when personality traits are taken into consideration, out-group trust has no effect on individual herding. On the other hand, the coefficient of in-group trust is statistically significant at the 5% level, even when personality traits are taken into account. It shows that when people trust each other more in their own group, they are more likely to herd. It implies that people will follow someone with whom they are familiar and trust. The herding effect is a medium-level parameter that can be used to examine the impact of in-

group trust on stock market participation. As part of our effort to ensure the validity and reliability of our findings in this area, we examined and compared this association for both experienced and non-experienced participants. Herding was influenced by in-group trust, as illustrated by Table 3.7, when people have no prior experience of making capital investment on a stock exchange. Having experience in stock investment meant that individuals would not be influenced by the financial decisions of their friends, family and colleagues.

Table 3-6: Herding, in-group and out-group trust.

VARIABLES	Herding					
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.009** (0.004)	-0.009** (0.004)	-0.008** (0.004)	-0.005 (0.004)	-0.005 (0.004)	-0.005 (0.004)
Education	0.018 (0.046)	0.017 (0.046)	0.009 (0.046)	0.015 (0.045)	0.014 (0.045)	0.013 (0.044)
Dummy for European	-0.689*** (0.053)	-0.711*** (0.054)	-0.709*** (0.053)	-0.630*** (0.053)	-0.638*** (0.054)	-0.638*** (0.053)
Number of Households	0.066*** (0.013)	0.063*** (0.013)	0.064*** (0.013)	0.066*** (0.013)	0.067*** (0.013)	0.066*** (0.012)
Dummy for Married	0.045 (0.090)	0.023 (0.090)	0.031 (0.089)	0.034 (0.087)	0.034 (0.087)	0.031 (0.086)
Dummy for Female	0.039 (0.038)	0.050 (0.039)	0.016 (0.039)	0.023 (0.038)	0.027 (0.038)	0.022 (0.038)
Dummy for Major in Business	0.233*** (0.047)	0.229*** (0.046)	0.233*** (0.046)	0.250*** (0.045)	0.251*** (0.045)	0.250*** (0.045)
Financial Literacy	0.002 (0.025)	0.001 (0.025)	0.002 (0.024)	0.010 (0.024)	0.010 (0.024)	0.016 (0.024)
Out-Group Trust	-0.011** (0.005)	-0.011** (0.005)	-0.008 (0.005)	-0.007 (0.005)	-0.006 (0.005)	-0.008 (0.005)
In-Group Trust		0.010* (0.005)	0.011** (0.005)	0.014*** (0.005)	0.014*** (0.005)	0.013** (0.005)
Openness		-0.045*** (0.011)	-0.043*** (0.011)	-0.040*** (0.010)	-0.040*** (0.010)	-0.044*** (0.010)
Neuroticism			-0.056*** (0.011)	-0.046*** (0.011)	-0.046*** (0.011)	-0.056*** (0.011)
Conscientiousness				0.104*** (0.012)	0.104*** (0.012)	0.111*** (0.012)
Agreeableness					-0.010 (0.012)	-0.007 (0.012)
Extraversion						0.060*** (0.011)
Constant	5.439*** (0.142)	5.585*** (0.173)	5.810*** (0.177)	4.920*** (0.204)	4.957*** (0.208)	4.687*** (0.213)
Observations	1,678	1,678	1,678	1,678	1,678	1,678
R-squared	0.240	0.249	0.261	0.291	0.291	0.303

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

Table 3-7: Herding, out-group and in-group trust in subsample.

VARIABLES	Previously Invested in Stocks			Non-Experienced		
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.011** (0.006)	-0.011** (0.006)	-0.008 (0.005)	-0.011* (0.006)	-0.011* (0.006)	-0.007 (0.006)
Dummy for Having Bachelor	0.061 (0.087)	0.061 (0.087)	0.070 (0.083)	0.011 (0.055)	-0.005 (0.055)	-0.002 (0.053)
Dummy for European	-0.625*** (0.097)	-0.624*** (0.097)	-0.527*** (0.096)	-0.683*** (0.064)	-0.714*** (0.066)	-0.660*** (0.066)
Number of Households	0.032 (0.021)	0.032 (0.021)	0.028 (0.020)	0.079*** (0.016)	0.081*** (0.016)	0.081*** (0.016)
Dummy for Married	0.113 (0.125)	0.115 (0.125)	0.096 (0.120)	-0.038 (0.128)	-0.032 (0.128)	-0.047 (0.123)
Dummy for Female	-0.069 (0.067)	-0.068 (0.067)	-0.080 (0.065)	0.095** (0.047)	0.085* (0.048)	0.077 (0.047)
Dummy for Major in Business	0.155** (0.074)	0.155** (0.074)	0.224*** (0.072)	0.259*** (0.060)	0.262*** (0.060)	0.244*** (0.058)
Financial Literacy	-0.117** (0.052)	-0.116** (0.052)	-0.091* (0.051)	0.017 (0.029)	0.011 (0.029)	0.025 (0.028)
Out-Group Trust	-0.022** (0.009)	-0.022** (0.009)	-0.016* (0.009)	-0.007 (0.006)	-0.010 (0.006)	-0.005 (0.006)
In-Group Trust		-0.002 (0.009)	0.004 (0.009)		0.014** (0.006)	0.018*** (0.006)
Openness			-0.045** (0.018)			-0.045*** (0.013)
Neuroticism			-0.070*** (0.021)			-0.052*** (0.013)
Conscientiousness			0.111*** (0.023)			0.108*** (0.015)
Agreeableness			0.014 (0.022)			-0.014 (0.015)
Extraversion			0.049** (0.022)			0.061*** (0.013)
Constant	6.108*** (0.254)	6.128*** (0.282)	5.489*** (0.409)	5.367*** (0.190)	5.149*** (0.215)	4.592*** (0.265)
Observations	509	509	509	1,169	1,169	1,169
R-squared	0.200	0.200	0.273	0.260	0.263	0.321

Standard errors in parentheses \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1



### **3.6 Conclusion**

In this study, we not only analyzed the causal effect of trust in others on the decision to invest in financial markets, but we also deconstructed generalized trust into two key subgroups: in-group trust and out-group trust. According to Ellemers et al. (2012), in order to be considered a member of certain groups, an individual must recognize that he or she is a member of those social groups (i.e., in-groups) but not others (i.e., out-groups). Furthermore, individuals' trusting attitudes toward in-groups and out-groups are statistically significantly different from one another (Romano et al., 2017). This study's primary contribution to the field is a comparison of the effects of individual trust dimensions on the propensity to invest in equity markets.

The results of this study shed light on the herding and trust attitudes of individuals in relation to their willingness to invest in the stock market. Using data from an international survey of more than 1,600 individuals, we find that general trust plays no role in investment behavior intention in the financial markets. However, an increase in people's herd mentality increases the propensity for stock ownership. This study's findings supplement those of previous research and demonstrate the importance of experience in the study of trust and stock market participation. Only participants in this study who had no prior exposure to stock ownership were found to be more likely to participate in the stock market when they had a higher level of in-group and out-group trust. Trust had a direct and indirect impact on the group of people who had never previously invested in securities. Lastly, higher out-group trust directly influences their decision, whereas higher in-group trust might encourage investment through herding

## **4 Personality traits, stock investment and home bias**

### **4.1 Introduction and literature review**

Social scientists, economists, and cognitive psychologists investigate human behavior to determine the origins of decision heterogeneity and the factors that contribute to behavioral diversity. There are three main theoretical approaches regarding the origin of Individual financial behavior and preferences:

- I. The first argues that people make choices based on a desire to maximize their own expected utility (Von Neumann and Morgenstern, 1947), which may be affected by factors like their preferences regarding risk and time (Gollier, 2001, Falk and Fischbacher, 2006). It is also argued that these preferences, combined with predictions of future returns influence behavior (Becker et al., 2012).
- II. The second group of theories uses individual features to show how factors like gender (Halko et al., 2012), education (Cole and Shastry, 2008), language (Grinblatt and Keloharju, 2001), age (Agarwal et al., 2009), culture (Guin, 2016), income (Bonaparte et al., 2014) and so on all play a relevant role in explaining why people make the financial decisions they do.
- III. Lastly, the third group of theories, which also have their origins in psychology, try to account for people's choices by pointing to their unique personalities. A growing body of research suggests a significant link between people's personality traits and their financial behavior and outcomes such as saving behavior (Asebedo et al., 2019), investment choice (Chitra and Sreedevi, 2011), investment management (Mayfield et al., 2008), trading behavior (Tauni et al., 2020) and borrowing (Nyhus and Webley, 2001).

In a similar vein to the last group of studies, our research project aims to assess the effects that individual personality variables have on financial choices, specifically those pertaining to stock investment. The findings of this study provide a more comprehensive picture of the ways in which personality traits influence stock ownership, portfolio risk, and biases in domestic stock investing.

The theory of planned behavior (Ajzen, 1991) is a helpful theoretical framework for understanding the important aspects of human behavior and helps to establish a link between behavior and personality traits. The basic idea is that people's attitudes determine how they act

and perceived behavioral control, subjective norms, and personality all have a role in shaping future behaviors. Almlund et al. (2011) perceive personality as "a strategy function for responding to life situations" and claim that a person's performance on tasks or decision making has a strong basis in their personality. The Theory of Planned Behavior will serve as the theoretical background for this project. The theory offers a framework for analyzing and predicting many aspects of financial decisions, such as portfolio allocation (Rajasekar et al., 2022). In addition to that, it serves as the foundation for models of personality evaluation, such as the Big Five.

Personality traits have been used to predict behavior in a variety of contexts, including consumption (Duong, 2021), marketing (Caliskan, 2019) and organizational behavior (Erdheim et al., 2006), but less commonly in the field of finance. Research related to the trait theory of personality often makes use of the Big Five model produced by Costa and McCrae (1992). In association with financial research, psychological elements such as personality traits have been explored in relation to financial behavior. This model classifies personality traits along five dimensions: openness, conscientiousness, extraversion, agreeableness, and neuroticism. In this study, we investigate whether the Big Five personality traits contribute to certain investment decisions.

Alongside with personality traits, we will study the effects of uncritical patriotism (Rieger, 2022) on stock market investment, as this is another personal factor that is likely to be connected its preferences over stock allocations due to the potential distinction between national and international stocks in a portfolio (Rajasekar et al., 2022, Oehler et al., 2018).

#### **4.1.1 Personality trait and stock investing**

The Big Five personality traits by Costa and McCrae (1992) can be combined in a variety of ways to produce each individual's own personality. We briefly summarize the content of each personality dimension and previous findings regarding their impact on investment decisions:

##### **Agreeableness:**

The term "agreeableness" relates to an individual's conduct in their relationships with other people, and it is associated to a variety of attributes that are often thought to be positive, such as a disposition to get along with, compassionate, and trustworthy (Graziano and Eisenberg,

1997). The ability to simply trust others and to believe the best in other people is linked to agreeableness (Mc Crae and Costa, 2003) and widely supported in the literature that greater level of trust in individuals effect significantly on their decision for investment in stock market (Balloch et al., 2015, Georgarakos and Pasini, 2011) and portfolio selection (Heimer, 2014). As a direct consequence of this trait, highly agreeable people have a lower propensity to be suspicious of information on the previous performance of financial institutions and investment fund which makes them more risk-tolerant (Chitra and Sreedevi, 2011).

### **Conscientiousness:**

People characterized by high levels of Conscientiousness have a sense of responsibility for their actions (Kumar and Dudani, 2021) and they are detail-oriented, cautious, and well-organized. Consequently, highly conscientious people handle their money better since they're responsible with money and future-focused (Donnelly et al., 2012). Moreover, persons with a greater level of discipline and carefulness in decision-making feel that their investing choices are superior to those of others (Jamshidinavid et al., 2012). Pan and Statman (2013) stated people with a greater degree of conscientiousness have a lower risk tolerance when it comes to making financial decisions. All above support this idea that it plays a highlighted role in individual decisions for financial issues.

### **Extraversion:**

Extraversion trait refers to the energetic and youthful feature that takes into account sociability, happiness, optimism, and being active (Weller and Tikir, 2011). Excitement and the need for new experiences are two things that may and will stimulate extraverts. These features suggest that extraversion is strongly linked to a person's propensity to take risks. According to the relevant studies by Mayfield et al. (2008), (Pan and Statman, 2013) and Oehler et al. (2018), extraversion is tied with a willingness to take on financial risk. This perspective may be indicative of the fact that extraverts are more likely to engage in risky behavior since they are less likely to consider the potential negative outcomes of their actions (Pinjisakikool, 2018). In the context of financial decision, it is shown that extraverts are more inclined to pay a premium for financial assets and make investments in overvalued equities (Oehler et al., 2018). Moreover, People who are more extroverted are more likely to share knowledge and take part in the stock market. People may be encouraged to engage in the stock market after hearing about its promising returns from friends, neighbors, and coworkers (Kaustia and Knüpfer, 2012).

**Openness:**

One's disposition toward novelty, curiosity, creativity, and the pursuit of new experiences all fall under the umbrella term "openness" also known as "openness to experience" (Pinjisakikool, 2018, Erdheim et al., 2006). People with lower openness scores tend to be less tolerant of other perspectives. Preference for novel experiences over routine ones might encourage experimentation and perhaps, risky behavior. Individuals who scored higher on openness to experience were more comfortable and willing to take financial risks (De Bortoli et al., 2019, Nandan and Saurabh, 2016). Furthermore, many studies support the idea that having openness to new experiences has a direct implication on an individual's vision on managing financial assets (Brown and Taylor, 2014, Mayfield et al., 2008) and trading frequency in stock market (Tauni et al., 2020).

**Neuroticism:**

A lack of emotional stability, which can lead to conditions like despair, anxiety, melancholy, and even egotism, is a hallmark of neuroticism (Pak and Mahmood, 2015). Investors who are more neurotic may be more sensitive to losses and less able to endure the inevitable ups and downs in asset value that come with risky investment (Young et al., 2012, Oehler et al., 2018, Niszczoła, 2014). Their perspective on the future of the market is, on average, more negative than that of their contemporaries, and they are convinced that the market will crash (Jiang et al., 2021, Pak and Mahmood, 2015). Regarding the explanation of risk tolerance by neuroticism, there are two distinct groups of views. By the first group, it was documented that a greater neuroticism score is inversely linked with risk taking (Rustichini et al., 2012, Brooks and Williams, 2021). On the other hand, it has been demonstrated that neurotic individuals are more likely to intentionally take on greater risk by investing in the stocks of companies with greater return volatility (Durand et al., 2008, Durand et al., 2013).

There are also more general findings on the role of personality for stock investments (Lauriola et al., 2014, Grinblatt and Keloharju, 2009). Asebedo et al. (2019) establish a link between broader personality traits and saving behavior. The findings show, openness to experience and neuroticism reduced saving behavior indirectly, while conscientiousness and extroversion encouraged it. This idea has been supported by Gambetti and Giusberti (2019) who claim investors with high degrees of extroversion, independence, and self-control are more likely to save and in turn, invest. In contradiction, Brandstätter and Güth (2000) and Nyhus and Webley

(2001) show that extraverts' habits may also make it hard to save. Because extraversion is linked to being friendly, and being friendly means going to parties, going to other people's houses and going out at night, which are costly activities and could hold individuals back from saving.

In prior research on investment horizons, Nandan and Saurabh (2016) argues that neuroticism, extraversion, and openness to experience have an indirect effect on short-term investment intentions via financial risk attitude. Rajasekar et al. (2022) explore the indirect effect of personality on investment strategy and ends up making the statement that an individual's investment attitude mediates the relationship between personality and investment strategy. Although Brown and Taylor (2014) found that openness to experience and extraversion greatly affect aggregate debt and financial instruments kept. Regarding the evaluation of the investment, the study by Durand et al. (2013) show that high conscientiousness people are more likely to take an active role in making decisions and have a more optimistic view on financial investments.

In the standard portfolio selection model, it is assumed that all investors, regardless of their level of tolerance with risk, should put some of their money into risky assets and securities (Merton, 1969). Stock market investing has historically been attractive to a limited percentage of the people, despite the clear benefits of investing in it (Campbell, 2006). The desire to do an activity whose outcome is unclear and might be unpleasant is indicative of a risk perspective. On the other hand, the risk attitude of an individual is a critical factor in the individual's preferences and decisions about various aspects of finance, such as investment in stocks (Wärneryd, 1996).

Beliefs, preferences, and desires in social interaction may all be influenced by a person's personality, which in turn can have an effect on their investing choices. Conlin et al. (2015) propose that personalities, and more specifically sub-dimensions of traits, are reliable indicators of stock market engagement. According to a study by Mayfield et al. (2008) among business school freshmen, those with greater levels of extroversion are more likely to trade regularly and invest a larger amount of their income in the stock market. Kaustia and Knüpfer (2012) contradicted these results by claiming that more extroversion leads to more stock market activity because of better information sharing.

In an experimental investigations, Jiang et al. (2021) emphasizes the impact of neuroticism and openness, highlighting that these two aspects are very important for explaining equity investment, but they do so via unique channels: neuroticism through route of beliefs, and

openness via route of preferences. Pak and Mahmood (2015) concur with the indirect influence of agreeableness studies and demonstrate that risk-takers and persons with strong convictions are the types most likely to invest into the stock market. The mediating and moderating effects of financial self-efficacy on personality characteristics and investing intentions were also investigated by Akhtar and Das (2018). Their findings suggest that one's attitude of financial self-efficacy might provide light on why certain personality qualities are related to a propensity to invest in the stock market.

When it comes to determining a person's disposition toward risk, it is more important to look at their personality traits and characteristics than their feelings (Brooks and Williams, 2021). Pinjisakikool (2018) explained how personal traits influence how much of a personal financial risk one is willing to take. In a survey of over 2,500 people, Pan and Statman (2013) discovered that individuals with a high level of extraversion and openness have a high risk tolerance, whereas individuals with a higher of conscientiousness have a relatively low risk tolerance. In a same vein, De Bortoli et al. (2019) highlighted that Individuals who scored higher on the trait of openness to experience were more comfortable and willing to take greater risks. Rustichini et al. (2012) shows that the trait of conscientiousness has a significant impact on the level of risk-taking. Their findings indicate that neuroticism is inversely correlated with risk-taking in the context of possible payoffs, but its negative impact is mitigated when losses are at stake. Later study by Brooks and Williams (2021) confirms the negative correlation between neuroticism and risk tolerance. The study of traits and risk aversion by Sarwar et al. (2020) shows that, with the exception of high levels of neuroticism, which have a negative effect on risk aversion, the higher amounts of risk aversion in investors are tied to the higher values of four other traits.

#### **4.1.2 Personality traits, patriotism and home bias**

Individuals' allocation of shares in their portfolios reflects their pragmatic approach to risk-taking. In the context of the function of personality in portfolio allocation, Gambetti and Giusberti (2012) found that participants with higher anxiety levels had a greater preference for less risky assets in portfolios than persons with lower anxiety levels. Durand et al. (2008) and Durand et al. (2008) discovered that the daily return standard deviation of investor portfolios increased as the neurotic levels of investors increased. According to the findings, neurotic

people are more prone to deliberately take higher risk by holding highly volatile equities in their portfolio. Oehler et al. (2018) evaluate how extraversion and extroversion affect investment choices in a simulated market. According to the study's findings, those who are more extroverted are willing to pay a premium for financial assets and are more likely to invest in overpriced financial assets. Investors who are more neurotic tend to have a more conservative attitude in asset allocation and invest in less risky assets.

Individuals' actions and judgments about wealth management and investments may be influenced by biases in people's behavior (Kahneman and Tversky, 2013). One such bias is the “home bias”: assuming unrestricted movement of liquid funds, portfolio theory recommends that investors maintain a globally diversified portfolio of shares, but this is usually not the case. The “home bias” refers to the observation that investors prefer to put a disproportionate amount of money into local shares and a relatively small amount into foreign equities (Kilka and Weber, 2000). Prior research on the home bias has concentrated on variables linked to culture, risk attitude, information, and financial constraints. Harms et al. (2015) and Bhamra et al. (2014) argue that the obstacles on capital flow is the explanation for the disproportionately large amount of domestic equity held by individuals. Fidora et al. (2007) investigate the significance of actual exchange rate volatility home-equity puzzle and claim that up to 30% of home bias in portfolios has a root in volatility of actual exchange rate. As noted by Brennan et al. (2005), local investors consider foreign stock to be more risky, they hold less of it. This view is supported by Huberman (2005) who writes that investors are more comfortable dealing with national equities, but they feel insecure, or even worried, about international stocks. Some other group of studies (Dimmock et al., 2016, Boyle et al., 2012) have attempted to draw fine distinctions between ambiguity and risk of investment in foreign market. Besides risk and ambiguity aversion, Solnik (2008) examines the impact of regret aversion and indicates that investors use the domestic portfolio as a reference and experience regret when their overseas investments perform poorly and consequently leading in equity home bias. The key findings of Beugelsdijk and Frijns (2010) and Anderson et al. (2011) demonstrate that cultural difference between two countries influences the diversification of portfolios. Foreign investments are relatively small and the domestic market is underweight in culturally distant nations' portfolios. Since previous research has demonstrated that personality factors have a substantial impact on financial behavioral anomalies such as herding (Baddeley et al., 2010), anchoring bias (Baker et al., 2022), confirmation bias (Melinder et al., 2020) and disposition effect (Singh et al., 2022), it seems natural to suspect that it is also relevant for the home bias. It can be seen that insufficient research seems to have attempted to establish the origins of the home equity puzzle



in the context of their individual traits. (Niszczoła, 2014) studied the effect of neuroticism, as a personality trait, on the willingness to invest in foreign securities and shows that investment in a host country declines with rising mean neuroticism.

In this study, we examine the association between the big five personality traits and the level of home bias in stock investments. In addition, we investigate whether patriotism plays a significant role in individual decisions for a greater preference of individuals to invest in the domestic stock market rather than other markets – an obvious alternative explanation. Morse and Shive (2011) reveal that patriotism influences financial decisions through two distinct channels: (1) investors' belief in superior advantage of domestic stocks to foreign stocks and (2) investors' desire to contribute to the country's economy. Another research looked at the impact of culture and patriotism on home bias in bonds (Pradkhan, 2016) and found that more patriotic countries tended to have a stronger bias for domestic bonds and a weaker preference for international financial instruments.

The results of this research add to the body of knowledge within the field of behavioral finance in a number of important ways: This is the first research which, to the best of our knowledge, attempts to provide a comprehensive explanation of the linkage between personality factors and the way people feel about stock investment. We considered here several aspects of the investment process: the question of participating in the stock market or not, the percentage of stocks in portfolios and finally the preference for investing in home country companies' shares (home bias). Our research will provide a clearer picture of how much each personality factor affects the allocations in a household's investment portfolio.

This chapter is structured as follows: Section 4.2 discusses the theoretical context and hypotheses. Section 4.3 discusses data and analysis techniques. Section 4.4 discusses the results and the relationship between the variables. Section 4.5 concludes the article.

## **4.2 Theoretical framework and hypotheses**

Knowledge, experience, beliefs, personality, and preferences all play a fundamental role in the decisions that individuals ultimately make (Baker and Ricciardi, 2014). Regarding the personality traits, our first hypothesis is that extraversion and openness are the key attributes most strongly associated with stock investment desire. Extraverted individuals prefer to seek out social connection and opportunities to engage with others, as described in section 3.1.

Several authors have described the impacts of social interaction on stock investment (Hong et al., 2004, Changwony et al., 2015) and how it reduces the information costs associated with investment activities (Ivković and Weisbenner, 2007). Given that sociability and extraversion are positively correlated (Kaustia and Knüpfer, 2012), we anticipate that a higher level of extraversion predicts a stronger propensity to invest in the stock market. On the other hand, people who are not open to new experiences tend to have a more conservative and conventional attitude. Engaging in a new experience can be regarded as a type of risk-taking because it demands one be adventurous and try something unfamiliar. We assume that there is a strong correlation between openness and behaviors involving inherent risk, such as stock market investment. Therefore, two hypothesis assert:

*H1: Extraversion has positive effect on individual willingness for stock market investment*

*H2: Openness has positive effect on individual willingness for stock market investment*

Even if a person's extraversion might reduce the cost of information for investing in the stock market, if they choose to have stocks in their portfolio, they must design an investment strategy and learn more about their equity investment choices. conscientiousness is the natural tendency to think things through before taking action (Mc Crae and Costa, 2003) and to seek out further information in order to make more educated decisions (Mondak, 2010). Furthermore, those who are careful, analytical, systematic and self-disciplined have set investment objectives for a certain level of confidence (Pak and Mahmood, 2015). Moreover, Consistent with the positive association between extraversion and hopefulness and overconfidence, extraverted investors appear more optimistic and attach greater subjective likelihood to both larger dividend payments and asset sales that result in a financial gain. We hypothesize that extraverted investors are more willing to put money into risky assets because of the correlation between extraversion and taking a risk. Openness, on the other hand, may be the second personality characteristic that might explain the proportion of equities in an individual's portfolio and their risk tolerance. As previously stated, openness to new experiences correlates with people's risk exposure (De Bortoli et al., 2019). Consequently, the ability to take more risks results in larger investments in stocks and other risky assets. When put together, we arrive at the following hypothesis:

*H3: Extraversion affect the size of investment in stocks positively.*

*H4: Openness has a positive effect on the size of investment in stocks.*

*H5: Greater conscientiousness leads to greater investment in stocks.*

The cognitive and behavioral biases that affect investors might cause them to make choices that are not necessarily in the best interests of their portfolio. To put it another way, investors do not base their assessments of investment risk just on the objective probability distributions of returns; rather, they base it on their own subjective probability distributions (Riff and Yagil, 2016). One potential rationale that contributes to home bias is optimism. Kilka and Weber (2000) revealed that investors had a better feeling of competence and optimism about national stock management. On the other hand, since investors have less familiarity of overseas markets and enterprises, they believe that foreign investments are riskier than they are. The fact that extraverts tend to be optimistic (Williams, 1992) is a likely link between personality traits and home bias, since the effect of optimism will be stronger for events that are closer to a person, like the economic situation of its home country.

*H6: Higher extraversion of individual causes a greater tendency for domestic stock investment*

Individuals' openness is linked to characteristics such as innovativeness and variety seeking (Turkyilmaz et al., 2015). Furthermore, people with high levels of openness are fascinated by new experiences and complicated ideas. Considering these openness components, it is possible to explain why a higher score of investors encourages them to have a globally diversified portfolio. People who have a high level of openness have a more optimistic perspective on the idea of investing in the stocks of companies that are located over the border. Moreover, they are more prone to diversification via other markets' equity because it also satisfies their variety seeking.

*H7: Higher openness of individuals decreases the home bias in their portfolio*

As it defined by Kosterman and Feshbach (1989), patriotism is seen to be a feeling of positive respect for one's country and it has positive implications. Blind patriotism, also known as uncritical patriotism, is defined as "an unwillingness to both criticize and accept criticism" of the nation, and is exemplified by statements such as "my country is either right or wrong" (Huddy and Khatib, 2007). This view is based on the idea that patriotism is a positive support for one's country. People with such a deep sense of uncritical patriotism are more likely to choose domestically produced goods over those made abroad (Zajonc and Markus, 1982). A similar reasoning might explain why people have an irrational preference for domestic equities over foreign shares. It is reasonable to assume that they believe in contributing to the national

economy by increasing their investment in the domestic stock market. Given this, the final hypothesis asserts that:

*H8: Higher level of patriotism increases the home bias in portfolios.*

### **4.3 Data and Methodology**

We utilize data from the International Survey of Preferences, Attitudes, Norms and Decisions in Asia (PANDA), which was undertaken in 2018/2019 with over 2,000 survey participants from China, Taiwan, Japan, Vietnam, Germany, and Estonia (Rieger, 2020b, Ashtiani et al., 2020). The data fits our research agenda well, since it covers questions addressing the willingness to invest in stock markets, the big five personality traits, prior experience with stock investment, patriotism, the proportion of stocks in a portfolio, and home bias (the latter two variables measures with an incentivized stock market game, see below and Ashtiani et al. (2020) for details). In addition to demographic variables, the survey also includes a number of questions that can be used as proxy for risk aversion, financial literacy, and ambiguity aversion. We excluded people with poor data quality (i.e., those who submitted inappropriate responses to open-ended questions and those with too low answering time to the questions) following the procedure of Ashtiani et al. (2020) as well as those older than 60 or less than 18 years old. The study that is going to be presented below made use of a total of  $N = 1915$  observations.

We used the following survey question as first variable in our survey:

- *“How likely is it that you would invest money in stocks or funds in the future, provided you had a reasonable amount of savings?”*

Participants were given the choice among the following four alternatives: Where 'willingness to stocks' ranges from 4 (very likely) to 1 (very unlikely), the choices are as follows: (A) Very likely; (B) Likely; (C) Not likely; and (D) Extremely unlikely.

This question has some advantages over a direct elicitation of stock market participation: First, it is likely that some respondents might not have considerable savings and are therefore unable to participate in the stock market due to a lack of financial resources. This problem is particularly important for a sample of young people (like in the PANDA study), but would also be in general a concern. Additionally, there might be costs associated with investing in stocks that may differ between countries, so a minimum investment amount that makes sense

economically will differ as well. The hypothetical question avoids these issues by stating explicitly that the respondent should assume he or she “*had a reasonable amount of savings*”.

As the next item, we used a simulated portfolio investment that asked participants about how much of a certain amount of money they would allocate to each of four alternative assets, two risky assets and two fixed-interest assets. In this question, participants to allocate a certain amount of money among these alternatives. The precise formulation was:

- “*Suppose you can go back to the past with a time machine and choose to stay at any time between 2002 and 2012. You will receive 100€ as a start-up capital, you can deposit the money for five years, and the final amount you may receive will be the value of the principal after five years. (For example, if you land randomly in 2008 then the 100€ will be invested as you indicated on January 1, 2008. Your payout will then be the value of your investment on January 1, 2013, exactly five years later.) How would you divide your 100€ into the following investments?*”

They could choose to place their money in a savings account, government bonds with a 5-year term, the participant’s national stock market, or the US stock market.

We use the elicited allocations as a proxy for two dependent variables: the share of stocks in the portfolio and the home bias. To estimate the home bias, we used a similar method as Graham et al. (2009): considering that the market capitalization of the US stock exchange is bigger than those of the other six participating nations, any allocation of equal or more value to the home country stock exchange was used as an indication of home bias. In contrast, the level of home bias is zero if a person has assigned a lower value to the local stock market. The proportion of investment in a country's stock market relative to the overall investment in shares is used as a proxy for home bias if a participant has a larger proportion of investments in domestic equities. According to this definition, the value of home bias might vary between 0 and 1.

$$\text{Home bias} = (\text{National Stock Investment}) / (\text{Total Stock Investment})$$

Participants' levels of patriotism were evaluated using the following four-point Likert scale question which was previously used by Roselle and Barnett (2009) and Rieger (2020a).

- “*We all should be willing to fight for our country, whether it is right or wrong.*”

People selected among the following four alternatives: Where 'patriotism' ranges from four (very likely) to one (extremely unlikely), the options are: (A) Very likely; (B) Likely; (C) Not likely; and (D) Extremely unlikely.

The openness, extraversion, conscientiousness, agreeableness, and neuroticism personality traits were measured as in John and Srivastava (1999): for each feature of the big five personality, two statements on a five-point Likert scale were adapted, and the sum of the scores for these two questions indicates the amount of each characteristic in an individual ranging from two to ten. The list of statements is available in the appendix I.

We used control variables such as demographics, ambiguity aversion, risk aversion, financial literacy, educational background, having academic education and European country dummy in our analysis. Academic education increases decision-making performance at all stages (Klein, 1999). We therefore also defined a dummy variable for participants with a bachelor degree (or higher degrees). For determining values in ambiguity and risk aversion, we asked participants a straightforward binary question in order to resemble the methodology that Rieger et al. (2015) developed. In addition, in order to evaluate the level of financial literacy, we utilized the methodology that was outlined by Ashtiani et al. (2020), based on the standard questions by Lusardi and Mitchell (2007).

Table 4-1: Summary of statistics

<b>Variable</b>	<b>No</b>	<b>Mean</b>	<b>Std.Dev</b>	<b>Min</b>	<b>Max</b>
Age	1862	24.12	6.59	18.00	60.00
Risk Aversion	1862	2.47	0.75	1.00	3.00
Financial Literacy	1862	2.36	0.78	0.00	3.00
Openness	1862	6.88	1.78	2.00	10.00
Agreeableness	1862	6.48	1.55	2.00	10.00
Conscientiousness	1862	5.92	1.53	2.00	10.00
Neuroticism	1862	6.02	1.73	2.00	10.00
Extraversion	1862	5.96	1.70	2.00	10.00
Willingness to stocks	1862	3.06	0.78	1.00	4.00
Risky Asset in Portfolio	1862	0.54	0.30	0.00	1.00
Home Bias	1688	0.51	0.28	0.00	1.00

The descriptive statistics for all continuous variables included in the analysis are shown in Table 4.1. Since the questionnaires were distributed in universities, it is not surprising that the average participant age is under 25 years old. In terms of gender, 1043 participants (56%) are women and 819 (44%) are men, with women more frequent in all survey countries. In the case of home bias, the number of observations is 174 fewer than in the other variables, because home bias

compares the risky asset allocation between two markets, and 174 participants had no risky asset in their portfolio choices. It should also be noted that the survey includes a question concerning an individual's previous investment experience in stock markets. This question can be used to compare financial decision making between experienced and inexperienced stock market investors. From a total number of 1862 observations, 1293 participants had no stock investment experiences and 569 individuals had previously invested in stocks.

## **4.4 Results and discussion**

### **4.4.1 Stock market participation and personality traits**

To begin, we looked at how each of the five personality traits affected an individual's willingness to invest in the stock market. According to the results of the regression analysis presented in Table 4.2, the characteristic of openness to new experiences does not have a significant impact on the willingness to participate in the stock market. In regressions 2 and 3, agreeableness as a variable that reflects cooperativeness and trust in individuals is marginally significant, but only for p-value of 10%. Moreover, when we additionally control for conscientiousness, neuroticism, and extraversion, the significance vanishes completely, indicating that agreeableness has no effect on the willingness to invest in stocks.

The findings summarized in Table 4.2, which shows that the personality dimensions of conscientiousness, neuroticism, and extraversion have statistically significant influence on the willingness to invest in stocks. These findings support the conclusions drawn by an earlier study conducted by Pak and Mahmood (2015), which stated that the personalities of individuals play a role in determining how much of their capital is invested in financial equities. Neuroticism is the single important attribute that discourages people from investing in stock markets. This result has several possible interpretations:

First, individuals who have a high level of neuroticism may tend to have an exaggerated perception of the likelihood of a stock market decline; second, the volatile nature of financial assets is in direct opposition to the desire of this group to achieve emotional stability.

Second, the significant positive association between extraversion and investment in stock markets supports our hypothesis 1 and the findings of Kaustia and Knüpfer (2012): people that lean toward the extrovert pole of the personality are strong conversationalists and like learning about the world. Their natural curiosity about learning increases the likelihood of gaining

knowledge about stock market investments. Moreover, seeing the bright side of things, an extraverted investor is more likely to overestimate his gain than his loss. This finding is in line with the proposed hypothesis for the role of extraversion in decision making for investments.

Third, there is a surprising positive connection between conscientiousness and the willingness to invest in stocks. People that have high scores in this dimension are more likely to invest in stocks, including those who are goal-driven, skilled at planning and detail-oriented. People who pay close attention to detail may become well informed about stock investment and return in both the short and long term.

As a robustness test, we repeat the analysis with additional country dummies, as shown in Appendix II, which supports our findings.

Regarding the control variables in Table 2, we see that higher levels of ambiguity aversion have, as expected, a negative impact on the willingness for stock investing. In addition, the willingness of people to participate in the stock market grows with financial literacy. The willingness is also higher for men than for women.

Table 3 provides a regression analysis comparison between two participant groups in order to determine which group's decisions be more influenced by personal traits. The first group has no prior experience investing in the stock market, but the second group has prior stock market participation experience.

When we compare regressions (2) and (4) in Table 4.3, we can see that an experienced investor's decision about how to invest in the stock market in the future has no association with their personality. Instead, their decision based on their financial knowledge level and their age.

While talking about inexperienced people, the results showed that a person's agreeableness, conscientiousness, neuroticism, and extroversion all play substantial roles in their stock market investment decisions. Regarding this group, the results differ slightly from those in Table 2, where agreeableness did not play a significant role in the overall sample analysis. The ability to trust and believe the other person is at the heart of the constructive effects that come from being agreeable. People who have a higher agreeableness score might be more likely to trust when other people will advice them to invest into stocks. Overall, the results in Table 3 show that personality factors have an important impact in stock participation decisions when the individual has no prior experience. On the other hand, after gaining experience in stock investment, personality features play no further role in future stock market investment



decisions. The results show that experienced investors' decisions are less influenced by their age and financial knowledge than the inexperienced group.

Given our prior hypotheses, we are able to confirm H1. Individuals with a higher level of extraversion are more inclined to invest in the stock market. Regarding the second hypothesis, we demonstrated that there is no meaningful association between openness and willingness to invest in stock among individuals, so the H2 rejected.

Table 4-2: Personality traits and willingness to invest in stocks

Variables	Willingness to invest in stocks					
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.006*	-0.007*	-0.006	-0.007**	-0.007*	-0.006*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Dummy for Female	-0.213***	-0.217***	-0.209***	-0.180***	-0.209***	-0.189***
	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.036)
Dummy for Married	-0.036	-0.039	-0.038	-0.051	-0.040	-0.047
	(0.082)	(0.082)	(0.082)	(0.082)	(0.082)	(0.082)
Dummy for European	-0.418***	-0.403***	-0.401***	-0.425***	-0.425***	-0.395***
	(0.044)	(0.045)	(0.045)	(0.043)	(0.044)	(0.045)
Dummy for Having Bachelor	-0.006	-0.003	-0.001	0.002	-0.010	0.003
	(0.040)	(0.040)	(0.040)	(0.040)	(0.040)	(0.040)
Ambiguity Aversion	-0.105***	-0.102***	-0.106***	-0.096**	-0.101***	-0.097***
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Risk Aversion	-0.054**	-0.054**	-0.053**	-0.054**	-0.051**	-0.052**
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Financial Literacy	0.186***	0.186***	0.189***	0.188***	0.189***	0.190***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Openness	0.012					0.008
	(0.010)					(0.010)
Agreeableness		0.019*				0.015
		(0.011)				(0.011)
Conscientiousness			0.021*			0.028**
			(0.012)			(0.012)
Neuroticism				-0.049***		-0.043***
				(0.010)		(0.010)
Extraversion					0.031***	0.024**
					(0.010)	(0.010)
Constant	3.160***	3.121***	3.090***	3.541***	3.051***	3.014***
	(0.131)	(0.133)	(0.141)	(0.128)	(0.128)	(0.204)
Observations	1,862	1,862	1,862	1,862	1,862	1,862
R-squared	0.116	0.117	0.117	0.127	0.120	0.132

Standard errors in parentheses \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 4-3: Personality and willingness to stocks in subgroups.

VARIABLES	Inexperienced		Previously Invested in Stocks	
	(1)	(2)	(3)	(4)
Age	-0.018*** (0.005)	-0.018*** (0.005)	-0.010** (0.004)	-0.009** (0.004)
Dummy for Female	-0.140*** (0.042)	-0.119*** (0.043)	-0.219*** (0.051)	-0.208*** (0.052)
Dummy for Married	-0.185 (0.122)	-0.198* (0.120)	-0.015 (0.093)	-0.018 (0.094)
Dummy for European	-0.513*** (0.051)	-0.471*** (0.053)	0.096 (0.073)	0.091 (0.076)
Dummy for Having Bachelor	-0.029 (0.046)	-0.009 (0.046)	0.044 (0.066)	0.048 (0.066)
Ambiguity Aversion	-0.081* (0.045)	-0.080* (0.044)	-0.049 (0.056)	-0.050 (0.056)
Risk Aversion	-0.061** (0.028)	-0.060** (0.028)	-0.001 (0.032)	0.002 (0.032)
Financial Literacy	0.140*** (0.026)	0.140*** (0.025)	0.107*** (0.041)	0.115*** (0.041)
Openness		0.020* (0.012)		-0.021 (0.014)
Agreeableness		0.028** (0.014)		-0.011 (0.018)
Conscientiousness		0.034** (0.014)		0.013 (0.019)
Neuroticism		-0.050*** (0.012)		-0.007 (0.016)
Extraversion		0.023** (0.012)		0.004 (0.017)
Constant	3.646*** (0.150)	3.263*** (0.249)	3.499*** (0.171)	3.611*** (0.321)
Observations	1,293	1,293	569	569
R-squared	0.145	0.171	0.071	0.077

Standard errors in parentheses \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

#### **4.4.2 Personality traits and risky asset investment**

The second section of the investigation will look into the impact that the big five personality types play in allocating risky assets within portfolio holdings. We used the overall share of investments in the home country and the US stock markets as dependent variables for this purpose.

As it is shown in Table 4.4, people with greater openness allocate larger portions of their investments to the stocks as a risky asset. This finding depicts that Individuals who scored higher on the trait of openness to experience were more comfortable and willing to take greater risks in their portfolio selection through investment in stocks. Numerous studies, including Pan and Statman (2013) and De Bortoli et al. (2019), have demonstrated a positive correlation between investor risk tolerance and openness to new experiences. Therefore, we can expect those with a higher risk tolerance to invest more in riskier assets such as stocks. Furthermore, individuals' conscientiousness plays a positive and important role in the size of shares in a portfolio. It has already been shown that those with high conscientiousness have a more positive perception on their financial investments(Durand et al., 2013). This mindset can explain the increased risk-taking in portfolio selection through stock investments, where this group of people give a larger probability of profit than loss in stock investing.

Table 4.4 also shows that the trait of neuroticism, which is related to a person's aversion to taking control of stressful situations, has a considerable and negative effect on the ratio of stocks in portfolios. These relationships may partly be explained by pessimistic view of neurotic investors about the future value of their assets. The lower level of risky securities in a portfolio not only reduces the portfolio's volatility and the stressful situations that come with it, but it also helps the person feel more emotionally stable. It is possible to conclude that an increase in neuroticism in an individual's personality makes that person less tolerant of risk and less likely to invest in the stock. We did not find a significant effect of agreeableness and extraversion on the share of risky assets in the portfolio.

The findings of the regression analysis of two subgroups of experienced and inexperienced investors are compared side by side in Table 4.5. Concerning the impact of the traits, for both groups conscientiousness and neuroticism influence their decisions regarding the percentage of stocks in their portfolio, although the effect seems to be stronger for the group of people with previous experiences. It is possible to conclude that gaining experience in stock investing

empowers neuroticism and conscientiousness to play a greater role in future risky asset allocation in portfolios. Lastly, openness only matters to inexperienced investors. Greater openness to experience enables inexperienced investors to hold more equities in their portfolios. After gaining experience with stock investment, however, this factor has little explanatory power. As a robustness test, we repeat the analysis with additional country dummies, as shown in Appendix II, which supports our findings.

Overall, the results support hypotheses 4 and 5, which hold that openness and conscientiousness positively influence the magnitude of stock investments. The results reveal that there is no connection between individual extraversion and stock investment; hence, the third hypothesis is rejected.

Table 4-4: Personality traits and stocks in portfolio

Variables	Ratio of stocks in portfolio					
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)
Dummy for Female	-0.125*** (0.013)	-0.122*** (0.014)	-0.122*** (0.013)	-0.114*** (0.014)	-0.122*** (0.013)	-0.116*** (0.014)
Dummy for Married	-0.022 (0.032)	-0.023 (0.032)	-0.023 (0.032)	-0.027 (0.032)	-0.024 (0.032)	-0.024 (0.032)
Dummy for European	0.023 (0.017)	0.023 (0.017)	0.036** (0.017)	0.021 (0.017)	0.022 (0.017)	0.034* (0.018)
Dummy for Having Bachelor	0.050*** (0.015)	0.050*** (0.015)	0.053*** (0.015)	0.052*** (0.015)	0.049*** (0.015)	0.054*** (0.015)
Ambiguity Aversion	-0.011 (0.014)	-0.010 (0.014)	-0.012 (0.014)	-0.008 (0.014)	-0.009 (0.014)	-0.010 (0.014)
Risk Aversion	-0.022** (0.009)	-0.022** (0.009)	-0.022** (0.009)	-0.022** (0.009)	-0.022** (0.009)	-0.021** (0.009)
Financial Literacy	0.058*** (0.009)	0.059*** (0.009)	0.061*** (0.009)	0.059*** (0.009)	0.060*** (0.009)	0.060*** (0.009)
Openness	0.009** (0.004)					0.008** (0.004)
Agreeableness		0.000 (0.004)				-0.001 (0.004)
Conscientiousness			0.016*** (0.005)			0.017*** (0.005)
Neuroticism				-0.013*** (0.004)		-0.012*** (0.004)
Extraversion					0.006 (0.004)	0.004 (0.004)
Constant	0.453*** (0.050)	0.512*** (0.052)	0.401*** (0.054)	0.593*** (0.050)	0.476*** (0.049)	0.385*** (0.079)
Observations	1,862	1,862	1,862	1,862	1,862	1,862
R-squared	0.090	0.087	0.093	0.092	0.088	0.102

Standard errors in parentheses \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 4-5: Personality traits and stocks in portfolio in sub groups

VARIABLES	Inexperienced		Previously Invested in Stocks	
	(1)	(2)	(3)	(4)
Age	-0.005** (0.002)	-0.004** (0.002)	0.001 (0.002)	0.002 (0.002)
Dummy for Female	-0.092*** (0.016)	-0.087*** (0.017)	-0.157*** (0.023)	-0.151*** (0.024)
Dummy for Married	0.021 (0.046)	0.016 (0.046)	-0.086** (0.043)	-0.081* (0.042)
Dummy for European	0.012 (0.019)	0.021 (0.020)	0.113*** (0.033)	0.127*** (0.034)
Dummy for Having Bachelor	0.040** (0.018)	0.045** (0.018)	0.084*** (0.030)	0.079*** (0.030)
Ambiguity Aversion	-0.001 (0.017)	-0.004 (0.017)	-0.009 (0.026)	-0.001 (0.025)
Risk Aversion	-0.020* (0.011)	-0.020* (0.011)	-0.016 (0.015)	-0.014 (0.015)
Financial Literacy	0.045*** (0.010)	0.045*** (0.010)	0.052*** (0.019)	0.059*** (0.019)
Openness		0.009** (0.004)		0.004 (0.006)
Agreeableness		-0.001 (0.005)		0.005 (0.008)
Conscientiousness		0.015*** (0.005)		0.026*** (0.008)
Neuroticism		-0.010** (0.005)		-0.017** (0.007)
Extraversion		0.000 (0.005)		0.010 (0.007)
Constant	0.560*** (0.057)	0.456*** (0.096)	0.601*** (0.078)	0.376*** (0.145)
Observations	1,293	1,293	569	569
R-squared	0.057	0.069	0.138	0.163

Standard errors in parentheses \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

### 4.4.3 Personality traits and home bias

The analysis presented in this section makes an effort to investigate hypotheses 6, 7, and 8 at the same time. The results of a regression analysis on the simultaneous influence of the big five traits and patriotism on the magnitude of home bias in people's portfolios are presented in Table 4.6.

This table is quite revealing in several ways. First, surprisingly, there was no proof that a change in extraversion scores affects a person's preference for home country stocks, hence the third hypothesis was rejected. Secondly, among all five elements of personality traits, only openness plays a vital role in the home bias. This also accords with the study by Turkyilmaz et al. (2015), which showed that openness leads to creativity and diversity where open-minded people like new experiences and sophisticated ideas. People who score higher are more likely to invest in cross-border firms' stocks. This finding supports the fourth hypothesis that greater openness reduces the level of home bias in portfolio selection.

As shown in Table 4.6, even when personality traits are taken into consideration, patriotism affects significantly and positively the desire of people for more investment in national stocks. The magnitude of this effect is considerable and more than three times greater than the openness to individual decisions. This finding backs up what Pradkhan (2016) found in earlier studies: that countries with more patriotism were more likely to choose domestic financial instruments and less likely to prioritize foreign financial instruments. It could be that the positive impact of patriotism is connected to investors' desires to contribute to the economy of the country through the investment in entities that are domestically owned or it could be that uncritical patriotism leads to a negative perception of foreign countries and their stock markets. The robustness check in Table 10 (in the Appendix) validates the significance of the conclusion concerning the role of openness and patriotism in home bias behavior.

In Table 4.7, we analyze the home bias among inexperienced and experienced investors side-by-side. At first glance, it is evident that the home bias in the two groups has distinct causes, with inexperienced participants' patriotism explaining their irrational preference for investing in domestic firms. In contrast, the decisions made by experienced investors are fundamentally influenced by openness, conscientiousness, and neuroticism, whereas patriotism has no major effect on the home bias action they take. The assumption that openness to experienced people is inversely linked with home bias in the stock selection made by experienced investors is supported. The results, as shown in Table 4.7, demonstrate that prior experiences in the stock



market lead patriotic emotions to lose their influence on an investor's decision to include a stock in their portfolio based on the company's location. To summarize the data in Table 4.7, we can say that patriotism and personality traits are important for one type of investor. Whereas the first group's home bias in portfolio selection stems from patriotism, the second group's bias stems from personality traits.

To sum up, the results validate hypotheses 7 and 8, which claim that, openness and patriotism influence home bias in portfolio selection significantly. The findings suggest that there is no linkage between individual extraversion and a preference for the home country stocks; hence, Hypothesis 6 is rejected.

Table 4-6: Personality traits, patriotism and home bias

Variables	Home Bias					
	(1)	(2)	(3)	(4)	(5)	(6)
Age	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Dummy for Female	0.037*** (0.014)	0.040*** (0.014)	0.035** (0.014)	0.037*** (0.014)	0.035** (0.014)	0.035** (0.014)
Dummy for Married	0.025 (0.032)	0.023 (0.031)	0.025 (0.032)	0.025 (0.032)	0.026 (0.032)	0.023 (0.031)
Dummy for European	0.022 (0.017)	0.022 (0.017)	0.028 (0.018)	0.021 (0.018)	0.022 (0.017)	0.027 (0.018)
Dummy for Having Bachelor	-0.005 (0.015)	-0.004 (0.015)	-0.004 (0.015)	-0.006 (0.015)	-0.006 (0.015)	-0.004 (0.015)
Ambiguity Aversion	-0.007 (0.015)	-0.006 (0.014)	-0.007 (0.015)	-0.007 (0.015)	-0.008 (0.015)	-0.007 (0.015)
Risk Aversion	0.012 (0.009)	0.012 (0.009)	0.012 (0.009)	0.012 (0.009)	0.012 (0.009)	0.012 (0.009)
Financial Literacy	-0.004 (0.009)	-0.003 (0.009)	-0.004 (0.009)	-0.004 (0.009)	-0.004 (0.009)	-0.004 (0.009)
Patriotism	0.044*** (0.008)	0.042*** (0.008)	0.043*** (0.008)	0.044*** (0.008)	0.044*** (0.008)	0.041*** (0.008)
Openness		-0.012*** (0.004)				-0.011*** (0.004)
Agreeableness			0.007 (0.004)			0.007* (0.004)
Conscientiousness				-0.001 (0.005)		-0.002 (0.005)
Neuroticism					0.004 (0.004)	0.004 (0.004)
Extraversion						-0.004 (0.004)
Constant	0.316*** (0.050)	0.403*** (0.057)	0.273*** (0.056)	0.324*** (0.060)	0.289*** (0.055)	0.370*** (0.084)
Observations	1,688	1,688	1,688	1,688	1,688	1,688
R-squared	0.025	0.031	0.027	0.026	0.026	0.034

Standard errors in parentheses \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 4-7: Personality traits, patriotism and home bias in sub-groups

VARIABLES	Inexperienced		Previously Invested in Stocks	
	(1)	(3)	(4)	(6)
Age	0.000 (0.002)	0.000 (0.002)	0.000 (0.002)	-0.000 (0.002)
Dummy for Female	0.033** (0.016)	0.036** (0.016)	0.049* (0.026)	0.042 (0.026)
Dummy for Married	-0.025 (0.046)	-0.028 (0.046)	0.053 (0.047)	0.041 (0.046)
Dummy for European	0.046** (0.020)	0.055*** (0.021)	-0.036 (0.037)	-0.040 (0.038)
Dummy for Having Bachelor	0.011 (0.017)	0.015 (0.017)	-0.056* (0.033)	-0.050 (0.033)
Ambiguity Aversion	0.016 (0.017)	0.018 (0.017)	-0.056** (0.028)	-0.059** (0.028)
Risk Aversion	0.013 (0.010)	0.012 (0.010)	0.006 (0.016)	0.004 (0.016)
Financial Literacy	0.002 (0.010)	0.001 (0.010)	-0.027 (0.021)	-0.030 (0.021)
Openness		-0.009* (0.005)		-0.020*** (0.007)
Agreeableness		0.004 (0.005)		0.013 (0.009)
Conscientiousness		0.004 (0.005)		-0.019** (0.009)
Neuroticism		-0.002 (0.005)		0.017** (0.008)
Extraversion		-0.006 (0.005)		0.001 (0.008)
Patriotism	0.049*** (0.009)	0.047*** (0.009)	0.033** (0.015)	0.025 (0.015)
Constant	0.318*** (0.063)	0.384*** (0.100)	0.486*** (0.102)	0.607*** (0.172)
Observations	1,145	1,145	543	543
R-squared	0.031	0.037	0.042	0.073

Standard errors in parentheses \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

## 4.5 Conclusion

This study uses the PANDA data to determine whether personality influences an individual's decision of investing in stocks. In this regard, we provided a broader perspective on three steps of equity investments: First, the decision to participate in the stock market, the allocation to stocks in the portfolio and the home bias. Second, we compared how personality traits affect the dimensions of stock investment decisions for participants who were either new to investing or experienced. This comparison underlines the importance of investment experience for financial studies that are linked to investor personality. Finally, we examined the home bias under both personality and patriotism factors to determine which of these factors contributes the most to preferences for home country equities.

As it is difficult to elicit parameters like personality dimensions and actual stock market investments simultaneously, we relied for our analysis on a large-scale international survey, using the data of 1910 respondents. The study's foremost finding is that personality traits play an obvious effect in individuals' decisions about stock investing and stock allocation in their portfolio, but the size and importance of traits differ between experienced and inexperienced investors. Furthermore, levels of conscientiousness and neuroticism emerged as reliable predictors of individual behavior in terms of stock investment and preferences. Even though these two traits only matter for one of the groups when it comes to stock market participation and home bias, the effects are significant. Individuals with the highest conscientiousness scores not only improve their desire to invest in stocks, but also allocate a larger proportion of their portfolio to risky assets like stocks, discouraging the home bias in asset allocation. In the case of neuroticism, the findings are opposite to the conscientiousness where a lower neuroticism score encourages the investment in stocks and the share of stocks in a portfolio and reduces the home bias in portfolio selection. Table 4.11 in the appendix shows the summary of findings for the effect of each trait on stock investing in both groups.

Finally, we found that the home bias is largely influenced by uncritical patriotism for investors without prior experience in portfolio selection. In the case of experienced investors, a low neuroticism score and a high conscientiousness and openness score are consistent determinants in an individual's decision to invest in a portfolio with a lower home equity bias.

## **Appendix I**

### **BIG Five personality questions**

The statements that follow specifically refer to specific aspects of a person's personality. The value 1 indicates that the respondent "Strongly disagrees," whereas the value 5 indicates that the respondent "Strongly agrees."

- (I see myself as someone who is) reserved
- (I see myself as someone who is) is generally trusting
- (I see myself as someone who is) tends to be lazy
- (I see myself as someone who is) is relaxed, handles stress well
- (I see myself as someone who is) has few artistic interests
- (I see myself as someone who is) is outgoing, sociable
- (I see myself as someone who is) tends to find fault with others
- (I see myself as someone who is) does a thorough job
- (I see myself as someone who is) gets nervous easily
- (I see myself as someone who is) has an active imagination

## Appendix II

Table 4-8: Personality traits and willingness to invest in stocks – with country dummies

Variables	Willingness to invest in stocks				
	(1)	(2)	(3)	(4)	(5)
Dummy for Estonia	0.965*** (0.108)	0.968*** (0.109)	0.970*** (0.109)	0.969*** (0.108)	1.013*** (0.108)
Dummy for Taiwan	0.520*** (0.053)	0.522*** (0.053)	0.504*** (0.054)	0.525*** (0.054)	0.532*** (0.054)
Dummy for Vietnam	0.747*** (0.054)	0.750*** (0.056)	0.735*** (0.057)	0.727*** (0.057)	0.741*** (0.056)
Dummy for Japan	0.309*** (0.081)	0.309*** (0.081)	0.294*** (0.081)	0.337*** (0.081)	0.348*** (0.081)
Dummy for China	0.329*** (0.052)	0.331*** (0.053)	0.319*** (0.053)	0.322*** (0.053)	0.324*** (0.053)
Age	-0.007* (0.004)	-0.007* (0.004)	-0.006 (0.004)	-0.007* (0.004)	-0.006* (0.004)
Dummy for Female	-0.217*** (0.034)	-0.216*** (0.034)	-0.216*** (0.034)	-0.183*** (0.035)	-0.186*** (0.035)
Dummy for Married	-0.044 (0.080)	-0.044 (0.080)	-0.044 (0.080)	-0.053 (0.080)	-0.054 (0.080)
Dummy for Having Bachelor	0.076* (0.040)	0.076* (0.040)	0.079** (0.040)	0.080** (0.040)	0.075* (0.040)
Ambiguity Aversion	-0.077** (0.036)	-0.077** (0.036)	-0.079** (0.036)	-0.072** (0.036)	-0.069* (0.036)
Risk Aversion	-0.045** (0.022)	-0.045** (0.022)	-0.045** (0.022)	-0.044** (0.022)	-0.041* (0.022)
Financial Literacy	0.177*** (0.022)	0.177*** (0.022)	0.179*** (0.022)	0.180*** (0.022)	0.183*** (0.022)
Openness	0.018* (0.009)	0.018* (0.009)	0.018* (0.009)	0.016* (0.009)	0.013 (0.009)
Agreeableness		-0.002 (0.011)	-0.002 (0.011)	-0.006 (0.011)	-0.005 (0.011)
Conscientiousness			0.019* (0.011)	0.021* (0.011)	0.026** (0.011)
Neuroticism				-0.044*** (0.010)	-0.036*** (0.010)
Extraversion					0.038*** (0.010)
Constant	2.562*** (0.133)	2.575*** (0.147)	2.447*** (0.166)	2.733*** (0.177)	2.427*** (0.194)
Observations	1,862	1,862	1,862	1,862	1,862
R-squared	0.184	0.184	0.185	0.193	0.200

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

Table 4-9: Personality traits and stocks in portfolio – with country dummies

Variables	Ratio of stocks in portfolio				
	(2)	(3)	(4)	(5)	(6)
Dummy for Estonia	0.186*** (0.043)	0.189*** (0.043)	0.190*** (0.043)	0.190*** (0.043)	0.197*** (0.043)
Dummy for Taiwan	0.047** (0.021)	0.049** (0.021)	0.035 (0.022)	0.042* (0.022)	0.043** (0.022)
Dummy for Vietnam	-0.004 (0.021)	-0.001 (0.022)	-0.013 (0.022)	-0.015 (0.022)	-0.013 (0.022)
Dummy for Japan	-0.067** (0.032)	-0.066** (0.032)	-0.078** (0.032)	-0.064** (0.032)	-0.062* (0.032)
Dummy for China	-0.041** (0.021)	-0.039* (0.021)	-0.049** (0.021)	-0.048** (0.021)	-0.047** (0.021)
Age	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Dummy for Female	-0.121*** (0.013)	-0.120*** (0.014)	-0.120*** (0.014)	-0.109*** (0.014)	-0.110*** (0.014)
Dummy for Married	-0.010 (0.032)	-0.010 (0.032)	-0.010 (0.032)	-0.013 (0.032)	-0.013 (0.032)
Dummy for Having Bachelor	0.049*** (0.016)	0.049*** (0.016)	0.051*** (0.016)	0.052*** (0.016)	0.051*** (0.016)
Ambiguity Aversion	-0.007 (0.014)	-0.007 (0.014)	-0.009 (0.014)	-0.007 (0.014)	-0.006 (0.014)
Risk Aversion	-0.022** (0.009)	-0.021** (0.009)	-0.021** (0.009)	-0.021** (0.009)	-0.020** (0.009)
Financial Literacy	0.053*** (0.009)	0.054*** (0.009)	0.055*** (0.009)	0.055*** (0.009)	0.056*** (0.009)
Openness	0.010*** (0.004)	0.010*** (0.004)	0.010*** (0.004)	0.009** (0.004)	0.009** (0.004)
Agreeableness		-0.002 (0.004)	-0.002 (0.004)	-0.003 (0.004)	-0.003 (0.004)
Conscientiousness			0.015*** (0.005)	0.015*** (0.005)	0.016*** (0.005)
Neuroticism				-0.014*** (0.004)	-0.013*** (0.004)
Extraversion					0.006 (0.004)
Constant	0.475*** (0.053)	0.487*** (0.058)	0.389*** (0.066)	0.481*** (0.070)	0.428*** (0.077)
Observations	1,862	1,862	1,862	1,862	1,862
R-squared	0.113	0.113	0.118	0.124	0.125

Standard errors in parentheses \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 4-10: Personality traits, Patriotism and Home Bias- Country dummies

Variables	Home Bias					
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy for Estonia	-0.284*** (0.042)	-0.296*** (0.042)	-0.296*** (0.042)	-0.296*** (0.042)	-0.304*** (0.042)	-0.304*** (0.042)
Dummy for Taiwan	-0.086*** (0.021)	-0.094*** (0.021)	-0.093*** (0.022)	-0.095*** (0.022)	-0.096*** (0.022)	-0.096*** (0.022)
Dummy for Vietnam	-0.046** (0.022)	-0.060*** (0.023)	-0.060** (0.024)	-0.059** (0.024)	-0.061*** (0.024)	-0.061*** (0.024)
Dummy for Japan	-0.031 (0.033)	-0.035 (0.033)	-0.034 (0.033)	-0.039 (0.033)	-0.041 (0.033)	-0.041 (0.033)
Dummy for China	-0.041* (0.021)	-0.051** (0.022)	-0.050** (0.022)	-0.050** (0.022)	-0.051** (0.022)	-0.051** (0.022)
Age	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Dummy for Female	0.034** (0.014)	0.031** (0.014)	0.031** (0.014)	0.028** (0.014)	0.028** (0.014)	0.028** (0.014)
Dummy for Married	0.029 (0.031)	0.029 (0.031)	0.029 (0.031)	0.030 (0.031)	0.030 (0.031)	0.030 (0.031)
Dummy for Having Bachelor	-0.001 (0.016)	-0.002 (0.016)	-0.002 (0.016)	-0.002 (0.016)	-0.001 (0.016)	-0.001 (0.016)
Ambiguity Aversion	-0.010 (0.014)	-0.009 (0.014)	-0.009 (0.014)	-0.010 (0.014)	-0.010 (0.014)	-0.010 (0.014)
Risk Aversion	0.011 (0.009)	0.011 (0.009)	0.011 (0.009)	0.011 (0.009)	0.010 (0.009)	0.010 (0.009)
Financial Literacy	0.002 (0.009)	0.001 (0.009)	0.001 (0.009)	0.001 (0.009)	0.001 (0.009)	0.001 (0.009)
Patriotism	0.043*** (0.008)	0.042*** (0.008)	0.042*** (0.008)	0.042*** (0.008)	0.042*** (0.008)	0.042*** (0.008)
Openness	-0.012*** (0.004)	-0.012*** (0.004)	-0.012*** (0.004)	-0.011*** (0.004)	-0.011*** (0.004)	-0.011*** (0.004)
Agreeableness		0.010** (0.004)	0.010** (0.004)	0.011** (0.004)	0.011** (0.004)	0.011** (0.004)
Conscientiousness			-0.001 (0.005)	-0.001 (0.005)	-0.002 (0.005)	-0.002 (0.005)
Neuroticism				0.005 (0.004)	0.003 (0.004)	0.003 (0.004)
Extraversion					-0.007* (0.004)	-0.007* (0.004)
Constant	0.439*** (0.057)	0.382*** (0.062)	0.388*** (0.069)	0.357*** (0.074)	0.415*** (0.081)	0.415*** (0.081)
Observations	1,688	1,688	1,688	1,688	1,688	1,688
R-squared	0.062	0.065	0.065	0.066	0.068	0.068

Standard errors in parentheses \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1



Table 4-11: Summary of results in subgroups

	Willingness to stocks		Stocks in portfolio		Home bias	
	Inexperienced	Experienced investors	Inexperienced	Experienced investors	Inexperienced	Experienced investors
Openness	-----	-----	Positive	-----	-----	Negative
Agreeableness	Positive	-----	-----	-----	-----	-----
Conscientiousness	Positive	-----	Positive	Positive	-----	Negative
Neuroticism	Negative	-----	Negative	Negative	-----	Positive
Extraversion	Positive	-----	-----	-----	-----	-----

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## **Einverständniserklärung zur Überprüfung meiner Arbeit mit der Plagiatserkennungssoftware EPHORUS**

Aufgrund mehrerer Plagiatsfälle hat sich die Universität Trier entschlossen, eine elektronische Überprüfung von Studien- und Prüfungsarbeiten auf Plagiate zu ermöglichen. Die Überprüfung erfolgt mit Hilfe der Plagiatserkennungssoftware EPHORUS.

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Mit meiner Unterschrift erkläre ich

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(Vorname, Name in Druckschrift)

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Datum

Unterschrift

## Education

**Ph.D. in Business  
administration –  
Finance**

June 2018 – April 2023

**University of Trier, Trier, Germany  
Department of Banking and Finance**

Advisor: Prof. Dr. Marc Oliver Rieger

Dissertation: Do Personality Traits, Trust and Fairness Shape the Stock-Investing Decisions of an Individual?

**M.Sc. in International  
Economics and  
Finance**

October 2014 -  
September 2017

**Otto Von Guericke University, Magdeburg, Germany**

Advisor: Prof. Dr. R. Gropp

Thesis: A study on bankruptcy regulation and financial distress; the case of Germany

**M.Sc. in Economics**

July 2009 – December  
2011

**University of Putra Malaysia, Serdang, Malaysia**

Advisor: Prof. Dr. Law Siong Hook

Thesis: Effect of oil price on the stock market return and volatility of six major oil exporting countries

**B.Sc. in Accounting**

**University of Isfahan, Isfahan, Iran**

## Publications

Amin, Masoud Yousefi, Zahra Yousefi Amin, and Hamid Reza Zadeh. "Oil Price Shocks, Asymmetric Effect and Volatility Spill over; Case of Stock Market in Oil Exporting Countries." Journal of Insurance and Financial Management 1.2 (2016).

Amin, Zahra Yousefi and Masoud Yousefi Amin. "Impact of accounting standards on earnings management in selected Middle-East countries." International Journal of Sciences: Basic and Applied Research 20.2 (2015): 316-333.

## Teaching Experience

**Fall 2022, 2021**

Seminars in behavioural finance, Finance C

**Spring 2022, 2021, 2020**

Banking and Finance II

**Fall 2018**

Finance and Investment

**Spring 2019, 2020**

Finance D

## Conferences

September 2021

Session Talk: *Do individuals' attitudes toward trust and herding matter in stock market participation?*

Second Cultural Finance conference

Trier, Germany

June 2020

Session Talk: *The Effect of Social Preferences and Personal Values on Stock Market Participation: a Cross-Country Study*

First Cultural Finance Conference

online

July 2014

Session Talk: *Impact of accounting standards on earning management*

The accounting, economics and financial management conference, Tehran, Iran

## Awards & Honors

2014 Best Paper in The Accounting, Economics and Financial Management Conference, Tehran

2010 Merit Scholarship winner, Awarded by Ministry of higher education of Malaysia

## Additional Skills

**Languages** - English (Fluent), German (Intermediate), Farsi(native)

**IT Skills**- VBA (Familiar), SQL (Advanced level) R and Python in data analysis (Intermediate level)

## Working experiences

June 2018 – December 2022

### **Research and teaching assistant**

Department of Finance, University of Trier, Germany

January 2014 - January 2018

### **Finance Functional Consultant- Freelancer**

Magdeburg – Germany

January 2011 - January 2014

### **Senior Trade Development Officer in Derivatives**

Pishgaman Behparvar Brokerage Co., Tehran, Iran

January 2010 - January 2011

### **Junior Financial Analyst**

Apex Equity Holdings Behrad, Kuala Lumpur, Malaysia

January 2005 - January 2009

### **Internal Auditor**

Iran Air Co., Tehran, Iran