Behavioural Biases in Investment Decision-Making:

A Study on the Impact of Demographic Factors on Behavioural Biases, within the Maltese Context

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Abstract

This study delves into behavioural biases in investment decisions of individual retail investors in Malta, and how they are related to several demographic variables. In light of the growing importance of behavioural finance to explain such irrational financial decisions, this study seeks to explore which demographic factors cause variations in the prominence and propensity of exhibiting behavioural biases. The biases that fall within this category include Anchoring, Cognitive Dissonance, Confirmation Bias, Conservatism, Framing, Herding, Home Bias, Loss Aversion, Overconfidence, Representativeness, and Self-Attribution.

The quantitative nature of the study involves the use of a structured questionnaire, completed by 161 Maltese retail investors. General findings indicate significant influences of the demographic factors on several biases, including gender, age, marital and employment status, as well as investment experience and size. The specific findings confirm the fact that male investors show higher overconfidence, while the level of loss aversion and home bias among women is higher. Younger investors were more prone to anchoring bias and self-attribution bias, whereas more experienced investors demonstrated less susceptibility to these biases but retained overconfidence. Unmarried investors were more prone to anchoring bias, loss aversion, and self-attribution bias compared to their married counterparts. Public sector employees exhibited higher levels of loss aversion relative to those in the private sector. Additionally, those with less investment experience were more vulnerable to anchoring and home bias, while larger investment sizes were linked to increased susceptibility to anchoring and herding bias. Education level had limited influence on biases, with only anchoring bias approaching significance.

The results show that demographic variables are very well linked to the behavioural biases, influencing investment decisions in diverse ways. From these findings, it appears that specialist financial education programs and investment advice tailored toward mitigating the adverse effects of these biases become imperative. The implication of this study is highly relevant for financial advisors and investors in highlighting the importance of considering demographic variables while formulating strategies to reduce irrational financial behaviour.

Keywords: Behavioural Finance, Demographic Factors, Investment Decision-Making, Behavioural Biases

To my parents,

Mariella and Tonio

for years of unwavering guidance, support, & most of all, love

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1. Introduction

Emotions, heuristics, and biases are intertwined with investment decision-making (Baker et al., 2019). Behavioural finance is a relatively novel, multidisciplinary field which integrates psychology and finance, offering insights into the intricacies of human decision-making within financial contexts (Okumura et al., 2023). It differs from traditional finance in its approach to understanding market dynamics and investor behaviour. Where traditional finance assumes that investors are rational and markets are efficient, relying on models that predict outcomes based on logical decision-making and perfect information, behavioural finance recognises that investors often act irrationally due to cognitive biases, emotions, and psychological factors.

This very relationship has been a subject of several research papers, given its rising prominence in times of late. One such study, carried out by Kumar et al. (2023) explored the impact of individual biases on financial decision outcomes, where the focus was on bringing out the ignorance of individuals towards their unconscious biases and the dynamic nature of decision-making abilities throughout one's lifespan. Another, carried out by Schulz (2023), emphasises how the decision-making processes of financial market participants are irrational, given that investors' subconscious minds are significantly influenced by biases, impacting nearly every decision they make. The widespread impact of biases is evident, enforcing the need to find measures and treatments to lessen their influence on financial decision-making.

1.1. Research Problem

This research addresses the lack of understanding of demographic factors influencing investors' behavioural biases in Malta. The existing body of literature does not adequately address these relationships and hence, a gap exists that this study aims to fill. Therefore, this research may serve as an opportunity to enhance investment decision-making for Maltese investors by providing input that can be used to counter and mitigate the consequences of behavioural biases.

1.2. Research Question & Objectives

This research will delve into key behavioural biases, namely anchoring, cognitive dissonance, confirmation bias, conservatism, framing, herding, home bias, loss aversion, overconfidence, representativeness bias, and self-attribution bias, while examining their significance in the context of investment decision-making. By solely targeting Maltese nationals, this research emphasises the importance of understanding these biases among Maltese investors.

The primary research question guiding this study is: "How do demographic variables of Maltese investors impact the propensity to exhibit behavioural biases in investment decisions?" By dissecting this research question, the main objectives of the research are threefold:

i. identifying and determining the pervasiveness or intensity of various behavioural biases among Maltese investors,
ii. investigating the relationships between demographic variables and the predisposition of having developed behavioural biases, and
iii. drawing recommendations on how to mitigate the consequences of behavioural biases on investment decisions.

1.3. Significance of the Study

This research will contribute to the discipline of behavioural finance and improve the understanding of investment decision-making processes undertaken by Maltese investors. From a practical perspective, results from this study are intended to provide financial professionals, policymakers, and investors in Malta with the necessary knowledge to effectively navigate the particular landscape of Maltese investors. The overall aim is to improve financial literacy and decision-making among the Maltese, hence enabling better investment strategies and risk management techniques, developed with consideration of the unique attributes and behaviours found in this market.

1.4. Methodology Overview

The research strategy employed is quantitative, where the data is collected using a questionnaire where respondents identify their response using a five-point Likert scale. Questionnaires were distributed to several banks and brokerage firms in Malta, specifically targeting professional and retail investors, brokers, and traders. To examine the impact of demographic variables on behavioural biases, descriptive statistics were initially calculated to summarise tendencies in responses across demographic groups. Additionally, non-parametric tests, such as the Friedman test, were used to identify significant differences in behavioural biases between demographic categories. Correlation analysis was also conducted to explore relationships between the biases and demographic factors.

While the chosen methodology brings both efficiency and relevance, it also comes with certain limitations.

The lack of all-rounded open-ended questions does not allow for in-depth qualitative data, probably missing out on some very important components of the participants' decision-making processes. Moreover, the reliance on self-reporting through the questionnaire increases the response bias, especially since respondents may report socially desirable answers or misinterpret specific questions unintentionally. Furthermore, the cross-sectional nature of the study may not be able to capture the dynamic nature of behavioural biases over time. Therefore, one should be cautious in making the assumptions about the origins of the biases since there is an absence of analysis on how they may change over long-time frames.

1.5. Dissertation Structure

This first chapter has presented a general overview of the research, highlighting the research question and the hypotheses that have been tested as well as giving a brief overview of the methodology. Chapter 2 will undertake an in-depth review of the existing literature, focusing on the behavioural biases being assessed in this survey and their relation to the demographic

variables. Chapter 3 will outline the methodology and discuss aspects such as data, variables, and data analysis method used. Chapter 4 will be explaining the findings of the study, and lastly, Chapter 5 will discuss the results and compare them with the scholarly literature reviewed in Chapter 2.

In summary, this research holds significant importance in understanding investment decision-making among Maltese investors, as it attempts to bring forth important insights that could improve financial decision-making and literacy within the Maltese investor community. The next chapter will provide a critical review of the literature on behavioural biases and their impact on investment decisions.

2. Literature Review

2.1. Introduction

This literature review attempts to present the most important concepts and empirical studies in the field of behavioural finance, later exploring the relationship between demographic factors and behavioural biases in investment decision-making. In particular, the emphasis is on conducting a thorough review of existing literature aimed at demonstrating the value of the research problem analysed in this work, namely, how various demographic variables influence the susceptibility of investors to specific behavioural biases. This literature review is structured in the following way. To begin with, the introduction will include a presentation of the most important theoretical models relevant in the area of the behavioural finance as well as an overview of essential concepts related to the topic. Following this, the review will look into specific behavioural biases, examining how these biases manifest across different demographic groups. The review concludes with an emphasis on the literature gap in Malta.

2.2. Theoretical Framework

The theoretical framework for this study is based on several core theories that form the foundation of behavioural finance. Prospect Theory, developed by Kahneman and Tversky (1979), is one of the milestones in the history of behavioural finance. This theory explains how individuals perceive expected losses and gains differently than what the rational agent model, as proposed by traditional finance theories, would suggest. Prospect Theory introduces the concept of loss aversion, in which losses are seen as more substantial than gains and hence influences various investor activities. Again, Efficient Market Hypothesis, EMH, (Fama, 1970), which was traditionally viewed as the founding stone of classic finance, is questioned even by behavioural finance since it is based on the idea that all relevant information is already reflected in the prices of assets. Behavioural finance challenges the EMH by demonstrating how cognitive biases and emotional responses can lead to market inefficiencies and anomalies. Another important theory is the

Theory of Planned Behaviour (Ajzen, 1991), which relates individual behaviour to intentions, attitudes, and perceived behavioural control, thus providing a psychological basis for financial decision-making processes. These theoretical perspectives jointly provide a framework for understanding the mechanisms through which investors might deviate from rational decision-making, particularly when influenced by demographic variables.

2.3. Key Concepts in Behavioural Finance

Behavioural finance is an interdisciplinary field that integrates psychology and economics to explain why investors sometimes make irrational financial decisions. Unlike traditional finance, which assumes that investors act as rational agents that always act in their best financial interests, the principles of behavioural finance state that investors are often subject to cognitive biases and emotional influences. A key concept is heuristics, which are mental shortcuts through which people optimise their decision processes but often lead to systematic errors or biases. Common biases include overconfidence, investors' overestimation of their knowledge or ability to predict market movements, and loss aversion, in which the fear of losses has more impact on decisions than the hope of similar gains. These two biases form the basis of understanding investors' behaviour.

The historical development of behavioural finance dates back to the late 20th century, starting with influential works by Kahneman and Tversky in 1979 and Richard Thaler in 1980 and 1985. These works call into question the very foundation of rationality underlying traditional economics. Since then, this discipline has grown in importance, even more so following the 2008 financial crisis, which highlighted the many instances in which frameworks relying on rational behaviour tended to be insufficient.

2.4. Behavioural Biases in Investment Decision-Making

2.4.1. Anchoring Bias

An anchoring bias refers to a situation in which one's decision making is heavily influenced by an initial piece of information, referred to as the "anchor", even if new and different information is subsequently made available. The phenomenon is rather persistent in the investment decision-making context, whereby investors might base their decisions on irrelevant or outdated information, ultimately yielding less than optimal financial outcomes.

The concept of anchoring was first introduced by Tversky and Kahneman in their groundbreaking study on heuristics and biases in cognitive processes back in 1974. They described how people often make estimates or judgments by starting from an initial value, which they then adjust to reach a conclusion. However, these adjustments are usually insufficient, resulting in estimates biased toward the anchor value. For example, investors who are given an initial stock price tend to use that as an anchor or reference point for their future predictions of the price instead of using more relevant and current information. This kind of tendency makes people overestimate the likelihood of all events happening simultaneously, and, at the same time, underestimate the probability of at least one event occurring. This results in a biased judgment of probabilities and risks (Tversky, Kahneman, 1974).

Recent empirical studies have also provided more evidence on the impact of anchoring bias on investment decision-making processes. For instance, Owusu and Laryea (2023) conducted research concerning mutual fund investors in Ghana and found that most respondents were prone to anchoring effects. Indeed, 81.4% of those who responded showed moderate to high levels of anchoring behaviour, which significantly influenced their investment decisions on the selection of funds and performance assessment. Investors often used treasury bill rates and past performances of mutual funds as anchor points, guiding their investment choices despite that the reference points were not necessarily indicative of future performances. Other research, such as

Jain et al. (2023), explores how investors tend to make decisions based on partial information such as trading volumes, news flashes, or return over a single day. This reliance on historical data, rather than adapting to new information, results in an investor making a decision that does not agree with the prevalent market situations. For example, investors may continue to buy or sell stocks according to the old price levels, thereby missing opportunities or facing losses that could have been avoided (Jain et al., 2023).

Anchoring bias plays a critical role in shaping investment decisions, often leading to systematic errors in judgment. Whether through reliance on outdated information, gender-related tendencies, or the impact on risk perception, anchoring continues to be a significant factor in financial decision-making. Understanding and mitigating this bias is essential for improving investment strategies and outcomes.

2.4.2.Cognitive Dissonance

Cognitive dissonance is a key psychological theory, first introduced by Festinger in 1957, suggesting that people experience psychological discomfort when exposed to conflicting elements of cognition such as beliefs, perceptions, or opinions. This discomfort drives them to adopt measures to lessen or eliminate the inconsistency, by changing the dissonant parts to achieve consistency, introducing new thoughts that will be in conformity with already existing ones, or reducing the significance of the conflicting aspects (Pirie & Chan, 2018).

Cognitive dissonance plays a costly role in investment decision-making, often resulting in irrational choices. Thereafter, investors may refuse to acknowledge their past mistakes and instead would attribute the adverse outcomes of their investments to external factors such as market conditions or bad timing. The lack of taking responsibility can further lead to a pattern of wrong decision-making where an investor cannot learn from past mistakes. Jamil and Bashir (2021) highlight that this bias carries negative implications for rational decision-making, as it hinders investors from realising, and thereby correcting their mistakes. The authors suggest that

integration of emotional intelligence can help alleviate the impact of cognitive dissonance through preparing investors to better monitor and regulate their emotions to reduce the state of psychological unease stemming from holding conflicting beliefs and information. In line with this previous study, Chang, Solomon, and Westerfield (2016) explore the implications of cognitive dissonance in financial contexts, emphasising that psychological discomfort linked to the realisation of a loss can grow very large. This discomfort then typically leads investors to either discount or avoid new information, especially when it is at odds with what their previous decisions entail. For example, they may want to ignore bad news given that such ignorance reduces their cognitive dissonance rather than altering the investment decisions they have made. Such behaviour can amplify the disposition effect where, on the other hand, they are quick to sell winning stocks for fear of the pain of subsequent losses. Additionally, due to cognitive dissonance, there can be a slowing down of investor reaction to unfavourable news during optimistic periods. Antoniou et al. (2013) argue that this bias prolongs the momentum anomaly in financial markets, since investors are less likely to process information that is unfavourable to their positive view. This reluctance to process negative news might even result in continued suboptimal investment decisions, which could further contribute to market inefficiencies. In other words, cognitive dissonance imposes a strong impact on investor behaviour, which tends to boil down to decisions based more on the need to maintain psychological comfort rather than on a rational assessment of the financial data.

2.4.3.Confirmation Bias

Confirmation bias is a type of cognitive bias that greatly influences investor behaviour, manifesting itself by the tendency to seek, interpret, and remember information that confirms one's current views and theories. It comes through two major mechanisms: i) selective information acquisition, where one selectively seeks information that is in line with their beliefs, and ii) biased interpretation, where one interprets information that is ambiguous in a manner that justifies one's prevailing views (Park et al., 2013).

Park et al. (2013) extended this research into the implications of confirmation bias in an investment context, focusing on how investors process information on message boards. It was found that investors are more prone to give greater importance to information that confirms their pre-existing beliefs and perceived knowledge, thereby showing a clear tendency toward affirming information. This cognitive bias not only increases their confidence in their previously held beliefs but also leads to overconfidence in their accuracy and undue optimism about future equity returns. The research showed a strong positive association between the level of confirmation bias and trading frequency, where investors who demonstrated high levels of confirmation bias traded more frequently in comparison with other investors showing lower levels of bias. In this respect, these traders manifest the effect of confirmation bias in inducing overconfident trading behaviours that may result in less than satisfactory investment outcomes.

Cheng (2018) designed an experiment that showed the phenomenon of selective information seeking among investors. Participants were given a choice to read one of two articles: one article either supporting or refuting a past investment decision they had made. The results showed that investors showed a significantly greater likelihood of choosing the article that supported their decision, thereby showing a strong predisposition toward information that was consistent with what they already believed. This propensity toward confirmation bias in turn gives rise to common investing errors like the disposition effect and excessive trading. According to Cheng, confirmation bias is a possible explanation for such errors because it prevents investors from entertaining conflicting evidence that might have caused them to rethink and possibly change their course.

2.4.4.Conservatism Bias

Conservatism bias is a cognitive bias in which people show a tendency to poorly react to new information as well as maintaining their existing beliefs or predictions even when evidence would reasonably require them to change said beliefs. This bias can also significantly affect investor behaviour, causing slow reaction to new data and increasing the potential for less-than-optimal investment decisions.

Montier (2002) defines conservatism bias as the "tendency to cling tenaciously to a view or a forecast", highlighting that people are reluctant to change their beliefs even in the face of new evidence that goes against their original beliefs. This bias leads to underweighting of new information, causing investors to hold onto the initial forecasts more than what is rationally justified. Elaborating further, Bisati, SM Imamul Haque Umer, and Gulzar (2021) state that conservatism bias influences people to be very slow in updating their beliefs and new evidence. The slow update of information makes one react slowly to new developments. Bakar and Yi (2016) further note that conservatism causes people to give too much weight to base rates, that is, the prior probabilities or beliefs, while at the same time underreacting to new information that is introduced. This psychological tendency could result in investors being overly conservative in their behaviour, which may ultimately lead to a failure in taking up opportunities or a slow reaction to changes in the market.

Wu, Wu, and Liu (2009) provide empirical evidence to confirm that conservatism bias does exist in financial markets. They mention that the behaviour of the raw returns can be predicted over a medium-term horizon because investors underreact to high as well as low growth trends, which they attribute to conservatism bias. Even after controlling for a variety of risk factors, including market beta, size, and book-to-market ratios, this underreaction persists, hence investors are seen to update their expectations gradually as recent earnings announcements are made. Investors tend to expect high EPS growth firms to keep on growing and the low EPS growth firms to keep on declining without due regard for new information that could suggest a change in these trends. Such bias may cause investors to hold onto outdated views, causing inefficiency in their investment strategies and slow reaction times to changes in the market.

2.4.5. Framing

Framing bias is a cognitive bias that affects decision-making as a result of information presentation. For instance, this can be done by highlighting specific characteristics, while underemphasising others, thus affecting what people think and react to when exposed to the

information. This cognitive bias has an influential impact on financial and investment decisions since the perception of risks and benefits changes with the way information is framed.

Bisati, SM Imamul Haque Umer, and Gulzar (2021) describe framing as the cognitive process through which people identify, organise, make sense of, and store information. It is caused by what is known as the “cognitive inertia”, that hints at the fact that people tend to change their approach or answer about a problem due to its presentation or framing.

Tversky and Kahneman (1981) proved that people inherently prefer information which is straightforwardly presented and are easily influenced by its pattern of presentation. For instance, people are likely to arrive at different conclusions concerning the same issue depending on whether it is set in the gains or losses context, even though the underlying issue is the same. They concluded that framing of information, such as dividend announcements, had significant impacts on investor behaviour. This is because positive framing of information, to an investor, was interpreted as good news and thus became more likely to react positively because the perceived investment risk was lower with a possibility of an increase in stock prices. Negatively framed information led to negative investor behaviour due to increased perceived risk. Thus, the sequence and framing of information can significantly affect decision-making, mainly because of cognitive inertia or some other emotional reasons which make people process and categorise information differently.

Kirchler, Maciejovsky, and Weber (2005) examine framing effects on trading behaviour in asset markets. They found that their results about framing of irrelevant information in a positive or negative way affected the way people traded. For instance, positively framed buyers were more likely to buy assets from negatively framed sellers and vice versa, though this did not translate into significant differences in trading prices. They also found evidence of the disposition effect, where participants were more likely to sell their assets in gain situations than in loss situations. This effect was further mediated by framing where positively framed participants generally sold their assets later than those who were negatively framed. The study highlights how framing can

influence market behaviour and individual expectations. Ica et al. (2018) discuss how framing bias is commonly examined within the context of Prospect Theory, which suggests that, when the decision is positively framed, individuals are risk-averse and when negatively framed, risk-seeking.

This bias is particularly important in financial situations because it could either force people into risk-averse actions or impel them to be risk-seekers, depending on how the information is presented: in terms of gains or losses.

2.4.6.Herding

Herding bias is a behavioural phenomenon in which individuals mimic the behaviours of a leading group or majority, often at the expense of their own insights, analyses, or intuition. This type of bias is most widespread in financial markets, where investors tend to follow the crowd that mimics the trends or choices of others rather than forming independent judgments.

Robin and Angelina (2020) stipulate that herding bias arises when investors place an unbalanced reliance on others' views while shelving their analysis. The behaviour is based on the deep-seated tendency of people to follow the crowd, driven by social pressure and a lack of confidence in their own knowledge or skills. This study finds that herding bias has a significant contribution to investment decisions and affects all types of investors irrespective of demographic traits. The authors note that this bias is motivated by the fact that conformity to the majority seems to be the right thing to do because of the assumption that masses are unlikely to be wrong. Moreover, this natural human tendency to follow the crowd, combined with low self-confidence, fuels herding bias and drives investment behaviour.

Sattar, Toseef, and Sattar (2020) show that, in this respect, herding bias makes some investors rely on public information and the behaviours of other investors rather than conducting independent research and gathering personal information about investment options. This sort of reliance on others' decisions can ultimately give rise to a type of investment decision that is

suboptimal because the collective behaviour may not always agree with an individual's financial goals or risk appetite. Rajdev and Raninga (2016) elaborate this concept by defining herding in financial markets as the behaviour where investors mimic their colleagues' actions or follow the existing market trends rather than rely on their judgment and information. Moreover, Rajdev and Raninga analyse the influence of personality traits such as empathy, sociability, and extraversion on the probability of an individual herding. For example, people who are highly sociable are more likely to be responsive to social influence, which in turn tends to increase the likelihood of herding behaviour. Moreover, differences in gender also contribute to herding bias; due to women being generally considered more communal and empathetic, their tendency for herding behaviour may be higher than that of men. Herding bias is one of the substantial components of decision-making in finance, whereby investors choose to follow the crowd rather than making independent and informed decisions. In line with that, this effect is brought about by a mixture of psychological factors that include lack of self-confidence, social influences, and an inherent human tendency to follow the majority.

2.4.7.Home Bias

Home bias refers to a phenomenon in behavioural finance in which investors prefer domestic investments to foreign ones, often at the expense of portfolio diversification. A number of drivers exist for this bias, including transaction costs, information asymmetries, and inherent preference for familiar environments.

Sattar, Toseef, and Sattar (2020) elaborate on how investors tend to favour home securities over foreign ones because of a number of obstacles that include transaction costs and asymmetric information. These factors create a bias in investment decision making in which investors feel more comfortable and secure investing in familiar domestic securities rather than venturing into foreign markets. Such behaviour may further lead to irrational decision making in that investors may react overly optimistically or pessimistically to home market performance and shun diversification abroad. Kiymaz et al. (2016) provide empirical evidence supporting the existence

of home bias by presenting findings that investors tend to invest a greater proportion of their investments in domestic equities because of familiarity with the home market. This bias results in over-investment in domestic securities and increased risk-taking. In particular, the study finds a negative association of investors' self-evaluations as well as emotional biases with the equity ratio in their investment portfolio, which suggests that a certain level of familiarity with domestic companies and markets may explain this bias. Also, variables such as trading activity, education, and age appear to reduce equity allocation, which may imply that investors with more experience or better educated are less prone to the home bias.

Oehler, Rummer, and Wendt (2008) examine the underlying causes of home bias, pinpointing three primary explanations: i) transaction costs, ii) hedging possibilities, and iii) information asymmetries. The authors argue that domestic assets offer better hedging against home country specific risks and that information asymmetries lead investors to perceive domestic investments as less risky due to greater availability of information pertinent to the investment decision. The analysis of German mutual funds reveals that these financial instruments exhibit a strong home bias, particularly for larger funds, which tend to deviate more from an ideal global portfolio structure. Interestingly, this research finds that even though there is a very significant European bias for these funds, which might imply a certain degree of integration in the European market, the overall degree of home bias remains high. This implies that private investors are the main culprits because they are more likely to follow bounded rationality due to the lack of information. One of the most imperative investment behaviour determinants is home bias, which is driven by a combination of transaction costs, information asymmetries, and psychological familiarity with local markets. This may result in an insufficient level of portfolio diversification, increasing risk and even lower returns, since the investor will forgo the benefits accruing from international diversification.

2.4.8.Loss Aversion

Loss aversion is a cognitive bias where investors are more sensitive to potential losses compared to similar gains. This tendency can lead to irrational decision-making, such as ignoring risks that come with significant returns, just to avoid the possibility of incurring a loss. Loss aversion traces its roots back to the work of psychologists Daniel Kahneman and Amos Tversky (1979), who introduced what came to be known as prospect theory. Their findings showed that people hate losses more than they love equivalent gains.

Atsala (2017) explains that loss aversion is reflected in the tendency for investors to check their portfolio constantly. The persistent observation of market conditions leads to the experience of more losses, given basic market volatility, which inherently invokes emotional behaviour. Because it is felt more intensely to lose than to win, habitual assessments create fear and compulsive selling because the fear of losing is stronger than making a rational assessment over any long-term gain from selling. Hence, investors make inappropriate decisions that damage their investment outcomes. Bisati, Haque Umer, and Gulzar (2021) extend the explanation of how loss aversion distorts choices by having investors overestimate losses compared to gains. According to Barberis and Huang (2001), losses are perceived to be twice as painful as gains are pleasurable. This observed asymmetry leads to a great extent of loss aversion, which could result in less optimal decision-making, such as selling assets too early at times of market declines or the reluctance to invest even when there is a high chance of profit due to loss aversion. The authors hint at how this cognitive bias is further amplified if circumstances are framed through negative contextualisation, further inflating investor concern and causing financial losses stemming from panic-driven decisions. Khan (2017) find that loss-averse investors mainly pay attention to the protection of capital from loss rather than considering growth in capital, a condition that makes them even more conservative in their investment strategy and may lose some revenues in the process. Financial literacy appears to nullify the loss aversion effect since more-informed investors do not engage in overly risk-averse decisions due to fear of losing.

Loss aversion pushes investors away from losses more than it draws them to gains. This naturally leads to overly risk-averse investment policies, regular portfolio monitoring that enhances the potential for panic selling, and, in general, an irrational approach to risk management. By recognising this psychological bias, investors can be better and more prudent decision-makers who tend to better align with their long-term financial objectives.

2.4.9. Overconfidence

Overconfidence bias occurs when a person holds excessive confidence in their ability with respect to decision-making, forecasting, and risk perception. This cognitive bias has been dramatically found to prevail in financial markets, where it leads to massive implications for investors.

Park et al. (2013) show that overconfidence may lead investors to understate the volatility of financial markets, which in turn causes them to engage in more frequent trading and increased transactions. Overconfident investors often exhibit a faulty sense of control, acting as if they have the power to influence the outcome of random events. They are also susceptible to the illusion of knowledge, which occurs when more information leads to a false perception of being better informed. Self-attribution bias is also prominent, as these investors tend to attribute their successes to personal ability while blaming external factors for their failures. Such illusions prompt overconfident investors to trade more intensely while they attempt to time the market, contrary to the evidence that indicates that such behaviour is commonly associated with poor performance. The study further emphasises that overconfident investors tend to realise lower returns because of their speculative trading activities and the related costs of trading. Mishra and Metilda (2015) note that overconfidence is an ordinary human sentiment characterised by an undue reliance on one's cognitive capacities and discretion. The authors refer to findings that show that people often overestimate their capabilities in various domains, including driving and financial management. For instance, Montier (2002) found that 74% of professional fund managers believed their performance was above average, which is an illustration of the better-than-average effect, one common manifestation of overconfidence. This type of cognitive bias leads investors to

overestimate their abilities in predicting market movements and in evaluating investment opportunities, mostly ignoring negative information that may indicate that the investment decision is poor. Overconfidence in competence and knowledge may lead to more active trading, which typically results in poorer portfolio performance because of higher transaction costs and less than adequate diversification. Rajdev and Raninga, 2016 analyse the gender-based differences in overconfidence, and their results show that men are generally more overconfident, leading them to trade more frequently and, therefore, results in lower net returns compared to women. One study by Barber and Odean, 2001 discovered that men traded 45% more than women resulting in significantly lower returns due to more substantial trading costs.

Sattar et al. (2020) note that overconfidence can be particularly dangerous because it leads investors to ignore risks and uncertainties, especially when a few consecutive investments have been successful. Such behaviour tends to increase the chances of failure as investors will conduct more trades without due consideration of potential downsides. Overconfidence bias leads investors to overestimate the accuracy of their knowledge and abilities, causing them to trade excessively, and hence poor investment performance.

2.4.10. Representativeness Bias

Representative bias is a cognitive bias in which people tend to estimate the likelihood of an event based on its resemblance to past events, rather than on objective probabilities. This tendency leads to systematic misjudgement in many cases, especially investment decisions.

Bisati, Haque Umer, and Gulzar (2021) argued that representativeness bias arises when individuals gauge the likelihood of an event by comparing it to a similar instance, mostly disregarding statistical facts. This heuristic may cause investors to generalise based on limited information, which can result in very serious errors of either overemphasising recent experiences or forgetting the base rate, in other words, the actual statistical probability of an event. For example, an investor might assume that a company will continue to do well just because it has

done so in the past, and without regard for other relevant factors. This cognitive bias can lead to a suboptimal investment decision since the investors overreact to recently gathered information or current trends and take them as a signal for future performance.

Irshad, Badshah, and Hakam (2016) discuss how representativeness bias can manifest in two main forms. First, investors may see patterns in similar information where none exist, leading them to overreact to recent news about a firm and mistakenly predict future performance based on these perceived patterns. Second, they may expect a reversion to the mean too soon, even when the data set is too small to justify such an expectation. This behaviour is driven by a reliance on stereotypes, which may lead to irrational choices, for example, an unjustified belief in the future success of a company based on superficial similarities to other cases. The study showed that this cognitive bias largely affects investment decisions and makes investors behave irrationally in stock markets.

Moosa et al. (2017) examine the implications that arise from representativeness bias regarding extreme responses in financial markets. They reference the study by De Bondt and Thaler (1985), who put the argument that representativeness bias is significant in a contrarian strategy where investors overreact to current information, hence leading to market anomalies. This bias may lead investors to overweight recent trends and underweight historical data, causing them to overreact to news, most especially bad news. This might cause price distortions in the market as investors mistake short-term fluctuations for long-term trends. Moreover, the study shows that the representativeness bias is closely related to several other biases, such as conservatism, which is the investors' unwillingness to change their beliefs, and anchoring, where investors give too much reliance on the first information that they are exposed to. The representativeness bias forces investors to make decisions based on perceived patterns or similarities, often ignoring statistical probabilities and the broader context. This can, therefore, lead to a reaction based on recent events, incorrect predictions concerning future performance, and, ultimately, poor investment

decisions. Recognising and working toward overcoming this bias is helpful for investors to make more rational and informed decisions.

2.4.11. Self-Attribution Bias

Self-attribution bias is a cognitive bias where people tend to attribute their successes to their own abilities, skills, and intelligence, while failures are more often attributed to external factors beyond their control. This bias can significantly affect investor behaviour by fostering overconfidence and leading to less-than-optimal decision-making in financial environments.

Bisati, SM Imamul Haque Umer, and Gulzar (2021) define self-attribution bias as a type of overconfidence bias. According to their study, people under this bias tend to attribute their successes to their abilities and skills, while failures are attributed to bad luck or other external causes. Gervais and Odean (2001) argue that people perceive their abilities not through an internal reflection but by studying their successes and failures. They then tend to overestimate their contributions to their success. This affects their ability to learn from past mistakes. Hoffmann and Post (2014) approach the concept of self-attribution bias in relation to household finance and show how this concept maintains and even amplifies investor overconfidence. By combining survey results with trading data obtained from a large discount brokerage firm, this study shows that investors attribute more to their own skill than to chance for their past investment success when they have generated high returns. Interestingly, this view seems to be strongly influenced by personal returns, but not by aggregate market returns. This may indicate that investors tend to adopt information that supports their self-image and, by extension, further fuels their overconfidence. Mishra and Metilda (2015) evaluate the psychological dynamics of self-attribution bias, which is described as a cognitive phenomenon where individuals attribute their successes to internal factors such as ability and foresight, while assigning their failures to external factors.

This bias takes two primary forms the first being self-enhancing bias, where persons overestimate their contribution to success, and the second being self-protecting bias, where they unwarrantedly deny any responsibility for their failures.

2.5. Demographic Factors and Behavioural Biases

In reviewing the relationship between demographic factors and behavioural biases, empirical studies provide insights into how variables like age, gender, marital status, education level, employment status, investment experience and income influence specific biases.

2.5.1. Gender

Males tend to be more overconfident than females, which results in greater trading activity and poor investment outcomes. A number of studies support this trend, indicating that male investors often believe more in their knowledge concerning the market, even if that knowledge is based on an insufficient amount of information (Barber & Odean, 2001; Bhandari & Deaves, 2006; Ates et al., 2016; Kumar & Goyal, 2016). On the other hand, female investors have higher herding propensity, meaning a preference for following others in investment decisions rather than making an independent decision (Beatrice, Murhadi & Herlambang, 2021; Zheng et al., 2021; Sharma, Mishra & Pande, 2022). Further, males are more loss averse and regret investments that yield losses more than females; at the same time, female investors are more prone to representativeness bias and rely on stereotypes or patterns in the past when making investment decisions (Sharma et al., 2022; Ates et al., 2016). Furthermore, males are found to be more susceptible to framing and anchoring biases, when their judgments are affected by how information is framed or by certain anchor points (Ates et al., 2016; Sharma, Mishra & Pande, 2022). On the other side, there is a contradictory study that posits females exhibit a greater tendency in anchoring behaviour (Owusu, Laryea, 2023).

2.5.2. Age

People in the younger age group are expected to have high herd mentality given that they have lower experience and a lack of information (Baker et al., 2019). On the other hand, investors in the older bracket, especially those between 51-60 years of age, show high confidence levels, possibly as a result of their vast experience and perceived financial literacy regarding investment (Prosad, Kapoor & Sengupta, 2015; Beatrice, Murhadi & Herlambang, 2021). Similarly, younger investors are more prone to representativeness bias than their older counterparts, who generally show lower predispositions toward this cognitive heuristic (Baker et al., 2019). Furthermore, investors in the working-age category show a higher level of loss aversion compared to those at retirement age, possibly due to heavier financial responsibilities (Ates et al., 2016).

2.5.3. Marital Status

Married investors will tend to have higher levels of cognitive dissonance compared to the single ones, probably due to shared financial responsibility with a spouse and the need to justify decisions in a home environment (Ates et al., 2016). On the other hand, single investors are highly vulnerable to loss aversion, which could be due to managing their finances independently and having a more emphasized view of the consequences of losses (Ates et al., 2016).

2.5.4. Education Level

Educational level has a positive relationship with overconfidence, hence, investors with high education levels, like graduate or postgraduate levels, are more likely to have more confidence in their investment decisions (Goo et al., 2010; Bhandari & Deaves, 2006). Investors with the highest educational credentials, like PhDs, are less likely to make fully rational decisions due to the overestimation of their knowledge (Dassani, Kittu Manda et al., 2022). With regards to cognitive dissonance, people on the higher end of the education level are more prone to the bias, since they have often struggled to decide impartially and would rather stick with less optimal choices to avoid the unpleasant psychological feelings that come from admitting mistakes

(Dassani, Kittu Manda et al., 2022). In contrast to this, investors without a bachelors' degree show high rates of representativeness bias, which heavily relies on heuristic-based decision-making (Ates et al., 2016).

2.5.5. Employment Status

Entrepreneurs and self-employed individuals have demonstrated greater levels of overconfidence, possibly an outcome of independence in decision-making and dependence on one's judgment (Sharma et al., 2022). Furthermore, such owners become more vulnerable to anchoring and representativeness biases due to a higher likelihood of depending on certain reference points or past experiences (Sharma et al., 2022). In specific cases, herding behaviour can be affected by certain occupations, especially those in collaborative or less independent roles, where it is more common to follow the investment decisions of one's peers (Beatrice, Murhadi & Herlambang, 2021).

2.5.6. Investment Experience

More experienced investors are generally more overconfident, primarily subject to the investor's self-evaluated expertise and decision-making skills (Bhandari & Deaves, 2006; Baker et al., 2019; Ates et al., 2016). On the contrary, less experienced investors, in particular those with less than one year of experience in investing, show a higher extent of herding behaviour, often depending on the choices of others rather than making independent ones (Prosad et al., 2015; Dassani, Kittu Manda et al., 2022). Expert investors, through increased exposure to market dynamics and decision-making processes, reduce the dissonance cognition function more easily (Dassani, Kittu Manda et al., 2022; Ates et al., 2016). On the other hand, they are more prone to framing and conservatism biases due to the reliance on traditional models of decision-making and information processing approaches (Ates et al., 2016). Similarly, investors who have over one year of experience are prone to anchoring bias as their previous experience acts like anchors for subsequent decisions (Ates et al., 2016). The greater the experience, the greater the possibility

of self-attribution bias whereby investors attribute success to personal ability and failure to other exogenous factors (Ates et al., 2016).

2.5.7. Income

In general, people with higher incomes are more prone to overconfidence (Kansal, Singh, 2018; Tekçe, Yılmaz, 2015). However, this is not always the case, as some studies have shown that there are situations in which an inverse relationship between income and overconfidence exists, showing that investors with higher incomes may show lower levels of overconfidence than those with lower incomes (Kumar & Goyal, 2016). Income also impacts herding behaviour, where lower-income investors are generally more cautious and deliberative in their investment decisions, hence less prone to herding bias (Shusha & Touny, 2016; Albart, 2024). Moreover, lower-income investors are more susceptible to representativeness bias, possibly because they have less access to complex financial information (Sharma, Mishra & Pande, 2022). Lower values in Demat holding, which in most cases occur for people with lower incomes, are more prone to cognitive dissonance. This group is more vulnerable to this bias and usually holds onto the unprofitable stocks in order not to recognize their earlier mistakes (Dassani, Kittu Manda et al., 2022).

2.6. Behavioural Finance in the Maltese Context

2.6.1. Overview of Maltese Financial Market

The financial market in Malta is considered relatively small but highly sophisticated, having an important position within the Mediterranean area. Characterised by its openness and strong regulatory framework, the Maltese market has attracted considerable foreign investment, particularly in sectors such as banking, insurance, and fund management. The Malta Stock Exchange (MSE) is the main platform for equities, bonds, and the trading of other securities. However, its relatively smaller size as a market translates to lower liquidity and increased exposure to fluctuation compared with larger markets. This very setup of the market opens up

different challenges and opportunities for investors, and hence it is an exciting topic to explore within the context of behavioural finance studies.

2.6.2. Previous Studies

While behavioural finance is a widely researched topic on an international level, there is very little literature focusing specifically on the Maltese environment. Recent studies into the small, developed economies that present similar characteristics, like Cyprus or Luxembourg, shed light on relevant insights about possible behaviours of local investors. The results of these studies recommend that investors in smaller markets are more prone to home bias, loss aversion, and herding behaviour, possibly due to the concentrated structure of the market and lesser diversification opportunities. The case of Malta produces a large gap in understanding how behavioural biases influence investment decisions in this unique environment, given the limited availability of studies relating to this area.

2.6.3. Gaps in Literature

With the increased importance of Malta as a financial hub, a gap in academic literature becomes visible when it comes to the influence of behavioural biases on investors in Malta. Existing literature tends to overlook how those peculiar market characteristics that define Malta might shape investor behaviour, and empirical work exploring how demographic factors such as age, gender, and education interact with these biases is scant. This discrepancy highlights the need for focused research in the area of behavioural finance in the Maltese context, particularly regarding the interplay between local market dynamics and investors' psychology.

2.7. Conclusions from the Reviewed Literature

There is a consistent view in the literature on behavioural finance that cognitive biases have a persistent influence on investment decision-making, and demographic factors such as age, gender, marital status and various others play a critical role in the moderation of these biases. Throughout the various contexts, some similar themes emerge younger investors are generally

more overconfident, women are less willing to take risks, and higher education levels can both dampen and amplify certain biases. However, the exact impact of these factors will vary depending on the market situation, which shows the need for context-specific studies.

The findings from this literature review provide a platform for the methodological approach implemented in the current study. The next chapter will go into details regarding the research design and techniques used to investigate the relationship between demographic variables and behavioural biases among investors in Malta. With the literature reviewed, the methodology specifically aims at providing meaningful empirical evidence that addresses the outlined research gaps and contributes to the broader discipline of behavioural finance.

3. Methodology

3.1. Data Collection Methods

This study adopts a quantitative approach through the use of a structured questionnaire to collect primary data. The decision to employ a questionnaire-based survey was motivated by the desire to collect precise and quantifiable information on the behavioural biases and demographic characteristics of investors. The structured nature of the survey enabled the collection of consistent data from a large sample size of individual investors, ensuring that the collected data was suitable for systematic analysis under statistical methods.

Other alternative methods of data collection, such as qualitative interviews or focus groups, were considered but ultimately rejected. Qualitative methods could have helped to obtain in-depth information about individual processes of investment decision-making, however, they are not applicable to the scale and scope of this research, where the objective is to identify patterns and relationships within a broad sample. The fact that meaningful statistical analysis needs a large sample size and the requirement of standardised measures of behavioural biases make a quantitative questionnaire most appropriate for this study.

Another reason a survey with questionnaires was chosen was because of the constraint of time. Given the fact that many of the target respondents are actively involved in retail investment activity and are busy, it must be assumed that they would probably not be too willing or able to take part in in-depth interviews or discussion in focus groups. A structured online survey allowed participants to complete it in their own time and thus greatly reduced the time burden, while still collecting comprehensive data. Participation and completion rates for this study were much higher than would have been possible with more time-consuming qualitative methods, while not sacrificing the depth of the measures of behavioural bias.

3.2. Data

3.2.1. Primary Data

The structured questionnaire, the key data collection instrument, was administered online using the Google Forms platform for easy distribution and response collection. It was available for two months, and the participants were followed up with reminders to increase completion. The questionnaire consisted of two parts. The first part measured the presence of 11 behavioural biases among respondents. The second part of the survey gathered demographic data and information on respondents' stock market investment experience and size.

3.2.2. Secondary Data

Published studies, used as secondary data, were reviewed for the purpose of helping to develop the questionnaire and provide a theoretical framework for the study. There are some studies that have been instrumental in shaping the questions used in the survey, especially those by Ates et al. (2016), Wood and Zaichkowsky (2004), and Novotná, Kořená & Lehmanová (2023), as they investigate behavioural biases of diverse investor populations. The integration of secondary data ensured that the primary data collected would align with established behavioural finance concepts, allowing for valid comparisons with prior research.

3.3. Criteria for Sample Selection

The sample of this study is selected from individual retail investors in Malta. The population used in this research targeted those beginners and experienced investors who, at the time, were actively taking part in the stock market. The following criteria were used in choosing the participants:

1. Inclusion Criteria: The research only considered investors who were Maltese citizens and actively invested in the stock market. The data collected would then reflect the investment behaviour of Maltese retail investors alone.

2. Exclusion Criteria: The study excluded institutional investors, as well as those who did not deal with investment in the stock market.

A combination of snowball sampling and the use of convenience sampling techniques was employed. The latter was used to distribute the questionnaire through online means, including social media groups related to investing, through local banks, investment firms, and the Malta Stock Exchange. Sample size was further expanded by means of snowball sampling by asking the first respondents to identify other investors in their network. Personal contacts were also used in the finance sector, as well as professional networks to reach professional investors. That way, it was possible to obtain a rather diverse sample concerning gender, age, marital status, level of education, employment status and investment experience.

Its sample size was 162 respondents, of which 161 were considered valid for analysis after screening for incomplete or invalid responses and confirmation that respondents were indeed holders of Maltese citizenship.

3.4. Pilot Study

A pilot study was conducted to test the clarity and relevance of the questionnaire before the full-scale survey. Over July, a sample representative of the target population was taken as 50 participants for the pilot. Results from the pilot test have provided feedback about unclear wording of questions or where terminology could be improved in the Maltese context. Following this feedback, changes were affected as follows in the final questionnaire:

- Rewording of specific questions to improve clarity.
- Minor adjustments to the Likert scale to ensure consistency in responses.
- Refinements in demographic categories, particularly related to investment experience and education level, to align with the Maltese financial landscape.

These changes ensured that the final questionnaire was clear, concise, and culturally relevant.

3.5. Variables and Measurement

3.5.1. Dependent Variables

The dependent variables in this study were 11 distinct behavioural biases:

- Anchoring Bias: The tendency to overweigh the first piece of information encountered (the anchor) when making decisions.
- Cognitive Dissonance: The discomfort or tension experienced when holding contradictory beliefs, often leading to irrational decision-making.
- Confirmation Bias: The tendency to seek out, interpret and remember information that supports already existing beliefs.
- Conservatism Bias: The tendency to underreact to new information, preferring the status quo.
- Framing Bias: The effect of the presentation of information on the decision.
- Herding Bias: The tendency to follow the actions of others rather than making independent decisions.
- Home Bias: The preference for domestic investments over foreign ones, despite potential benefits from diversification.
- Loss Aversion: The preference to avoid losses over acquiring equivalent gains, leading to risk-averse behaviour.
- Overconfidence Bias: The overestimation of one's abilities, knowledge, or control over investment outcomes.
- Representativeness Bias: The judging of the probability of an event by how much it resembles other events, often leading to stereotyping.
- Self-Attribution Bias: The attribution of success to personal skill and failure to external factors, reinforcing overconfidence.

These biases were each measured on a pair of statements using five-point Likert scale measuring responses from "strongly disagree" to "strongly agree".

For each respondent, a mean score for each of the behavioural biases was calculated using their response to the two associated items. These scores were then used as dependent variables to explore the impact of the demographic factors.

3.5.2. Independent Variables

The independent variables were the demographic factors hypothesised to impact the extent to which investors exhibit behavioural biases (Refer to Table A2.1). The following demographic data was collected: Gender, Age, Marital Status, Education Level, Employment Status, Investment Experience, and Investment Size. These demographic factors were included in the analysis to examine their impact on the presence and intensity of each behavioural bias.

3.6. Data Analysis

The data collected from the survey was analysed using the SPSS software.

Descriptive statistics, including means and frequency distributions, were calculated for all demographic variables and behavioural bias scores. This provided a general overview of the sample characteristics and helped identify any anomalies in the data.

Pearson correlation coefficients were computed to assess the relationships between the demographic variables and the behavioural bias scores. This analysis provided some initial insights into how demographic factors might be associated with specific biases.

Multiple regression analysis was carried out to explore the impact of demographic factors on each of the 11 behavioural biases. The mean score for each bias was taken as the dependent variable, and the set of demographic variables made up the independent variables. This allowed the possibility to identify relevant predictors for each of the behavioural biases, gaining insights on how demographic factors impact investor behaviour in the Maltese market.

Significance level for all tests was established at $p < 0.05$. The differences in behavioural biases across demographic groups were analysed using t-tests and ANOVA for determining the presence of statistical significance.

3.7. Ethical Considerations

Ethical considerations were strictly followed throughout the study. All participants were informed of the nature and purpose of the study before participation. Informed consent was taken from all respondents that their data would be kept anonymous and confidential. No personal identifiers were collected, and data was stored securely, accessible only to the researcher and authorised personnel. Approval of the study was sought and granted by the ethics committee of the University of Malta before data collection commenced.

3.8. Limitations

While this study's chosen methodology has been designed with the aim of obtaining robust results, there are a few limitations that must be acknowledged. Firstly, the reliance on self-reported data introduces the potential for response bias, as participants may not always accurately reflect their true behaviours or attitudes. Secondly, the use of a convenience and snowball sampling technique implies that the sample may not be representative of the whole population of Maltese investors, especially those less involved with online platforms. Thirdly, the study had a cross-sectional design, meaning it is limited in the potential to draw causal inferences from the identified relationships. Behavioural biases can also develop over time, and a longitudinal approach could offer deeper insights. Lastly, this study concentrates on individual investors, which may perhaps overlook institutional investors who may exhibit different behavioural patterns.

3.9. Conclusion

The methodology outlined in this chapter gives an overview of a well-structured approach toward examining the relationship between demographic factors and behavioural biases in the Maltese

investment context. Through a survey using a questionnaire and, importantly, an in-depth statistical analysis approach, this study promises to enrich the field of behavioural finance. The analysis of results leading to such conclusions is presented in the next chapter, where detailed discussion of the findings of regression models and their implications will be carried out.

4. Analysis & Results

This chapter delves into a detailed analysis of the data collected through the structured questionnaire sent to Maltese retail investors, with a focus on the relationships between the demographic factors and the 11 identified behavioural biases.

4.1. Demographic Distribution of Respondents

The respondents in this study were slightly concentrated in certain demographic groups (Refer to Table 3.1). The gender distribution was fairly balanced, with 59% of male respondents and 40% female respondents. The majority of the sample was relatively young, with 42% of respondents aged between 21 and 29 years, and only 4% over the age of 60. Educational level was skewed to the higher education side, as 83% of the respondents had at least a bachelor's degree. The distribution of employment status was also skewed, with 58% of the respondents working in the private sector and 25% in the public sector. The self-employed and unemployed, as well as those retired, constitute a smaller proportion of the sample. Considering experience with investing, 35% of the respondents had less than 2 years of experience, while 23% had more than 10 years of experience. The larger part of the respondents, 71%, had portfolios valued at less than €50,000, which means that the sample includes a prevalence of relatively small investors.

4.2. Internal Consistency of Questions Measuring Biases

Before analysing the impact of demographic factors, internal consistency between the paired items, used to measure each behavioural bias, was assessed using Pearson correlation coefficients (Table 4.1). All biases, except for conservatism, showed statistically significant correlations between the paired items ($p < 0.05$).

The non-significant correlation for conservatism bias raises questions regarding the reliability of the items used to measure this bias. This could be attributed to the cultural or contextual differences in how conservatism bias manifests among Maltese investors, a possibility that should

be explored in future research. For the above reasons, conservatism bias will, from here onwards, be excluded in the analysis of data collected from this survey.

TABLE 4.1 PEARSON CORRELATION TEST FOR INTERNAL CONSISTENCY

		Correlation	P-Value
Pair 1	Anchoring1 & Anchoring2	.379	**<.001**
Pair 2	CognitiveDissonance1 & CognitiveDissonance2	.227	**.004**
Pair 3	Confirmation1 & Confirmation2	.238	**.002**
Pair 4	Conservatism1 & Conservatism2	-.037	.644
Pair 5	Framing1 & Framing2	.260	**<.001**
Pair 6	Herding1 & Herding2	.438	**<.001**
Pair 7	HomeBias1 & HomeBias2	.287	**<.001**
Pair 8	LossAversion1 & LossAversion2	.218	**.006**
Pair 9	Overconfidence1 & Overconfidence2	.333	**<.001**
Pair 10	RepresentativenessBias1 & RepresentativenessBias2	.292	**<.001**
Pair 11	SelfAttribution1 & SelfAttribution2	.387	**<.001**

4.3. Relationships Between the Biases Themselves

Following the test for internal consistency, the relationships between the various behavioural biases under consideration were investigated. Table A2.2 provides insights into how certain biases may co-occur and influence one another in investment decision-making.

Anchoring bias was significantly correlated with confirmation bias, home bias, and representativeness bias. This suggests that investors who anchor on initial information are likely to confirm pre-existing beliefs, prefer domestic investments, and rely on past experiences when making decisions. Additionally, cognitive dissonance correlated significantly with representativeness bias, indicating that discomfort from holding conflicting beliefs may prompt investors to rely on familiar patterns.

Confirmation bias also correlated with herding bias and representativeness bias highlighting that investors who seek confirming information are prone to follow others and make decisions based on previous patterns.

Framing bias, which shapes decisions based on how information is presented, also correlated with herding bias, suggesting that those investors who are influenced by framing are more inclined to follow other investors' actions. Herding bias itself showed significant correlations not only with framing, but also confirmation bias, indicating that herding is reinforced by several cognitive tendencies such as the need for external validation, and the way information is framed.

Home bias was linked to anchoring and representativeness biases, showing that investors who prefer domestic assets often base decisions on prior experiences or initial information, reducing the likelihood of international diversification. Moreover, overconfidence bias correlated with representativeness bias and self-attribution bias, indicating that overconfident investors not only rely on past successes but also credit those successes to personal ability, reinforcing their overconfidence.

Overall, the correlations demonstrate that behavioural biases often co-occur, reinforcing each other. These interrelationships suggest the need for multi-layered approaches to mitigate biases.

4.4. Comparison of the Mean for Questions Measuring Bias

The Friedman test was conducted to compare the mean scores of the 11 behavioural biases (Refer to Table A2.3). The test showed that biases differed significantly from one another, thereby proving that some biases were more predominant among Maltese investors compared to others.

The highest mean score was observed for framing bias (M = 4.037), followed by confirmation bias (M = 3.891) and herding bias (M = 3.701). These results suggest that investors in Malta are very vulnerable to framing effects and that there is a tendency to seek information that confirms their prior beliefs, which is also consistent with findings of international studies (Kumar and Goyal, 2016; Baker et al., 2018).

On the other hand, the lowest mean score was for home bias (M = 3.053), indicating a lower tendency for Maltese investors to favour domestic over foreign investments. This may reflect the relatively small size and limited diversity of the Maltese financial market, which could drive investors to seek international diversification.

4.5. Impact of Demographic Factors on Behavioural Biases

The effect of the demographic variables on the propensity to exhibit behavioural bias was examined using one-way ANOVA for independent variables.

4.5.1. Gender

Gender was found to significantly influence home bias, loss aversion, and overconfidence bias (Refer to Table A2.4).

As expected, males scored higher in overconfidence (M = 3.416) than females (M = 3.231). This is consistent with the prior literature, which outlines that men tend to be overconfident about their abilities and knowledge when making investment decisions (Barber & Odean, 2001). Overconfidence among males is often associated with more active trading and riskier investment behaviours, indicating a stronger belief in the ability to exert control over financial outcomes.

On the other hand, female investors showed much higher loss aversion levels (M=3.546) than men (M=3.226), meaning that women are more loss-averse and may behave more cautiously to avoid losses. This finding is in line with those studies which indicate that women, in general, are more risk-averse than men when making financial decisions. The higher home bias for the female investors (M = 3.215) than males (M = 2.942) also uphold this trend as females would prefer to invest in domestic assets, which they are familiar with, rather than venturing out into the perceived risky foreign assets.

4.5.2. Age

Age was found to significantly influence anchoring bias (Refer to Table A2.5).

Age was found to influence anchoring bias significantly where young investors, especially those aged 21-29, showed the highest levels of anchoring (M = 3.478). This result is in line with the notion that inexperienced investors would rely more heavily on initial information in making decisions, as they might lack the ability to integrate new information efficiently. This was lower for investors in the 40-49 age group (M = 3.019), which may indicate a greater ability for these participants to adjust their views as they accumulate investment experience over time.

The data revealed that self-attribution bias approached significance with younger investors (M = 3.382) showing higher levels of self-attribution than older investors, which may suggest that younger people are more likely to attribute their success to their own ability rather than outside forces.

Though not statistically significant, there was also some notable trend in loss aversion with age, where older investors, especially those aged 60+, exhibited a higher level of loss aversion (M = 3.786). This aligns with previous research suggesting that older individuals tend to become more risk averse as they age, preferring to protect their wealth rather than take risks, preferring to protect their wealth rather than increase their risk for a higher return. Younger investors in the age group 21-29 years had lower levels of loss aversion (M = 3.228), which may imply they are more willing to take risks for potential gains.

4.5.3.Marital Status

Marital status was found to significantly influence anchoring bias, loss aversion, and self-attribution bias (Refer to Table A2.6).

It was found that unmarried investors showed considerably higher levels of anchoring (M = 3.40) than married investors (M = 3.11), suggesting that unmarried individuals may be more prone to relying on initial information when making decisions. This can be explained by differences in decision-making processes between married and unmarried people, where married investors may

either feel more responsible or have some sort of shared decision-making process that makes them more cautious in dealing with new information.

Likewise, unmarried investors showed lower loss aversion (M = 3.23) than married investors (M = 3.54), which may suggest that married individuals might be more loss-sensitive and hence more risk-averse, in line with the belief that people having family would want to preserve their financial security with greater care.

Lastly, self-attribution bias was more pronounced among the unmarried investor group (M = 3.33) when compared with the married group (M = 3.07). This may indicate that unmarried individuals are more prone to attribute success to their own skill and failure to external factors, which would enhance overconfidence in their decision-making. This may be attributed to an individualistic mindset of unmarried investors who may not have the same kind of shared decision-making responsibilities as married investors.

4.5.4. Education Level

Education level was not found to significantly influence most behavioural biases, except for anchoring bias where the p-value approached significance (Refer to Table A2.7).

The mean scores indicate that investors with an Ordinary Matriculation Certificate (M = 4.167) had the highest levels of anchoring bias, followed by those with a bachelor's degree (M = 3.375) and an Advanced Matriculation Certificate (M = 3.333). Investors with a Doctorate showed the lowest mean level of anchoring bias (M = 2.625), suggesting that higher levels of formal education may provide some protection against reliance on initial information when making investment decisions.

In general, while the level of education does not have a uniformly strong impact on behavioural biases, certain patterns, such as the influence of advanced education on anchoring bias, are worth noting and might warrant further examination with a larger sample size.

4.5.5. Employment Status

Employment status was found to significantly influence loss aversion (Refer to Table A2.8).

Public sector employees (M = 3.638) exhibited the highest levels of loss aversion. This is higher than private sector employees (M = 3.263) and for all other employment categories, such as the self-employed (M = 3.143) and students (M = 3.219). It could be said that public sector employees may be more loss averse because of the perceived job security stemming from employment status, thereby entailing greater aversion to financial risk.

Although not statistically significant, some interesting trends did appear for the other biases: for instance, self-employed respondents recorded relatively high mean scores for confirmation bias (M = 4.286) and representativeness bias (M = 3.929), which might suggest that they could be more susceptible to overemphasizing patterns or past successes in their decision processes. While based on a small sample size (N = 7), these findings should be approached cautiously.

4.5.6. Investment Experience

Investment Experience was found to significantly influence anchoring bias, home bias, and self-attribution bias (Refer to Table A2.9).

Anchoring bias displayed a strong inverse relationship with investment experience. Investors with less than 2 years of experience had the highest mean score (M = 3.526), suggesting they were most likely to rely heavily on initial pieces of information when making decisions. In contrast, those with over 10 years of experience exhibited significantly lower levels of anchoring bias (M = 2.932). This would suggest that more experienced investors are better able to process and update new information rather than anchor on past or initial data points. Such a finding is supported by the wider behavioural finance literature, which suggests that experience facilitates reliance on cognitive shortcuts.

Home bias also showed a significant relationship with investment experience, where less experienced investors (less than 2 years) had a higher tendency to favour domestic investments (M = 3.404) compared to those with over 10 years of experience (M = 2.811). The findings are indicative that inexperienced investors are more likely to shy away from international diversification, possibly due to a lack of familiarity with foreign markets. In contrast, more experienced investors might have a better understanding of the advantages of diversification beyond national boundaries, which would necessarily translate to lower home bias.

For self-attribution bias, the results showed that means are significantly different in line with experience. Comparatively, investors with more than 10 years of experience had higher means of self-attribution bias (M = 3.392) than those with 5-10 years of experience (M = 2.889), while the group of less than 2 years of experience had a mean score of 3.202. That may suggest that more experienced investors would be more likely to attribute their success to a personal skill factor, perhaps due to a longer track record of investing and past successes that reinforce their confidence in their abilities.

Overconfidence bias was not significant, p = 0.114. However, there is a visible trend that investors with more than 10 years of experience have the highest mean score, M = 3.554, which might indicate higher levels of overconfidence. While this relation was not statistically significant, it agrees with prior research where, over time, experience sometimes inflates investors' perception of knowledge and control over investment outcomes.

Overall, the results confirm that investment experience has a significant impact on certain biases, particularly anchoring, home, and self-attribution biases, highlighting the importance of experience in shaping how investors approach decision-making.

4.5.7. Investment Size

Investment size was found to significantly influence anchoring bias, home bias, and self-attribution bias (Refer to Table A2.10).

The analysis of investment size shows a few important results with regards to anchoring bias and herding bias, which prove that the amount of capital invested affects some behavioural tendencies.

It was found that anchoring bias can be significantly explained by the size of investment portfolio. The investors with smaller portfolios (less than €50,000) revealed a higher level of anchoring bias (M = 3.382) compared to those who have larger portfolios. As the size of the investment increased, the average score for anchoring bias generally decreased. This might mean that investors with smaller portfolios have to rely more on the initial information for their decisions, which could be due to a lack of experience or knowledge. On the other hand, investors with bigger portfolios might process new information more aptly and not rely as much on the initial anchors.

Herding bias also showed significant differences across the investment size categories. Investors with smaller portfolios (less than €50,000) showed a higher level of herding bias (M = 3.724), meaning that an investor with a smaller portfolio is more likely to follow the other's decisions rather than making independent choices. Ironically, investors with portfolios ranging from €100,000 to €250,000 showed an even higher herding tendencies (M = 4.000), which could hint that as the portfolios of investors grow to a certain extent, they could seek more external validation or peer influence in their decision-making.

However, investors with portfolios above €3,000,000 showed the highest herding bias score (M = 4.500), which could be explained by the higher difficulties and stakes related to the management of large portfolios, which could have driven them to rely more on collective market behaviours. However, with a very small sample size (N = 1), such conclusions should be treated very carefully and should be investigated in further research.

While confirmation bias approached significance (p = 0.073), it did not show a statistically significant relationship with investment size. However, it is worth noting that the bigger investors (€100,000 – €250,000) showed a slightly higher mean score (M = 4.100) than smaller ones,

indicating that larger investors could be more likely to seek information verifying their already existing opinions.

All in all, the size of the portfolio of the investor has the strongest influence on anchoring bias and herding bias; the smaller the investor, the more dependence on initial information and the greater the tendency to follow the crowd. The findings show that with the growth of investors' portfolios, their decisions may be less influenced by anchoring, though in some cases, large portfolios still fall under herding behaviour.

5. Discussion of Results, Conclusions, and Recommendations

This final chapter will bring together the findings from the study and try to give an assessment of whether the stipulated research objectives in Chapter One have been adequately met. The implications of these findings are further discussed with evidence-based recommendations for investors, policymakers, and future research.

5.1. Achievement of Research Objectives

The primary objective of this research was to explore how demographic factors influence behavioural biases in investment decision-making among Maltese investors. Specifically, the study examined the effects of age, gender, education, marital status, employment, investment experience, and portfolio size on 11 key behavioural biases: Anchoring, Cognitive Dissonance, Confirmation Bias, Conservatism, Framing, Herding, Home Bias, Loss Aversion, Overconfidence, Representativeness, and Self-Attribution.

The findings largely provide support for the research hypothesis seeking to explore the degree to which investors exhibit certain behavioural biases is significantly influenced by the demographic factors. As demonstrated in the results, gender, age, and marital status, together with investment experience, strongly influence biases like overconfidence, loss aversion, and anchoring. However, some biases, such as cognitive dissonance and confirmation bias, varied less between demographic groups, potentially suggesting that they may be more universal across different populations.

One notable outcome was the inconsistent measurement of conservatism bias, which displayed negative correlations and internal reliability issues. This suggests that conservatism bias may manifest differently within the Maltese context or that the tools used to measure this bias may need to be refined. Nevertheless, the research successfully met its objectives by highlighting the interplay between demographic factors and behavioural biases within the Maltese market.

5.2. Implications of Findings

5.2.1. Gender

The study confirmed literature that suggests gender is an influencing factor on behavioural biases. Overconfidence bias was more pronounced among male investors compared to females, which is in line with Ates et al. (2016), Barber & Odean (2001) and Bhandari & Deaves (2006) to name a few, who found that men tend to overestimate their knowledge and abilities in making financial decisions. In addition, female investors exhibited higher loss aversion, similar to Ates et al. (2016), in which women were shown to be more sensitive to losses and more likely to be risk averse.

Interestingly, women showed more significant home bias than men did, which supported theories related to risk aversion indicating that female investors are more likely to prefer domestic investments due to their perception of safety (Sharma et al., 2022). These results can be a call for financial advisors in considering gender-based tendencies while giving advice, particularly in diversifying portfolios of women and addressing overconfidence developed in men.

5.2.2. Age

Age significantly influenced anchoring bias, with younger investors in the 21-29 years range showing a greater level of this bias. The result is consistent with other studies on the topic by Baker et al., 2019 and Beatrice, Murhadi & Herlambang, which found that young investors rely more heavily on their first information because they are relatively inexperienced. Similarly, younger investors were more prone to self-attribution bias, where successes were attributed to personal skill, meaning that inexperienced investors tend to overestimate their abilities.

Contrary to expectations, confirmation bias and framing bias did not show significant age-related differences, suggesting that some biases may be universal across age groups. This has implications for education and training programs for younger investors, which should focus on mitigating the effects of anchoring and self-attribution bias through encouraging critical thinking, given these are areas in which younger investors are more susceptible.

5.2.3.Marital Status

Marital status significantly influenced anchoring bias, loss aversion, and self-attribution bias, with unmarried investors exhibiting higher levels of these biases. Unmarried individuals, often more financially independent and risk-tolerant, are more likely to anchor on initial information and attribute successes to personal skill, aligning with findings from Ates et al. (2016). Married investors, on the other hand, may exhibit more cautious behaviour due to shared financial responsibilities, leading to lower levels of these biases. This highlights the importance of tailoring financial advice based on marital status and associated risk preferences.

5.2.4. Education Level

Unlike previous studies, education level was not found to significantly influence most behavioural biases. The only exception was anchoring bias, where the p-value approached significance. This contrasts with prior literature, such as Bhandari & Deaves (2006) and Goo et al. (2010), which suggested that higher education levels typically reduce the prevalence of biases like overconfidence and representativeness.

The limited role of education in this study suggests that formal education alone may not be sufficient to overcome biases. It points to the need for practical financial education and cognitive training programs that focus on real-world decision-making scenarios, targeting both highly educated and less educated investors.

5.2.5.Employment Status

Employment status significantly affected loss aversion, with public sector employees showing higher levels than those in the private sector or self-employed. Public sector workers, with more stable incomes, tend to be more risk-averse, prioritising financial security over potential gains, which aligns with findings from Beatrice, Murhadi & Herlambang (2021). In contrast, private sector and self-employed individuals, accustomed to more variable income, showed lower loss aversion.

Understanding employment context is crucial for financial advisors in assessing clients' risk tolerance and providing suitable investment strategies.

5.2.6. Investment Experience

Investment experience was found to significantly influence several biases, particularly anchoring bias, home bias, and self-attribution bias. Less experienced investors were more susceptible to these biases, aligning with studies like Prosad et al. (2015) and Ates et al. (2016), which suggested that inexperienced investors tend to rely on initial information and make decisions based on familiar patterns.

More experienced investors (over 10 years) displayed lower levels of anchoring bias, reinforcing the idea that experience mitigates cognitive shortcuts. These experienced investors, albeit being less susceptible to these biases, still displayed signs of overconfidence, indicating that confidence grows with experience but may sometimes become excessive. This reinforces the need for continuous education and self-reflection for experienced investors, to avoid falling into the trap of overconfidence, as suggested by Bhandari & Deaves (2006).

5.2.7. Investment Size

Investment size was significantly related to both anchoring and herding biases, suggesting a significant relationship with behavioural tendencies that mirrors the findings in the literature on the effect of income on investment behavior. While this study did not directly measure income, investment size is a good proxy variable, as it can also reflect financial standing, thereby showing how resource availability may influence investor behavior. The strong correlation between investment size and anchoring bias suggests that smaller investors are more prone to rely on initial information they are given, possibly due to lesser access to full financial consultancies or resources to further analyse. This tendency to "anchor" may be in an attempt to simplify decision-making under their financial constraint, as noted in studies where low-income investors also depend heavily on underestimated initial cues (Owusu & Laryea, 2023).

Similarly, the significant link between investment size and herding bias is in line with findings that lower-income or smaller-scale investors are more likely to depend on social cues in their decision-making. This could be due to a perceived need to follow the market trend as a risk mitigation strategy, especially when the investor does not have the financial cushioning that allows for independent or contrarian investment decisions. Anchoring on the investment size rather than income, this study provides another perspective of the role of financial standing in shaping behavioural biases and underlines the importance of financial literacy interventions that address biases like anchoring and herding among investors with smaller portfolios.

5.3. Recommendations

5.3.1. Financial Education and Awareness Programs

One of the important lessons from this study is financial literacy in overcoming behavioural biases. Government, financial institutions, and educators need to be guided in formulating extensive programs in financial education targeted for various groupings. Training to reduce anchoring bias should be given more to younger and less experienced investors, while male investors might need more awareness programs that could reduce overconfidence bias. More specifically, women, particularly those showing loss aversion and home bias, should be encouraged to diversify their investment portfolios and take on riskier, high-reward opportunities.

5.3.2. Personalised Financial Advice

Financial planners should adopt a personalised approach when dealing with clients; this would mean demographic considerations. Ensuring male clients are aware of overconfidence bias, while at the same time encouraging female investors to rise above loss aversion and invest more aggressively, is essential. Young investors found to rely on anchoring and self-attribution could benefit from strategies emphasizing critical analysis and long-term thinking.

5.3.3. Suggestions for Future Research

This study's findings single out various areas that need further research in the future. Firstly, the conflicting results vis-à-vis conservatism bias call for more investigation. Future studies might investigate whether this bias exhibits in different ways in small financial markets, such as Malta, or whether the measurement tools used in this study require refinement.

Finally, given the strong intercorrelations among some of the biases, future research should investigate the possibility that interventions designed to reduce one bias might, in effect, unconsciously increase another, for instance, reducing overconfidence bias might actually increase loss aversion, with more apprehension about risks realised.

Longitudinal studies would allow an understanding of changes in behavioural biases over time and as market conditions change. Following investors over different life stages will further help in validating these findings and revealing new insights regarding the link between behavioural biases and demographics.

5.4. Conclusion

This research successfully attained its goal of researching the relationship existing between demographic factors and behavioural biases among Maltese investors. Results show that biases like overconfidence, loss aversion, anchoring, and self-attribution are influenced to a great degree by demographic factors like gender, age, marital status, employment, investment experience, and size. While the study falls short in measurement of conservatism bias and education not playing as large a role as expected, overall results fall in line with existing literature and bear important implications for financial education, personalized advice, and regulatory interventions.

These findings have important implications for financial education and personalised investment advice as ways to overcome the harmful influence of behavioural biases on investment decisions. Future studies should build from the findings to continue to broaden our understanding of this complex interplay between demographics and cognitive biases in financial markets.

References

Ajzen, I. 1991, "The Theory of Planned Behavior", *Organizational behavior and human decision processes.*

Albart, N. 2024, "The Influence of Financial Literacy, Income Level and Herding Behavior on Investment Decisions", *International Journal of Economics Development Research (IJEDR),* vol. 5, no. 2, pp. 1344–1360.

Antoniou, C., Doukas, J.A. & Subrahmanyam, A. 2013, "Cognitive Dissonance, Sentiment, and Momentum", *Journal of financial and quantitative analysis,* vol. 48, no. 1, pp. 245–275.

Ates, S., Coskun, A., Sahin, M.A. & Demircan, M.L. 2016, "Impact of Financial Literacy on the Behavioral Biases of Individual Stock Investors: Evidence from Borsa Istanbul", *Business and Economics Research Journal,* vol. 7, no. 3, pp. 1.

Atsala, B. 2017, "Behavioral finance: The literature review of myopic loss aversion", *International Conference on Education (ICE2) 2018: Education and Innovation in Science in the Digital Era*, pp. 162.

Bakar, S. & Yi, A.N.C. 2016, "The impact of psychological factors on investors' decision making in Malaysian stock market: a case of Klang Valley and Pahang", *Procedia Economics and Finance,* vol. 35, pp. 319–328.

Baker, H.K., Kapoor, S. & Khare, T. 2023, "Personality traits and behavioral biases of Indian financial professionals", *Review of Behavioral Finance,* vol. 15, no. 6, pp. 846–864.

Baker, H.K., Kumar, S., Goyal, N. & Gaur, V. 2019, "How financial literacy and demographic variables relate to behavioral biases", *Managerial Finance,* vol. 45, no. 1.

Baker, H.K., Kumar, S., Goyal, N. & Gaur, V. 2019, "How financial literacy and demographic variables relate to behavioral biases", *Managerial finance,* vol. 45, no. 1, pp. 124–146.

Barber, B.M. & Odean, T. 2001, "Boys will be boys: Gender, overconfidence, and common stock investment", *The quarterly journal of economics,* vol. 116, no. 1, pp. 261–292.

Beatrice, V., Murhadi, W.R. & Herlambang, A. 2021, "The effect of demographic factors on behavioral biases", *Jurnal Siasat Bisnis,* vol. 25, no. 1, pp. 17–29.

Bhandari, G. & Deaves, R. 2006, "The demographics of overconfidence", *The Journal of Behavioral Finance,* vol. 7, no. 1, pp. 5–11.

Bisati, A.I., SM Imamul Haque Umer, J.G. & Gulzar, I. 2021, *Decision Making in Financial Markets: A Thematic Review and Discussion*, Warsaw: Enviro Research Publishers, Warsaw.

Chang, T.Y., Solomon, D.H. & Westerfield, M.M. 2016, "Looking for Someone to Blame: Delegation, Cognitive Dissonance, and the Disposition Effect", *The Journal of finance (New York),* vol. 71, no. 1, pp. 267–302.

Cheng, C.X. 2018, "Confirmation Bias in Investments", *International Journal of Economics and Finance,* vol. 11, no. 2, pp. 50.

Dassani, P., Kittu Manda, V. & ., D. 2022, "Cognitive Dissonance Bias Among Stock Market Investors", *Review of Professional Management,* vol. 20, no. 1.

Fama, E.F. 1970, "Efficient capital markets", *Journal of Finance,* vol. 25, no. 2, pp. 383–417.

Festinger, L. *A Theory Of Cognitive Dissonance,* Stanford University Press, Stanford, CA.

Gervais, S. & Odean, T. 2001, "Learning to Be Overconfident", *The Review of financial studies,* vol. 14, no. 1, pp. 1–27.

Goo, Y., Chen, D., Chang, S.S. & Yeh, C. 2010, "A study of the disposition effect for individual investors in the Taiwan stock market", *Emerging Markets Finance and Trade,* vol. 46, no. 1, pp. 108–119.

Hoffmann, A.O.I. & Post, T. 2014, "Self-attribution bias in consumer financial decision-making: How investment returns affect individuals' belief in skill", *Journal of Behavioral and Experimental Economics,* vol. 52, pp. 23–28.

Ica, R.C., Salim, U., Indrawati, N.K. & Ratnawati, K. 2018, "Influence of Framing Information and Disposition Effect in Decision of Investment: Experimental Study on Investor Behavior at Indonesia Stock Exchange Representative on Denpasar, Bali", *International review of management and marketing,* vol. 8, no. 3, pp. 59.

Irshad, S., Badshah, W. & Hakam, U. 2016, "Effect of representativeness bias on investment decision making", *Management and Administrative Sciences Review,* vol. 5, no. 1, pp. 26–30.

Jain, J., Walia, N. & Gupta, S. 2020, "Evaluation of behavioral biases affecting investment decision making of individual equity investors by fuzzy analytic hierarchy process", *Review of Behavioral Finance,* vol. 12, no. 3, pp. 297–314.

Jain, J., Walia, N., Singla, H., Singh, S., Sood, K. & Grima, S. 2023, "Heuristic Biases as Mental Shortcuts to Investment Decision-Making: A Mediation Analysis of Risk Perception", *Risks (Basel),* vol. 11, no. 4, pp. 72.

Jamil, N. & Bashir, T. 2021, "Impact of Cognitive Dissonance Bias on Investors' Decisions: Moderating Role of Emotional Intelligence", *Pakistan Social Sciences Review,* vol. 5, no. 3, pp. 338–552.

Kahneman, D. & Tversky, A. 1979, "Prospect Theory: An Analysis of Decision under Risk", *Econometrica,* vol. 47, no. 2, pp. 263–291.

Kansal, P. & Singh, S. 2018, "Determinants of overconfidence bias in Indian stock market", *Qualitative Research in Financial Markets,* vol. 10, no. 4, pp. 381–394.

Khan, M.U. 2017, "Impact of availability bias and loss aversion bias on investment decision making, moderating role of risk perception", *Management & Administration (IMPACT: JMDGMA),* vol. 1, no. 1, pp. 17–28.

Kirchler, E., Maciejovsky, B. & Weber, M. 2005, "Framing Effects, Selective Information, and Market Behavior: An Experimental Analysis", *The journal of behavioral finance,* vol. 6, no. 2, pp. 90–100.

Kiymaz, H., Öztürkkal, B. & Akkemik, K.A. 2016, "Behavioral biases of finance professionals: Turkish evidence", *Journal of Behavioral and Experimental Finance,* vol. 12, pp. 101–111.

Kumar, P., Islam, M.A., Pillai, R. & Sharif, T. 2023, "Analysing the behavioural, psychological, and demographic determinants of financial decision making of household investors", *Heliyon,* vol. 9, no. 2.

Kumar, S. & Goyal, N. 2016, "Evidence on rationality and behavioural biases in investment decision making", *Qualitative research in financial markets,* vol. 8, no. 4, pp. 270–287.

Mishra, K.C. & Metilda, M.J. 2015, "A study on the impact of investment experience, gender, and level of education on overconfidence and self-attribution bias", *IIMB management review,* vol. 27, no. 4, pp. 228–239.

Montier, J. 2002, *Behavioural finance: Insights into Irrational Minds and Markets,* John Wiley & Sons, New Jersey.

Moosa, I.A., Ramiah, V., Moosa, I.A. & Ramiah, V. 2017, "Loss aversion bias, the disposition effect and representativeness bias", *The financial consequences of behavioural biases: An analysis of bias in corporate finance and financial planning,* , pp. 71–92.

Novotná, M., Kořená, K. & Lehmanová, B. 2023, "Assessing Behavioral Biases in the Banking Sector: Evidence from a Questionnaire Survey", *FINANCIAL MANAGEMENT OF FIRMS AND FINANCIAL INSTITUTIONS,* , pp. 88.

Oehler, A., Rummer, M. & Wendt, S. 2008, "Portfolio Selection of German Investors: On the Causes of Home-biased Investment Decisions", *The journal of behavioral finance,* vol. 9, no. 3, pp. 149–162.

Okumura, B.U., Pimenta Júnior, T., Maemura, M.M.D., Gaio, L.E. & Gatsios, R.C. 2023, "Behavioural finance: the decoy effect on stock investment decisions", *Journal of Economics, Finance and Administrative Science,* vol. 28, no. 56, pp. 335–351.

Owusu, S.P. & Laryea, E. 2023, "The impact of anchoring bias on investment decision-making: evidence from Ghana", *Review of behavioral finance,* vol. 15, no. 5, pp. 729–749.

Park, J., Konana, P., Gu, B., Kumar, A. & Raghunathan, R. 2013, "Information Valuation and Confirmation Bias in Virtual Communities: Evidence from Stock Message Boards", *Information systems research,* vol. 24, no. 4, pp. 1050–1067.

Pirie, S. & Chan, R.K.T. 2018, "A two-stage study of momentum investing in Asia: A case of cognitive dissonance?", *Research in international business and finance,* vol. 44, pp. 340–349.

Prosad, J.M., Kapoor, S. & Sengupta, J. 2015, "Behavioral biases of Indian investors: a survey of Delhi-NCR region", *Qualitative research in financial markets,* vol. 7, no. 3, pp. 230–263.

Rajdev, A.A. & Raninga, A.M. 2016, "Gender and heuristic driven biases: A review of literature", *International Journal of Commerce, Business and Management,* vol. 5, no. 3, pp. 35–38.

Robin, R. & Angelina, V. 2020, "Analysis of the impact of anchoring, herding bias, overconfidence and ethical consideration towards investment decision", *JIMFE (Jurnal Ilmiah Manajemen Fakultas Ekonomi),* vol. 6, no. 2, pp. 253–264.

Sattar, M.A., Toseef, M. & Sattar, M.F. 2020, "Behavioral finance biases in investment decision making", *International Journal of Accounting, Finance and Risk Management,* vol. 5, no. 2, pp. 69.

Schulz, B. 2023, "Behavioral Finance and how its Behavioral Biases Affect German Investors", *Economic studies & analyses,* vol. 17, no. 1, pp. 39–59.

Sharma, P.C. 2024, ""Influence of Behavioural Biases on Market Investment Behaviour-Mediating Role of Brand Trust"", *Iranian journal of management studies,* vol. 17, no. 1, pp. 1–19.

Sharma, R., Mishra, N. & Pande, S. 2022, "Impact Of Demographic Variables On Behavioural Dispositions Of Individual Investors–An Empirical Analysis", *Advanced Engineering Science,* vol. 54, no. 2, pp. 1498–1514.

Shusha, A.A. & Touny, M.A. 2016, "The attitudinal determinants of adopting the herd behavior: an applied study on the Egyptian exchange", *Journal of Finance and Investment Analysis,* vol. 5, no. 1, pp. 55–69.

Tekçe, B. & Yılmaz, N. 2015, "Are individual stock investors overconfident? Evidence from an emerging market", *Journal of Behavioral and Experimental Finance,* vol. 5, pp. 35–45.

Thaler, R. 1985, "Mental accounting and consumer choice", *Marketing science,* vol. 4, no. 3, pp. 199–214.

Thaler, R. 1980, "Toward a positive theory of consumer choice", *Journal of economic behavior & organization,* vol. 1, no. 1, pp. 39–60.

Tversky, A. & Kahneman, D. 1974, "Judgment under Uncertainty: Heuristics and Biases", *Science,* vol. 185, no. 4157, pp. 1124–1131.

Wood, R. & Zaichkowsky, J.L. 2004, "Attitudes and Trading Behavior of Stock Market Investors: A Segmentation Approach", *The journal of behavioral finance,* vol. 5, no. 3, pp. 170–179.

Wu, C., Wu, C. & Liu, V.W. 2009, "The conservatism bias in an emerging stock market: Evidence from Taiwan", *Pacific-Basin finance journal,* vol. 17, no. 4, pp. 494–505.

Zheng, Z., Tang, K., Liu, Y. & Guo, J.M. 2021, "Gender and herding", *Journal of empirical finance,* vol. 64, pp. 379–400.

Appendix 1 Questionnaire Distributed to Participants

Introduction

Dear Participant,

My name is Amy, a student at the University of Malta currently reading for my master's degree in Banking, Finance, and Investments. Thank you for taking the time to participate in this survey. This survey aims to unravel how demographic variables within the Maltese context influence behavioural biases in investment decisions. By exploring your perspectives and tendencies, I seek to identify patterns that can provide insights into addressing and mitigating the impact of behavioural biases in investment decision-making.

Your feedback is invaluable in helping me understand the relationship between demographic factors and behavioural biases in investment decision-making among Maltese investors.

Confidentiality

Your responses will be kept confidential and anonymous. The data collected will be used for research purposes only and will not be shared with any third parties.

Instructions

Please read each question carefully and select the response that best reflects your thoughts, feelings, and behaviours. There are no right or wrong answers, so please answer honestly and to the best of your ability.

Duration

The survey should take approximately 10 minutes to complete.

Consent

By answering the questions set out hereafter, you consent to participating in this survey.

Contact Information

If you have any questions or concerns about the survey, please contact Amy Farrugia on amy.farrugia.20@um.edu.mt.

Thank you for your participation!

Sincerely,

Amy Farrugia

Section 1: Assessment of Biases

I usually forecast the future stock prices based on recent stock price.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I regret missing the opportunity to sell a stock that was recently at a high price and usually wait until it returns to that price before considering selling.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

It cannot be said that losses in investments during crisis periods are due to the investor's incompetence since crises are unpredictable.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

After signing a contract with a bank to take out a loan, I do not research the credit terms of other banks because learning that I could have gotten better terms and realising that I made the wrong bank choice makes me uncomfortable.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Positive news about a company I am considering buying stock in encourages me to proceed with the purchase.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I feel very good if people whose opinions I value are also investing in the areas I am investing in.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Even if a stock I bought with strong belief starts to lose value, I do not panic and sell immediately.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

When I hear news that could negatively impact the price of a stock in my portfolio, I wait for the news to spread in the market and its significance to be understood before taking any action. Then I decide what to do.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

If one option guarantees a gain of €5000 with 100% probability and another option offers a 25% probability of gaining €8000 with a 75% probability of gaining nothing, I prefer the first option.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

If one option guarantees a loss of €6000 with 100% probability and another option offers a 75% probability of losing €8000 with a 25% probability of losing nothing, I prefer the second option.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I am more likely to buy a stock that has a lot of investors interested in it.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Following other “experts” is a better way to protect my self-interests than making uninformed and miscalculated decisions.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I prefer to invest in domestic and familiar stocks or companies.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Language and cultural similarities are key factors in selecting stocks.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I readily sell shares that have increased in value.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I would rather choose an investment option with a high probability of a small loss over one with a low probability of a large loss.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I feel more confident in my own investment opinions over opinions of financial analysts and advisors.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

When I purchase a winning investment, I feel that my actions and knowledge affected the result.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I buy trending stocks and avoid stocks having poor performance in past.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

The past performance of a stock's returns plays an important role in buying and selling decisions.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

The high returns I achieve from my investments are a result of my ability to make accurate evaluations and decisions.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

If I have failed as a result of my financial decisions, it is largely due to bad luck rather than my lack of skill.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Section 2: Demographics

How would you describe your gender identity?

- Male
- Female
- Other

Which category includes your age?

- 18-20
- 21-29
- 30-39

- 40-49
- 50-59
- 60+

What is your marital status?

- Married
- Unmarried

What is the highest level of education you have completed?

- Doctorate
- Master’s Degree
- Bachelor’s Degree
- Diploma
- Advanced Matriculation Certificate
- Ordinary Matriculation Certificate
- Other (please specify):

What is your employment status?

- Public Sector Employee
- Private Sector Employee
- Self Employed
- Unemployed
- Student
- Retired
- Other (please specify):

For how long have you been investing in the stock market?

- Less than 2 years
- 2 – 5 years
- 5 – 10 years
- Over 10 years

What is the monetary amount of your investable assets?

- Less than €50,000
- €50,000 - €100,000
- €100,000 - €250,000
- €250,000 - €500,000
- €500,000 - €1,000,000
- €1,000,000 - €3,000,000
- Over €3,000,000

Appendix 2 Tables with Results

TABLE A2.1 VARIABLE DESCRIPTION

	Category	Coding	Abs. freq.	Rel. freq. (%)
Gender	Male	1	95	59%
	Female	2	65	40%
	Prefer Not to Say	3	1	1%
Age	18-20	1	0	0%
	21-29	2	68	42%
	30-39	3	40	25%
	40-49	4	26	16%
	50-59	5	20	12%
	60+	6	7	4%
Marital Status	Unmarried	1	98	61%
	Married	2	63	39%
Education Level	Doctorate	1	4	2%
	Master's Degree	2	79	49%
	Bachelor's Degree	3	52	32%
	Diploma	4	12	7%
	Advanced Matriculation Certificate	5	12	7%
	Ordinary Matriculation Certificate	6	3	2%
Employment Status	Public Sector Employee	1	40	25%
	Private Sector Employee	2	93	58%
	Self Employed	3	7	4%
	Unemployed	4	1	1%
	Student	5	16	10%
	Retired	6	4	2%

Investment Experience	Less than 2 years	1	57	35%
	2 – 5 years	2	40	25%
	5 – 10 years	3	27	17%
	Over 10 years	4	37	23%
Investment Size	Less than €50,000	1	114	71%
	€50,000 - €100,000	2	16	10%
	€100,000 - €250,000	3	15	9%
	€250,000 - €500,000	4	10	6%
	€500,000 - €1,000,000`	5	2	1%
	€1,000,000 - €3,000,000	6	3	2%
	Over €3,000,000	7	1	1%

TABLE A2.2 PEARSON CORRELATION TEST FOR RELATIONSHIP BETWEEN EACH BIAS

		Anchoring	Cognitive Dissonance	Confirmation	Conservatism	Framing	Herding	Home	Loss Aversion	Overconfidence	Representative	Self-Attribution
Anchoring	Correlation	1	.051	**.175***	.072	.058	.123	**.186***	.083	.023	**.215****	.076
	P-Value		.524	**.027**	.367	.464	.119	**.018**	.296	.770	**.006**	.335
Cognitive Dissonance	Correlation	.051	1	.088	-.004	.123	.048	.113	-.102	-.086	**.208****	-.016
	P-Value	.524		.267	.961	.119	.547	.153	.199	.279	**.008**	.844
Confirmation	Correlation	**.175***	.088	1	.046	.110	**.285****	.113	-.112	.074	**.352****	.099
	P-Value	**.027**	.267		.566	.164	**<.001**	.153	.159	.351	**<.001**	.212
Conservatism	Correlation	.072	-.004	.046	1	-.055	**.179***	-.013	-.078	.052	.009	.012
	P-Value	.367	.961	.566		.490	**.023**	.866	.327	.512	.914	.876
Framing	Correlation	.058	.123	.110	-.055	1	**.215****	-.109	.013	.064	.088	.018
	P-Value	.464	.119	.164	.490		**.006**	.169	.869	.421	.269	.819
Herding	Correlation	.123	.048	**.285****	**.179***	**.215****	1	.095	.114	-.072	.129	.089
	P-Value	.119	.547	**<.001**	**.023**	**.006**		.233	.150	.365	.103	.263
Home	Correlation	**.186***	.113	.113	-.013	-.109	.095	1	.125	-.010	**.288****	.151
	P-Value	**.018**	.153	.153	.866	.169	.233		.113	.905	**<.001**	.056
Loss Aversion	Correlation	.083	-.102	-.112	-.078	.013	.114	.125	1	-.017	.097	-.039
	P-Value	.296	.199	.159	.327	.869	.150	.113		.831	.220	.624
Overconfidence	Correlation	.023	-.086	.074	.052	.064	-.072	-.010	-.017	1	.015	**.270****
	P-Value	.770	.279	.351	.512	.421	.365	.905	.831		.850	**.001**
Representative	Correlation	**.215****	**.208****	**.352****	.009	.088	.129	**.288****	.097	.015	1	-.012
	P-Value	**.006**	**.008**	**<.001**	.914	.269	.103	**<.001**	.220	.850		.879
Self-Attribution	Correlation	.076	-.016	.099	.012	.018	.089	.151	-.039	**.270****	-.012	1
	P-Value	.335	.844	.212	.876	.819	.263	.056	.624	**.001**	.879	

TABLE A2.3 FRIEDMAN TEST FOR MEAN COMPARISON

	Mean	Std. Deviation
Anchoring	3.2857	.71527
Cognitive Dissonance	3.2671	.81400
Confirmation	3.8913	.53821
Conservatism	3.5714	.63703
Framing	**4.0373**	.56886
Herding	3.7019	.65283
Home	**3.0528**	.81318
Loss Aversion	3.3540	.73451
Overconfidence	3.3354	.68642
Representative	3.3571	.73406
Self-Attribution	3.2298	.67776

TABLE A2.4 'GENDER' IMPACT ON BEHAVIOURAL BIASES

		N	Mean	Std. Deviation	P-Value
Anchoring	Male	95	3.195	.776	.064
	Female	65	3.408	.599	
Cognitive Dissonance	Male	95	3.211	.827	.277
	Female	65	3.354	.799	
Confirmation	Male	95	3.879	.582	.676
	Female	65	3.915	.472	
Conservatism	Male	95	3.632	.637	.175
	Female	65	3.492	.634	
Framing	Male	95	4.032	.609	.743
	Female	65	4.062	.496	
Herding	Male	95	3.653	.700	.210
	Female	65	3.785	.573	
Home	Male	95	2.942	.847	.037
	Female	65	3.215	.745	
Loss Aversion	Male	95	3.226	.781	.007
	Female	65	3.546	.623	
Overconfidence	Male	95	3.416	.698	.046
	Female	65	3.231	.656	
Representative	Male	95	3.279	.757	.095
	Female	65	3.477	.693	
Self-Attribution	Male	95	3.189	.693	.386
	Female	65	3.285	.661	

TABLE A2.4 'AGE' IMPACT ON BEHAVIOURAL BIASES

		N	Mean	Std. Deviation	P-Value
Anchoring	21-29	68	3.478	.666	
	30-39	40	3.275	.660	
	40-49	26	3.019	.781	.018
	50-59	20	3<.001	.688	
	60+	7	3.286	.906	
Cognitive Dissonance	21-29	68	3.221	.812	
	30-39	40	3.275	.816	
	40-49	26	3.308	.649	.840
	50-59	20	3.425	1.055	
	60+	7	3.071	.732	
Confirmation	21-29	68	3.912	.586	
	30-39	40	3.913	.437	
	40-49	26	3.885	.476	.906
	50-59	20	3.850	.671	
	60+	7	3.714	.488	
Conservatism	21-29	68	3.559	.550	
	30-39	40	3.663	.593	
	40-49	26	3.577	.821	.802
	50-59	20	3.450	.759	
	60+	7	3.500	.645	
Framing	21-29	68	4.103	.543	
	30-39	40	4.013	.583	
	40-49	26	3.962	.706	.593
	50-59	20	4.050	.394	
	60+	7	3.786	.636	

Herding	21-29	68	3.743	.570	
	30-39	40	3.650	.727	
	40-49	26	3.673	.616	.898
	50-59	20	3.650	.844	
	60+	7	3.857	.627	
Home	21-29	68	3.213	.907	
	30-39	40	2.888	.747	
	40-49	26	2.846	.718	.181
	50-59	20	3.050	.667	
	60+	7	3.214	.756	
Loss Aversion	21-29	68	3.228	.688	
	30-39	40	3.275	.816	
	40-49	26	3.558	.653	.091
	50-59	20	3.525	.769	
	60+	7	3.786	.636	
Overconfidence	21-29	68	3.294	.568	
	30-39	40	3.488	.615	
	40-49	26	3.096	.849	.195
	50-59	20	3.450	.902	
	60+	7	3.429	.673	
Representative	21-29	68	3.368	.751	
	30-39	40	3.463	.624	
	40-49	26	3.173	.734	.641
	50-59	20	3.375	.686	
	60+	7	3.286	1.254	

Self-Attribution	21-29	68	3.382	.664	
	30-39	40	3.150	.612	
	40-49	26	3<.001	.632	.055
	50-59	20	3.075	.832	
	60+	7	3.500	.577	

TABLE A2.5 'MARITAL STATUS' IMPACT ON BEHAVIOURAL BIASES

		N	Mean	Std. Deviation	P-Value
Anchoring	Unmarried	98	3.40	.696	.013
	Married	63	3.11	.715	
Cognitive Dissonance	Unmarried	98	3.25	.800	.741
	Married	63	3.29	.841	
Confirmation	Unmarried	98	3.88	.546	.800
	Married	63	3.90	.530	
Conservatism	Unmarried	98	3.59	.588	.705
	Married	63	3.55	.711	
Framing	Unmarried	98	4.06	.574	.601
	Married	63	4.01	.564	
Herding	Unmarried	98	3.69	.691	.752
	Married	63	3.72	.594	
Home	Unmarried	98	3.07	.868	.718
	Married	63	3.02	.726	
Loss Aversion	Unmarried	98	3.23	.722	.010
	Married	63	3.54	.720	
Overconfidence	Unmarried	98	3.28	.601	.168
	Married	63	3.43	.797	
Representativeness	Unmarried	98	3.34	.766	.661
	Married	63	3.39	.687	
Self-Attribution	Unmarried	98	3.33	.669	.017
	Married	63	3.07	.665	

TABLE A2.6 'EDUCATION LEVEL' IMPACT ON BEHAVIOURAL BIASES

		N	Mean	Std. Deviation	P-Value
Anchoring	Doctorate	4	2.625	1.031	.091
	Master's Degree	79	3.228	.706	
	Bachelor's Degree	52	3.375	.692	
	Diploma	11	3.227	.754	
	Advanced Matriculation Certificate	12	3.333	.577	
	Ordinary Matriculation Certificate	3	4.167	.764	
Cognitive Dissonance	Doctorate	4	3.250	.645	.969
	Master's Degree	79	3.316	.797	
	Bachelor's Degree	52	3.231	.915	
	Diploma	11	3.091	.801	
	Advanced Matriculation Certificate	12	3.250	.691	
	Ordinary Matriculation Certificate	3	3.333	.289	
Confirmation	Doctorate	4	3.375	1.031	.340
	Master's Degree	79	3.854	.538	
	Bachelor's Degree	52	3.952	.554	
	Diploma	11	3.909	.375	
	Advanced Matriculation Certificate	12	4.042	.396	
	Ordinary Matriculation Certificate	3	3.833	.289	

Conservatism	Doctorate	4	3<.001	<.001	.062
	Master's Degree	79	3.538	.683	
	Bachelor's Degree	52	3.663	.531	
	Diploma	11	3.864	.636	
	Advanced Matriculation Certificate	12	3.250	.723	
	Ordinary Matriculation Certificate	3	3.833	.289	
Framing	Doctorate	4	4.250	.289	.853
	Master's Degree	79	4.019	.580	
	Bachelor's Degree	52	4.096	.569	
	Diploma	11	3.909	.625	
	Advanced Matriculation Certificate	12	3.958	.582	
	Ordinary Matriculation Certificate	3	4<.001	.500	
Herding	Doctorate	4	3<.001	1.581	.101
	Master's Degree	79	3.646	.621	
	Bachelor's Degree	52	3.750	.606	
	Diploma	11	3.818	.681	
	Advanced Matriculation Certificate	12	3.833	.537	
	Ordinary Matriculation Certificate	3	4.333	.289	
Home	Doctorate	4	2.375	.479	.194
	Master's Degree	79	3.013	.759	
	Bachelor's Degree	52	3.048	.935	
	Diploma	11	3.045	.723	

	Advanced Matriculation Certificate	12	3.542	.656	
	Ordinary Matriculation Certificate	3	3.167	.577	
Loss Aversion	Doctorate	4	3.750	.645	.297
	Master's Degree	79	3.373	.718	
	Bachelor's Degree	52	3.231	.770	
	Diploma	11	3.591	.437	
	Advanced Matriculation Certificate	12	3.542	.891	
	Ordinary Matriculation Certificate	3	2.833	.577	
Overconfidence	Doctorate	4	3.750	.645	.534
	Master's Degree	79	3.335	.719	
	Bachelor's Degree	52	3.260	.704	
	Diploma	11	3.227	.607	
	Advanced Matriculation Certificate	12	3.542	.450	
	Ordinary Matriculation Certificate	3	3.667	.577	
Representative	Doctorate	4	3.500	1.291	.187
	Master's Degree	79	3.424	.698	
	Bachelor's Degree	52	3.404	.700	
	Diploma	11	2.955	.757	
	Advanced Matriculation Certificate	12	3.208	.811	
	Ordinary Matriculation Certificate	3	2.667	.764	

Self-Attribution	Doctorate	4	3.250	.866	.301
	Master's Degree	79	3.108	.673	
	Bachelor's Degree	52	3.308	.701	
	Diploma	11	3.364	.636	
	Advanced Matriculation Certificate	12	3.500	.564	
	Ordinary Matriculation Certificate	3	3.500	.500	

TABLE A2.7 'EMPLOYMENT STATUS' IMPACT ON BEHAVIOURAL BIASES

		N	Mean	Std. Deviation	P-Value
Anchoring	Public Sector Employee	40	3.275	.698	
	Private Sector Employee	93	3.231	.721	
	Self Employed	7	3.500	.913	.467
	Unemployed	1	2.500	.	
	Student	16	3.531	.562	
	Retired	4	3.500	1<.001	
Cognitive Dissonance	Public Sector Employee	40	3.163	.873	
	Private Sector Employee	93	3.355	.775	
	Self Employed	7	3.143	.988	.602
	Unemployed	1	3<.001	.	
	Student	16	3.031	.884	
	Retired	4	3.500	.577	
Confirmation	Public Sector Employee	40	3.775	.530	
	Private Sector Employee	93	3.909	.551	
	Self Employed	7	4.286	.488	.331
	Unemployed	1	4<.001	.	
	Student	16	3.906	.491	
	Retired	4	3.875	.479	
Conservatism	Public Sector Employee	40	3.513	.812	
	Private Sector Employee	93	3.618	.578	
	Self Employed	7	3.571	.607	.796
	Unemployed	1	4<.001	.	
	Student	16	3.406	.491	
	Retired	4	3.625	.750	
Framing	Public Sector Employee	40	3.975	.599	.766
	Private Sector Employee	93	4.038	.577	

	Self Employed	7	4.071	.787	
	Unemployed	1	4.500	.	
	Student	16	4.188	.310	
	Retired	4	3.875	.629	
Herding	Public Sector Employee	40	3.700	.668	.650
	Private Sector Employee	93	3.694	.680	
	Self Employed	7	4.071	.450	
	Unemployed	1	3.500	.	
	Student	16	3.563	.544	
	Retired	4	3.875	.629	
Home	Public Sector Employee	40	2.988	.729	.462
	Private Sector Employee	93	3.027	.838	
	Self Employed	7	2.786	.951	
	Unemployed	1	3.500	.	
	Student	16	3.344	.831	
	Retired	4	3.500	.707	
Loss Aversion	Public Sector Employee	40	3.638	.768	.014
	Private Sector Employee	93	3.263	.702	
	Self Employed	7	3.143	.690	
	Unemployed	1	2<.001	.	
	Student	16	3.219	.657	
	Retired	4	3.875	.629	
Overconfidence	Public Sector Employee	40	3.450	.714	.725
	Private Sector Employee	93	3.280	.720	
	Self Employed	7	3.571	.607	
	Unemployed	1	3.500	.	
	Student	16	3.250	.447	
	Retired	4	3.375	.629	

Representative	Public Sector Employee	40	3.375	.705	.284
	Private Sector Employee	93	3.323	.758	
	Self Employed	7	3.929	.673	
	Unemployed	1	2.500	.	
	Student	16	3.375	.465	
	Retired	4	3.125	1.250	
Self-Attribution	Public Sector Employee	40	3.025	.725	.205
	Private Sector Employee	93	3.296	.692	
	Self Employed	7	3.143	.378	
	Unemployed	1	3<.001	.	
	Student	16	3.281	.482	
	Retired	4	3.750	.645	

TABLE A2.8 'INVESTMENT EXPERIENCE' IMPACT ON BEHAVIOURAL BIASES

		N	Mean	Std. Deviation	P-Value
Anchoring	Less than 2 years	57	3.526	.530	<.001
	2 – 5 years	40	3.325	.730	
	5 – 10 years	27	3.204	.880	
	Over 10 years	37	2.932	.689	
Cognitive Dissonance	Less than 2 years	57	3.263	.846	.889
	2 – 5 years	40	3.350	.753	
	5 – 10 years	27	3.222	.738	
	Over 10 years	37	3.216	.902	
Confirmation	Less than 2 years	57	3.895	.479	.409
	2 – 5 years	40	4<.001	.555	
	5 – 10 years	27	3.852	.434	
	Over 10 years	37	3.797	.661	
Conservatism	Less than 2 years	57	3.456	.607	.159
	2 – 5 years	40	3.525	.698	
	5 – 10 years	27	3.759	.670	
	Over 10 years	37	3.662	.566	
Framing	Less than 2 years	57	4.070	.521	.805
	2 – 5 years	40	3.963	.711	
	5 – 10 years	27	4.074	.474	
	Over 10 years	37	4.041	.545	
Herding	Less than 2 years	57	3.728	.583	.904
	2 – 5 years	40	3.638	.660	
	5 – 10 years	27	3.741	.544	
	Over 10 years	37	3.703	.820	
Home	Less than 2 years	57	3.404	.741	<.001
	2 – 5 years	40	2.813	.845	

	5 – 10 years	27	3<.001	.693	
	Over 10 years	37	2.811	.802	
Loss Aversion	Less than 2 years	57	3.474	.644	.440
	2 – 5 years	40	3.313	.731	
	5 – 10 years	27	3.333	.650	
	Over 10 years	37	3.230	.910	
Overconfidence	Less than 2 years	57	3.202	.654	.114
	2 – 5 years	40	3.325	.561	
	5 – 10 years	27	3.333	.760	
	Over 10 years	37	3.554	.771	
Representative	Less than 2 years	57	3.456	.715	.122
	2 – 5 years	40	3.438	.700	
	5 – 10 years	27	3.370	.715	
	Over 10 years	37	3.108	.783	
Self-Attribution	Less than 2 years	57	3.202	.674	0.015
	2 – 5 years	40	3.350	.622	
	5 – 10 years	27	2.889	.543	
	Over 10 years	37	3.392	.756	

TABLE A2.9 'INVESTMENT SIZE' IMPACT ON BEHAVIOURAL BIASES

		N	Mean	Std. Deviation	P-Value
Anchoring	Less than €50,000	114	3.382	.676	
	€50,000 - €100,000	16	3.281	.632	
	€100,000 - €250,000	15	2.967	.855	
	€250,000 - €500,000	10	3.100	.738	.024
	€500,000 - €1,000,000	2	3.250	1.061	
	€1,000,000 - €3,000,000	3	2.167	.577	
	Over €3,000,000	1	2.500	.	
Cognitive Dissonance	Less than €50,000	114	3.272	.804	
	€50,000 - €100,000	16	3.125	.764	
	€100,000 - €250,000	15	3.600	1.021	
	€250,000 - €500,000	10	3.050	.725	.639
	€500,000 - €1,000,000	2	3<.001	.707	
	€1,000,000 - €3,000,000	3	3<.001	.866	
	Over €3,000,000	1	3.500	.	
Confirmation	Less than €50,000	114	3.904	.536	
	€50,000 - €100,000	16	3.875	.500	
	€100,000 - €250,000	15	4.100	.387	
	€250,000 - €500,000	10	3.750	.589	.073
	€500,000 - €1,000,000	2	3.750	.354	
	€1,000,000 - €3,000,000	3	3<.001	.866	
	Over €3,000,000	1	4<.001	.	
Conservatism	Less than €50,000	114	3.557	.634	
	€50,000 - €100,000	16	3.469	.741	
	€100,000 - €250,000	15	3.833	.556	.244
	€250,000 - €500,000	10	3.800	.632	
	€500,000 - €1,000,000	2	3<.001	<.001	

	€1,000,000 - €3,000,000	3	3.167	.289	
	Over €3,000,000	1	3<.001	.	
Framing	Less than €50,000	114	4.053	.546	
	€50,000 - €100,000	16	3.750	.707	
	€100,000 - €250,000	15	4.033	.581	
	€250,000 - €500,000	10	4.150	.580	.249
	€500,000 - €1,000,000	2	4.250	.354	
	€1,000,000 - €3,000,000	3	4.167	.289	
	Over €3,000,000	1	5<.001	.	
Herding	Less than €50,000	114	3.724	.610	
	€50,000 - €100,000	16	3.531	.785	
	€100,000 - €250,000	15	4<.001	.423	
	€250,000 - €500,000	10	3.700	.422	.004
	€500,000 - €1,000,000	2	3<.001	.707	
	€1,000,000 - €3,000,000	3	2.500	1.500	
	Over €3,000,000	1	4.500	.	
Home	Less than €50,000	114	3.083	.801	
	€50,000 - €100,000	16	3.250	.876	
	€100,000 - €250,000	15	2.900	1.004	
	€250,000 - €500,000	10	2.950	.599	.566
	€500,000 - €1,000,000	2	2.250	.354	
	€1,000,000 - €3,000,000	3	2.667	.764	
	Over €3,000,000	1	2.500	.	
Loss Aversion	Less than €50,000	114	3.329	.725	
	€50,000 - €100,000	16	3.406	.800	
	€100,000 - €250,000	15	3.367	.790	.779
	€250,000 - €500,000	10	3.500	.782	
	€500,000 - €1,000,000	2	3.250	.354	

	€1,000,000 - €3,000,000	3	3.833	.764	
	Over €3,000,000	1	2.500	.	
Overconfidence	Less than €50,000	114	3.276	.649	
	€50,000 - €100,000	16	3.375	.785	
	€100,000 - €250,000	15	3.400	.712	
	€250,000 - €500,000	10	3.500	.816	.389
	€500,000 - €1,000,000	2	4<.001	1.414	
	€1,000,000 - €3,000,000	3	4<.001	.500	
	Over €3,000,000	1	3.500	.	
Representative	Less than €50,000	114	3.399	.723	
	€50,000 - €100,000	16	3.313	.814	
	€100,000 - €250,000	15	3.467	.581	
	€250,000 - €500,000	10	2.900	.615	.396
	€500,000 - €1,000,000	2	3.500	.707	
	€1,000,000 - €3,000,000	3	3.167	1.607	
	Over €3,000,000	1	2.500	.	
Self-Attribution	Less than €50,000	114	3.259	.673	
	€50,000 - €100,000	16	3.125	.619	
	€100,000 - €250,000	15	3.400	.660	
	€250,000 - €500,000	10	2.850	.784	.267
	€500,000 - €1,000,000	2	2.500	<.001	
	€1,000,000 - €3,000,000	3	3.500	.866	
	Over €3,000,000	1	3.500	.	