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# **The Impact of Biases, Personality and Financial Advice on Investment Decisions**

Name: René Levesley

Degree: PhD (Economics)

Institution: Birkbeck, University of London

# 1. Abstract

A unique data set, including both qualitative and quantitative data, from a large UK investment platform was used to assess how investment decisions are made and the impact financial advice has on these.

Returns achieved by self-directed investors, and investors who had a financial adviser, were compared. The highest returns were achieved by investors who had a financial adviser. Financial advice reduces the number of trades placed, the amount of time spent obtaining information, as well as eliminating or reducing the impact of biases. A number of biases were observed, however, many of these did not actually lead to poor outcomes.

Overconfident investors spent more time obtaining information and placed more trades, but this did not lead to lower returns. Overconfidence also had a significant impact on financial advice, differentiating whether investors seek advice and how it is consumed. Overconfident investors see a financial adviser as a consultant who they discuss investment ideas with and then make their own investment decisions, taking the credit for any excess returns achieved. Financial advice also moderates overconfident behaviours by reducing the number of trades placed and the amount of time spent obtaining information. Personality was found to have a limited impact on investment decisions.

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## 3. Introduction

### 3.1 The UK Investment Market

Over the last 30 years, a number of significant policy changes in the UK have had a tremendous impact on the financial services sector, bringing in reforms of pensions, financial advice and investment products, to name a few. These reforms have led to some improved outcomes for investors but they have also had some significant consequences.

There are approximately 15.7 million investors in the UK and, of these, only 3.6 million currently receive advice. However, around 12.7m people would like to receive financial advice but are unable to access it, demonstrating the size of the advice gap in the UK (Boring Money, 2021).

#### 3.1.1 Auto-Enrolment

Auto-enrolment is a requirement for employers to automatically enrol all qualifying employees in to a money purchase pension scheme, making the majority of individuals in the UK of working age investors (Deloitte, 2014). This is in line with the heuristics approach to decision making, where the frame of the pension is altered and a nudge is utilised to make the default option enrolling. Therefore, the vast majority of people enrol rather than filling out the forms to opt out (Benartzi and Thaler, 2007). The nudge is further reinforced with the use of incentives, such as employers contributing to the pension scheme.

Auto-enrolment began in October 2012 against the backdrop of a decline in employers offering final salary pension schemes (a scheme that is usually non-contributory and provides an income at retirement based on the employee's final salary) and an increase in money purchase plans (a scheme in which contributions are required and invested, with income in retirement based on the value). In 1987, the total active membership of private sector occupational final salary pension schemes was 5.7 million with 0.2 million in money purchase schemes (The Pensions Institute, 2008). In 2017, the number of active members of private sector final salary schemes had fallen to just 1.1 million with active membership of money purchase schemes increasing to 7.7 million (Office of National Statistics, 2018).

The shift towards money purchase schemes has meant that investment risk, costs and longevity risk has moved from employers to employees. Employees are now responsible for contributing, investing and managing their pension plans with little or no help or training (Barberis and Thaler, 2003).

### **3.1.2 The Retail Distribution Review**

Historically, financial advice in the UK was available to everyone. It has always been easily accessible, with the adviser receiving a commission from the product provider to pay for their time. Individual investors have historically perceived this advice as "free" due to the advice charges being hidden within the product charges. Due to the commission based charging structure, it was very difficult for the individual investor to know if they were being provided with impartial advice or being offered the product that paid the most commission (HM Treasury and FCA, 2016). In June 2007, the Financial Services Authority (FSA), now the Financial Conduct Authority (FCA), in the UK, announced the introduction of the Retail Distribution Review (RDR). The major outcome from this review was that from 1/1/2013 financial advisers had to hold a higher qualification (Diploma in Financial Planning) and investors had to pay explicit fees for financial advice.

An unintended consequence of the RDR is that many investors are now unable to access financial advice. This is either due to high upfront fees or not qualifying for advice, as many financial advisers and financial services firms have withdrawn advice for mass market investors (those with below £50k to invest) and focussed solely on high net worth clients (Davies, 2011). A survey by adviser software firm, Intelliflo, found that out of 203 UK financial advisers surveyed, nearly 60% would not offer advice to mass market investors. 44% had a minimum requirement of £50,000 before they would give advice to an investor and 15% had a minimum requirement of £100,000 (FTAdiser, 2016). Another study by Blue & Green Tomorrow (2016) found that 32% of advice firms in the UK now only offer advice to investors who have a minimum portfolio value of £100,000. This figure has more than doubled over the last 2 years, from 13% in 2013. Research conducted as part of the Financial Advice Market Review (FAMR) (HM Treasury and FCA, 2016) found that 69% of advisers said they turned away potential clients, with the most common reason for this



being affordability. The same research estimated that 16m people in the UK do not have access to, or are not able to afford, financial advice. A study conducted by NMG Consulting (2014) found that 62% of people would take advice on investing a sum of £50,000 suggesting that the issue may not be with demand but with accessibility.

A number of investors who previously received financial advice have also found that it is no longer available to them and have become “orphaned” investors. The Investment Platforms Market Study conducted by the FCA (2019) found that there are around 400,000 orphaned investors in the UK holding more than £10bn of assets on investment platforms. The number of orphaned investors also appears to be increasing. A study published by Alpha (2021), which assessed the number of orphaned investors on six adviser platforms, found that since 2017 the number of orphaned investors has increased. In 2017, assets held by orphaned investors accounted for around 0.27% of assets under management and this figure has risen to 1.7% in 2020. At the time of writing, no academic study has investigated the impact of becoming an orphaned investor, how that may affect investment decisions and whether the advice previously received has a lasting impact.

### **3.1.3 Pension Freedoms**

In April 2015, the UK pension freedom regulations came in to force which introduced voluntary annuitisation, moving away from a system of compulsory annuitisation. This meant that for the first time, individuals reaching retirement age could choose how to access their pension and, if they wanted to, withdraw the whole amount in one lump sum, subject to tax.

As these new regulations came into force post the RDR, it also means that the majority of individuals have to do this without having access to advice. Following the introduction of pension freedoms, only 8% of people accessing their pension took advice after speaking to Pension Wise, the government’s free guidance service. In addition, only 63% of people going into drawdown, a complex form of flexible retirement, and just 19% of people purchasing an annuity, received financial advice (FT Adviser, 2015; FCA, 2020; Wells, 2015).

### **3.1.4 Financial Literacy**

These regulatory changes have shifted responsibility for complex investment decisions to individuals, however, the majority of the UK population have very low levels of financial literacy. 49% of adults have been found to have the numeracy level of a primary school child (children aged under 11), and 78% of adults have numeracy skills below Level 2, which is equivalent to a GCSE pass, a qualification that 15-16 year old high school children take (National Numeracy, 2017). This means that 78% of adults in the UK are unable to correctly answer a simple question such as, 'A TV has been reduced by 20% and now costs £280. What was the original price?' (OECD, 2016). England and Northern Ireland (NI) perform worse on everyday financial numeracy tasks than adults in many other developed countries, with the over-55s typically being the worst performing age group (Bhutoria, Jerrim and Vignoles, 2018).

### **3.1.5 The Impact of the Regulatory Changes**

The combination of low levels of financial literacy, increased personal responsibility and more complex financial products mean that some key areas require exploration:

- How do people make investment decisions and what factors influence them?
- What impact does financial advice have on investment decisions and does it lead to more positive outcomes?
- What impact does financial literacy (or lack thereof) have on financial decisions?

These regulatory changes have meant that a very high proportion of individuals in the UK of working age have now become investors and are responsible for managing and contributing to investments and also managing their longevity risk as they move into retirement. In addition, they have also added extra choice and complexity to an investment market that was already complex, with very little education or training offered to individuals who already had low levels of financial literacy (Chalmers and Reuter, 2012). This lack of financial literacy, training and education means that more people may benefit from financial advice or a financial adviser, helping them make appropriate investment decisions, however, regulatory changes mean that this has become unobtainable for the majority of individuals due to qualification criteria or cost. This could lead to individuals making poor investment decisions and may have a significant impact on their future standard of living. It has now become even

more important to understand how investment decisions are made, what the benefits of financial advice are, and who may benefit from it the most. This study aims to address these questions and provide new insights, utilising a behavioural finance approach.

### **3.1.6 Contribution to the Literature**

Although a number of studies have investigated investor behaviour and decision making, a number of these studies have had numerous limitations, which may have impacted upon the results. These limitations include excluding investments (such mutual funds) and focusing solely on shares (Barber and Odean, 2000, 2001, 2008; Hoechle et al, 2013; Ivkovic, Sialm and Weisbenner, 2008), estimating returns or turnover, as these were not directly measured (Barber and Odean, 2000, 2001, 2008; Hoechle et al, 2013), collecting information on investment returns and trade frequency using survey responses (Guiso and Jappelli, 2007), and inferring that biases are the reason for the results without directly measuring the bias (Barber and Odean, 2000, 2001, 2008; Hoechle et al, 2013). Also, very little research has been conducted on UK investors, with most studies focussing on investors in the US or in developing countries. The UK has a very unique financial services industry which means that previous studies may not be representative of the UK market. There is limited research on the impact of financial advice on investment decisions and biases and to the best of our knowledge, there is no research on investors who previously had a financial adviser but now make their own investment decisions.

This study contributes to the literature by using some of the best practices utilised within previous research, and also addresses the limitations stated above (all investment types are included; overconfidence, time spend obtaining information and trade data are directly measured) expanding upon the existing research to provide greater insights into the impact of biases, personality and financial advice on investment decisions.

This study aims to explore and answer the following research questions:

- How personality impacts upon investment decisions (including the impact on biases).
- Whether financial advice leads to higher returns and if there are any other benefits (tangible or intangible) of receiving financial advice.
- How investors make investment decisions.
- How overconfidence, time spent obtaining information, risk aversion and attitude to risk impact upon investment decisions.
- How investors who previously had a financial adviser, but now make their own investment decisions, differ from advised and self-directed investors.

To achieve this, a unique, original dataset is used, which combines both quantitative trade data and qualitative survey data. Personality and biases are directly measured, along with trading behaviour, including all investment types. The data includes clients of a leading UK-based investment platform. The trade data includes 765,829 completed trades across 21,205 accounts (2,925 advised and 18,280 self-directed) between 2nd January 2012 and 1st January 2016. All account balances, trades, inflows and outflows were included. The questionnaire was completed by 218 investors. Completed questionnaires could be linked to 210 investment accounts which were then linked to 94 individual investors. To our knowledge, this is the first study to have such a comprehensive data set and one which allows both quantitative trading data and qualitative survey data for the same sample of investors to be analysed.

It was hypothesised that, based on the previous literature, overconfident investors would spend more time obtaining information, place more trades and achieve lower investment returns (Barber and Odean, 2000, 2001; Daniel, Hirshleifer and Subrahmanyam, 1998, 2001; Guiso and Jappelli, 2007; Odean, 1998, 1999; Shu et al, 2004). It was also hypothesised that financial advice will not lead to higher investment returns but will increase the diversification of portfolios (Bluethgen et al, 2008; Chalmers and Reuter, 2012; Hackethal, Haliassos and Jappelli, 2011; Kramer, 2011; Shapira and Venezia, 2001) and investors scoring higher in extroversion will be more overconfident (Pompian and Longo, 2004; Said et al,

2011). However, the results of this study only supported one hypothesis in full, with overconfident investors spending more time obtaining information each week. Partial support was found for two hypotheses, with advised investors being found to hold more diversified portfolios but not achieving lower returns, and overconfident investors being found to place more trades but not achieving lower returns because of this. The hypotheses that more extroverted investors would be overconfident was disproved.

By combining quantitative trade data with qualitative data on how investment decisions are made, compared to previous studies, a more robust analysis of how biases impact upon investment decisions was conducted. The results support some previous findings - overconfident investors trading more and spending more time obtaining information (Guiso and Jappelli, 2007) - but contradict many others - overconfident investors achieving lower returns, holding more money in shares and being more susceptible to biases (Barber and Odean, 2000, 2001; Dittrich, Guth and Maciejovsky, 2001; Finke, Howe and Huston, 2011; Guiso and Jappelli, 2007; Looney et al, 2007; Odean, 1998; Pompian and Longo, 2004). In addition, new insights were also identified - the impact of overconfidence on the use of financial advice.

Overall, the results indicate that a number of biases influence investment decisions, however, not all of these led to poor outcomes for investors. Financial advice improved outcomes, producing higher investment returns, while also reducing the impact of biases on investment decisions. Overconfidence appeared to differentiate not only whether investors seek advice but also how it is consumed. Overconfident investors were found to be more likely to utilise the services of a financial adviser, however, they do not delegate their investment decisions to a financial adviser; instead, they consult a financial advisor and then make their own investment decisions. This finding provides new insights into how advice and overconfidence impact upon one another and influence investment decisions.

Investors who are not overconfident, have a low attitude to risk and are less emotionally stable, may benefit most from financial advice. These investors either held the least efficient portfolios (experiencing similar levels of volatility but achieving much lower returns) or

invested in what's popular rather than what would be the most suitable investment for them.

### 3.1.7 Structure of Study

The study is structured as follows:

<b>Section Number</b>	<b>Title</b>	<b>Description</b>
4	Literature Review	A review of behavioural finance models, along with relevant research on behavioural biases and the effect of demographics and personality traits on investment decisions. This section ends with a review of the literature on the impact of financial advice on investment decisions, and hypothesis are formed.
5	Method	A detailed description of the methodology applied. The specific measures used to collect and analyse the data are discussed, including a detailed description of the data and any assumptions made.
6-8	Results	To complement the structure of the data, the results are split in to three parts: the trade data, the survey data and the combined trade and survey data. Each part explores the data, providing summary statistics along with an econometric analysis and discussion.
9	Conclusion	A summary of the findings with clear conclusions drawn.
10	Policy Implications	The impact of the results on future policy decisions.
11	Further Research	Areas that produced some mixed or inconclusive results which would benefit from further investigation.

12	Limitations	Identification of some limitations faced by the study which may have impacted upon the results.
13	Bibliography	A detailed list of references cited plus background readings and other material

## 4. Literature Review

Traditional economic theory and financial models rely on investors being rational, logical (having clear and sound reasoning) and self-controlled (emotions do not drive decisions). They accurately assess expectations about costs, benefits and the likelihood of future events (FCA, 2013, Firat and Fettahoglu, 2011). However, these assumptions ignore the impact of personality and emotions on investment decisions. In addition, the traditional economic models fail to account for the complexity involved in decision making when information is often inaccurate, difficult to access and/or infrequent, and the cost of processing information is high, which is particularly true when making investment decisions (Altman, 2012). The failure of traditional models to capture the complexity of human decision making suggests that these models are either incorrect or need to be more detailed. This has led to the development of a new branch of economics, called behavioural economics, which combines economic models and psychology in order to try to explain decision making and human behaviour.

Many studies have assessed investment decisions and found numerous examples of decisions which cannot be explained by traditional economic models (Barber and Odean, 2000, 2008; Bluethgen et al, 2008; Firat and Fettahoglu, 2011; Ivkovic, Sialm and Weisbenner, 2008; Odean, 1998). The observed investment decisions made by investors appear to have a negative impact on investment performance and therefore, in terms of traditional economic models, would be considered irrational or mistakes. A number of studies have tried to explain decision making, especially complex decisions, and these have been applied to investment decisions in an attempt to explain investor behaviour. These include Naturalistic Decision Making (Klein, Orasanu, Calderwood and Zsombok, 1993), the Heuristics approach to decision making (Tversky and Kahneman, 1974) and the Bounded Rationality Model (Simon 1957).

### 4.1 The Heuristics Approach to Decision Making

Heuristics are shortcuts, which enable quick decisions to be made. Under the Heuristics approach to decision making, all intuitive judgements, even in the absence of skill, come from the memory. If the individual has relevant experience and recognises the situation, the



intuitive decision will likely be correct and lead to a successful outcome (Kahneman, 2011). However, if the decision is new to the individual, complex or evokes emotion, the intuitive judgement may be incorrect (Altman, 2012).

The heuristics model suggest that we have two minds or two thinking systems. One mind is fast and intuitive, forming rapid judgements with great ease and with no conscious output, system 1, and the other is slow, reflective, analytical and requires conscious effort, system 2 (Kahneman, 2011). Decisions are made using both systems, however, the decisions made by system 1 are often accepted without further integration or checking by system 2 and accepted as valid, unless the decision is clearly wrong (Kahneman and Klein, 2009). Using system 2 to make a decision is time consuming and difficult, and some people may not have the time or inclination to use this system when making decisions (Kahneman, 2011).

Incorrect judgement are usually due to errors in the decision making process (Tversky and Kahneman, 1974). For example, when a decision is complex, such as an investment decision, the individual may focus on a single piece of information, or answer a different question, which is similar to the original but easier to answer using system 1. Therefore, a decision around whether to invest in a particular investment may be replaced with the question of whether the investor likes that particular investment/stock (Kahneman, 2011). This substitution of a complex question with a simpler one, or focussing on a single piece of information, means that errors or biases can impact upon the decision and it is difficult for the individual to determine whether or not this intuition is valid (Altman, 2012).

Although decisions made using intuitions may be viewed, in the eyes of traditional economic models, as irrational, it is unrealistic to imagine that an investor assesses the thousands of investments available to purchase before making an investment decision. Therefore, some form of shortcut must be used when deciding on which investment to purchase.

## **4.2 Biases**

A bias is an inclination, tendency or prejudice based on intuition rather than sound logic and knowledge. Biases help to make decisions quickly by helping the mind to produce a quick response to a question and can be positive, such as avoiding danger, or negative such as sexism. Biases can often lead to good decisions being made but can sometimes lead to poor decisions, as they go undetected and may be viewed as valid by an individual even when there is no sound basis for it (Charles and Kasilingam, 2015).

Biases come in many shapes and sizes and can be either cognitive or emotional. Cognitive biases are the result of flawed logic whereas, emotional biases are the result of impulses and intuition and are more difficult to correct. Table 4.1 shows some of the main biases that may influence investment behaviour.

**Table 4.1 - The Main Biases Influencing Investment Behaviour**

Bias	Description	Impact on Investment Behaviour	References
Framing	Framing refers to the way a question is posed or “framed” to the decision maker and can exploit and enhance the impact of biases on decision making.	A positive frame may indicate a better choice and therefore lead to individuals choosing an option which is more positively framed. An example of this would be framing an investment opportunity as having a 70% chance of a positive return rather than stating that there is a 30% chance of losing money.	Gigerenzer, 2007; Thaler, 1985; Tversky and Kahneman, 1981;
Broad and Narrow Framing	Broad framing involves taking an holistic view and narrow framing involves focusing on a single or a small number of factors.	Whether an individual frames event and decisions in a narrow or broad way can significantly impact upon behaviour. For example, within an investment portfolio, narrow framing will lead to a focus on each loss with the effects of the loss felt more severely, whereas a broad frame will view losses in terms of an overall portfolio rather than a single event/loss.	
Mental Accounting	Mental accounting is a form of narrow framing, where individuals subjectively frame a transaction based on the utility they receive or expect, splitting wealth into separate “mental accounts” rather than viewing wealth as a whole.	Different values are given to different “mental accounts” which means that for some accounts, investments are too cautious and for others too risky. For example, an investor who would not accept any risk with their children’s savings for university but would risk completely losing money that was an unexpected inheritance from a distant relative. In addition, investors may simply split money equally between different investments rather than diversifying their portfolio in line with their attitude to risk.	Benartzi and Thaler, 2001; Charupat and Deaves, 2004; FCA, 2013; Kahneman and Tversky’s, 1979; Shefrin and Thaler, 1988; Thaler, 1985; Thaler, 1999
Belief Perseverance and	Belief perseverance bias refers to an individual forming an opinion and holding it too tightly and for too long. Confirmation bias is when an individual misinterprets	There may be a reluctance to search for information that contradicts beliefs and if this is found, investors may be very sceptical about its merits and/or misinterpret the information. This may lead to holding an investment for too long, despite information that would suggest it should be sold.	Barberis and Thaler, 2003

Confirmation Bias	information that contradicts their beliefs as actually supporting them.		
Anchoring	When forming estimates, an individual will often start with a value, anchor on it, and then adjust away from it, which tends to be insufficient.	Investors may use an initial value of an investment in order to make investment decisions, such as refusing to sell until a certain return is achieved or the original investment amount is recouped.	Tversky and Kahneman, 1974
The Endowment Effect	Valuing assets that are owned at a higher value than they are actually worth.	Investors may anchor to a fixed price based on what was paid for the investment rather than making a rational decision about what it is worth. This may lead to holding losing investments for too long.	Charupat and Deaves, 2004; Fischer and Gerhardt, 2007; Kahneman, 2011
Disposition Effect	An investor's reluctance to sell investments that are trading at a price lower than the purchase cost.	Investors may be more likely to sell investments that have increased in value compared to their purchase price and less likely to sell those that have gone down in value.	Barberis and Thaler, 2003; Odean, 1998
Availability Bias	When making a decision that involve assessing the probability of an event happening individuals may recall more recent or salient events which may not accurately reflect the probability of an event happening.	A recent loss on an investment due to a downturn in the markets may lead an investor to invest into lower risk or safe investment, as the probability of the market dropping is viewed as being high, even if this is not the case. Alternatively, a recent gain could lead to higher risks being taken as the probability of further market growth may be seen as high.	Tversky and Khaneman, 1974
Escalation of Commitment	When making successive decisions, an individual may stick with the decision even when the wrong decision is made, which is	Investor may hold poor performing investments for too long in order to prove that the initial investment decision was the correct decision to make.	Firat and Fettahoglu, 2011; Odean, 1998; Sadi et al 2010

	confirmed by the consequences, and may even become more determined as they try to prove that the initial decision was correct.		
Randomness/ Self-attribution Bias	An individual's perception of control over an outcome and their ability to control their own fate by making rational decisions.	Investors may interpret any stock market gains to be the result of their own skill and judgement rather than random events or luck.	Sadi et al, 2010
Hindsight Bias	An individual's belief that they knew the outcome of an event after it had happened.	An investor may claim to have known that a particular stock was going to go up in value after this had happened.	Biais and Weber, 2009
Home/ Familiarity Bias	Investing in stocks that are geographically or professionally closer to the individual.	Investors may hold concentrated portfolios that are high risk and not appropriately diversified.	Barber and Odean, 2000; Barberis and Thaler, 2003; Ivkovic, Sialm and Weisbenner, 2008
Overconfidence	An individual's overestimation of the accuracy of decisions, precision of knowledge and skills.	An investor may misinterpret cues from information, trade too frequently and hold a concentrated portfolio.	Baber and Odean, 2001; Dittrich, Guth and Maciejovsky 2001; Pompian 2006.

### **4.3 Research into Investment Behaviour**

As standard economic models fail to adequately explain investment behaviour, many studies have looked at the impact of biases on investment decisions. Whilst most have found that biases do have a direct impact upon investment decisions, there are mixed results when the specific bias and its impact is assessed (Bashir et al, 2013; Mallick 2015; Onsumu, 2014).

#### **4.3.1 Trading behaviour**

Standard economic theory suggests that investors will trade when the expected utility gain is high or equal to the trading costs plus expenses for information acquisition. However, investors have been found to trade excessively, harming investment returns (Bluethgen et al, 2008). Shu et al (2004) analysed the returns on 52,649 brokerage accounts in Taiwan. They found a U-shaped turnover and return relationship with investors who traded the most, achieving better returns than other investors. Barber and Odean (2000) also conducted a study which compared the frequency of trades placed by investors. They hypothesised that the most frequent traders would achieve higher returns as they had more expertise, kept up to date with the markets and carefully monitored and adjusted their portfolios. However, when the results were analysed, the opposite was found. Investors who traded less frequently achieved significantly higher returns than investors who traded more often. The lower returns achieved by investors who traded more frequently was mainly due to the additional transaction costs incurred.

One of the limitations of the main studies that have investigated the purchasing behaviour of investors is that they have only assessed stock purchases and ignored other types of investments, such as mutual funds (Barber and Odean, 2000, 2001; Odean, 1998, 1999). Mutual funds are professionally managed investments that bring together a group of investors who pool their money together to buy a variety of assets. Mutual funds offer an investor a simple and cost-effective way to either build or buy a well-diversified portfolio. They also offer the option for the underlying investments to be actively managed by a professional fund manager.

Over recent years, mutual funds have become the investment of choice for retail investors. In 1980, only 4.6% of retail investors held open ended mutual funds, however, this number had increased to 32.4% in 2007 (French, 2008). In 2017, £46bn was invested into mutual funds in the UK, bringing the total amount invested into mutual funds in the UK to £1.22tn (Financial Times, 2018). This compares to just £251.5bn held in shares by individuals in the UK (Office of National Statistics, 2017). Therefore, excluding mutual funds from any study on investment behaviour will impact upon the results.

In addition to trading too frequently, many studies have found that investors also tend to chase returns, invest at the top of the market after an investment has experienced good past performance, sell at the bottom of the market or fail to sell poor performing investments (Gruber, 1996; Chevalier and Ellison, 1997; Zhao, 2006). Research conducted by online investment magazine, Investment Week, compared fund flows of the best and worse performing Investment Management Association (IMA) Sector funds for six months following their move to the top or bottom of the chart and fund inflows. The results showed that inflows increased with performance, however, performance in the following six months tended to be poor. For example, in Q4 2013 the UK All Companies sector had quarterly flows of £946m following a return of 14% over the previous six months but then returned -0.70% over the next six months. In contrast to this, over the same period, the Sterling Corporate bond sector had flows of -£383m following a return of 2.30% but then returned 4.2% in over the next six months (Investment Week, 2014). This demonstrates how placing trades at the wrong time can impact upon returns.

In addition, professional consultancy firm Deloitte (2014) suggest in their report on the Investment Management Industry that individual investors will seek comfort in size, brand and past performance. In the UK, although there are thousands of funds available, investors tend to gravitate towards a small number of funds. In 2013, 90% of all UK fund flows went into approximately 10 funds (Deloitte, 2014).

Zhao (2006) conducted a study that looked at investments into funds. They found that individual investors who made their own financial decisions were more likely to invest into funds that had no initial charge. However, these tended to be larger funds that had lower

potential for growth. This finding, along with those by Deloitte (2014), suggests that familiarity bias and a herd mentality may be influencing investment choices, especially as larger funds tend to receive more publicity (Odean, 1998).

A study by Bailey, Kumar and Ng (2011) did include mutual funds within their analysis. They found that investors tended to buy and hold mutual funds rather than frequently trade them, which mirrors what other studies have found when looking at stock trading (Firat and Fettahoglu, 2011; Ivkovic, Sialm and Weisbenner, 2008; Odean, 1998). They also found that older, more knowledgeable, higher earning and are more experienced investors made better use of mutual funds. They were found to buy funds with lower charges and hold them for longer. This finding is also supported by other studies that have explored the use of mutual funds. Zhu (2005) found that “busy investors” are more likely to invest into funds rather than stocks and Malloy and Zhu (2004) found that investors in poorer neighbourhoods are more likely to buy funds with high charges.

Bailey, Kumar and Ng (2011) also found that behavioural biases had no impact on tracker fund holdings. Although the Bailey, Kumar and Ng study enhanced previous research into investor behaviour by including mutual funds in the analysis, the one major limitation of this study was that only aggregate fund flows were analysed and not individual investor behaviour. This could have had a significant impact on the results.

#### **4.3.2 Home Bias and Diversification**

Despite the widespread and much publicised advantages to diversifying investment portfolios, many studies have found that investors tend to ignore this advice and hold concentrated portfolios invested into just a few stocks (Barber and Odean, 2000; Calvet, Campbell and Sodini, 2007; Goetzmann and Kumar, 2008; Ivkovic, and Weisbenner, 2005; Ivkovic, Sialm and Weisbenner, 2008; Massa and Simonov, 2006). Most studies have attributed undiversified, concentrated portfolios to investor bias, including home and familiarity bias, overconfidence or a reluctance to sell investments that have been held for a long time, which may be due to escalation bias, anchoring or the disposition effect (Barber and Odean, 2000; Huberman, 2001; Ivkovic, and Weisbenner, 2005; Ivkovic, Sialm and Weisbenner, 2008; Massa and Simonov, 2006).



Barberis and Thaler (2003) suggest that when making decisions, individuals prefer familiarity rather than ambiguity, therefore, investments in home stock markets, stocks in companies that are geographically close to the investor, or their employer's stocks are more attractive than less familiar markets or investments. This was supported by the results of a study conducted by French and Poterba (1991) who found that investors held the majority of their equity holdings in domestic companies. US investors held 94%, Japanese investors held 98% and UK investors held 82% of their equity holdings in domestic equities. This home or familiarity bias may then lead to investors holding less diversified, concentrated portfolios.

Although some studies have found that holding a concentrated portfolio can have a negative impact on returns (Barber and Odean, 2000; Goetzmann and Kumar, 2008) others have found that it does not necessarily lead to a poor outcome. Some studies have found that the impact on returns is minimal (Campbell, 2006; Calvet, Campbell and Sodini, 2007) while others have found that it may actually lead to higher returns (Ivkovic and Weisbenner, 2005; Massa and Simonov, 2006).

Ivkovic, Sialm and Weisbenner (2008) suggest that investors may hold undiversified portfolios due to either a lack of opportunity or trading costs. Investors with large portfolios, who have the opportunity to diversify and the means to pay any trading costs, are making an active decision to invest and hold a concentrated portfolio and this may lead to outperformance. To test this theory, Ivkovic, Sialm and Weisbenner (2008) conducted a study on 78,000 US households who held a portfolio with a large discount broker. They found that investors who held more concentrated portfolios achieved higher returns than those who held more diversified portfolio and this was especially true for investors with large portfolios. The outperformance of the more concentrated portfolios was due to these investors holding non-S&P 500 stocks and stocks that are geographically close to the investor. This finding could be due to the investor having some extra information about these stocks, which they can exploit to pick winning investments (Guiso and Jappelli, 2007 ; Ivkovic, and Weisbenner, 2005; Ivkovic, Sialm and Weisbenner, 2008; Massa and Simonov, 2006;). Investors holding undiversified, concentrated portfolio may mean that their portfolios are higher risk than other investors and this is what leads to the higher returns

observed in this study. However, volatility may also be higher for these investors and they may suffer some significant downturns if the market was to move against them.

Despite these potential limitations, the findings by Ivkovic, Sialm and Weisbenner (2008) suggest that what behavioural science views as “irrational”, “overconfident” or “an investment mistake” is, for some investors, a well thought through and successful investment decision. If undiversified portfolios are driven solely by behavioural biases, these investors would be expected to, on average, achieve lower returns than investors who hold more diversified portfolios. However, undiversified, concentrated portfolios could lead to higher returns if these investors chose to hold undiversified portfolios due to favourable information, especially if these stocks are not large, mainstream stocks. This is supported by the finding of a study by Kacperczyk, Sialm and Zheng (2005) who assessed the returns achieved by fund managers of actively managed equity funds. They found that funds that were less diversified and focused on a particular sector achieved higher returns than funds that were more widely diversified. This difference in performance was attributed to the fund manager’s ability to pick winning stocks from a smaller universe of investments, suggesting that more focused investing may enable information to be utilised more effectively, leading to higher returns.

The Ivkovic, Sialm and Weisbenner (2008) study also found that the outperformance of concentrated portfolios compared to those that were more diversified, was more pronounced for investors who had larger portfolios. These investors would have more opportunity and fewer barriers to diversify, adding support to the suggestion that the lack of diversification was an active choice rather than being driven by a behavioural bias. This suggests that these decisions are not quick and irrational but rather considered decisions with investors identifying investments with high expected returns.

Although the findings of the Ivkovic, Sialm and Weisbenner (2008) study are interesting, the findings do not include a direct measure of risk, information collection or trading costs, all of which could have significantly contributed to the results observed. Once risk is taken into account, by calculating the Sharpe ratio, investors holding more concentrated portfolios no longer outperform more diversified investors.

### 4.3.3 Overconfidence

Overconfidence is a bias that is most frequently linked to investment decisions.

Overconfidence has been used to explain some of the most common observations when investment behaviour is analysed, such as over trading and holding a concentrated portfolio (Baber and Odean, 2001; Pompian, 2006). It may also be linked to a number of other common biases (Barberis and Thaler, 2003).

Overconfidence is an overestimation of the accuracy of decisions, precision of knowledge and skills (Dittrich, Guth and Maciejovsky 2001). Individuals can be overconfident in many ways. They may think that they are better than others even if there is no evidence to support this, or overestimate their abilities or performance relative to objective, operational criteria (Bashir et al. 2013). Overconfidence has been observed in many fields including fire safety, nursing, engineering, law and banking and has been found to be more prevalent for tasks that are difficult, have low predictability and fast, clear feedback is not available (Griffin and Tversky, 1992; Lichtenstein, Fischhoff and Phillips, 1982; Svenson, 1981; Weinstein, 1980; Yates, 1990). Investing into the stock market would fit all of the criteria above and has been found to evoke overconfidence (Barber and Odean, 2001).

In support of this, Barberis and Thaler (2003), in their summary of behavioural finance research, suggest that over 90% of individuals feel that they are above average in sense of humour, driving skill and ability to get along with others. In addition, individuals are generally poor at estimating probabilities, with events that they think are impossible occurring around 20% of the time and events that they deem certain, occurring around 80% of the time (Barberis and Thaler, 2003).

This is likely due to system 1 generating overconfident judgements. This judgement may then lead individuals to place too much faith in their intuitions. Confidence in a belief is mostly based on the quality of the story seen, even if very little is seen. This is because confidence is determined by the coherence of the best story told based on the information at hand. This leads to intuitions that produce predictions that are too extreme and the individual puts too much faith in them. The possibility that critical evidence is missing is also often neglected. The associative system settles on a coherent pattern of activation and

suppresses doubt and ambiguity. Investors who are overconfident will tend to overestimate their knowledge and their ability to control events whilst also underestimating the risks (Nofsinger, 2002).

Overconfidence may be due, in part, to other biases, namely self-attribution bias and hindsight bias (Barberis and Thaler, 2003). Overtime, repeatedly attributing success to their own ability may lead investors to the conclusion that they are very skilled and talented at picking winning investments, when this may not necessarily be the case. Hindsight bias may lead to overconfidence, as investors may believe that as they had correctly predicted past events, they can predict the future much better than they actually can. This misplaced confidence in predicting the future may then impact upon investment decisions.

#### **4.3.4 Overconfidence and Information Acquisition**

Although many studies associate overconfidence with making decisions with little focus on technical analysis (Quadri and Shabbir, 2014), others have associated this with an increase in information gathering (Guiso and Jappelli, 2007). Investors who are more informed would be expected to perceive lower volatility of returns and therefore would be expected to be more likely to invest in stocks and invest more money (Guiso and Jappelli, 2007). Economic theory suggests that for the rational investor, an increase in information should lead to an increase in returns. Although an overconfident investor may behave like a rational investor, they may acquire more information than a rational investor and overestimate the precision and value of signals gained from this information, spending too much time and money obtaining information and also trading too frequently (Guiso and Jappelli, 2007).

A study on customers of a leading Italian bank by Guiso and Jappelli (2007) found that financial information had a negative correlation with returns, as measured by the Sharpe ratio. Investors who spent between 2 and 4 hours per week obtaining financial information had a Sharpe ratio which was 27% lower than investors who spent no time at all obtaining information. This is equivalent to generating a return which is 16 bps lower.

The negative correlation between information and returns was found to be worse for men and investors who stated that they knew stocks well, suggesting that these investors were overconfident. When an overconfidence model was tested it was found that overconfident investors traded more frequently and had a focus on stock picking which reduced returns. This supports the findings of Odean (1998) and Barber and Odean (2000 and 2001) who also found that overconfident investors traded more frequently. Guiso and Jappelli (2007) also found that overconfident investors had portfolios that were less diversified, holding more single company shares than mutual funds, and were less likely to delegate their investment decisions. Although this study does provide some interesting findings, it is only based on survey data with assumptions made about performance rather than using real performance and trade data.

Daniel, Hirshleifer and Subrahmanyam (1998, 2001) suggest that if an individual does their own research, they are more likely to be overconfident about this private information, compared to public information, as they have worked hard to produce it. Subsequent public information then alters the individual's confidence in their private information asymmetrically. If the public information supports the private information, it strongly increases the individual's confidence in that research, however, if it does not support it, it is given less attention and confidence in the private information is unchanged.

#### **4.3.5 Overconfidence and Trading Behaviour**

Many studies have identified groups of investors that trade too frequently and have found that this has a direct impact on returns (Barber and Odean, 2000;2001; Odean 1998; 1999; Shu et al, 2004). These studies have pointed to overconfidence as a way of explaining the results. They suggest that the overtrading is the result of the investor being overconfident in their ability to pick winning stocks, misinterpreting cues and overestimating the accuracy of their own knowledge and ability to outperform the markets (Barber and Odean, 2001; Barberis and Thaler, 2003; Fischer and Gerhardt, 2007). Therefore, overconfident investors lose money in two ways; through poor stock picking and through high transaction costs (Fischer and Gerhardt, 2007). Overconfidence appears to be the result of how individuals perceive and judge information, holding unrealistic beliefs about the size of the returns that will be achieved, the accuracy of these expected returns and also spending too much time

and money on information (Barber and Odean, 2001). This all leads to an overconfident investor overreacting to signals (Odean, 1998; 1999; Dittrich, Guth and Maciejovsky 2001; Guiso and Japelli 2007). In addition, when explaining the past and the future, individuals tend to focus on the causal role of skill, neglecting the role of luck and making the individual prone to the illusion of control (Kahneman, 2011).

Although it is hard to explain the findings of many of the studies investigating trading behaviour, such as Odean (1998; 1999) and Barber and Odean (2000; 2001), without looking towards overconfidence, it is not directly measured in any of these studies.

#### **4.3.6 Overconfidence and Risk**

Pompian (2006) suggests that overconfidence can be “predictive overconfidence”, an individual’s belief that they can predict an outcome, which means that risks tend to be ignored, or “certainty overconfidence”, an individual’s belief in the certainty of their own judgement, which can lead to overtrading and holding a concentrated, high risk portfolio. Overconfident investors will either ignore or underestimate the risks associated with the decision they are making which in turn increases the propensity to take risks (Guiso and Jappelli, 2007; Nofsinger, 2002).

The relationship between risk and overconfidence may not be as clear as some previous studies would suggest. Fellner and Maciejovsky (2007) and Lo et al. (2005) found that risk is negatively correlated with trading frequency, which directly contrasts the findings of studies on overconfidence. If overconfident investors are willing to take higher risks, then it would be expected that this also leads to more trades being placed and therefore a positive correlation between risk and trading frequency would be observed.

#### **4.3.7 Studies That Have Found No Link Between Overconfidence and Investment Behaviour**

Although many studies (Guiso and Jappelli, 2007; Nofsinger, 2002; Pompian, 2006) have found a link between overconfidence and investment behaviour, other studies have found no link between them (Onsumu, 2014; Sharma and Vasakarla, 2013). Sharma and Vasakarla

(2013) conducted a study to examine how gender, overconfidence and risk aversion affects investment decisions. They were unable to identify any significant relationship between overconfidence and investment decisions. In addition, Onsumu (2014) conducted a study on individuals who invested in the Nairobi Securities Exchange. They found that availability bias, representativeness bias, confirmation bias and the disposition affect all had a direct impact on investment decisions. However, overconfidence was found to not have a significant impact.

#### **4.3.8 The Impact of Demographics on Decision Making**

Differences in investment behaviour have been observed between groups based on sex, age, education and wealth. However, the findings tend to be inconsistent and, in many cases, contradictory. Therefore, there is very little agreement around the effect of demographics on investment decisions within the literature.

**Table 4.2 – Summary of the Observed Impact of Demographics on Investment Behaviour**

Author	Findings
Lewellen, Lease and Schlarbaum (1977)	Men believe returns are more predictable, expect higher returns, spend more time and money on analysing investments and rely less on brokers compared to women.
Barber and Odean (2001)	<p>Men are more prone to over trading and over a six year period were found to trade 45% more, on average, than women, leading to a reduced return of 2.65% per annum compared to 1.72% per annum for women.</p> <p>Women reported having less investment experience than men with 47.8% of women reporting that they had good or extensive investment experience compared to 62.5% of men.</p> <p>Younger investors hold more volatile portfolios and are more prone to overtrading than older investors.</p>
Dittrich, Guth and Maciejovsky (2001)	<p>When making investment decisions, women are more prone to overconfidence than men.</p> <p>Age is negatively correlated with overconfidence.</p>
Pompian and Longo (2004)	<p>Gender affects an investor's susceptibility to biases.</p> <p>Women tend to be more pessimistic, realistic and have a lower risk tolerance. Men are overconfident, unrealistic and have a high risk tolerance compared to women.</p>
Guiso and Jappelli (2007)	<p>Portfolios of male investors perform worse than those of females, as men are more likely to be overconfident when making investment decisions.</p> <p>Men are less likely to delegate investment decisions due to their overconfidence.</p>
Zhao (2006)	Age did not affect flows into mutual funds.
Looney et al (2007)	Men are more confident in their investment decisions and construct higher risk portfolios compared to women.



Durand, Newby and Sanghani (2008)	<p>Masculinity was associated with risk aversion, as it had a negative relationship with exposure to equities and no observed effect on trading behaviour.</p> <p>Masculinity was also found to be associated with lower investment returns.</p>
Eroglu and Croxton (2010)	Age, gender and education did not significantly influence optimistic bias.
Finke, Howe and Huston (2011)	Confidence in financial decision making increased in older age, suggesting that older investors may be more likely to suffer from overconfidence.
Firat and Fettahoglu (2011)	<p>Younger investors are more likely to invest in the markets.</p> <p>Significant differences between married and single investors, with single investors being more likely to invest in the markets and were found to be more optimistic than married investors.</p> <p>Less educated and female investors were more likely to display a herd mentality.</p>
Hackethal, Haliassos and Jappelli (2011)	<p>Male investors hold a larger percentage of their portfolios in directly held stocks, and their portfolios perform worse than female investors.</p> <p>Investors aged between 40 and 60 years were also found to be more likely to purchase investments.</p>
Sharma and Vasakarla (2013)	In terms of risk aversion, women are more cautious than men.
Onsumu (2014)	Gender was found to not have a significant impact on overconfidence, availability bias, confirmation bias, representativeness bias and disposition effect.
Mayfield, Perdue and Wooten (2008)	Compared to women, men report stronger intentions to engage in both long term and short term investing.

When assessing gender differences, it is worth bearing in mind that women are disproportionately underrepresented in the majority of studies investigating investment behaviour. It may be that, as more men hold investments, and culturally, men are seen to make household investment decisions, they are naturally more confident when investing. Also, the Baber and Odean (2001) study only had data on the sex of the person that opened the household account, which may be different to the person who actually runs the account.

Studies by Agarwal et al (2009) and Korniotis and Kumar (2010) found that financial capability tends to peak around 60 years of age. Research has also found that as individuals age they rely more on gut instincts and rules of thumb rather than on well-reasoned, considered judgements (FCA 2016). Although confidence in managing finances and choosing financial products may increase with age, cognitive abilities, including numeracy and awareness of key financial terms, decrease with age (Agarwal et al, 2009; Korniotis and Kumar, 2010). Also, older people may find picking a product from a wide range difficult and prefer simple choices with a smaller number of options. This may lead to older people deferring decisions when there is too much choice (Chen, Ma and Pethtel, 2011). These findings suggest that older people may be more susceptible to biases, which could lead to older people displaying more common investment mistakes. However, this is not completely supported by the studies summarised in Table 4.2.

A study by the FCA (2021) found that younger investors invest in higher risk assets. They also found that these investors had high levels of confidence but a lack of awareness about the risks they were taking, with 4 in 10 not viewing “losing some money” as a risk, even though their whole investment was at risk. In addition, 4 in 5 investors attributed investment decisions to gut instincts, suggesting that they may be more overconfident.

Although the specific impact of demographics on investment decisions is unclear, age and gender appear to be factors that have an impact on investment behaviour. Education level and income have also been found to influence investment decisions (Mak and IP, 2017). Income and education level have been the sociological factors that have been found to have the most influence on investment decisions (Al-Ajmi, 2008; Chaffai and Medhioub, 2014;

Mak and Ip, 2017; Rizvi and Fatima, 2015; Shaikh and Kalkundrikar, 2011). Again, the results of studies on this have yielded mixed results.

#### **4.3.9 Risk**

Many of the biases and common investment mistakes identified have direct links to risk, either by increasing the risk investors are willing to take or by increasing the risk level of the portfolios held. The definition of risk and how individuals approach it has evolved considerably over the last 70 years. Von Neumann and Morgenstern (1947) suggested that the maximisation of utility was the only factor taken into account when making decisions. This was the primary view of risk within economics until Allais (1952) questioned maximisation of utility being the sole factor in decision making. An individual who is faced with a trade off between expected return and the probability of achieving a specific goal was used as an example which may not fit the Von Neumann and Morgenstern model. Markowitz (1952) suggested an alternative, two-factor approach to take into account a decision which includes a desire to achieve higher returns but a reluctance to accept the uncertainty to of returns. This model has evolved since but the overriding view within economic models is that individuals will look to achieve the highest return whilst minimising the uncertainty of returns/risk. Figner and Weber (2015) sum this up by stating that risk taking is a compromise between greed (value) and fear (risk).

The overall assumption within economics is that individuals are risk averse (Warneryd, 1996). Psychology studies have challenged this assumption as they suggest that, rather than striving to minimise risk, the ideal amount of risk taken may differ between individuals and may depend on factors such as personality and situational differences (Figner and Weber, 2015; Lopes, 1987; Mayfield, Perdue and Wooten, 2008; Weber and Kirsner, 1997).

Risk aversion is where an individual gravitates toward certain, as opposed to uncertain, events. It is defined as a preference for a sure outcome over a choice which has an equal or greater expected value (Tversky and Fox, 1995). Attitude to risk is a willingness to incur monetary risk, but is generally broader than risk aversion and can be influenced by many factors such as financial situation, investment goals, time horizon and previous experience (Corter and Chen, 2006). Pak and Mahood (2013) agree with this and suggest that

personality traits, emotion and knowledge may also be key factors which determine an individual's attitude to risk.

Figner and Weber (2015) suggest that risk taking is a function of the perceived riskiness and the return/value from different actions and an individual's attitude towards the perceived risk. Therefore, situational differences in risk taking are due to the individual's perception of risk in different situations rather than their willingness to take risk. Within the model suggested by Figner and Weber, situational differences, such as how the outcome is framed, may influence risk perceptions. This model provides an explanation as to how biases may influence risk taking in an investment context. This is supported by studies that have investigated the influence of emotion on risk taking (Weller and Tikir, 2011). Decisions that are made in an emotionally charged context (hot) have been found to lead to greater levels of risk being taken compared to other decision, that are made in a cold, deliberative state (Figner et al 2009; Figner and Weber, 2011 and 2015).

Although investors may have an initial reluctance to invest, as they are risk averse, factors such as a market bubble (for example technology shares), a rising market and friends who have made money on the stock market could motivate people to invest. The factors which motivate this behaviour could also affect the investor's perception of risk and may even help to forget about past investment mistakes and losses. In these circumstances, the investor's perception of loss is moved towards a loss of return, rather than the reality of a loss of capital. This also means that it is likely the investment is made at the top of the market. Friesen and Sapp (2007) found that this behaviour - investors moving into funds following an increase in equity markets and moving out following a downturn - resulted in an annual underperformance of 1.56%. This shows that the framing of an investment may lead investors to misjudge the amount of risk they are taking.

Many of the studies on risk have tended to frame questions around a specific action, such as 'buy or sell?', and have not assessed how measured attitude to risk correlates with actual behaviour (Warneryd, 1996). Many have also been laboratory based studies that have only measured repeated gambles with very small stakes. All of the above may have an impact on

the results and may mean that they are not representative of real life risk taking and decision making (Kahneman and Tversky, 1979).

One study which overcame these issues by framing questions around choices rather than sales and purchases was conducted by Holt and Laury (2002). They conducted a simple lottery style choice task with 175 subjects, which included a wide range of high, real incentives/payoffs. They found that risk aversion was high with around two thirds of subjects choosing a safe option even when the payoff was low/under \$4.00. They also found that risk aversion significantly increased as the payoff increased.

A study by Kachelmeier and Shetata (1992) found that an individual's risk taking behaviour was affected by the value of the prize and whether a task involved buying or selling. They found, by using choice tasks, that the higher the prize value, the lower the risk seeking behaviour. Risk seeking behaviour was also lower when something was owned, evidenced by a higher value being put on these items when deciding a selling price, and increased when something is not owned, evidenced by a lower buying price. This finding shows how the endowment effect may have an impact on risk.

The reference point used to assess a gain or loss can have a significant impact on investment behaviour (Kahneman and Tversky, 1979). The reference point can make some people view a loss as a gain, for example, if the markets crashed but the investor did not lose as much as the majority of people, they may consider this a gain. Another example would be if an investor made money on an investment but then had to pay tax on the gain, the investor may view this gain as a loss due to the tax being taken. This change in reference point (gain/loss) illustrated in the examples above can lead to investors misjudging the amount of risk they are taking.

Barberis and Thaler (2003) suggest that risk perceptions may depend on how often investors review their portfolios. Investors who review their portfolios daily will see greater fluctuations in value than those who review their portfolios on an annual basis. This may lead to these investors perceiving investments as being riskier, and being more risk averse,

than those who review their portfolios less regularly. Therefore, even though an individual may state that they have a long time horizon and can tolerate high levels of risk, their actual time horizon, and therefore risk tolerance, may depend on how often they review their portfolio.

Some studies analysing the performance of different stocks over time and different market conditions have found that a high percentage of gains and losses occur over just a couple of days, around the time of earning announcements (Chopra, Lakonishok and Ritter, 1992; Porter et al. 1997). This finding is surprising, since the systemic risk of these stocks does not change around this time. Therefore, this could mean that the level of risk taken may not necessarily be reflected in any gains or losses.

#### **4.3.10 Past Performance**

Past investment experience has been found to directly influence investment decisions. Prior gains may encourage individuals to take more risk, and prior losses may lead to less risk being taken (Barberis and Thaler, 2003). Many studies have supported this and found that positive past experience leads to increased confidence (overconfidence) and risk taking by influencing both perceptions and attitude to risk, and the likelihood of investing in a specific stock (Byrne, 2005; Graham et al, 2005; Mak and Ip, 2017).

Past performance is linked to the availability bias, in which individuals use past events to shortcut decision making. These easily recalled events make an outcome appear more likely than it may actually be and those events that are hard to imagine are judged to be less likely, even though this may not be the case (Sadi et al 2010).

Odean (1999) suggests that when choosing an investment to purchase, individuals do not systematically sift through thousands of the investments available until they find one they would like to purchase. Instead, they will typically purchase something that has previously caught their attention. This is known as the attention effect. One of the best ways to get an investor's attention is extreme past performance, which could be good or bad. The attention effect is likely to be less important when it comes to deciding whether to sell an investment

or not, as individuals will narrow their search to investments that they already hold (Barberis and Thaler, 2003). This is supported by Barber and Odean (2008) who conducted a study which tested the impact of attention-grabbing stocks on buying and selling decisions. They found that investors were more likely to buy attention grabbing stocks and that attention was less likely to drive selling decisions.

Hackethal, Haliassos and Jappelli (2011) conducted a study on investment behaviour and found that more experienced investors achieved higher returns than those with less experience. The experienced investors also had a lower percentage of their portfolios invested in directly held stocks, suggesting that investment experience may lead to a more diversified portfolio and lower risk portfolio. This is supported by Mak and Ip (2017), who conducted a study on investors in China and Hong Kong. They found that investment experience had a significantly negative impact on the amount held in investments. They suggest that as investors become more experienced, they become more cautious and high risk investments are only attractive to less experienced investors.

Mayfield, Perdue and Wooten (2008) found that individuals who had greater previous investment experience had stronger intentions to attend to their short term investments but not their long term. They suggest that previous investment experience may not necessarily mean that these individuals have a long term financial perspective. As the frequency with which portfolios are reviewed may impact upon risk, investors who attend to their short term investments, may view investments as being more risky and therefore may have a lower attitude to risk or be more risk averse (Barberis and Thaler, 2003). The findings of Hackethal, Haliassos and Jappelli (2011) and Mak and Ip (2017) would also support this.

#### **4.4 Personality**

The majority of the behavioural research into investor behaviour and financial decision making has focussed on heuristics, observing the results achieved from the decisions taken and inferring why these decisions were made. Within the academic literature, little consideration has been given to what drives these heuristics and whether personality has an impact on them (Pompian and Longo, 2004; Segura and Streblau, 2012).

Ryckman (1982) suggests that personality is what drives a person's unique responses to environmental stimuli and has been found to guide decision making in uncertain circumstances (Back and Seaker, 2004). Therefore, personality would be expected to have some influence on investment decisions (Charles and Kasilingam, 2015).

Personality is defined as:

“a pattern of characteristic thoughts, feelings, and behaviours that distinguishes one person from another and that persist over time and situation” (Phares, 1991)

Personality is often exhibited through traits, which can be measured, as they determine how an individual behaves, reacts and interacts with others (Pak and Mahmood, 2013). Although changes to personality may be observed over a lifetime, personality traits tend to be relatively stable (Laverdiere, Morin and St-Hilaire, 2013). This means that if there is link between personality and decision making, interventions can be developed to help people make better decisions.

The “Big Five” measure of personality is the most commonly used personality measure (Pak and Mahmood, 2013). It has been used in a high number and variety of studies over the last 50 years, in which, strong support for the five dimensions has been established. The Big Five personality model suggests that most variations in personality are due to five broad personality traits (Gosling, Rentfrow and Swann, 2003). The model is hierarchical with personality being broken down in to five broad high level traits/factors. Each trait is made up of a number of more specific sub traits/facets which are in turn made up of even more specific sub-traits (Gosling, Rentfrow and Swann, 2003; Hofmans, Kuppens and Allik, 2008). The personality dimensions have been adapted slightly by different researchers who have used variations to the labels given to the traits in the original measure (Costa and McCrae, 1992; Donnellan et al, 2006; Thompson, 2008). Table 4.3 sets out each of the “Big Five” personality traits, providing a description along with how each trait has been found to impact upon investment decisions.



**Table 4.3 - The Big Five Personality Traits**

Personality Trait	Description	Impact on Investment Decisions	References
<b>Extroversion</b>	Individuals who score highly in extroversion are outgoing, sociable, friendly, careless and make quick, impulsive decisions, showing little self-restraint and understanding. They focus on external elements not under their influence and therefore believe outcomes are due more to luck than skill/control; they are not bound by rationality. They are also more optimistic about life and events and will tend to make positive forward looking decisions.	Positive attitude could lead to underestimating risks and overestimate potential positive outcomes, leading to a higher attitude to risk.	Gholipour, 2007; Hopfensits and Wranik, 2009; Charles and Kasilingam, 2015; McCrae and Costa, 1996; Pak and Mahmood, 2015; Sadi et al 2010
<b>Agreeableness</b>	Agreeableness reflects an individual's social co-operation. Individuals that score highly in agreeableness are respectful of others, co-operative, trusting, honest, flexible and modest. When it comes to decision making they will ask few questions and will require little information before making a decision, showing little scepticism or curiosity.	More likely to rely on the advice from a financial adviser and find it difficult to make their own decisions.	Farzenepey, 2006; Pak and Mahmood, 2015
<b>Conscientiousness</b>	Individuals who score highly in conscientiousness are trusted, stable, reliable, determined, self-disciplined and responsible. They are methodical and will have clear goals, analysing information and displaying caution when making decisions.	Unlikely to take impulsive risks.	Charles and Kasilingam, 2015; Farzenepey, 2006; Pak and Mahmood, 2015; Sadi et al, 2010
<b>Emotional Stability</b>	Emotionally stable individuals are confident and relaxed. They have effective cognitive skills, strong analytical abilities, critical thinking and conceptual understanding. They do not make impulsive decisions and are efficient at planning for and achieving their goals.	Unlikely to take impulsive risks. More likely to make decisions using system two and less likely to be influenced by emotion and biases.	Farzenepey, 2006; Sadi et al, 2010

<b>Openness to Experience</b>	<p>Individuals who score highly in openness to experience are creative, flexible, adaptive and curious. They tend to agree to new ideas, as they have a desire to try new things and are susceptible to new beliefs. When making decisions, they prefer things to be clear and simple rather than complex and vague and are more willing to take risks.</p>	<p>May frequently change portfolios in response to changes in the market and have a high attitude to risk.</p>	<p>Hopfensits and Wranik, 2009; Charles and Kasilingam, 2015; McCrae and Costa, 1996; Pak and Mahmood, 2015; Sadi et al, 2010</p>
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#### 4.4.1 Personality, Investment Decisions and Biases

To date, only a small number of studies have explored the impact of personality on investment decisions and biases. One of the most comprehensive was by Durand, Newby and Sanghani (2008). They investigated the impact of personality on investment behaviour using an adapted version of the Costa and McCrae's (1992) "Big Five" personality measure, along with Psychological Gender Traits (Bem, 1977) and personality traits of Preference for Innovation and Risk Taking Propensity (Jackson, 1976) to assess the personality of 21 Australian investors. All subjects also disclosed their trading details for the financial year ending 30<sup>th</sup> June 2005. This study found that certain investment behaviours were linked to personality traits, indicating that:

- Better investment returns were achieved by investors who were more extroverted, had a greater preference for innovation and were less 'masculine'.
- Higher risk portfolios were held by investors who had higher negative emotion, higher risk taking propensity and more openness to experience.
- Increased trading was associated with higher negative emotion and higher risk taking propensity.
- Extroversion was found to be associated with lower levels of trading.
- Personality was also found to be linked to how frequently investors accessed information about the markets.

The finding that higher negative emotion is associated with higher trading activity is an unusual finding, as one would expect negative emotion to be related to risk aversion. Durand, Newby and Sanghani (2008) suggest that this may be due to the investors being nervous, which then leads to an increase in trading in an attempt to reduce the negative feelings. However, one would expect an investor with high negative emotion to encash their investment if they were nervous, rather than trade more.

Although this study expands the existing research and is one of the few to directly measure personality and trading, a major limitation is that investment returns are disclosed rather than recorded. Therefore, investors may not have disclosed the true value of a loss or gain.

This study had a very small sample size of 21 subjects and of these only two were female. Also, investors who chose to have their portfolios managed by a professional were discounted. Including these investors would have provided a better insight into the type of investor that would seek advice and would have enhanced the study. Overall, although this study produced interesting results, the sample size, the number of women included in the study, the self-reported financial information and discounting advised investors may mean that the results are not representative of the general population. Other studies that have investigated the impact of personality on investment decisions and biases are summarised in Table 4.4.

**Table 4.4 – Summary of Studies Investigating the Impact of Personality on Investment Decisions, Risk and Biases**

Author	Finding
Bashir et al (2013)	The results were mixed with no significant correlations identified between personality traits and overconfidence in students, but for employees, who are investment experts at financial institutions, all personality traits correlated with overconfidence, with openness to experience showing a negative correlation.
Eroglu and Croxton (2010)	Only two personality traits influenced optimism (measured by adjusting forecasts, demonstrating optimistic bias). Agreeableness decreased optimistic bias, whilst openness to experience increased it.
Balasuriya et al (2013)	Extroversion positively correlated with financial optimism.
Pompian and Longo (2004)*	<p>Personality type and gender affects an investors susceptibility to biases, with confidence and optimism being the main differentiators.</p> <p>Women tended to be more pessimistic, realistic and had a lower risk tolerance, scoring highly in openness, agreeableness and conscientiousness.</p> <p>Men were overconfident, unrealistic and had a high risk tolerance, scoring highly in extroversion.</p>
Segura and Streblau (2012)	Investors exhibit different personalities and these differences in personality lead to different behaviours when making investment decisions.
Charles and Kasilingam (2015)	There was a significant positive relationship between heuristics and personality, with submissive heuristics (overconfidence, anchoring) having the largest impact.
Pak and Mahmood (2015)	<p>Openness to experience had a significant, positive correlation with risk tolerance, and agreeableness had a significant, negative correlation.</p> <p>No significant correlations were found between personality traits and investment decisions, however, investment decisions were significantly correlated with risk tolerance, with higher levels of risk tolerance being correlated with the intention to invest in stocks.</p>
Mayfield, Perdue and Wooten (2008)	Individuals who are more extroverted are more likely to intend to engage in short term investing than other investors. This may be due to more extraverted individuals being more optimistic and outgoing and therefore more likely to consult a financial adviser or start investing on their own.

	<p>Individuals scoring more highly in openness to experience are more likely to attend to their long term investments. This may be due to the high level of personal organisation, imagination and intellectual expression.</p> <p>Individuals who are risk averse are more likely to avoid short term investing and are unlikely to engage in long term investing as well.</p> <p>No significant relationship was found between extroversion and an intention to invest over the long term.</p>
Sadi et al (2011)	<p>There are links between specific biases and personality traits.</p> <p>Extroversion and openness correlated with hindsight bias and overconfidence, neuroticism correlated with randomness bias and escalation of commitment correlated with availability bias.</p> <p>Conscientiousness negatively correlated with randomness bias and openness negatively correlated with availability bias.</p> <p>Overall, the results suggest that investors who score highly in openness to experience and extroversion are more likely to suffer from hindsight bias which intensifies overconfidence.</p>
Weller and Tikir (2011)	<p>Personality traits can be related to risk perceptions and influence both general and task specific risk attitudes.</p> <p>Emotionality, which reflects low emotional stability without anger, was associated with higher risk perceptions and conscientiousness with lower risk perceptions in general.</p> <p>Openness to experiences was only associated with task specific risk perceptions.</p>

\* Pompian and Longo (2004) used an adapted version of the MBTI personality measure rather than a Big Five measure. For comparative purposes, the results have been converted to big five personality traits using the findings of Furnham, Mouttafi and Crump (2003) who assessed the correlation between MBTI results and those of the Big Five's Revised NEO-Personality Indicator.

The work of Durand, Newby and Sanghani (2008), Charles and Kasilingam (2015), Pompian and Longo (2004) and Segura and Streblau (2012) suggest that an individuals' personality may make them more susceptible to certain biases when making investment decisions. A link between personality and investment biases opens up the possibility for investors to be segmented based on their personality, meaning that product providers and financial advisers may be able to administer interventions before investment decisions are made, improving the investment outcome for investors.

#### **4.4.2 Biases, Risk, Personality and Investment Decisions**

Although the exact interactions are still unclear, the research into the impact of biases, risk taking and personality on investment decisions demonstrate that psychological, sociological and demographic factors are significant predictors of investment behaviour (Mak and Ip, 2017). It is a complex combination of these factors that investment decisions appear to be based upon.

As Simon (1955) suggested, when making decisions, individuals make "satisfying" decisions rather than "optimal decisions", due to a lack of knowledge and procedures. Although these decisions may not appear to be rational or logical, they may make perfect sense to the individual at the time of making the decision. What is still unclear is whether these decisions actually have a negative impact and lead to poor outcomes for investors.

#### **4.5 Financial Advice**

It is estimated that there are 15.7 million investors in the UK, and only 3.6 million of these currently receive advice, with the advice gap - individuals who would like advice but are unable to access it - currently standing at around 12.7m people (Boring Money, 2021).

Most of the studies that have investigated investor behaviour and investment decisions have focused on investors who make their own investment decisions, self-directed investors.

These studies have found that individual investors are overconfident, hold undiversified high-risk portfolios and make basic mistakes when managing their portfolios (Odean, 1998, Barber and Odean 2001; Charupat and Deaves, 2004; Fischer and Gerhardt, 2007). Even though many investors' investment decisions are either influenced by advice or completely

delegated to a financial adviser/financial institution, the impact of advice on these observed behaviours and biases has not yet been explored in any real detail (Allen, 2001. Hoehle et al, 2013, Zhao, 2006). The majority of studies investigating the impact of advice have focussed solely on returns and paid little attention to how the advice is received and how the investor interacts with the adviser (Martenson, 2008, Segura and Streblau, 2012). Shiller (2008, 2009) suggests that financial advice and medical advice are very similar, in that both are needed on an on-going basis, and not receiving advice can have a negative impact and impose costs on society as a whole.

#### **4.5.1 Barriers to Receiving Financial Advice**

Seeking financial advice is likely, in most circumstances, to be as a result of engaging the reflective brain, system two, after an investor has looked to make an investment decision but realised that they do not possess the necessary skills and knowledge to make a decision. However, other investors may have advice offered and make a quick decision as to whether they need it or not. Within both of these processes, investors will need to consider the potential benefits of advice and it is at this point that barriers may impact upon the decision of whether to receive advice or not.

The potential benefits of financial advice include increased savings, reduced tax, improved investment returns, financial education and peace of mind (Knutsen and Cameron, 2012). Research by the International Longevity Centre (2019) found that the average UK consumer who takes financial advice will increase their pension wealth by £30,991. Given these clear benefits, and the significant negative impact poor investment decisions could have on an individual's standard of living, especially when making decisions around pensions, one would expect the use of financial advisers to be at least as popular, if not more so, than other professional advisers, such as accountants and solicitors. However, this is not the case and very few people seek and receive financial advice.

A survey by the Financial Conduct Authority (FCA) in 2018 found that 4.5 million, or one in ten, UK adults took financial advice on investments, saving into a pension or retirement plan over the previous 12 months. However, this also means that 91% of UK adults, or 46.5 million people, have not had regulated financial advice in the last 12 months. The FCA



estimate that 18.2 million people who have £10,000 or more in savings and/or investments and who might have a need for advice, haven't taken it. This is equal to 36% of the UK population as a whole. A study by Aegon (2015) found that only 16% of people would be confident in making an investment into the stock market or an equity fund without financial advice, and only 14% would be confident in planning their retirement goals without financial advice. Therefore, there must be a barrier preventing people from seeking and receiving financial advice. There are a number of factors that may lead to this low take up of financial advice. These would include cost, a general lack of engagement with financial services and products due to poor financial literacy, and a general mistrust of banking and financial advisers (Knutsen and Cameron, 2012).

The ASIC 2010 report in Australia that found that 40% of Australian adults have never used a financial adviser. The most common reasons cited for this were advice being out of reach, circumstances not warranting advice and a mistrust of financial advisers. A study by Mintel (2015) found that 44% of consumers felt that they did not understand how a financial adviser could help them manage their financial affairs, suggesting that the benefits or value of advice may not be clear, which could impact upon willingness to pay.

In 2014 investment research company Morningstar conducted a survey with 1,000 UK investors in order to assess why so few investors receive financial advice. They found that trust was the most important factor when choosing a financial adviser. However, only 1 in 5 of the investors ranked the trust of financial advisers as "good" or "very good" and, out of the 54% of investors who stated that they were not willing to pay for financial advice, only 20% stated a lack of trust as the reason. Wanting to be in control (29%) and thinking that they can do a better job (22%) were the main reasons investors did not receive advice. Only 5% stated that they could not afford advice, suggesting that cost and willingness to pay for advice may not be the main barrier for this group of investors. However, this study was amongst investors who use Morningstar.co.uk to research and monitor their investments. Morningstar is a comprehensive website that includes very technical and detailed information aimed at financial advisers and sophisticated investors. Therefore, the investors included within this study are unlikely to be representative of the general population.

#### **4.5.2 Studies into Financial Advice**

Financial advisers have the ability to correct individual investment mistakes and enhance investment decisions (Hackethal, Haliassos and Jappelli, 2011). However, very few studies have attempted to investigate this. Even theoretical investment models such as CAPM and APT ignore the impact of financial advice and presume that investors invest directly into the market (Elton and Gruber, 2000). Therefore, very little is known about the impact of financial advice on investment decisions and the benefits (Allen, 2001; Fischer and Gerhardt 2007; Hoechle et al, 2013). The few studies that have investigated the impact of financial advice have yielded mixed results, and often conflict, with some suggesting the impact of financial advice on investment decisions is positive, while others suggest that the impact is negative. Table 4.5 summarises the finding of these studies.

**Table 4.5 – Summary of Studies Investigating the Impact of Financial Advice on Investment Decisions**

Author	Findings
Shapira and Venezia (2001)	<ul style="list-style-type: none"> <li>• Advised and self-directed investors suffered from the disposition effect (selling winning investments and holding onto losing investments) but it had a stronger influence on self-directed investors.</li> <li>• Advice led to an increased number of trades, improved diversification and had a positive effect on returns compared to the self-directed investors.</li> </ul>
Bluethgen et al (2008)	<ul style="list-style-type: none"> <li>• Financial advice led to investors holding better quality investments and a more diversified, lower risk portfolio, with 3% less equity on average being held in portfolios.</li> <li>• Advised investors also traded more frequently.</li> <li>• Advised investors paid higher charges on their investments.</li> </ul>
Kramer (2011)	<ul style="list-style-type: none"> <li>• Advised investors held portfolios that were more diversified than self-directed investors.</li> <li>• However, there was no observed difference in returns.</li> </ul>
Chalmers and Reuter (2012)	<ul style="list-style-type: none"> <li>• Advised investors had more diversified portfolios.</li> <li>• However, these portfolios were riskier and led to lower returns compared to self-directed portfolios. This may be due to financial advisers trying to mask poor performance by recommending riskier investments.</li> <li>• When adviser charges were factored in, advised investors achieved returns that were 0.92% lower than self-directed investors.</li> </ul>
Hackethal, Haliassos and Jappelli (2011)	<ul style="list-style-type: none"> <li>• Advice led to lower net returns, a lower Sharpe ratio (risk-return-trade-off) and a higher turnover of assets (excessive trading).</li> <li>• This increased costs and reduced returns for advised investors.</li> <li>• Advised investors did have less volatile and more diversified portfolios.</li> <li>• If financial advisers are to make a positive contribution to investor portfolios, the impact is likely to be minimal due to the cost of advice.</li> </ul>

Bergstresser et al (2009)	<ul style="list-style-type: none"> <li>• Advised investors invested into funds with higher fees/commissions.</li> <li>• Advice led to lower returns when compared to self-directed investments.</li> <li>• Advised investors displayed the same return chasing behaviour as self-directed investors, advice did not correct this.</li> </ul>
Hoechle et al (2013)	<ul style="list-style-type: none"> <li>• Advice negatively affects investment returns, especially if a trade is executed following contact which is initiated by the adviser.</li> <li>• No difference found in the number of trades made by self-directed and advised investors.</li> <li>• The negative impact of financial advice is only seen on the purchase of investments, however, advisers do not make up for the poor recommendations when assets are sold.</li> <li>• Advised trades produced returns that were 8% per annum lower than self-directed.</li> <li>• Self-directed investors placed 6.7 trades on average over 2.5 years compared to advised investors who placed a total of 18.9 trades. Of these, only 4.7 were advised and 14.2 were independently placed self-directed trades. This may suggest that advised clients suffer from overconfidence.</li> </ul>
Bullard, Friesen and Sapp (2008)	<ul style="list-style-type: none"> <li>• Investors who buy funds through a financial adviser achieve returns that are 150 basis points lower than self-directed investors due to adviser charges.</li> </ul>
Mullainathan et al (2011)	<ul style="list-style-type: none"> <li>• Financial advisers encourage investors to chase returns by focussing on investments that have recently performed strongly.</li> </ul>

Whilst the studies summarised in Table 3.5 provide useful insights into the impact of financial advice on investment decisions, the majority of the studies suffer from similar limitations. The limitations include a short assessment period/duration, limited subject pool, small subject pool and an inability to assess data at a trade level.

The study conducted by Hoechle et al (2013) is one of the most comprehensive studies into the impact of financial advice on investment decisions, which managed to overcome some of the limitations of other studies on financial advice. Hoechle et al analysed data from a large Swiss bank and, unlike other studies which could only classify portfolios as advised or self-directed, they were able to classify each trade as advised or self-directed, allowing for a more in-depth analysis to be performed. The study also included a large sample size, 18,520 clients, 427 advisers and over 150,000 trades from January 2002 to June 2005. In addition, they also attempted to account for the fact that, those who were competent in making investment decisions may not be the ones who sought or needed financial advice by adding client fixed effects to their regression analysis, controlling for the average trade performance of the client. However, they still found that, on average, advised trades performed worse than self-directed trades.

Although this study was comprehensive and overcame some of the main limitations of previous studies, it did also suffer from some significant limitations. Only stock trades were included within the analysis; investments into funds were discounted, which may affect the results. In contrast to most adviser charging structures and propositions, investors were only offered optional, free of charge advice, and investors who completely delegated their investment decisions to an adviser were eliminated from the study. This may have had a significant impact on the results, as only 43.3% of investors acted on the advice following a personal meeting and only 54.2% acted after a phone call. Investors have been found to be more likely to act on paid for advice compared to free advice (Gino, 2008). The data was collected between January 2002 and June 2005, which is a relatively short time period and since the data was collected the financial crisis, technology developments and regulatory changes mean that the finance industry is now very different. Also, only clients of one Swiss bank were included within the sample. These were all high-net-worth clients that may not be representative of the general population.

The UK Office of National Statistics (ONS) conduct an ongoing Wealth and Asset survey which tracks the wealth of thousands of people over two yearly waves. The survey has been running since 2004-2006 and is now on the 5<sup>th</sup> wave. The International Longevity Centre (2019) analysed the ONS data and found that individuals who took financial advice were on average £47,706 better off than those who did not take advice. However, this result may be a little misleading when compared to other academic studies on the value of advice, as this study only looked at total wealth and not investment returns. Therefore, the figure may be skewed by individuals simply saving and investing more if they receive advice rather than achieving higher returns than those who do not receive advice.

#### **4.5.3 Demographics and Financial Advice**

Demographics have been found to influence the take up of financial advice, however, the studies that have investigated this have produced some conflicting results.

Finke, Huston and Winchester (2002) found that high income earners, college graduates and the self employed were more likely to use a financial adviser than other members of the public. A study by Royal London (2020) found that advised investors were more likely to be male, over 45 years of age and earn more than £40k per annum. Bluethgen et al (2008) found that investors receiving financial advice were older, wealthier, more risk adverse and more likely to be female. These findings are supported by Hackethal, Haliassos and Jappelli (2011) who found that richer, older, more experienced, self-employed and female investors were more likely to delegate their investment decisions to a financial adviser. Bhattacharya et al (2011) found that higher levels of wealth were found to correlate with the take up of financial advice. The National Longitudinal Survey of Youth also found that when planning for retirement the use of a financial adviser increased dramatically, with wealth, income and investors with higher levels of education and higher self-esteem being more likely to seek financial advice (US Department of Labor, 2008). However, in contrast to the above findings, Chalmers and Reuter (2012) found in their study that younger, less educated and lower paid investors were more likely to seek advice.

Whilst these results have some inconsistencies, they do suggest that financial advice is more likely to be sought and taken up by older, wealthier and more educated investors. This may mean that many individual investors see advice as out of their reach, or it may not even be a consideration for mass market investors. If this is the case, many investors will dispel financial advice immediately as they think that they do not have enough money to warrant or qualify for advice in the first place.

#### **4.5.4 Overconfidence and Financial Advice**

When assessing the reasons why investors did not receive financial advice, Morningstar (2014) found that wanting to be in control and thinking they can do a better job were the main reasons investors gave for not receiving financial advice, which may suggest overconfidence is a factor when deciding whether or not to receive financial advice. Guiso and Jappelli (2007) suggest that overconfident investors are less likely to delegate investment decisions and receive financial advice. If they did, there is a question over whether the advisor would discourage the overtrading commonly associated with this bias or make it worse (Hackethal, Haliassos and Jappelli, 2011).

#### **4.5.5 The Definition of Financial Advice**

In addition to the limitations of studies mentioned above that have investigated the impact of financial advice on investment decisions, another significant limitation is the definition of what financial advice or a financial adviser is. There appears to be no clear definition of “financial advice” or “financial adviser” within the literature, with some studies including guidance, optional, free advice and paid for holistic advice as financial advice (Hoechle et al, 2013). Some of these studies also include stock brokers, relationship managers and account managers as financial advisers, when in fact the roles and qualification required to do them are very different.

Fischer and Gerhardt (2007) are one of the few researchers to tackle this issue. They suggest that a financial adviser should be defined as:

*“a person or organisation that offers its professional financial expertise to individuals who seek assistance or want to completely delegate their investment decisions.”*

Although, this definition is close to defining the role of a financial adviser, advice does not include complete delegation; the investor always has a choice over whether or not to follow the advice. In addition, although a financial adviser may work for a company, the advice will be given by an appropriately qualified, authorised and regulated individual. To reflect these points, the definition offered by Fischer and Gerhardt (2007) has been used as a basis for the definition of a financial adviser used within this study. The definition of a financial adviser in this study will be:

*“a suitably qualified, authorised and regulated person that offers their professional financial expertise to individuals who seek assistance with making investment decisions.”*

#### **4.5.6 The Impact of Financial Advice**

As Table 3.5 shows, the majority of studies that have investigated the impact of financial advice on investment decisions have produced mixed and often contradictory results, making it very difficult to draw any firm conclusions from the previous research. However, the research has tended to show that, when compared to self-directed investors, advice has led to lower returns, increased trading and a more diversified portfolio.

If the cost of advice is higher than the additional return achieved by the investor, then it could be argued that there is no benefit to paying for financial advice (Fischer and Gerhardt, 2007). However, the value of financial advice may not be financial. Investors who are less confident and prone to making mistakes may benefit from the peace of mind and reassurance that an adviser is looking after their money rather than looking for a superior return. It may be that a financial adviser provides many intangible benefits to an investor, such as emotional support, peace of mind and education. Shefrin and Thaler (1988) suggest that foresight, self-control and habits are what influence financial decisions. It may be that when making financial decisions a financial adviser has an influence on all of these three factors. A financial adviser could help with foresight (explaining longevity and agreeing a



time horizon for any plan). They could help to enhance self-control either by challenging decisions, making actions easier, making investment recommendations, or by removing emotion from investment decisions, ensuring that well thought out and rational decisions are made (Finke, 2012). A financial adviser could also help to form good habits by educating the investor, encouraging them to save regularly, and view their portfolio as a whole, by challenging mental accounts and reduce or eradicate the effects of framing (Chartupat and Deaves, 2004; Balasuriya et al 2013).

Chalmers and Reuter (2012) conducted a study into the benefits of financial advice. They issued a survey to a number of pension plan members at a University and found that investors value the expertise of an adviser when deciding how much money to invest in the stock market. The most important factors in choosing an adviser were that they could be trusted and able to meet with the investor, which gave them “peace of mind”. They also asked investors whether an adviser calmed them down when the markets were volatile and found that only 55.1% agreed or strongly agreed with this statement.

Under the current UK regulations, financial advice involves a detailed fact find, which explores the investor’s current circumstances, needs, goals and attitude to risk. Following the fact find, the financial adviser produces a written financial plan, providing the investor with formal recommendations. Therefore, it would be expected that when meeting with a financial adviser, the investor’s reflective mind is engaged, as goals and needs are explored and a financial plan is developed, reducing the impact of biases and quick judgements/decisions (Benartzi, 2012, Finke, 2012). During this process, a financial adviser should also be able to observe the psychology of the investor, identifying whether they are prone to mental accounting or acting on a hunch or emotions. The financial adviser can then clearly define the investor’s goals and devise a financial plan to help manage any psychological traits - which can lead to poor investment decisions - and secure commitment to an investment strategy, reducing the appeal of short term investment techniques (Chieffe and Rakes, 1999; Chartupat and Deaves, 2004).

Despite this, many studies have focused solely on returns and comparing the returns of advised portfolios with those of self-directed investors ignoring other factors and the impact

of financial advice on biases (Bluethgen et al, 2008). Returns are only one very narrow area that could be impacted by advice, and many financial advisers now focus on asset allocation and costs rather than returns, with some even having a focus on managing investor emotion (New Model Adviser, 2015). Therefore, focussing on returns may not be the correct way to assess the impact of financial advice on investment decisions. There is also no clear benchmark to compare financial advice with and it is not clear what is being measured and compared (Bluethgen et al, 2008). This leads to the question of what the investor is looking to achieve from receiving financial advice, is the investor looking for the adviser to get them the best possible return or to give them reassurance, comfort and reduce the anxiety and stress involved in market based investments. Thaler (1985) demonstrated that most behaviour is linked to emotions and feelings so why would investment decisions and financial advice be any different?

For many investors, the investment journey may be more important than the outcome, therefore, if a financial adviser helps to make the journey smoother by providing support, peace of mind and helping to make rationale investment decisions, the final return may be less important. A study by the life company, Royal London, in 2020 found that financial advice helps to improve emotional wellbeing, with 63% of investors who received financial advice feeling financially secure and stable. Only 32% stating that they felt anxious about household finances. This compares to 48% of investors who did not receive financial advice feeling financially secure and stable and 41% feeling anxious about household finances. Fischer and Gerhardt (2007) conducted a study which investigated the mistakes individual investors make and the impact of financial advice on them. They suggest that financial advice may be an important intervention that corrects the mistakes made by individual investors with the adviser not being subject to the behavioural anomalies and biases observed in individual investors. They proposed a framework for an investment process, which can be used to investigate individual investment decisions, and a model to demonstrate the impact of financial advice. The model includes a financial component that relates to the impact the financial adviser has on the investor's portfolio, and a non-financial element which is the impact the financial adviser has on the investor themselves. The non-financial element includes the reduced stress and reassurance an individual may feel as a result of receiving financial advice.

In contrast to the model proposed by Fischer and Gerhardt (2007) and many of the studies into financial advice, Mullainathan et al (2012) found that financial advisers reinforce some of the mistakes made by investors. They found that advisers suffer from biases that mirror those displayed in the investors original portfolio leading to poor diversification. In the study, only 40% of advisers recommended that investors holding single company stocks should sell them and diversify. The study found that advisers avoided the difficult discussions with the investor, failing to challenge their existing portfolios and investment decisions in order to get business and ensure the investor came back the following year. It was suggested that this was due to the adviser feeling that the investor would be likely to reject advice that is different from their own. This study was done using actors/auditors and financial advisers, therefore the results may not be the same in real life situations. It would also be expected that the adviser would challenge the investor in order to demonstrate their knowledge and experience, consolidating the need for financial advice and an ongoing relationship.

Other studies have also found little or no evidence that financial advisers help to reduce biases or address investment mistakes. Hackethal and Jansen (2005) found that financial advisers do not treat individuals differently, suggesting that they do not truly understand the needs of the individual investor. However, post RDR the return premium for financial advice has risen, as financial advisers offer a minimum level of service in order to evidence value for money. This means that the number, intensity, depth and efficiency of meetings has increased, ensuring that the investor's needs, goals and aspirations are fully understood by the financial adviser (Fischer and Gerhardt, 2007). Financial advisers should now act in the best interests of the investor, as the commission bias has been removed and an advice fee is payable. If an investor is paying a fee for advice, they would expect this to be specific to them, be in their best interests and not just what they want to hear. They would also expect to be challenged around their previous investment decisions.

Hoechle et al (2013) investigated the impact that financial advisers have on investor biases, as well as studying the impact of advice on investment decisions and performance. Using an analysis of individual trades, they investigated whether or not advisors help to overcome biases such as home bias, disposition effect and overtrading due to overconfidence. The

study found only limited evidence that advisers help to reduce biases. The intangible benefits of financial advice and the true value of financial advice are areas that are yet to be explored within the literature. It is clear that there is still a lot to learn about the true impact of financial advice on investment decisions and the value of it.

In reality, the impact of financial advice is likely to be much broader than simply achieving the best return. The quality of advice or success of a financial adviser will depend on what the investors is looking to achieve from the advice and what their goals are. Although financial advice may not dramatically improve investment returns, advice may prevent investors from succumbing to biases which, without the interjection of the financial adviser, would produce even lower investment returns and poor outcomes for investors. It may also be the case that it is investors who have the poorest investment skills or knowledge that seek advice. Although the adviser may dramatically improve the individual's investment returns compared to what they would have achieved if they had not received advice, there is no way of measuring this (Chalmers and Reuter, 2012). Therefore, a comparison between self-directed and advised investment returns may be a little misleading and may not be a fair comparison. Those who are competent in making investment decisions may not be the ones who seek or need financial advice.

#### **4.7 Limitations of Previous Studies**

Although a number of studies have investigated investor behaviour and decision making, a number of these studies have had numerous limitations which may have impacted upon the results. The present study aims to apply some of the best practices utilised within previous research and also tries to address the limitations.

Barber and Odean (2000, 2001, 2008) excluded mutual funds, warrants and options from their studies and chose to focus solely on shares. Over recent years, more and more individual investors are investing into mutual funds. In 2017, £46bn was invested into mutual funds in the UK, bringing the total amount invested into mutual funds in the UK to £1.22tn (Financial Times, 2018). This compares to just £251.5bn held in shares by individuals in the UK (Office of National Statistics, 2017). Therefore, focussing solely on shares may not provide a representative sample of individual investors and may also skew the results.

Barber and Odean also had to estimate turnover, as the data set only included the end of month position and trades. Because of this, inflows and outflows, such as natural income paid out to investors, could not be accurately calculated. The present study will overcome these limitations by including mutual funds, as well as other investment vehicles, in the analysis and also include actual inflows and outflows in the data set.

Rather than discounting other investments and focussing only on shares, as Barber and Odean did in their 2000, 2001 and 2008 studies, Guiso and Jappelli (2007) analysed investors' whole portfolios. Guiso and Jappelli also went further than Barber and Odean, as they looked at the relationship between portfolio returns and information. However, investment returns and trade frequency were collected through survey responses and were not directly observed or based on actual data. In the present study, actual trade data was collected which enabled a direct calculation of returns to be done.

Another limitation of many of the previous studies in this area are the source of the data and the sample. Guiso and Jappelli (2007) used data from a bank rather than a discount brokerage. Hoechle et al (2013) argue that data analysed from a bank will gain a better picture of an investor's overall assets. They suggest that data obtained from a discount broker, such as the sample used in the Barber and Odean studies, is likely to be "play money" and may not be an accurate representation of individual investors. However, the same view could be taken about data obtained from a bank. What all of these studies suggest is that careful consideration should be given to the source of the data and whether it is likely to be representative of the general population.

Table 4.6 sets out the main studies that have investigated investment decisions of individual investors, the main limitations of these studies and how they were overcome in this study. In addition to the limitations identified, a number of measures were included within the present study, which will help to expand upon existing research.

**Table 4.6 – Limitations of Previous Studies**

<b>Study</b>	<b>Limitation</b>	<b>Limitation Overcome in Present Study</b>	<b>Detail</b>
Barber and Odean (2000, 2008), Hoechle et al (2013)	Excluded mutual funds and solely focussed on shares.	Y	All investments are included.
	Had to estimate turnover.	Y	Observations include all inflows and outflows.
	Inferred overconfidence from data, no measure was included.	Y	A direct measure of overconfidence included.
Guiso and Jappelli (2007)	Returns and trade frequency were collected through survey responses and was not backed up by data.	Y	Returns and trade frequency directly observed.
Hoechle et al (2013)	Returns were estimated.	Y	Returns directly observed.
Hackethal, Haliassos and Jappelli, (2011) and Bluethgen et al (2008)	Financial advisers had a conflict of interests; they received a commission payment for implementing the financial advice given to the investor.	Y	All financial advice given to investors is paid for via an explicit fee within this study. There is no commission payable to the financial adviser.
Ivkovic, Sialm and Weisbenner (2008)	Returns, risk and information acquisition not directly measured.	Y	Returns, risk and time spent obtaining information directly measured.
	Only shares included in study.	Y	All investments included.

Very little research has been conducted on UK investors, with most studies focussing on investors in the US or in developing countries. The UK has a very unique financial services industry which means that previous studies may not be representative of the UK market. The present study will only include UK based investors.

Unlike some previous studies that have inferred overconfidence (Barber and Odean, 2000; 2008; Hoehle et al, 2013) this was directly measured and observed in the present study, along with attitude to risk and personality, through the use of quantitative trade data and qualitative survey data. This has helped to expand upon existing research and provide greater insights into the impact of biases, personality and financial advice on investment decisions.

#### **4.8 The Aims of The Study**

In the UK, behavioural economics has received increased focus following the publication of an occasional paper in 2013 by the UK regulator, the Financial Conduct Authority (FCA) on this subject. Within the paper the FCA state:

“we want to understand the consumer biases that are common in the financial markets and how firms respond to these biases” (FCA, 2013).

This study will hopefully help to answer these questions.

This study aims to enhance the understanding of the impact of biases, personality and financial advice on investment decisions by building on previous research and also exploring areas that have so far received little or no attention in academic literature. The study will investigate two specific biases: overconfidence and information collection, along with exploring the impact of investor personality and financial advice on investment decisions.

#### **4.9 Hypothesis**

Based on the previous literature, it is hypothesised that:

- Hypothesis 1 – Overconfident investors will place more trades and achieve lower investment returns.
- Hypothesis 2 – Overconfident investors will spend more time obtaining information.
- Hypotheses 3 – Financial Advice will not lead to higher investment returns but will increase the diversification of portfolios.
- Hypothesis 4 – Investors scoring more highly in extroversion will be more overconfident.



## 5. Method

This study expanded upon previous research by conducting additional qualitative assessments on the same sample used to collect the trade data, so that the trade data and qualitative survey data could be linked and analysed. In order to do this, the study was split into three stages.

- A quantitative analysis of trade data over the observation period.
- A qualitative analysis of investor personality, biases and their views on investments and financial advice.
- A qualitative and quantitative assessment of all of the data.

All stages of the study were conducted on the same sample - clients of a leading UK based investment platform. Using the same sample ensured consistency across the three stages and also enabled the survey responses to be linked to actual investment behaviour. To our knowledge, this is the first time such a detailed and large data set of UK investors has been analysed and both trade data and survey data has been collected for the same sample.

### 5.1 The Investment Platform

The investment platform is one of the largest in the UK. As at 31<sup>st</sup> December 2015, the platform had assets under management of £9.4bn with 23% of this being held in self-directed accounts and 15% in advised accounts. The other assets under management were held in other account types not included within this study. The platform offers primarily a 'do it yourself' (DIY) investment solution, where investors can invest into a variety of investments through either a General Investment Account (GIA), Individual Saving Account (ISA) or a Self Invested Personal Pension (SIPP).

## **5.2 Advice**

Advisers provided advice on investment accounts (GIAs, ISAs and SIPPs), they did not offer holistic advice on other areas of financial planning such as retirement planning and insurance. Advice could be taken by investors who had a balance of at least £50,000. The investment advice was provided mainly over the telephone, with face to face advice provided upon request. The adviser could advise on investment funds, including Unit Trusts and Open Ended Investment Companies (OEICs). They could also advise on Investment Trusts and Exchange Traded Funds (ETFs). Advice on single company shares or any other more complex or alternative assets was not allowed. Advice was focussed around tax efficiency and an appropriate asset allocation based on the investor's attitude to risk. All advisers were appropriately qualified and approved by the Financial Conduct Authority (FCA) to give financial advice, and all advice was regulated financial advice that included a full fact find and written recommendations.

## **5.3 Fees, Charges and Tax**

All accounts incurred a platform fee of between 0.4% and 0.45% of the total value of the account, per annum, depending on the account type and the total amount in the account. For an extra fee, clients could receive advice on their investments from an investment adviser. The fee for advice was a tiered percentage charge on the balance of the account. The charge was an additional 0.75%-1.5% of the total value of the account. The fee for advice was tiered, decreasing as portfolio size increased. All charges were paid monthly in arrears by either debiting cash held on the account or by cashing in investments equally across the account. The platform charge and advice fee was paid in addition to any other charges such as fund charges i.e. the fee for managing the investment levied by the fund manager. All payments into and out of accounts were net of all appropriate taxes and all investors paid a dealing fee (unless investing in funds) associated with completing a trade. All fees, charges, taxes and income are included as inflows and outflows in each account within the data set. There is no commission paid for recommending particular investments and no incentive for the adviser to recommend one investment over another.

## 5.4 Investment Data

All account balances, trades, inflows and outflows over 4 years, covering the period from 2<sup>nd</sup> January 2012 to 1<sup>st</sup> January 2016, were collected. This period saw some volatile market conditions with the FTSE All Share Index moving from 2227 in January 2012 to a high of 3796 in June 2015 and then falling to 3344 in January 2016.

Each advised account was designated with an “A” if it was under advice. This made it extremely easy to identify and analyse advised accounts. Within advised accounts, only the adviser could place trades; investors were not able to place their own trades in an advised account, and within self-directed accounts only the account holder could place trades. If an investor switched from self-directed to advised, or visa versa, a new account was set up. Therefore, if an account was denominated as advisory every trade would be transacted by the adviser, the same was true for self-directed accounts.

The accounts included within this study represented a random sample of accounts held by the online investment platform. All account holders were retail investors, resident in the UK and all accounts were denominated in pounds sterling. The data set included details on account holder demographics such as sex, age, account type (GIA, ISA or SIPP), service type (advised or self-directed) and size of portfolio. Table 6.1 shows descriptive statistics for the data set.

Investors under the age of 18, businesses, trust, discretionary managed accounts and accounts with balances under £1000 were removed from the sample (Barber and Odean, 2000, Hoechle et al, 2013). After removing the accounts defined above, 21,205 accounts were included within the study. Of these 2,925 were advisory accounts and 18,280 were self-directed accounts. Throughout this study, the term self-directed will be used to describe accounts where investors made their own investment decisions without any professional advice.

Only trades that were completed were included within the data set. All trades that did not complete were removed. In total, 765,829 completed trades were observed and included

within the analysis. The trades included all investment types including shares, investment trusts, mutual funds (single and multi-asset) and ETFs.

### **5.5 Calculating Returns**

As this study contained a much more detailed dataset, a different returns calculation to the one used by Barber and Odean (2000) was conducted. Barber and Odean assumed a nil balance at the start of the period and then calculated returns based only on trades observed. As the dataset for this study included balances at the start of the period and details of all inflows and outflows, an alternative calculation was used.

The dataset provided data at 6 monthly intervals. The data included an account balance, based on the value of all holdings and all inflows and outflows, at six monthly intervals, from the start of the observation period to the end.

In order to calculate the returns data, the following were removed from the dataset:

- All accounts with a balance of less than £1000 at each 6 monthly interval.
- Accounts where the balance was fully withdrawn during a 6 monthly period.
- Accounts open for less than 6 months.
- Any anomalies.
- Extreme Outliers.

After these exclusions, the mean return over the period was calculated for each account. The returns data could be calculated for 20,098 investment accounts, however, the returns figures contained an extremely large range. To limit the impact of outliers on the results winsorization was used to remove the top and bottom 5%. After the winsorisation, the dataset included returns for 18,087 accounts.

Due to the format of the dataset and volume of data there were a number of challenges in accurately calculating returns. The main challenges - how these were overcome and how

returns were calculated - are detailed in Appendix 1. As all charges were deducted from the investment portfolio, all return figures are net of charges. Only advisers could transact on an advised account and only investors could transact on a self-directed account, therefore, the returns of each individual trade did not need to be analysed. Instead the overall returns of each account was assessed and analysed.

To allow a direct comparison with the markets, the FTSE All-share Index was identified as suitable index to benchmark against due to the wider range of companies included within the index.

## **5.6 Categorisation of Investments**

To enable an analysis of the asset allocation of an individual's portfolio, investments were categorised into the high-level categories listed in Table 5.1. The majority of funds were categorised based on their Morningstar asset class categorisation ([www.morningstar.co.uk](http://www.morningstar.co.uk)) and their asset allocation during January and February 2018. To ensure that the high-level categories remained manageable, some of the wider asset classes and the Morningstar asset classes were consolidated. If a different category to the Morningstar asset class was used, this was based on the asset allocation at the time of the analysis and categorised by the asset class with the highest weighting, or an asset allocation which matched a pre-determined definition, such as the multi-asset funds. The categorisations included the following investments:

- All commodity funds were mapped to the Alternative category.
- All ETFs were mapped to the Tracker category.
- Bond funds, high income funds, fixed income funds and Gilt funds were mapped to the Bond category providing the major holding was bonds.
- Multi Asset Investment Funds mapped to:
  - Cautious if equity holding <40%
  - Medium if equity holding 40-80%
  - Aggressive if equity holding >80%

**Table 5.1 – Categorisation of Investments**

<b>High-level Investment Category</b>	<b>Consolidated Risk Category</b>
Cash	No Risk
Bond	Low Risk
Multi Asset Cautious	
Equity Fund	Medium Risk
Investment Trust	
Tracker	
Property	
Multi Asset - Medium	
Shares	
Emerging Markets	
Multi Asset - Aggressive	
Absolute Return	
Alternative	

### **5.7 Volatility Calculation**

In order to calculate volatility accurately and consistently across investment accounts, only investment accounts with one year or more of returns data (two data points at six monthly intervals) were included in the analysis.

Due to the format of the data (daily values were not included within the data set and balances were only recorded half yearly), the standard deviation of half yearly returns for each account was calculated and used as a measure of volatility. After removing all account with performance data of one year or less, 16,780 accounts were included in the analysis.

In order to produce a comparative benchmark, the volatility of the FTSE All-share was calculated the same way, using the standard deviation of annual returns rather than the traditional method using daily closing values of the index.

Appendix 1 provides further details on how volatility was calculated, some of the issues experienced when calculating volatility and how these were overcome.

## **5.8 Questionnaire**

In order to gain a deeper understanding of investor decisions and further expand upon previous research, a short questionnaire was developed and sent to investors of the online investment platform (the same group that the trade data set was taken from). The questionnaire contained a number of items designed to provide greater insights into investment decisions and the impact of advice on these. The questionnaire included more detailed demographic questions, questions around attitude to risk, confidence, information gathering and the benefits of financial advice. A short personality measure was also included. The structure of the questionnaire and the data also enabled the questionnaire results to be linked back to respondents' investment accounts so that the trade data and survey data could be compared and assessed. A copy of the questionnaire is included within Appendix 3

Due to the large number of variables, this study is looking to assess (actual investment behaviour, personality, biases and the impact of financial advice) there was a concern over the length of the questionnaire administered to investors and the impact this may have had on response rates. Therefore, careful consideration was given to the personality measure used.

## **5.9 The Big Five Personality Dimensions**

Over the last 50 years, a number of personality measures have been developed. The "Big Five" measure of personality is the most commonly used personality measure (Pak and Mahmood, 2013). It has been used in a high number and variety of studies over the last 50 years, in which strong support for the five dimensions has been established.

The “Big Five” personality dimensions are not the result of a single approach to categorising personality traits but are the outcome of early personality studies that tried to organise various personality traits into a common structure (Fahr and Irlenbusch, 2008). The Big Five personality model suggests that most variations in personality are due to five broad personality traits (Gosling, Rentfrow and Swann, 2003). The model is hierarchical, with personality being broken down into five broad high-level traits/factors. Each trait is made up of a number of more specific sub traits/facets, which are in turn made up of even more specific sub-traits (Gosling, Rentfrow and Swann, 2003; Hofmans, Kuppens and Allik, 2008). The five traits have been adapted slightly by various researchers (Costa and McCrae, 1992; Donnellan et al, 2006; Thompson, 2008). However, for the purposes of this study, the five traits measured will be defined as Extroversion, Agreeableness, Openness to Experience, Conscientiousness and Emotional Stability.

One of the most comprehensive measures is considered to be Costa and McCrae’s (1992) Revised NEO Personality Inventory, which consists of 240 items, with six subscales for each of the “Big Five” factors (Gosling, Rentfrow and Swann, 2003). This measure takes around 45 minutes to complete, which would mean that very few additional measures could be added to the questionnaire without impacting upon response rates. It has also been suggested that the length of time taken to complete a survey may affect the results due to frustration and negative feelings generated as a result of the time taken, and may also lead to a lower take up and a higher drop out rate (Donnellan et al, 2006; Hofmans, Kuppens and Allik, 2008).

Therefore, in order to address this potential issue shorter personality measures were reviewed and considered (Thompson, 2008, Romero et al, 2012). Whilst it is accepted that a shorter personality measure will always yield results that are not as robust as the longer measures, many studies have found a strong correlation between the long and short measures and found the shorter measures to be effective at measuring personality traits (Baldasaro, Shanahan and Bauer, 2013).

A number of personality measures were assessed including Big-Five Mini-Markers (Thompson, 2008), the Mini-IPIP (Donnellan et al, 2006) and Ten Item Personality Inventory (TIPI). The TIPI was chosen due to the short time required to complete the survey and the



strong correlations found with longer, more robust measures (Gosling, Rentfrow and Swann, 2003; Muck et al, 2007).

#### **5.10 The Ten Item Personality Inventory (TIPI)**

The TIPI measure of personality was developed by Gosling, Rentfrow and Swann (2003), with the aim of developing a short scale which maximises content validity using descriptors from other established scales such as Goldberg's big five markers (Goldberg, 1992), the BFI (John et al, 1991) and the Adjective Checklist markers (John and Srivastava, 1999).

The TIPI scale is made up of 10 items with each item containing two descriptor adjectives. Each of the big five personality traits is represented by two items. The scale can take around one minute to complete (Romero et al, 2012). A number of items are reverse scored to inhibit response bias.

The initial study into the TIPI scale by Gosling, Rentfrow and Swann (2003) tested the scale on 1813 undergraduate students along with the Big Five Inventory (BFI). The NEO Personality Inventory, Revised (NEO-PI-R) was also administered to a subset of 180 students. These students were also retested six weeks later to assess the test-retest reliability of the scale. The results found strong correlations between the BFI and the TIPI ( $r = .77$ ) and good test-retest correlations ( $r = .72$ ) The TIPI will not measure the individual facet of each personality trait but will provide a short and efficient measure of the high level personality traits.

Many studies testing the validity of the TIPI scale have found that one of the main limitations is internal consistency. The scale usually has low alpha coefficients, which could be expected due to the short nature of the scale. A summary of the internal consistency score and test re-test reliability found in a number of studies conducted using the TIPI are summarised in the Table 5.2.

**Table 5.2 – Summary of Studies Assessing the Reliability of the TIPI Personality Measure**

<b>Study</b>	<b>Internal consistency</b>	<b>Test Re-Test reliability</b>
Gosling, Rentfrow and Swann (2003)	.55	.72
Muck et al (2007)	.57	n/a
Romero et al (2012)	.50	.72
Jonason, Teicher and Schmitt (2011) (average estimate)	.33	n/a

Although Donnellan et al (2006) suggest that internal consistency has been the main limitation to the TIPI scale, it may not be useful for short personality measures such as the TIPI (Kline, 2000). Gosling, Rentfrow and Swann (2003) state that the scale was not designed to produce impressive internal consistency scores but to provide a brief measure that uses a few descriptor adjectives to maximise the content validity and spread of coverage of the items, whilst minimising redundancy between items. Therefore, despite the low internal consistency scores, this was not considered a significant enough issue to prevent the TIPI from being used in this study.

It has also been suggested that the TIPI may be problematic when conducting structural equation modelling, as only having two measures for each trait may lead to limited modelling flexibility, exploratory factor analysis and estimation problems (Donnellan et al, 2006). If the Big Five personality traits are made up of a number of sub-traits/facets, shorter measures may only be measuring the sub-trait. The main way to test this and the validity of the shorter personality measures (to ensure that they still maintain adequate psychometric properties) is to assess the correlation of the new scale with other variables that have been found to correlate strongly with the longer personality scales. A number of studies have done this in order to assess the validity of the TIPI.

Hofmans, Kuppens and Allik (2008) administered the TIPI, the NEO-PI-R scale, a Self-Esteem Scale, trait anger scale, aggression questionnaire, positive and negative affect schedule and peer reports by a close friend or family member to 345 Dutch speaking students. They also retested the scale on 295 of the original 345 subjects. The measures included within this study have been found to correlate with the longer Big Five Measures of personality. The

results show that the TIPI is a valid alternative measure of the Big Five personality traits and has a correlation pattern with the other measures that is similar to those of longer personality assessments.

Jonason, Teicher and Schmitt (2011) analysed the correlations between the TIPI scale, self-esteem and sociosexuality, which have previously been found to correlate strongly with Big Five traits. They administered these to 360 college students in order to assess the construct validity of the TIPI scale. The results indicate that the TIPI scale is a valid measure of the Big Five personality traits.

In another study, Romero et al (2012) tested the validity of the TIPI measure by administering it to 1181 Spanish adults along with the NEO-PI-R and a measure of risk taking and well being. Re-tests were also administered to 340 subjects six weeks after the completion of the first measure in order to assess the test-retest reliability of the TIPI measure. From the results it was concluded that the TIPI scale was an acceptable measure of the big five personality traits.

Whilst the majority of studies support the use of the TIPI as a reliable measure of personality, some have identified issues with the accuracy of some of the measures. Hofmans, Kuppens and Allik (2008) found that Openness was not adequately captured by the TIPI measure. Romero et al (2012) and Baldasaro, Shanahan and Bauer (2013) have concerns over the Agreeableness measure. Other studies have found that intellect/imagination is the personality trait that causes most issues (Costa and McCrae, 1992; Goldberg, 1993; Saucier, 1994). There is little consistency between studies around which personality measure is problematic when using the TIPI scale and it is unclear whether the issues relate to a single study or are more widespread. Therefore, it is difficult to draw any firm conclusions from these findings.

### **5.11 Pilot Study and Sample**

A pilot study was conducted with 10 random subjects in order to check the validity of the questionnaire. After the validity of the questionnaire was confirmed, a link to the questionnaire was sent in February 2016 via email to 1000 self-directed investors and 500 advised investors of the online investment platform. The questionnaire was originally sent to 500 self-directed investors, but the response rate was much lower for this group compared to the advised investors. Therefore, the questionnaire was sent to an additional 500 self-directed investors. The first emails were sent on 25<sup>th</sup> February 2016 and the second email was sent on 29<sup>th</sup> February 2016. All investors were chosen at random and all questionnaires were completed online, the questionnaire closed on 31<sup>st</sup> March 2016. As an incentive to complete the questionnaire, each respondent was offered the chance to be entered into a prize draw for £100 in gift vouchers. 248 responses were received, however, after removing responses that could not be used within the sample, due to the questionnaire not being fully completed, a total of 218 questionnaires were fully completed and formed the sample for the study.

### **5.12 Overconfidence Measure**

Overconfidence was assessed using a question from Guiso and Jappelli (2007) “Compared to other people who have a similar level of financial experience and knowledge, how well would you say you know investments? Much better, somewhat better, about the same, somewhat worse, much worse.” If an investor answered “much better” or “somewhat better” to the question they were categorised as being overconfident as overconfident individuals have been found to overestimate their knowledge (Taylor and Brown, 1988).

### **5.13 Time Spent Obtaining Information and Research Measures**

The questions used to assess time spent doing research were also taken from Guiso and Jappelli (2007), “Compared to other people who have a similar level of financial experience and knowledge, how much research would you say you do before deciding to invest? Would you say, much more, somewhat more, about the same, somewhat less, much less?”

Although this is a measure of time spent conducting research, it is more closely related to overconfidence than information gathering. Therefore, inline with Guiso and Jappelli (2007), an addition question, which specifically measured the time spent obtaining information, was

included. The question used to assess this was, “How much time do you usually spend, in a week, to obtain information on how to invest your savings? (think about time reading newspapers, surfing the internet, talking to your adviser, reading company balance sheets etc).”

#### **5.14 Risk Measures**

Risk was measured using two questions: “which of the following statements comes closest to the amount of financial risk that you are willing to take when you make your financial investments? 1. A very high return, with a very high risk of losing money, 2. High return and high risk 3. Moderate return and moderate risk 4. Low return no risk (Guiso, Paiella and Visco, 2006). The question does not distinguish between relative and absolute risk aversion, however, it does provide an indicator of risk preferences.

A direct question on risk aversion was also asked, as this has been found to be more informative and have better predictive powers (Barsky et al,1997 and Guiso and Paiella (2003). The direct question used was taken from Guiso, Paiella and Visco (2006), “With which of the following statements do you agree most: 1. Risk is an uncertain event from which one can extract a profit 2. Risk is an uncertain event from which one should seek protection.” Both risk measures have been found to be highly correlated. In the Guiso, Paiella and Visco (2006) study, they relied up on the first measure but checked the sensitivity using the second.

#### **5.15 Trade Data and Survey Data Combined**

The completed questionnaires could be linked to 210 investment accounts. The 210 investment accounts were then linked to 94 individual investors. This meant that the survey data could be combined with and compared to 94 investors - 31 (33%) advised and 63 (67%) self-directed.

### 5.16 Previous Advice

To the best of our knowledge, to date, no study has investigated the investment decisions of investors who have previously received financial advice and whether advice has a lasting impact on investment decisions. This is a dynamic that needs to be assessed, especially following the introduction of the RDR and was measured by asking:

Which of the following best describes your use of financial advice?

- I currently have a financial adviser.
- I previously had a financial adviser but now make my own investment decisions.
- I have always made my own investment decisions.

This measure will assess whether the impact of advice on investment decisions is only effective if the adviser is giving advice at the time the decision is made, or if investors learn from the adviser and the impact of advice on investment decisions continues after the investor has started making their own investment decisions.

Based on the results of the Godek and Murray (2008) study, it could be suggested that individuals who have received advice in the past have increased their decisions-specific knowledge. Therefore, they may be less likely to seek advice and may make decisions using the reflective, system 2 mind, as they have been taught to make well thought out and considered investment decisions. Alternatively, it could be argued that due to past experience of receiving advice, decisions will be more self-centric and made using the intuitive, system 1 mind making investment decisions susceptible to biases and emotions. Clearly further work is required to assess the impact of advice and the longevity of this on investment decisions.

## **5.17 Results Section**

In order to effectively present the results of each stage of the study, the results section will be split in to 3 distinct sections:

**6. The Impact of Financial Advice on Investment Decisions: A Comprehensive Analysis of UK Investor Trade Data.**

**7. How Investment Decisions Are Made and the Impact of Financial Advice, Biases and Personality: An Analysis of Survey Data.**

**8. How Personality, Overconfidence, Financial Advice, Research and Attitude to Risk Impact Upon Trading Behaviour: A Comprehensive Analysis of UK Investors Trade Data and Survey Responses.**

Each variable is explained within the relevant section and a detailed description of all variables is included within Appendix 2.

## **6. The Impact of Financial Advice on Investment Decisions: A Comprehensive Analysis of UK Investor Trade Data**

A detailed analysis of the trade data was conducted in order to identify the impact financial advice has on investment decisions, contrasting the makeup of investor portfolios, returns achieved and volatility experienced by advised and self-directed investors. Biases are identified along with the impact they have on investment decisions and the relationship between the biases observed and financial advice. The following sections describe the data in more detail, explore the empirical hypothesis and main findings, which are then supported by a detailed empirical analysis, before concluding with a discussion.

This section aims to answer the following research questions:

- Whether financial advice leads to higher returns.
- Whether financial advice improves diversification of portfolios.
- What the main biases are that appear to impact upon investment decisions.
- The impact of financial advice on biases.

### **6.1. Trade Data Description**

The sample included 21,205 investment accounts of clients of a leading UK based investment platform, table 6.1. Of these, 12,921 were male account holders (61%) and 8,284 (39%) were female account holders. The average age of an account holder was 54.29 (55.13 for women and 53.76 for men). There were 2,925 (14%) investment accounts designated as advised and 18,280 (86%) designated as self-directed. The period observed was from 2<sup>nd</sup> January 2012 to 1<sup>st</sup> January 2016, during which 765,829 completed trades were observed and included within the analysis. The average age of self-directed investors was 52.68 and the average age of advised investors was 64.38.



The average portfolio size for all accounts was £65,318, which was based on the average balance over the observation period. This compares to an average in the UK of £53,793 for people aged over 45 years, £47,237 for people aged over 55 years and the UK average of £26,180 (Aviva, 2015; Sunlife, 2017). Therefore, the sample represents wealthier investors than the UK average. As the sample was skewed towards older wealthier investors, this may mean that the results are not representative of the general population or mass market. These investors may be more experienced, more financially literate and be more willing and able to pay for financial advice than the general population. Self-directed investors held portfolios with a mean value of £54,126 and advised investors held mean portfolios worth £133,513. A t-test revealed that this observed difference between the mean portfolio values of self-directed and advised investors was significant at the <0.01 level ( $t = -32.76$ ,  $p = 0.000$ ).

To calculate returns, the mean return over the period was calculated for each account. Returns could be calculated for 20,097 accounts, however, the returns figures contained an extremely large range. To limit the impact of outliers on the results, winsorization was used to remove the top and bottom 5% (further details on this are included within Appendix 1). After the winzoration, the dataset included returns for 18,087 accounts. Advised investors achieved a mean return of 4.6% and self-directed investors achieved a return of -0.1% over the observation period. A t-test revealed that the observed differences between mean returns were significant at the <0.001 level ( $t = -21.21$ ,  $p = 0.000$ ).

To assess volatility, the standard deviation of returns was calculated and slightly fewer observations were included within this measure (16,780), as the volatility calculation required investors to have a minimum of two years returns data, which excluded some accounts from the analysis.

Unlike previous studies, trading activity, inflows and outflows were directly observed and all asset classes were included (Barber and Odean, 2000; Bluethgen et al, 2008; Calvet, Campbell and Sodini, 2007; Chevalier and Ellison, 1997; Gruber, 1996; Odean, 1998, 1999;

Shu et al, 2004; Zhao, 2006). This enabled a more detailed and accurate analysis of the data to be conducted.

Measuring the impact of trades using the total number of trades placed could be misleading, as it does not take into account the type of trades placed, it includes both buy and sell trades. The type of trade placed provides more comprehensive results and, as the dataset includes the number of buy and sell trades placed, these will be used as variables in all further regression analysis.

The results shown in table 6.1 show that advised investors were generally older and female with larger investment portfolios. Self-directed investors were younger and male with smaller investment portfolios.

**Table 6.1 - Summary of Demographic Data**

	<b>Total Dataset</b>				<b>Self-directed</b>				<b>Advised</b>			
<b>Totals (N/%)</b>	21,205				18,280 (86%)				2,925 (14%)			
<b>Sex</b>												
Male (N/%)	12,921 (61%)				11,410 (62%)				1,511 (52%)			
Female (N/%)	8,284 (39%)				6,870 (38%)				1,414 (48%)			
<b>Age</b>												
Mean	54.29				52.68				64.38			
Below 45 (N/%)	5,978 (28%)				5,784 (32%)				194 (7%)			
46-65 (N/%)	9,830 (46%)				8,561 (47%)				1,269 (43%)			
66 or over (N/%)	5397 (25%)				3,935 (22%)				1,462 (50%)			
	<b>Mean</b>	<b>Median</b>	<b>Mode</b>	<b>Range</b>	<b>Mean</b>	<b>Median</b>	<b>Mode</b>	<b>Range</b>	<b>Mean</b>	<b>Median</b>	<b>Mode</b>	<b>Range</b>
Portfolio Size	£65,318	£28,484	£1,579	£8,084,204	£54,126	£23,878	£8,091	£8,084,204	£133,513	£103,536	£1,579	£1,736,608
Buy Trades	19.2	8	1	1308	19.3	7	1	1308	18.1	11	0	257
Sell Trades	11.7	8	0	1125	11.8	8	0	1125	11	9	0	93
Returns %	0.6	2.5	0.6	52.5	-0.1	1.6	0.6	52.5	4.6	7.8	12.4	52.2
Volatility %	32.4	29.7	48.3	240.6	32.0	28.9	48.5	240.6	34.8	33.9	48.3	187.2
Number of Investments Held	19.5	9	1	592	19.7	9	1	592	18	9	1	251

## 6.2 Regression Analysis

Multiple regressions were performed to confirm the findings of the univariate analysis and provide further insights into how the variables impact upon one another. The data was structured as cross-sectional data, with each account appearing once in the dataset. Table 6.2, 6.3 and 6.4 show the results of the regression analysis for the whole dataset (table 6.2), self-directed investors (table 6.3) and advised investors (table 6.4).

An Ordinary Least Squares regression (OLS) was used to analyse the results. An OLS regression is one of the most frequently used statistical analyses for estimating coefficients of linear regression equations. It was chosen as the most appropriate technique for assessing the correlations between the variables as it aims to minimise the prediction error between the predictor and real values and takes into account the sum of squared errors.

When the OLS regression analysis was run to assess the relationship between the number of investments held and other variables, the relationship between the dependent and independent variables changed when the number of buy and sell trades was added to the model. This also happened when a model was created, which included a number of independent and dummy variables, to further assess the impact of volatility - when the number of investments held was added to the model, the relationship between the dependent and independent variables changed.

In both of these instances, to explore the reason for this, a number of additional tests were conducted. Firstly, further regressions were completed with each variable being added separately. The analysis revealed that buy and sell trades were the variables which were having a direct impact on the correlation between the other variables and the number of investments held. For the volatility model, the analysis revealed that the number of investments held was the variable which was having a direct impact on the correlation between the other variables and volatility. In both tests, the other variables did not significantly alter the relationship when added separately.

Given this results, Breusch-Pagan/Cook-Weisberg Tests and White Tests were conducted to test for Heteroskedasticity. Both tests indicated that Heteroskedasticity was present in both models with significant Chi Squared values  $<0.05$ , rejecting the null hypothesis of Homoskedasticity. Therefore, the variance of the observed value of the dependent variables around the regression lines is non-constant. The OLS regressions, initially used to analyse the results, makes the assumption that the variance of the error term is constant, Homoskedasticity. Therefore, if Heteroskedasticity is present, the results of an OLS regression may not be reliable and can inflate or deflate the significance test (Kaufman, 2013). Multicollinearity was also tested for between the variables using a Variance Inflation Factor. All results were within normal tolerance levels, indicating that multicollinearity was not present.

To address the Heteroskedasticity in the number of investments held model, the number of buy and sell trades placed were excluded from the model including the other dummy and independent variables. This was because these variables would provide only limited insights beyond those already observed and the relationship between the number of investments held and these variables was not a main area of focus.

To address the Heteroskedasticity in the volatility model, the number of investments held was excluded from the model including the other dummy and independent variables. This is because, the only area of interest around the number of investments held and volatility was the relationship between those two variables. The addition of the number of investments held to a model including the other independent and dummy variables would not provide any additional insights.

Heteroskedasticity was also identified in other models that included one of the risk levels as the dependent variable and mainly buy and sell trades as the independent variables. When identified, this was overcome by removing the variable causing the heteroskedasticity from the model and regressing it against the risk level separately.

To assess the impact of the number of assets held by each investor on returns, the net number of trades was calculated. The total number of investments held by each investor was not observed. Therefore, the number of holdings was estimated. To achieve this, it was assumed that all investors held no investments at the start of the observation period and the net number of trades, buy trades less sell trades, was used as a proxy for the number of investments held by each investor. If, by using this approximation, an investor had a negative number of investments held i.e. they had sold more investments than they had bought, the number of investments held was not included in this analysis. The same was done for investors whose net trades equalled zero. Therefore, the number of investments held could be approximated for 11,623 accounts. Although investors could be buying and selling the same investments or portions of the same investments, this was considered to be a small risk. The assumption that no investments were held at the start of the period means that net trades are likely to represent a conservative proxy for the number of investments held. Therefore, net trades was considered to be an acceptable proxy for the number of investments held.

To calculate the amount held in each risk level, each trade was mapped to an asset class based on each funds Morningstar asset class categorisation ([www.morningstar.co.uk](http://www.morningstar.co.uk)) and their asset allocation during January and February 2018 and then mapped to a risk level based on volatility. The number of accounts open at the start of the observation period was quite small compared to the amount at the end of the period. This was due to a large number of accounts being opened during the observation period. Because of this it was felt that reviewing static holdings at the start of the period would not provide representative results. Therefore, it was assumed that all account holders had a zero balance at the start of the assessment period and the value of buy trades placed over the assessment period was analysed in order to gain an insight into portfolio diversification. It is appreciated that this assumption does not account for investments held at the start of the period or for investments sold. However, this was considered to be a reasonable assumption to make as the number of buy trades were much higher than sell trades during the observation period and the number of accounts open and holding investments at the start of the of the observation period was relatively low.

**Table 6.2 – Trade Data Regression Analysis Results (Whole Dataset)**

	Dependent Variable							
	Returns (obs = 18,087, R <sup>2</sup> = 0.03)	Volatility (obs = 16,780, R <sup>2</sup> = 0.17)	Number of Investments Held (obs = 10,219, R <sup>2</sup> = 0.02)	Sharpe Ratio (obs = 18,430, R <sup>2</sup> = 0.00)	No Risk (obs = 18,087, R <sup>2</sup> = 0.00)	Low Risk (obs = 18,087, R <sup>2</sup> = 0.05)	Medium Risk (obs = 18,087, R <sup>2</sup> = 0.02)	High Risk (obs = 18,087, R <sup>2</sup> = 0.05)
<b>Returns</b>	-	51.86**	4.10**	-	-1.26	1.12	-6.25**	3.15**
<b>Use of Advice (Advised)</b>	18.60**	5.51**	0.23	3.46**	-1.52	18.80**	9.13**	-21.15**
<b>Sex (Female)</b>	1.19	-1.08	-8.79**	1.04	0.74	5.52**	4.12**	-6.89**
<b>Age in Years (Compared to 45 and below)</b>								
<b>46 -65</b>	3.10**	-0.48	0.99	-0.01	0.13	5.23**	4.74**	-6.89**
<b>66 Plus</b>	6.09**	-1.26	-8.60**	0.73	0.02	10.42**	9.78**	-14.17**
<b>Total Buy Trades</b>	8.55**	11.92**	-	1.73	-1.55	9.94**	-1.93	0.37
<b>Total Sell Trades</b>	-0.98	-6.37**	-	-0.59	2.68**	-9.02**	-0.15	4.30**

The table shows the Ordinary Least Squares (OLS) regression t stats. \*\*, \* denote significance at 1% and 5% levels respectively. For the Medium Risk regressions the number of sell trades placed was regressed separately (obs = 21,205, R<sup>2</sup> = 0.00) and for the High Risk regressions the number of buy trades placed (obs = 21,205, R<sup>2</sup> = 0.00) and the number of sell trades placed (obs = 21,205, R<sup>2</sup> = 0.00) were regressed separately due to heteroskedasticity.

**Table 6.3 – Trade Data Regression Analysis Results (Self-Directed)**

	Dependent Variable							
	Returns (obs = 15,468, R <sup>2</sup> = 0.01)	Volatility (obs = 14,267, R <sup>2</sup> = 0.17)	Number of Investments Held (obs = 8,677, R <sup>2</sup> = 0.02)	Sharpe Ratio (obs = 15,742, R <sup>2</sup> = 0.00)	No Risk (obs = 15,468, R <sup>2</sup> = 0.00)	Low Risk (obs = 15,468, R <sup>2</sup> = 0.01)	Medium Risk (obs = 15,468, R <sup>2</sup> = 0.01)	High Risk (obs = 15,468, R <sup>2</sup> = 0.02)
<b>Returns</b>	-	48.00**	4.83**	-	-1.24	2.06*	-6.43**	2.91**
<b>Sex (Female)</b>	1.75	-1.28	-8.48**	1.16	0.47	5.66**	3.71**	-6.87**
<b>Age in Years (Compared to 45 and below)</b>								
<b>46-65</b>	3.73**	0.68	-0.93	-0.07	0.37	4.74**	4.32**	-6.43**
<b>66 Plus</b>	4.32**	-1.80	-7.61**	0.72	-0.29	8.23**	9.23**	-12.63**
<b>Total Buy Trades</b>	8.98**	11.92**	-	1.36	2.34*	2.82**	-4.10**	-0.14
<b>Total Sell Trades</b>	-1.44	-7.46**	-	-0.16	3.05** (obs = 18,280, R <sup>2</sup> = 0.00)	-4.00** (obs = 18,280, R <sup>2</sup> = 0.00)	0.33 (obs = 18,280, R <sup>2</sup> = 0.00)	3.04** (obs = 18,280, R <sup>2</sup> = 0.00)

The table shows the Ordinary Least Squares (OLS) regression t stats. \*\*, \* denote significance at 1% and 5% levels respectively. For the No Risk, Low Risk, Medium Risk and High Risk regressions the number of buy trades placed and the number of sell trades placed were regressed separately due to heteroskedasticity.



**Table 6.4 – Trade Data Regression Analysis Results (Advised)**

	Dependent Variable							
	Returns (obs = 2,619, R <sup>2</sup> = 0.02)	Volatility (obs = 2,513, R <sup>2</sup> = 0.15)	Number of Investments Held (obs = 1,542, R <sup>2</sup> = 0.03)	Sharpe Ratio (obs = 2,688, R <sup>2</sup> = 0.00)	No Risk (obs = 2,619, R <sup>2</sup> = 0.00)	Low Risk (obs = 2,619, R <sup>2</sup> = 0.02)	Medium Risk (obs = 2,619, R <sup>2</sup> = 0.00)	High Risk (obs = 2,619, R <sup>2</sup> = 0.02)
<b>Returns</b>	-	20.02**	-2.32*	-	-0.21	-1.09	-0.06	1.17
<b>Sex (Female)</b>	-1.20	0.42	-2.62**	-0.82	0.80	0.43	1.99*	-1.52
<b>Age in Years (Compared to 45 and below)</b>								
<b>46-65</b>	-0.48	0.29	-0.65	0.70	-0.89	2.51*	0.58	-2.90**
<b>66 Plus</b>	2.54*	0.80	-3.13**	1.09	0.63	5.12**	1.51	-5.89**
<b>Total Buy Trades</b>	-0.73	-0.16	-	1.12	-1.30	5.65**	-0.91	-4.63**
<b>Total Sell Trades</b>	0.96	1.97*	-	-2.08*	0.91	-4.75**	-1.31	4.74**

The table shows the Ordinary Least Squares (OLS) regression t stats. \*\*, \* denote significance at 1% and 5% levels respectively. For the Medium Risk regressions the age groups were regressed separately due to heteroskedasticity (obs = 2,925, R<sup>2</sup> = 0.00).

### 6.3 Trade Data

Table 6.1 shows that the average number of buy trades over the assessment period is far higher than the number of sell trades; 19.2 compared to 11.7. This difference even holds when the average number of buy and sell trades for advised and self-directed trades are assessed.

This finding supports the results of other studies into investment behaviour that have found that investors buy and hold investments rather than selling (Charupat and Deaves, 2004, Fischer and Gerhardt, 2007). The number of sell trades placed are also lower than buy trades for both self-directed and advised investors, suggesting that advice does not prevent investors from buying and holding investments rather than actively selling losing investments. Although the differences in the number of buy and sell trades placed by self-directed and advised investors appears to be small, regression analyses revealed that they were significant. Advised investors placed significantly fewer buy trades ( $z = -2.36$   $p = 0.018$ ) and significantly fewer sell trades ( $z = -3.04$   $p = 0.002$ ).

Barber and Odean (2001) found that men tend to trade more frequently than women and, therefore, overtrade. To test this, the number of trades placed by men and women were compared. Over the assessment period, men traded far more than women, 34 trades compared to 26. A regression analysis revealed that this difference was significant at the  $<0.01$  level ( $t = -10.68^1$   $p = 0.000$ ), confirming that men placed significantly more trades than women, supporting the findings of Barber and Odean (2001). This also supports the theory that men suffer from overconfidence (Lewellen, Lease and Schlarbaum, 1977, Barber and Odean, 2001, Guiso and Jappelli, 2007), however unlike many previous studies, overconfidence will be directly measured and assessed in Section 7 and 8 in order to test this theory further.

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<sup>1</sup> Negative relationship was between female investors and average trades placed

The number of trades placed decreased as investors got older. This trend fits with a normal lifecycle, the number of trades placed reducing as investors move into retirement, using money to produce/supplement income and pay for later life costs. A regression analysis revealed that there was a significant negative relationship between the number of buy trades placed and age at <0.001 level ( $t = -9.82$ ,  $p = 0.000$ ), confirming that older investors place significantly fewer buy trades than younger investors. No significant differences were found between the number of sell trades placed and age.

#### **6.4 Returns**

Trade data provides useful insights into investment behaviour and identifies some biases, however, returns data answers the question of whether these actually lead to positive or negative outcomes for investors. Previous studies suggest that more trades placed/overtrading leads to lower returns (Barber and Odean, 2000; 2001; Odean 1998; 1999) and, although more mixed, so does financial advice (Bergstresser et al, 2009; Chalmers and Reuter 2012; Hackethal, Haliassos and Jappelli, 2011). To test these findings, returns achieved by investors who placed lower and higher numbers of trades and those who received financial advice were compared.

Men and women both achieved low returns over the period with no significant difference found. When looking at the trade data along with this, the results show that women achieved a return that was not significantly different to men by making far fewer trades, placing an average of 26 trades, compared to men who traded on average 34 times during the observation period. This suggests that women are making more efficient investment decisions, as they can achieve a higher return by placing fewer trades and will have to spend far less time researching and managing their portfolios.

As shown in table 6.1, advised accounts achieved far higher returns than self-directed accounts, returning 4.7% more over the four year observation period (4.6% vs -0.1%). The returns figures are net of all charges, therefore adviser charges are included. If these were added back into the returns figures, the difference would be even greater. When the returns achieved by men and women are considered, advice appears to have a greater impact on returns achieved by men, with advised men achieving a return that was 0.6% higher than

advised women and 5.1% higher than self-directed men. Advised women also achieved higher returns than self-directed women, with advised women achieving a return that was 4.3% higher than self-directed women.

Advised investors achieved higher returns than self-directed investors across all age groups. Advised investors achieved a return that was 4.3% higher (-0.7% vs 3.6%) in the 45 years and below age group, 3.1% higher (0.1% vs 3.2%) in the 46 – 65 years age group and 5.7% higher (0.2% vs 5.9%) in the 66 years and over age group. Returns generally increased with age, with the highest returns being achieved by investors aged 66 years and over, with overall returns, self-directed and advised investor returns all being higher in this age group. This result makes sense, as the older investors are likely to be more experienced and may be less likely to be susceptible to biases. However, returns may be expected to fall as investors reach and move into retirement, as they begin to draw an income from their investments rather than chase returns, but this was not observed. It may be that older investors hold lower risk income producing portfolios that, over the observation period, led to higher returns than higher risk, more growth-oriented portfolios. This is partly supported by older investors holding significantly more in low risk investments, however, no significant relationship was found between low risk investments and returns (table 6.2).

Returns significantly correlated with use of advice at the <0.001 level ( $t = 18.60$   $p = 0.000$ ), showing that advised investors achieved significantly higher returns than self-directed investors, table 6.2. Sex was found to not significantly affect returns, however, age did have a significant impact. Compared to investors aged 45 years and below, all other age groups significantly correlated with returns at the <0.01 level, indicating that as investors get older, they achieve higher returns. This result could be because investors learn from previous mistakes and gain more experience as they get older, or it could be due to the realignment of portfolios as investors move into retirement, moving from higher risk growth-oriented portfolios to lower risk income generating portfolios.

To assess how trades impact upon returns, the total number of buy and sell trades placed were also included within the regression. Previous studies have found a significant relationship between the total number of trades placed and returns with many finding that

investors who place more trades achieve significantly lower returns (Barber and Odean, 2000, 2001; 4 et al, 2008; Odean, 1999). As previously mentioned, measuring the impact of trades using the total number of trades placed could be misleading, as it does not take into account the type of trades placed. Therefore, the number of buy and sell trades placed was used within the analysis.

The results of the regression analysis show that the number of buy trades placed had a significant positive impact on returns at the  $<0.01$  level ( $t = 8.55$   $p = 0.000$ ), showing that the more buy trades placed, the higher the return achieved. The total number of sell trades placed was found to not have a significant impact on returns. This suggests that buying and holding investments may lead to higher returns. This is an interesting finding, as buying and holding investments has been viewed as a common investment mistake by previous studies (Charupat and Deaves, 2004, Fischer and Gerhardt, 2007; Odean, 1998). This finding also suggests that investors may be selling the wrong assets or selling at the wrong time. If investors were selling once a certain price or value was reached, then the number of sell trades would be expected to correlate with returns. Although the number of buy trades placed was found to be significantly correlated with returns for self-directed investors, this was not the case for advised, where no significant relationship was found between the number of buy trades placed and returns. To test this further interaction effects were tested. This assessment found that the interaction between use of advice and trades led to the number of buy trades placed being negatively correlated with returns ( $t = -3.56$ ,  $p = 0.00$ ). Therefore, although a higher number of buy trades placed led to higher returns, this effect was only true for self-directed investors.

One of the main aims of the study is to identify the impact of financial advice on returns and confirm whether advice does have a significant impact on them and whether it leads to lower returns, as suggested by previous studies (Bergstresser et al, 2009; Chalmer and Reuter, 2012; Hackethal, Haliassos and Jappelli, 2011). Although the initial regression model found that financial advice led to investors achieving significantly higher returns, it was not clear from this analysis whether it was advice or one of the other variables. To answer this, the dataset was split into advised and self-directed investors. The results are shown in table 6.3 and 6.4 and confirm that it is financial advice that is leading to the higher returns rather

than the other variables. This is shown by none of the independent or dummy variables, with the exception of the 46-55 years age group, correlating with returns for advised investors. Given the significant correlation between investors in the 46-55 year old age group and returns, this could suggest that age is playing some role in advised investors achieving higher returns. This relationship is clarified when the Sharpe Ratio is considered. Advice was significantly positively correlated with the Sharpe Ratio, however, for advised investors, age was not significantly correlated with the Sharpe Ratio. These findings prove that it is advice that is leading to the higher returns rather than age. The results for the self-directed investors mirror those of the combined dataset, with all age groups, when compared to the 35 years and below group, and buy trades significantly correlating with returns.

Only investors who had at least £50,000 across all of their accounts<sup>2</sup> qualified for financial advice. As a result of this, advised investors, on average, held larger portfolios than self-directed investors, £133,513 vs £54,126 (despite the observed difference and the difference in mean values being found to be significant, the regression analysis revealed that there was no significant relationship between use of advice and portfolio size). Therefore, to test the findings above and explore whether the qualification criteria for advice impacted upon the results – wealthier investors consuming financial advice and making better investment decisions – a robustness check was conducted. All self-directed accounts with a balance of £50,000 or less were removed from the dataset and the regression model ran again, table 6.5.

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<sup>2</sup> As the trade data analysis was done at account level rather than customer level investors with an account balance of less than £50,000 were removed from the dataset regardless of the total balance across all accounts. Although this does not directly compare to the qualification criteria for financial advice it was considered a more robust analysis as all customers included in the analysis would have at least £50,000 across all of their account.

**Table 6.5 –Trade Data Regression Analysis Results Only Including Self-Directed Accounts with A Balance Above £50k (Full Dataset)**

	Dependent Variable							
	Returns (obs = 7,492, R <sup>2</sup> = 0.04)	Volatility (obs = 7,210, R <sup>2</sup> = 0.20)	Number of Investments Held (obs = 4,660, R <sup>2</sup> = 0.03)	Sharpe Ratio (obs = 7,697, R <sup>2</sup> = 0.00)	No Risk (obs = 7,492, R <sup>2</sup> = 0.00)	Low Risk (obs = 7,492, R <sup>2</sup> = 0.07)	Medium Risk (obs = 7,492, R <sup>2</sup> = 0.02)	High Risk (obs = 8,988, R <sup>2</sup> = 0.07)
<b>Returns</b>	-	38.54**	1.82	-	-1.22	1.50	-5.09**	-1.20 (obs = 7,492, R <sup>2</sup> = 0.00)
<b>Use of Advice (Advised)</b>	14.49**	1.88	-5.84**	2.21*	-1.35	18.14**	6.49**	-18.57** (obs = 8,988, R <sup>2</sup> = 0.00)
<b>Sex (Female)</b>	0.70	-0.17	-5.04**	0.55	-0.17	1.47	3.05**	-2.62**
<b>Age in Years (Compared to 45 and below)</b>								
<b>46 -65</b>	-0.33	-0.97	-1.74	-1.28	0.38	3.83**	4.97**	-7.01**
<b>66 Plus</b>	2.26*	-1.05	-6.39**	-1.29	-0.13	7.47**	8.74**	-12.06**
<b>Total Buy Trades</b>	4.65**	2.99**	-	0.89	0.71	-0.24	-4.30**	2.91** (obs = 8,988, R <sup>2</sup> = 0.00)
<b>Total Sell Trades</b>	0.39	-1.54	-	-1.18	1.86	-4.06**	-3.86**	4.75** (obs = 8,988, R <sup>2</sup> = 0.00)

The table shows the Ordinary Least Squares (OLS) regression t stats. \*\*, \* denote significance at 1% and 5% levels respectively. For the No Risk regressions use of advice, buy and sell trades were regressed separately due to heteroskedasticity. For the Low Risk and Medium Risk regressions buy and sell trades were regressed separately due to heteroskedasticity and for High Risk regressions buy trades, sell trades and returns were regressed separately due to heteroskedasticity.

The results of the regression analysis on the full data set with all self-directed accounts that had a balance of £50,000 or less removed were very similar to those of the full dataset, confirming the initial results and the impact of advice. Use of advice was again significantly correlated with returns, showing that advised investors achieved significantly higher returns, even when all self-directed accounts with a balance of £50,000 or less were removed. The finding that advised investors achieved a significantly higher Sharpe Ratio still held true, showing that even when advised accounts are compared to self-directed accounts that would also qualify for advice, if the investor wished to consume it, advised investors still achieved a significantly higher risk adjusted return.

The only notable differences were that returns did not have a significant correlation with investors aged 46-65 years, showing that this age group did not achieve significantly higher returns than those aged 45 years and below. Also, high risk investments were no longer significantly correlated with returns, showing that investors who held more in high risk investments did not achieve significantly higher returns.

To further assess the robustness of the initial results self-directed accounts with a balance of over £50,000 were extracted from the full dataset so that the results could be directly compared to the regression analysis of all self-directed investors and advised investors, table 6.6. The results again confirm the original findings and the observed impact of advice. The most notable differences between the regression analysis of all self-directed accounts and those with a balance of over £50k were that returns were not significantly correlated with the 46-65 years and 66 years plus age groups in the over £50k group, showing that for investors with higher balances, older investors did not achieve significantly higher returns when compared to investors aged 45 and below. When self-directed accounts with a balance of over £50k were compared to advised accounts, the initial results observed when all self-directed accounts were compared to advised accounts held true, again confirming the validity of the initial results and that comparing advised account to all self-directed accounts is a fair comparison.



**Table 6.6 – Trade Data Regression Analysis Results Only Including Accounts with A Balance Above £50k (Self-Directed Accounts Only)**

	Dependent Variable							
	Returns (obs = 4,873, R <sup>2</sup> = 0.01)	Volatility (obs = 4,697, R <sup>2</sup> = 0.21)	Number of Investments Held (obs = 3,118, R <sup>2</sup> = 0.00)	Sharpe Ratio (obs = 5,009, R <sup>2</sup> = 0.00)	No Risk (obs = 4,873, R <sup>2</sup> = 0.00)	Low Risk (obs = 4,873, R <sup>2</sup> = 0.01)	Medium Risk (obs = 4,873, R <sup>2</sup> = 0.02)	High Risk (obs = 4,873, R <sup>2</sup> = 0.02)
<b>Returns</b>	-	32.89**	2.75**	-	-1.05	2.76**	-5.26**	2.23*
<b>Sex (Female)</b>	1.75	-0.50	-4.42**	0.99	-0.18	1.71	2.23*	-2.84**
<b>Age in Years (Compared to 45 and below)</b>								
<b>46 -65</b>	0.12	-1.10	-1.53	-1.36	0.66	3.13**	4.49**	-5.16**
<b>66 Plus</b>	0.26	-1.63	-5.76**	-1.43	-0.32	5.42**	7.87**	-9.45**
<b>Total Buy Trades</b>	5.34**	3.43**	-	-0.09	-1.64	1.67	-3.01**	0.66
	(obs = 4,873, R <sup>2</sup> = 0.01)					(obs = 6,063, R <sup>2</sup> = 0.00)	(obs = 6,063, R <sup>2</sup> = 0.00)	(obs = 6,063, R <sup>2</sup> = 0.00)
<b>Total Sell Trades</b>	2.51*	-2.59*	-	0.59	1.95	-0.00	-2.82**	1.24
						(obs = 6,063, R <sup>2</sup> = 0.00)	(obs = 6,063, R <sup>2</sup> = 0.00)	(obs = 6,063, R <sup>2</sup> = 0.00)

The table shows the Ordinary Least Squares (OLS) regression t stats. \*\*, \* denote significance at 1% and 5% levels respectively. For the Returns regressions buy trades were regressed separately due to heteroskedasticity. For the Low, Medium and High Risk regressions buy and sell trades were regressed separately due to heteroskedasticity

## 6.5 Trades vs Time vs FTSE

To put the returns achieved by investors into context, and to act as a benchmark, investor returns were compared to the average total returns of the FTSE All-share Index, table 6.7. The FTSE All-share was chosen as the most suitable benchmark due to the wide range of assets held by investors.

**Table 6.7 – FTSE All-share and Average Returns by Total Dataset and Use of Advice**

	<b>Total</b>		
	<b>Total</b>	<b>Self-Directed</b>	<b>Advised</b>
<b>Return</b>	1.1%	0.3%	6.1%
<b>FTSE All-share</b>	8.8%	8.8%	8.8%

Overall, investors underperformed the FTSE All-share by 7.7%. When the results are broken down by use of advice, both self-directed and advised investors achieved returns that were lower than the FTSE All-share index. Although advised investors underperformed the FTSE All-share by 2.7%, self-directed investors underperformed by nearly three times as much, 8.5%. However, this analysis does not take into account volatility or diversification, which could, in part, account for the lower returns achieved by self-directed investors when compared to those of the FTSE All-share index.

To gain a deeper understanding of how investment decisions are made and whether investors are suffering from some bad luck or are just making poor investment decisions, annual returns of investor's portfolios and the FTSE All-Share were compared. Table 6.8 shows that investor portfolios behaved differently to the FTSE All-Share Index. Investors underperformed the FTSE All-Share in 2012 and 2015 but achieved higher returns in 2013 and 2014. The positive returns earned in 2012, 2013 and 2014 were offset by a large negative return in 2015. This pattern was mirrored by self-directed and advised investors.

**Table 6.8 – Annual FTSE All-Share and Investor Portfolio Returns**

<b>Year</b>	<b>FTSE All Share Return</b>	<b>Grand Total</b>	<b>Self- Directed</b>	<b>Advised</b>
<b>2012</b>	12.3%	7.8%	7.4%	9.1%
<b>2013</b>	20.8%	52.1%	52.9%	48.9%
<b>2014</b>	1.2%	3.5%	3.3%	4.4%
<b>2015</b>	1%	-18.1%	-17.7%	-20.7%

To assess the impact of the independent variables upon the dependent variable, returns over time, the model of best fit had to be identified. Panel data was produced with account numbers used as the ID and time, in years, representing the year, from 2012 to 2015. The structure of the panel data meant that each account could appear up to four times, if it was open for the duration of the observation period. Panel data accounts for individual heterogeneity and enables variables that cannot be observed or measured (such as cultural factors) or those that change over time but not across individuals (such as the amount that can be paid into a tax free savings account) to be controlled for.

A number of regressions were then conducted using the panel data. The initial results showed that the coefficients included both within-entity and between-entity effects. To address this, a Breusch and Pagan Lagrangian Multiplier and Hausman test was conducted. The Breusch and Pagan Lagrangian Multiplier rejected the null hypothesis, (Chi-squared =  $<0.05$ ). This indicated that a random effect model is appropriate for this analysis as there is evidence of significant differences across individuals and there is a panel effect. In addition, The Hausman test produced a Chi-Squared of  $<0.05$  indicating that a fixed effect model should be used.

Although the tests indicated that both fixed-effects and random-effects models could be used, the random-effects model was deemed to be the model of best fit, as it is hypothesised that differences between investors, such as sex and use of advice, have an impact on the dependent variable. Unlike the fixed-effects model, the random-effects model assumes that the variation across entities is random and uncorrelated with the independent

or predictor variables included within the model (Greene, 2008). Therefore, time invariant variables can also be included; these variables are absorbed by the intercept in the fixed-effects model. The Random-effects regression model used was the Generalized Least Squares (GLS) regression with heteroskedasticity controlled for, as, unlike OLS, GLS does not assume that the residuals are normally distributed.

The return of the FTSE All-share over the period<sup>3</sup> was regressed against returns and the number of buy trades and sell trades placed over the observation period. As GLS was found to be the model of best fit, this model was used for the regressions. The results, shown in table 6.9, show that returns achieved by investors had a highly significant relationship with the total return of the FTSE All-share index at the <0.01 level, showing that as the markets increased in value, so did the investments held by investors. This finding was also true for self-directed and advised investors. Although this finding is generally what would be expected, returns increasing as the markets increase, this significant relationship could suggest that investors are holding high risk portfolios that are not well diversified.

**Table 6.9 - Random-effects GLS Regression of FTSE All-share Total Return**

	FTSE All-Share Return		
	Whole Dataset	Self-Directed	Advised
<b>Returns</b>	135.87**	115.95**	77.26**
<b>Buy Trades</b>	14.19**	14.46**	-1.08
<b>Sell Trades</b>	-5.03**	-4.68**	-1.49

The table shows the Random-effects GLS regression z stats for the FTSE All-share total return over the period. \*\*, \* denote significance at 1% and 5% levels respectively. Returns were the dependent variable when regressed against the FTSE All-Share and the FTSE All-Share was the dependent variable when regressed against buy and sell trades.

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<sup>3</sup>All figures based on market data from <https://www.londonstockexchange.com/statistics/ftse/ftse.htm> and <http://www.swanlowpark.co.uk/ftseannual>

Previous studies have found that common investment mistakes and biases linked to the return of the stock market (chasing returns, anchoring, the endowment effect and the disposition effect) impact upon investment decisions (Barberis and Thaler, 2003; Firat and Fettahoglu, 2011; Fischer and Gerhardt, 2007; Odean, 1998; Tversky and Kahneman, 1974). These findings were tested.

The regression analysis revealed, that for the whole dataset, buy trades had a significant positive relationship with the return of the FTSE All-Share and sell trades had a significant negative relationship. This shows that as the FTSE All-Share increases in value, investors placed more buy trades and fewer sell trades. These findings also held true for self-directed investors. The relationships between trades and returns of the FTSE All-Share are consistent with the common investment mistakes, with investors chasing returns and buying when the market is high and selling when it is lower (Gruber, 1996; Chevalier and Ellison, 1997; Zhao, 2006). This may also suggest that investors may not be selling winning investments and holding on to losers, due to anchoring, the endowment effect and the disposition effect (Firat and Fettahoglu, 2011). For advised investors, no significant relationship was found between the number of buy or sell trades placed and the return of the FTSE All-share. This suggests that advised investors are not chasing a return and advised investors are not making investment decisions solely based on market movements.

A number of variables were regressed against annual investor returns, table 6.10. As the relationship between the returns of the FTSE All-Share and these additional variables, such as age and sex, would not provide any additional insights, the returns of the FTSE All-Share were not included within these regressions.

**Table 6.10 - Random-effects GLS Regression of Returns Against the Dependent and Dummy Variables**

	Returns		
	Whole Dataset (obs = 49,059, R <sup>2</sup> = 0.00)	Self-Directed (obs = 40,950, R <sup>2</sup> = 0.00)	Advised (obs = 8,109, R <sup>2</sup> = 0.00)
Sex (Female)	2.82**	2.11*	0.01
<b>Age (Compared to 45 and below)</b>			
46-65 Years	4.04**	3.29**	-1.88
66 Plus	7.11**	3.84**	-1.30
Buy Trades	9.52**	9.96**	-0.97
Sell Trades	-5.30**	-5.44**	-1.46

The table shows the Random-effects GLS regression z stats for returns regressed against the dependent and dummy variables over the period. \*\*, \* denote significance at 1% and 5% levels respectively

Table 6.10 shows that for the whole dataset and self-directed investors, sex, age and buy and sell trades were significantly correlated with returns. These findings confirm the results of the previous regressions where total returns over the observation period were regressed against the same variables. The only exception is the significant negative relationship between returns and sell trades, which was not found when the number of sell trades were regressed against the total returns over the observation period. These results show that for the whole dataset and self-directed investors, women, older investors, those that place more buy trades and those that place fewer sell trades all achieved higher returns.

For advised investors, there was no significant relationship between sex, buy or sell trades and returns. The only significant finding was that investors aged 46-55 achieved significantly higher returns. The finding that returns are not significantly correlated with the number of buy and sell trades placed shows that even if advice does not completely reduce biases such as the endowment effect and anchoring it does prevent these from having a significant impact on returns.

## **6.6 Diversification**

The diversification of portfolios has been found to be influenced by many factors – biases (such as, home and familiarity bias), having a high attitude to risk and financial advice (French and Poterba, 1991; Guiso and Jappelli, 2007; Hackethal, Haliassos and Jappelli, 2011). The impact of diversification on returns is something that has produced mixed results in previous studies, some have found that concentrated portfolios increase returns (Ivkovic and Weisbenner, 2005; Massa and Simonov, 2006), others have found that it reduces returns (Barber and Odean, 2000; Goetzmann and Kumar, 2008) or has no significant impact (Campbell, 2006; Calvet, Campbell and Sodini, 2007). Financial advice has been found to increase the diversification of portfolios (Bluethgen et al, 2008; Kramer, 2011; Shapira and Venezia, 2001).

Diversification can be measured in a number of ways:

- The number of investments held within portfolios.
- The composition of portfolios.
- The asset classes held in portfolios.
- The risk level of assets held within portfolios

All of the above measures are used to assess how diversification impacts upon returns, the impact of biases on diversification and the impact of financial advice. Testing previous findings and also clarifying the impact of diversification on returns.

### **6.6.1 Number of Investments Held**

The number of investments held can be an indication of the diversification of portfolios. Previous studies have found that many investors hold just a few investments within their portfolio (Barber and Odean, 2000; Calvet, Campbell and Sodini, 2007; Goetzmann and Kumar, 2008; Ivkovic, and Weisbenner, 2005; Ivkovic, Sialm and Weisbenner, 2008; Massa and Simonov, 2006). The impact of holding a small number of investments is unclear, with some studies finding that this leads to lower returns (Barber and Odean, 2000; Goetzmann and Kumar, 2008), others finding that it leads to excess returns (Ivkovic and Weisbenner,

2005; Massa and Simonov, 2006) and some finding that it makes little difference to returns (Campbell, 2006; Calvet, Campbell and Sodini, 2007).

Table 6.1 shows that on average investors held 19.5 investments during the observation period. The investors in the current sample held a much higher number of investments than the sample used for the Ivkovic, Sialm and Weisbenner (2008) study. They found that the average number of holdings was 3.9 stocks, however, they excluded all assets apart from equities, which may account for the difference. Self-directed and advised investors held a similar number of investments (19.7 vs 18). Men held a higher number of investments (21.5) than women (16.1). This finding held true for both advised and self-directed accounts with self-directed men holding 21.8 investments women holding 16, advised men holding 19.3 investments and advised women holding 16.4. These findings suggest that advice has little impact on the number of holdings held by investors. The OLS regression analysis, table 6.2, confirmed the results of the univariate analysis with men holding a significantly higher number of investments ( $t = -8.79$   $p = 0.000$ ). Use of advice did not have a significant impact on the number of investments held.

The regression analysis also revealed some additional findings. When compared to investors aged 45 years and below, older investors, those aged 66 years and over, held significantly fewer investments. No significant relationship was found between investors aged 46 – 65 years and the number of investments held. The number of investments held were significantly correlated with returns ( $t = 4.10$ ,  $p = 0.000$ ), showing that investors who held a higher number of investments achieved higher returns. This finding supports those of Barber and Odean (2000) and Goetzmann and Kumar, (2008) who found that holding a small number of investments had a negative impact on returns. However, the findings of Calvet, Campbell and Sodini (2007), Ivkovic, and Weisbenner (2005) and Massa and Simonov (2006) are not supported. These studies found that holding a small number of investments within a portfolio either had a minimal impact on returns or led to higher returns.

Splitting the dataset into advised and self-directed investors and running further regressions supported the findings observed for the whole dataset. The results for self-directed investors mirrored those for the whole dataset (table 6.3), however, for advised investors



(table 6.4), although men still held a significantly higher number of investments and investors aged 66 and over held significantly fewer investments, returns had a significant negative relationship with the number of investments held. Therefore, unlike self-directed investors, advised investors who held fewer investments achieved significantly higher returns.

When the results for the whole dataset are considered along with the findings for advised investors, they show that advised investors do not hold significantly more or fewer investments than other investors. However, of the investors who receive financial advice, those that hold fewer investments achieve higher returns, men hold significantly more investments than women and investors aged 66 years and over hold significantly fewer investments when compared to investors aged 45 years and below. These results are surprising as sex and age would not be expected to have a significant impact on the number of investments held by advised investors. Also, the number of investments held would not be expected to impact on the returns achieved by advised investors. These results may indicate a bias that advice is not moderating or a bias in the advice being delivered by the financial adviser.

### **6.6.2 Composition of Portfolios: Top Holdings**

Table 6.11 shows the top five investments over the period of the study, based on the number of trades in total, for advised and self-directed investments. The results show that all groups (advised, self-directed and overall total), have a home bias, with all having three UK centric funds within the top five holdings. Based on total trades, advice appears to lead to a slightly more diversified portfolio with fewer trades in UK equity funds and an increase in property trades. However, this measure includes all trades, buy and sell, which may not give a true reflection of investor behaviour. Some investors may be selling their UK based funds in order to diversify their investments which would not be clear from this analysis. Therefore, the top five investments split by buy and sell trades were analysed.

**Table 6.11 - Top Five Trades by Overall Totals and Use of Advice**

Overall		Advised		Self-directed	
Fund Name	Number of Trades	Fund Name	Number of Trades	Fund Name	Number of Trades
Standard Life Global Absolute Return Strategies	17742	Standard Life Global Absolute Return Strategies	4157	CF Woodford Equity Income	15803
Cf Woodford Equity Income	16856	Threadneedle UK Equity Income	3484	Liontrust Special Situations	14827
AXA Framlington UK Select Opportunities	16778	HSBC American Index	3253	AXA Framlington UK Select Opportunities	14060
Threadneedle UK Equity Income	16729	Henderson UK Property	2929	Standard Life Global Absolute Return Strategies	13585
HSBC American Index	16177	AXA Framlington UK Select Opportunities	2718	Threadneedle UK Equity Income	13245

**Table 6.12 - Top Five Trades By Number of Buy Trades and Use of Advice**

Overall		Advised		Self-directed	
Fund Name	Number of Trades	Fund Name	Number of Trades	Fund Name	Number of Trades
Standard Life Global Absolute Return Strategies	13558	Standard Life Global Absolute Return Strategies	3102	Standard Life Global Absolute Return Strategies	10456
HSBC American Index	10470	Henderson UK Property	2324	CF Woodford Equity Income	9093
Threadneedle European Select	10183	Threadneedle UK Equity Income	2078	Threadneedle European Select	8808
Threadneedle UK Equity Income	10156	Threadneedle UK Absolute Alpha	1917	HSBC American Index	8582
CF Woodford Equity Income	9856	HSBC American Index	1888	Threadneedle UK Equity Income	8078

**Table 6.13 - Top Five Trades by Number of Sell Trades and Use of Advice**

Overall		Advised		Self-directed	
Fund Name	Number of Trades	Fund Name	Number of Trades	Fund Name	Number of Trades
In House Growth Portfolio	8930	AXA Framlington UK Select Opportunities	1440	In House Growth Portfolio	8886
AXA Framlington UK Select Opportunities	8115	Threadneedle UK Equity Income	1406	Liontrust Special Situations	7248
Liontrust Special Situations	7724	HSBC American Index	1365	CF Woodford Equity Income	6710
CF Woodford Equity Income	7000	Standard Life Global Absolute Return Strategies	1055	AXA Framlington UK Select Opportunities	6675
Threadneedle UK Equity Income	6573	Artemis Income	933	In House Aggressive Growth Portfolio	5723

Although the overall trade data provides a useful overview of the top five trades placed over the observation period (table 6.11), the overall totals for buy and sell trades provide further insights (table 6.12 and 6.13). The top five trades based on buy and sell trade data suggests that investors may be buying and selling investments rather than buying and holding them, which was initially indicated by a comparison between the number of buy and sell trades placed. Two funds, CF Woodford Equity Income<sup>4</sup> and Threadneedle UK Equity Income, feature in the top five trades for both overall total buy trades and overall total sell trades. This suggests that investors are buying and selling funds rather than just buying and holding them. Although it is worth noting that the number of buy trades was higher than the number of sell trades, CF Woodford Equity Income had 9,856 buy trades compared to 7,000 sell trades and Threadneedle UK Equity Income had 10,156 buy trades and 6,573 sell trades.

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<sup>4</sup> The well-publicised issues with this fund were not known at this time and were first reported in 2019.

Although this data may tell an interesting story, it could be that it is different investors who are buying and selling rather than the same ones.

The advised buy and sell trades show that three investments, Threadneedle UK Equity Income, HSBC American Index and Standard Life Global Absolute Return Strategies, featured in the top five trades for both advised buy and sell trades. When compared to the self-directed trades, only one investment, CF Woodford Equity Income, featured in the top five investments for both buy and sell trades. This suggests that self-directed investors are more likely to buy and hold investments rather than sell investments when a certain level is reached or when they lose money. This may be due to the endowment effect, valuing assets that are owned at a higher value than they are actually worth, and anchoring, fixing a price based on what was paid for the investment rather than making a rational decision about what it is worth (Kahneman, 2011). The results suggest that advice may correct both of these biases, with the same investments being bought and sold over the observation period. This supports the finding that self-directed investors placed more buy trades when the markets rose and placed more sell trades when the markets fell, suggesting that these investors may not be selling winning investments and holding on to losers (Firat and Fettahoglu, 2011). This relationship was not observed when investors had a financial adviser.

Sex did not appear to impact upon the most popular investments when assessing the number of trades and value invested. A similar analysis was conducted using the amount traded in Pounds Sterling rather than on the number of trades. However, this did not provide any further insights and it was felt that this would also not provide meaningful findings, as large trades are likely to skew the results.

### **6.6.3 Asset Classes Held in Portfolios: Trades**

To further test the impact of diversification, investments were grouped into asset classes to identify the asset type, and then analysed. Assessing the top investments gave a useful insight into what investors are buying and selling, but it only provides limited insights into the makeup of investors' portfolios and the diversification of them. Therefore, analysing investment by asset class enabled a more detailed analysis to be conducted and the impact of the key variables on diversification to be assessed.

It was assumed that all account holders had a zero balance at the start of the assessment period and the value of buy trades placed over the assessment period was analysed in order to gain an insight into portfolio diversification. To calculate the percentage held in each asset class the value of buy trades for each asset class was divided by the total value of all buy trade, the total amount invested, over the observation period. The percentage held in each asset class was then regressed against sex, age and use of advice, table 6.14.

**Table 6.14 – OLS Regression Analysis of Percentage Held in Each Asset Class**

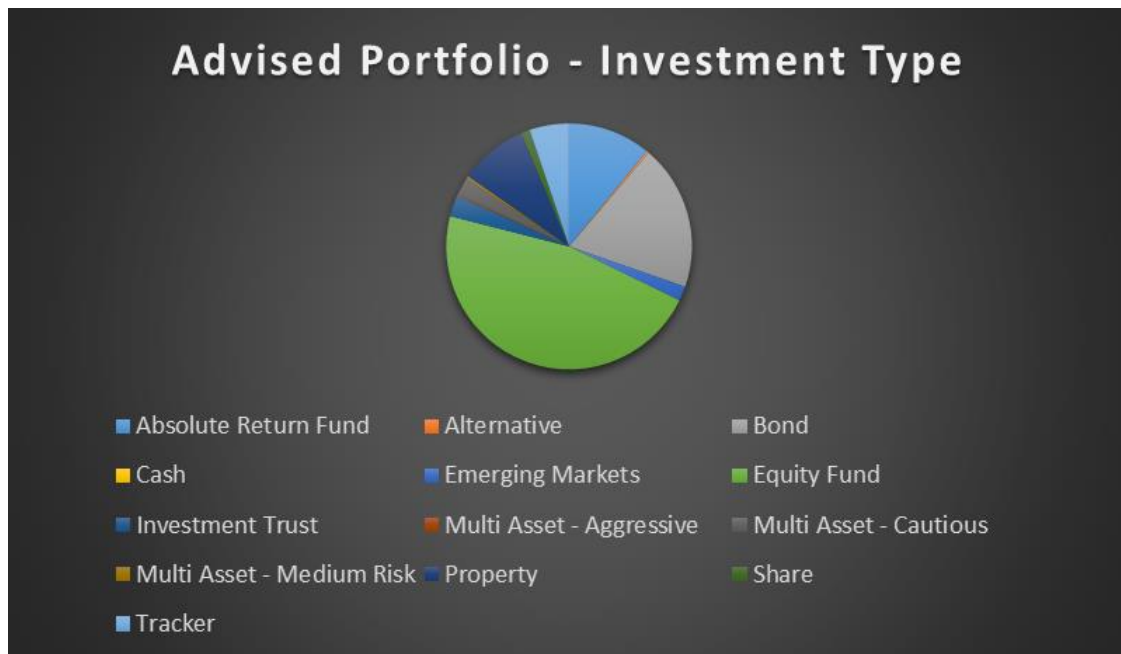
Asset Class	Sex	Age		Use of Advice
	(Female)	(Compared to 45 years and below)		(Advised)
		46 – 65 Years	66 Years and Over	
Absolute Return Fund	1.95	0.81	-1.40	21.27**
Alternative	-1.50	-1.55	-2.58*	3.43**
Bond	3.85**	6.13**	10.57**	22.20**
Cash	0.40	0.09	0.02	-0.45
Emerging Markets	-3.46**	-3.25**	-6.57**	-4.20**
Equity Fund	2.02*	4.42**	5.45**	0.53
Investment Trust	-0.86	6.16**	6.26**	-19.40**
Multi Asset - Aggressive	2.38*	-1.06	-2.41*	-24.56**
Multi Asset - Cautious	4.40**	3.61**	3.33**	-3.77**
Multi Asset - Medium Risk	4.01**	4.53**	9.36**	-16.10**
Property	1.34	3.02**	3.94**	22.02**
Share	-10.42**	-2.82**	-6.22**	-35.00**
Tracker	-1.26	-12.48**	-18.48**	-5.39**

The table shows the Ordinary Least Squares (OLS) regression t stats. \*\*, \* denote significance at 1% and 5% levels respectively.

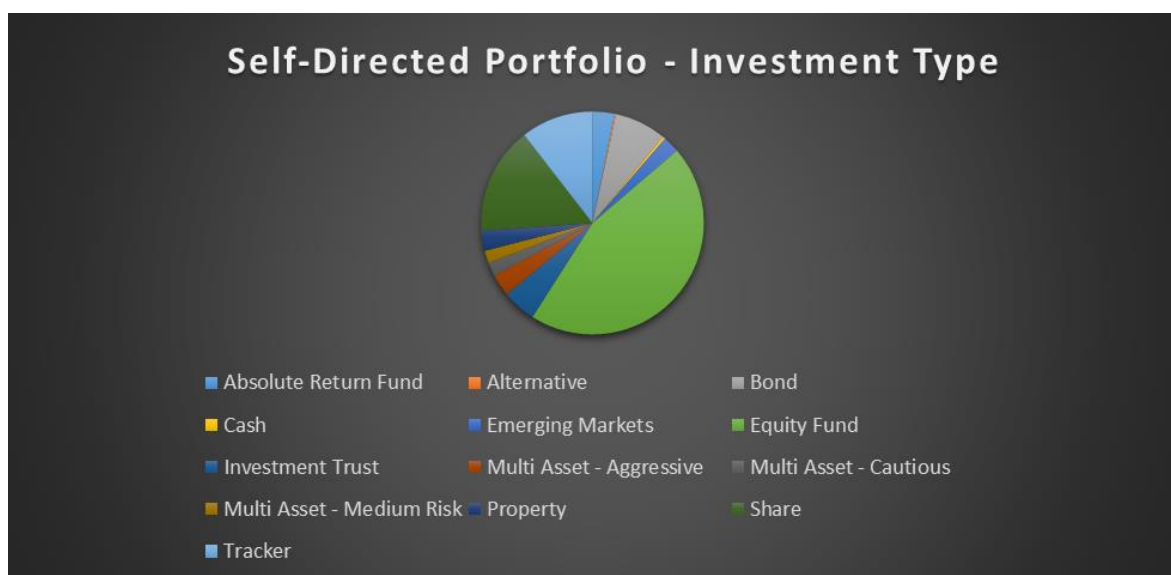
Investor portfolios were generally high risk and poorly diversified across asset classes, with a large bias towards equities. 58% of all money invested was invested into equities (12.4% invested directly in shares and 45.6% into equity funds), only 10.1% was invested into Bonds and 4.3% into property. Advice appears to increase diversification and lower the risk level of portfolios (chart 6.1 and 6.2) . Compared to self-directed portfolios, advised trades led to portfolios having a much higher holding in bonds (19.1% advised, 7.5% self-directed) and larger holdings of property (8.9% advised, 2.9% self-directed) and absolute return funds (10.9% advised, 3.2% self-directed). Advice also reduced the percentage invested in shares - 15.6% of self-directed investors' portfolios were invested in directly held share compared to just 1.2% for advised. These findings were found to be significant, table 6.14, with use of advice being significantly correlated with the percentage held in a number of asset classes. Advised investors held significantly more in absolute return funds, alternative investments, property and bonds and significantly less in emerging markets, investment trusts, multi-asset aggressive, medium risk and cautious investment funds, shares and tracker funds. This shows that advised investors are increasing the diversification of their portfolios by investing in uncorrelated asset classes such as absolute return funds, alternative investments and property. The finding that self-directed investors invested more in tracker funds is in line with previous research (Deloitte, 2014). However, this is most likely explained by advisers having more conviction in actively managed investments.

One explanation for the results observed could be that self-directed investors trade other assets, such as bonds, on another platform, which would not appear in these results. However, this is unlikely as the platform the data was taken from offers investments across all major asset classes at competitive prices. Although trading on another platform could not be ruled out, there would be little benefit of doing this.

**Chart 6.1 - Advised Portfolios Split by Asset Class**



**Chart 6.2 - Self-Directed Portfolios Split by Asset Class**



When the portfolios of men and women are compared, women held significantly more in bonds ( $t = 3.85, p = 0.00$ ), equity funds ( $t = 2.02, p = 0.044$ ), multi asset cautious ( $t = 4.40, p = 0.000$ ), medium risk ( $t = 4.01, p = 0.000$ ) and aggressive ( $t = 2.38, p = 0.018$ ). Men, held significantly more in emerging markets ( $t = -3.46, p = 0.001$ ) and shares ( $t = -10.42, p =$

0.000). Although the overall risk levels appear to be similar, men held more in directly held equities, but women held more in equity funds and multi asset aggressive funds, these results would suggest that women hold slightly lower risk portfolios.

Comparing advised and self-directed portfolios of men and women did not identify any significant differences between the sexes and any difference between advised and self-directed portfolios were very similar to the results stated above. When the age of investors was assessed (table 6.14), compared to investors aged 45 years and below, older investors invested significantly more into bonds, equity funds, investment trusts, multi asset medium risk funds, multi asset cautious funds and property. Older investors invested significantly less in emerging markets, shares and tracker funds. Although no significant difference were observed in the 46 – 65 years age group, investors aged 66 years and over invested significantly less in alternative investments and multi asset aggressive funds.

These changes show that as investors get older, they reduce the risk of their portfolios and increase diversification. These changes in the asset allocation of portfolios as investors get older could be because of the need to produce an income from portfolios in retirement. This could explain the move away from riskier, more growth orientated investments like tracker and directly held shares towards lower risk, income producing investments such as bonds. However, this could also be the result of investors learning from previous mistakes and beginning to adjust their portfolios, utilising lessons learnt and acquired investment experience.

#### **6.6.4 Risk Level**

To enable further analysis of investor portfolios, the asset classes were grouped by their risk level based on volatility. Analysis of the risk level allows for further investigations into the impact of financial advice on portfolio diversification. Based on previous research, it would be expected that investors who have a financial adviser hold less in higher risk assets (Bluethgen et al, 2008; Hackethal, Haliassos and Jappelli, 2011). Grouping the assets classes held in portfolios by their risk level enabled this to be tested. Previous studies have also found that men and younger investors hold a higher percentage of their portfolio in high risk



investments (Barber and Odean, 2001; Hackethal, Haliassos and Jappelli, 2011; Looney et al, 2007; Pompian and Longo, 2004), these findings are also tested.

Table 6.15 sets out how each investment type was mapped to a risk level. and the spread of risk for advised and self-directed investors is shown in table 6.16 and chart 6.3 and 6.4.

**Table 6.15 – Mapping of Asset Classes to Risk Levels**

<b>No Risk</b>	<b>Low Risk</b>	<b>Medium Risk</b>	<b>High Risk</b>
Cash	Multi Asset - Cautious	Property	Share
	Bond	Multi Asset - Medium Risk	Tracker
			Multi Asset - Aggressive
			Emerging Markets
			Equity Fund
			Investment Trust
			Absolute Return Fund
			Alternative

**Table 6.16 - Advised and Self-Directed Portfolios Split by Risk Level**

<b>Risk Level</b>	<b>Advised Percentage Split</b>	<b>Self-Directed Percentage Split</b>
<b>No Risk</b>	0.0%	0.4%
<b>Low Risk</b>	21.4%	9.5%
<b>Medium Risk</b>	9.3%	4.7%
<b>High Risk</b>	69.2%	85.3%

### 6.3 - Advised Portfolios Split by Risk Level

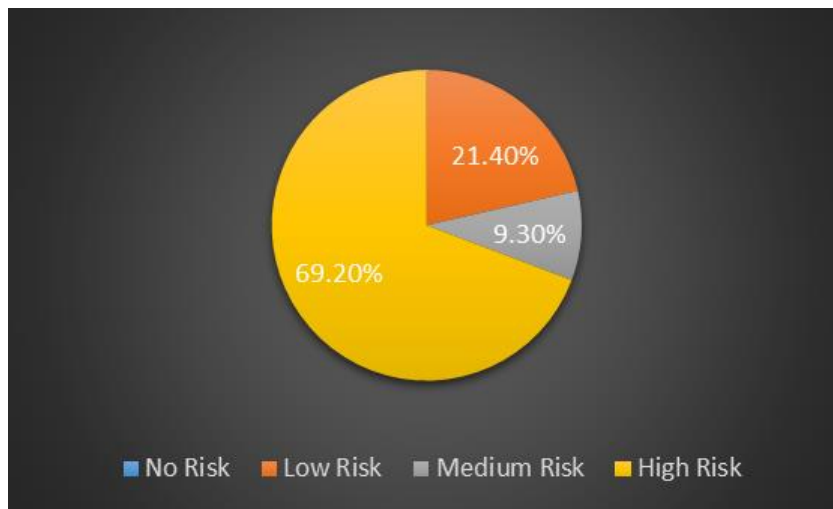
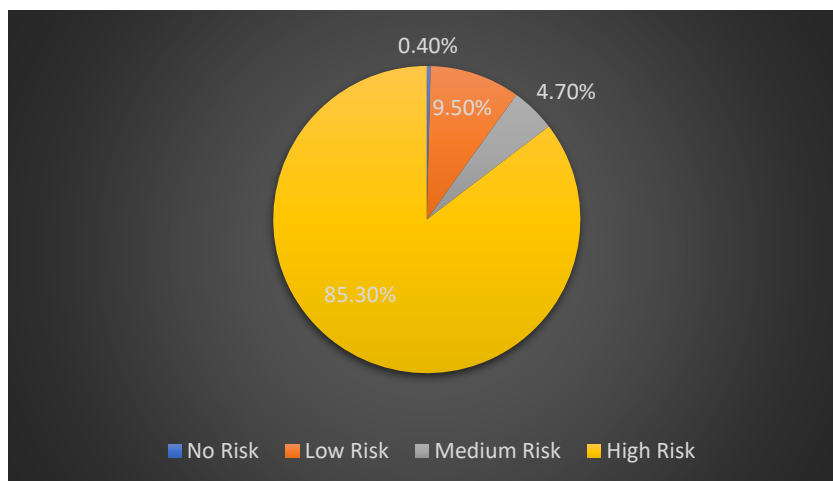


Chart 6.4 - Self-Directed Portfolios Split by Risk Level



The grouping of assets into risk categories demonstrates the impact advice has on an investor's portfolio with 16.1% less invested into high risk investments and 11.9% more invested into lower risk investments. Further analysis on the risk level of portfolios was conducted by performing a number of regressions (table 6.2, 6.3 and 6.4). Sex, age, use of advice, buy trades, sell trades and returns were regressed against the percentage held in each risk level.

Low risk investments were significantly correlated with sex ( $t = 5.52$ ,  $p = 0.000$ ), use of advice ( $t = 18.18$ ,  $p = 0.000$ ) and buy trades ( $t = 9.94$ ,  $p = 0.000$ ). The number of sell trades placed was significantly negatively correlated with the percentage held in low risk investments. Compared to investors aged 45 years and under, all age groups were significantly correlated with the percentage held in low risk investments. These findings show that female investors, older investors, investors who had a financial adviser and those who placed more buy trades and fewer sell trades held a significantly higher percentage of their portfolios in low risk investments. Low risk investments were not significantly correlated with returns. The results for advised and self-directed investors, when split into separate groups, were very similar to the results for the whole dataset. The only exceptions were that for advised investors, sex was not significantly correlated with the amount held in low risk investments and for self-directed investors returns were positively correlated with the amount held in low risk investments.

When the independent variables were regressed against medium risk investments sex and use of advice significantly correlated with medium risk investments, showing that women and advised investors held more in medium risk investments. All age groups, when compared to investors aged 45 years and below, significantly correlated with the amount held in medium risk investments showing that older investors held significantly more medium risk investments.

The number of buy and sell trades placed did not have a significant relationship with the amount held in medium risk investments. Returns were also significantly negatively correlated with medium risk investments. The results show that female investors, older investors, investors who placed fewer buy trades and investors who have a financial adviser held a significantly higher percentage of their portfolios in medium risk investments and investors who held a higher percentage in medium risk investments achieved significantly lower returns.

When the results for advised and self-directed investors were analysed separately (table 6.3 and 6.4), the results for self-directed investors were very similar to those of the whole dataset. However, advised investors produced some interesting results. Unlike the results

for the whole dataset and self-directed investors, the age of advised investors, the returns achieved and the number of buy and sell trades placed did not have a significant impact on the percentage held in medium risk assets. The only exception was investors who were aged 66 years and over, they had a significant relationship with the amount held in medium risk investments. Overall, these results show that, although holding a higher percentage in medium risk investments led to lower returns for the whole dataset and self-directed investors, this was not the case for advised investors, showing that they are making better investment decisions.

Sex, use of advice and the number of buy and sell trades placed and returns all significantly correlated with the percentage held in high risk investments. However, in contrast to the results of the regression analysis for the percentage of an investor's portfolio held in low and medium risk investments, the percentage held in high risk investments significantly negatively correlated with sex ( $t = -6.89$ ,  $p = 0.000$ ) and use of advice ( $t = -21.15$ ,  $p = 0.000$ ) at the  $<0.01$  level. The number of sell trades placed had a significant positive correlation with the percentage held in high risk investments ( $t = 4.30$ ,  $p = 0.000$ ). All age groups, when compared to investors aged 45 years and below, had a significant correlation with the percentage held in high risk investments. Investors aged 46-65 and 66 years and over had a significant negative correlation with the amount held in high risk assets, showing that older investors have a significantly lower percentage of their portfolios invested in high risk investments. These results show that male, younger, self-directed investors and investors who placed a higher number of sell trades held a significantly higher percentage of their portfolios in high risk investments. Investors who held a higher percentage of their portfolio in high risk investments also achieved significantly higher returns ( $t = 3.15$ ,  $p = 0.000$ ). Although use of advice was significantly correlated with returns, the amount invested in high risk investments was found to be significantly correlated with returns for self-directed investors, use of advice had a significantly negative correlation with the amount held in high risk investments. To test this further, interaction effects were tested. This assessment found that the interaction between use of advice and the amount held in high risk meant that the amount held in high risk investments no longer significantly correlated with returns once effect of use of advice was taken into account ( $t = -0.50$ ,  $p = 0.617$ ).

When the dataset was split into advised and self-directed investors, the correlations between high risk investments and the other variables were again very similar for self-directed investors and the whole dataset. However, advised investors again produced some interesting results. Similar to the whole dataset and self-directed investors, older investors held a lower percentage of their portfolios in high risk investments and investors who placed more sell trades held higher amounts in high risk investments. However, in contrast to the whole dataset and self-directed investors, advised investors who placed more buy trades held significantly less in high risk investments, as shown by a significant negative correlation. Also, sex did not have a significant impact on the percentage held in high risk investments, there was no significant correlation between age and high risk investments, when the 46-65 years and 66 years and over age groups were compared to the 45 years and below age group, and holding a higher percentage in high risk assets did not have a significant impact on returns.

Overall, analysing the risk level of investments held by investors and how they impact upon other variables revealed that investors who held a higher percentage in medium risk investments achieved significantly lower returns and those who held a higher percentage of their portfolio in high risk investments achieved significantly higher returns. Female investors held a larger percentage of their portfolios in low and medium risk assets and men held more in higher risk. Older investors held more in low and medium risk investments and less in high risk investments. Investors who placed more buy trades held a larger percentage of their portfolio in low risk investments, and investors who placed more sell trades held more in high risk investments and less in low risk.

Advised investors held a higher percentage of their portfolios in low and medium risk assets and less in high risk. However, unlike the results for the whole dataset and self-directed investors, the amount held in each risk level did not have a significant impact on returns. This shows that advised investors are making different investment decisions and it is other factors that are influencing returns. The age and sex of advised investors also had less of an impact on the percentage held in each risk level.

## 6.7 Volatility

Although the return achieved may be what most investors are concerned with, and what the majority of previous studies have focused on (Shapira and Venezia, 2001; Bergstresser et al, 2009; Hackethal, Haliassos and Jappelli, 2011; Kramer, 2011; Chalmers and Reuter, 2012; Hoechle et al, 2013), the journey to get that return and the risks taken are an important consideration. The results above clearly show that advised and self-directed investors' portfolios are different, but they do not explicitly show how this impacts upon the volatility of portfolios. Therefore, the amount of volatility observed across self-directed and advised portfolios was assessed. This enables further testing of the findings above along with the findings of previous studies, which would suggest that investors who do not have a financial adviser (self-directed investors), men and younger investors will hold more volatile portfolios (Barber and Odean, 2001; Bluethgen et al, 2008; Hackethal, Haliassos and Jappelli, 2011; Looney et al, 2007; Pompian and Longo, 2004).

To assess volatility the standard deviation of the returns achieved by both advised and self-directed investors over the observation period was calculated. Overall investors held portfolios that were more than three times more volatile than the market, FTSE All-share Index, over the observation period (32% vs 10%). This was also true for advised (35% vs 10%) and self-directed investors (32% vs 10%). Taken together with the returns analysis, this shows that investors achieved returns that were lower than the market but took on more risk.

Advised investors had slightly more volatile portfolios than self-directed investors, with advised accounts having volatility of 35% over the observation period compared to self-directed investors who had volatility of 32%. This was the same for men and women, with advice leading to slightly higher volatility. Overall, men and women had very similar levels of volatility, 33% vs 32%. The finding that advised accounts were more volatile than self-directed accounts is surprising given the results of the portfolio analysis, which found advised investors held a higher percentage of their portfolio in lower risk investments. When returns are also considered, these results show that overall investors underperformed the FTSE All-share index during the observation period and took on far more risk. This suggests

that investors are holding inefficient portfolios, taking on high levels of risk but achieving low returns.

To gain a deeper understanding of the relationship between diversification and volatility, the number of investments held by investors was regressed against volatility. The number of investments held was significantly correlated with volatility ( $t = 3.55$ ,  $p = 0.000$ ) showing that investors who held more investments had more volatile portfolios. This is a surprising finding as the number of investments held would be expected to be negatively correlated with volatility, showing that investors who hold fewer investments have more volatile portfolios. This finding may be due to the fact investment funds were included within the analysis, and investors who held smaller numbers of investments held multi-asset investment funds that were less volatile and well diversified within the fund, rather than more volatile single company shares. To test this theory, two regressions were run; the number of investments held regressed against the percentage of investors' portfolios held in shares, and the number of investments held regressed against the percentage of investors' portfolios held in cautious, medium risk and aggressive multi-asset funds. The results of these regressions support the theory as to why volatility was higher for investors who held more investments. Investors who held more investments had a significantly higher percentage of their portfolios invested in single company shares ( $t = 2.65$ ,  $p = 0.008$ ) and investors who held a lower number of investments had a significantly higher percentage invested in multi-asset medium risk funds ( $t = -4.46$ ,  $p = 0.000$ ) and multi-asset aggressive funds ( $t = -13.03$ ,  $p = 0.000$ ), as shown by the negative correlation.

To further assess the impact of volatility, volatility was regressed against the independent variables, table 6.2. Returns and volatility were significantly correlated at the  $<0.01$  level ( $t = 51.86$ ,  $p = 0.000$ ), showing that as returns increased, so did volatility and, therefore, investors who achieved higher returns also held more volatile portfolios. This suggests that investors are taking higher risks in order to achieve enhanced returns and supports the results of the portfolio risk level analysis, which found that investors who held a higher percentage of their portfolios in high risk assets achieved higher returns. Use of advice ( $t = 5.51$ ,  $p = 0.000$ ) and the number of buy trades placed ( $t = 11.92$ ,  $p = 0.000$ ) were also significantly positively correlated with volatility at the  $<0.01$  level. The number of sell trades

placed was significantly negatively correlated with volatility ( $t = -6.37, p = 0.000$ ). Sex did not have a significant impact on volatility and, when compared to those aged 45 years and under, neither did age. These findings show that investors who had a financial adviser, achieved higher returns and placed more buy trades experienced higher levels of volatility and those who placed more sell trades experienced lower levels of volatility. The same regressions were also run on just self-directed (table 6.3) and advised investors (table 6.4). The results were quite similar to the whole dataset, the only differences were that for advised investors the number of buy trades placed did not have a significant impact on volatility and the number of sell trades placed had a positive, rather than a negative, correlation with volatility.

### 6.8 Risk Adjusted Returns

The results suggest that, compared to other investors, advised investors maybe achieving higher returns, but to do so they are taking on higher levels of volatility. To further analyse this and identify whether the returns achieved by advised investors are the result of their investment decisions or just a symptom of the level of risk being taken, risk adjusted returns were calculated and assessed.

The Sharpe Ratio is a risk adjusted measure of performance that takes into account performance and volatility and provides a way to assess the return achieved above a risk free rate of return (Weber and Pelizzon, 2005). To calculate the Sharpe Ratio the annual average yield from British Government Securities, 10 year Nominal Par Yield (Bank of England, 2019) over the observation period was used as the risk free rate of the return.

**Table 6.17 – Shape Ratio of Investor Accounts Split by Sex and Use of Advice**

	<b>Total</b>	<b>Self Directed</b>	<b>Advised</b>
<b>Total Sharpe Ratio</b>	-0.2	-0.3	0.2
<b>Men Sharpe Ratio</b>	-0.3	-0.3	0.3
<b>Female Sharpe Ratio</b>	-0.1	-0.1	0.1



Table 6.17 shows that the Sharpe Ratio of advised investors was much higher than that of the self-directed investors. The total dataset had a Sharpe Ratio of -0.2 which shows that investors generally are making poor investment decisions and are achieving returns that are lower than those that could be achieved by holding a risk-free asset. In contrast, advised investors achieved a Sharpe Ratio of 0.2 which shows that, even when risk is taken into account, these investors are making better investment decisions and are achieving a return that is higher than what could be achieved by holding a risk-free asset.

When looking at the total figures, men and women had negative Sharpe Ratios, however, women achieved a slightly higher Sharpe Ratio than men, -0.1 vs -0.3. For self-directed investors, men and women achieved the same Sharpe ratio of -0.3. In contrast, both men and women who had a financial adviser achieved a positive Sharpe Ratio, with advised men achieving a higher Sharpe Ratio than women, 0.3 vs 0.1. The only variable that was significantly correlated with the Sharpe Ratio was use of advice. This finding shows that, although advised investors achieved higher returns and had more volatile portfolios, the risk adjusted returns were significantly better than self-directed investors.

## **6.9 Trade Data Discussion**

There is a large degree of heterogeneity within the investment portfolios held by individual investors, both in terms of the makeup of portfolios, their values, returns and volatility. In addition to this, the complexity of the investment markets, raises many questions about how individual investors make investment decisions, why some are more successful than others and what role financial advice plays in this. A detailed analysis of a unique dataset has provided new insights into this and provided some answers to these questions.

### **6.9.1 Trades, Returns and Volatility**

An area that previous studies have focused heavily on is the returns achieved by investors. These studies have yielded some conflicting results with no clear indication of which factors lead to investors achieving higher or lower returns (Barber and Odean, 2000; Bluethgen et al, 2008; Calvet, Campbell and Sodini, 2007; Chevalier and Ellison, 1997; Gruber, 1996; Odean, 1998, 1999; Shu et al, 2004; Zhao, 2006). To expand upon the previous research,

trade data from 21,205 investment accounts held with a popular UK based online investment platform were analysed. Unlike previous studies, trading activity, inflows and outflows could be directly observed and all asset classes and investment types were included.

Returns were influenced by a number of factors including the type of trade placed, the number of investments held and volatility. Unlike previous studies, the type of trade placed, buy or sell, could be identified and analysed, rather than just assessing total trades. This provided a more detailed analysis of the impact of trades on other variables. Investors who placed more buy trades achieved higher returns. This finding supports those of Shu et al (2004) but is in contrast to the findings of Barber and Odean (2000, 2001), Bluethgen et al (2008) and Odean (1999) who found that placing more trades reduced returns. The underperformance observed within these studies was mainly due to transaction costs. In the present study, most trades placed involved investment funds, which do not attract any transaction fees. Investment funds were excluded from the Barber and Odean (2000, 2001) and Odean (1999) studies which demonstrates how excluding certain investment types and asset classes may skew the results. This finding clarifies the impact that the number of trades placed, especially the type of trade placed, has on returns. If the investor is not attracting high transaction costs, overtrading appears to lead to enhanced returns. However, investors who placed more buy trades and those who achieved higher returns held more volatile portfolios.

The number of sell trades placed was found to have no significant impact on returns. This suggests that buying and holding investments may lead to higher returns. This is an interesting finding, as buying and holding investments has been viewed as a common investment mistake by previous studies (Charupat and Deaves, 2004; Fischer and Gerhardt, 2007; Odean, 1998). It may be that the decision to buy and sell are fundamentally different, with investors finding buying easier than selling as a number of shortcuts can be used.

Investor returns increased in line with the FTSE All-share index, however, when the returns achieved by investors were compared to the return of the FTSE All-share index, investors achieved lower returns over the observation period. The fact that most investors did not

have 100% of their portfolio invested in equities could account for some of the underperformance observed. As the FTSE All-Share increased, so did the total number of trades placed, with investors placing more buy trades when the FTSE All-Share increased in value and placing fewer sell trades. This finding is consistent with common investment mistakes, with investors chasing returns and buying when the market is high and selling when it is low (Gruber, 1996; Chevalier and Ellison, 1997; Zhao, 2006). Taken together with the finding that the number of sell trades did not have a significant impact on returns, this finding also suggests that investors either may not be selling winning investments, are selling the wrong investments, are selling at the wrong time or are holding on to losers (Firat and Fettahoglu, 2011).

Investors who achieved higher returns held more volatile portfolios, suggesting that to achieve the higher returns, investors were taking on more risk. To explore this further the diversification of investor portfolios, including the number of investments held and the underlying assets, were analysed in detail. On average, investors held 19.5 investments during the observation period and the number of investments held was significantly correlated with both volatility and returns. Investors who held more investments had more volatile portfolios but also achieved higher returns. The correlation between volatility and the number of investments held is an interesting finding as it would be expected that holding more investments would reduce volatility as the risk is spread. Further analysis revealed that this was due to investors who held a smaller number of investments holding a higher percentage of their portfolios in multi-asset investment funds (multi-asset medium risk and multi-asset aggressive funds) that are less volatile and well diversified within the fund, compared to more volatile single company shares. Investors who held more investments had a higher percentage of their portfolios invested in higher risk, more volatile single company shares. These findings help to clarify the impact the number of investments held in portfolios has on returns, which was previously unclear due to conflicting results reported across other studies. These findings do not support those of previous studies, which found many investors held just a few investments within their portfolio and these concentrated portfolios led to higher returns (Ivkovic and Weisbenner, 2005; Massa and Simonov, 2006). The findings of Barber and Odean (2000) and Goetzmann and Kumar (2008), who found that holding a small number of investments led to lower returns, was supported.

Although investors generally held a high number of investments within their portfolios, the portfolios tended to be high risk with limited diversification across asset classes. The vast majority (63%) of trades, based on total trades, were in equities (directly held shares or equity funds) and only 9% in bonds. Analysis of the top 5 investments, based on the total number of trades placed, during the observation period revealed that investors suffer from a home bias with three UK centric funds appearing in the top five investments. Given the extremely large number of investments available, it is unrealistic to think that investors systematically sift through thousands of investments until they find one they would like to purchase (Odean, 1999). Instead, they will typically invest in something that has previously caught their attention, the attention effect, or something that is familiar, the familiarity bias. Therefore, investors may unwittingly hold portfolios that have a home bias; they are just investing in investments that have caught their attention or are familiar. As the investors live in the UK, they could be expected to be more attracted to UK centric investments or have heard about UK centric investments due to marketing. However, investors appear to be unaware of these biases influencing their investment decisions. The survey analysis, Section 7, found that only 7% of investors stated that they invest in what's popular, a finding that was contradicted by the analysis of the top five holdings. The top five holdings suggest that investors do invest in what is popular, as certain investments were found to attract a large number of trades and/or a large proportion of the money invested over the observation period. These findings support those of previous studies that have found investors to not be aware of the subconscious biases that influence their investment decisions (Kahneman, 2011; Kahneman and Klein, 2009; Shefrin and Thaler, 1988).

One of the best ways to get an investor's attention is extreme past performance (Barber and Odean, 2008; Doloitte, 2014). This was supported by the finding that the number of trades placed by investors increased as the FTSE All-share index increased. Investors appear to invest when they notice strong performance or the markets increasing in value, but in doing so, they succumb to a number of biases and common investment mistakes such as investing into UK centric investments at the top of the market. However, this does not appear to harm returns as the number of buy trades placed was positively correlated with returns.

No significant relationship was identified between the percentage held in specific asset classes and returns. However, when the asset classes were consolidated into risk levels the percentage held in each risk level was found to have a direct impact on returns. Investors who held a higher percentage of their portfolios in medium risk investments achieved significantly lower returns and those who held a higher percentage of their portfolio in high risk investments achieved significantly higher returns. This finding confirms that investors who achieved higher returns did so by taking on more risk. However, when risk adjusted returns (the Sharpe Ratio) was calculated and analysed, the only variable that had highly significant relationship was use of advice, showing that investors who had a financial adviser achieved significantly higher risk adjusted returns. This shows that when risk is taken into account, with the exception of those who have a financial adviser, the investors that are taking on more risk in order to achieve higher returns are not achieving significantly higher risk adjusted returns. These investors would actually be better off not investing.

#### **6.9.2 The Impact of Sex and Age on Trading Behaviour**

Men placed significantly more trades than women and held more investments in their portfolios, however, this was found to not significantly affect risk adjusted returns. Previous studies have found that men trade more than women and this leads to a reduced return due to increased transaction costs (Barber and Odean, 2001; Hackethal, Haliassos and Jappelli (2011)). In the present study, the majority of trades were into investment funds, which do not have any initial transaction costs. Although male investors may not be incurring explicit trading costs due to the increased number of trades, they are incurring high costs in terms of time and effort. This was supported by the finding from Section 7, that female investors spent less time obtaining information each week. Women placed fewer trades and held a higher percentage of their portfolio in low and medium risk assets and less in higher risk assets. Despite these differences in the risk levels of assets held between men and women, no significant differences between volatility, returns or risk adjusted returns, Sharpe Ratio, were identified.

Older investors placed fewer trades, held fewer investments, held a larger percentage of their portfolios in low and medium risk investments and less in high risk, and achieved higher returns. However, this did not lead to significantly lower levels of volatility. Although

it is not a direct measure of investment experience, age could be seen as a proxy for this. This would mean that the results support those of Hackethal, Haliassos and Jappelli (2011) who found that that more experienced investors achieved higher returns than those with less experience and held lower risk assets in their portfolios.

### **6.9.3 Financial Advice and Trade Data**

Advised investors achieved far higher returns than self-directed investors, achieving a return that was 4.7% more over the four year observation period. The returns figures are net of all costs and charges, therefore, if adviser charges were added back into the return figures, the difference would be even greater. Advised investors also placed fewer trades than self-directed investors, held more money in low and medium risk assets and less in high risk assets. Despite advised investors holding a higher percentage in low and medium risk assets, advised investors did experience higher levels of volatility. However, this did lead to them achieving a significantly higher Sharpe Ratio, risk adjusted return, than self-directed investors.

Self-directed investors may have achieved lower investment returns due to capacity for processing information and the ability to conduct a number of tasks at one time being generally limited. This restricts reasoning and problem solving, making researching and managing a well diversified investment portfolio difficult for investors (Cantor and Engle, 1993; Ivkovic, Sialm and Weisbenner, 2008; Kahneman, 1973). Having a financial adviser may help to address this issue, helping to reduce the impact of biases and, along with the quality of research and information available to financial advisers, may lead to higher returns being achieved.

Although it was clear that advice led to enhanced returns, it was unclear whether this outperformance was due to advice or the impact of other variables, which also happen to correlate with advice. For example, was the outperformance due to advice, or due to the fact that advised investors were older and it was actually the age of investors that was leading to the outperformance. To test this, the dataset was split in to self-directed and advised investors. Analysis of the results obtained from the advised only dataset revealed that it is advice rather than other variables that led to the higher returns being achieved.

The hypotheses that financial advice will not lead to higher investment returns but will increase the diversification of portfolios was generally disproved, as financial advice led to higher returns. Although there were no significant differences in the number of investments held, portfolios of advised investors were generally more diversified, with advised investors holding more in uncorrelated assets such as absolute return funds, alternative investments, and property. This provides some support for the hypothesised relationship between financial advice and diversification.

In contrast to the findings of Hoechle et al (2013), financial advice does appear to reduce biases. Investors placed more buy than sell trades and this was true for both advised and self-directed investors. This suggests that investors are buying and holding investments rather than selling, which could be due to the endowment effect or anchoring (Kahneman, 2011). However, although there was a significant relationship between the number of buy trades placed and returns for self-directed investors, this relationship was not significant for advised investors. Also, when the actual trades placed were analysed in detail, advised investors had three specific investments in the top five of both buy and sell trades. This compares to self-directed investors who only had one investment featured in the top five of both buy and sell trades. These results show that advised investors appear to be buying and selling the same investments with the financial adviser encouraging them to sell once the investments achieve a certain value, or if the value has dropped and future prospects do not look promising. This means that the type of trade placed is not directly impacting upon returns and advice is preventing anchoring and/or the endowment effect from influencing investment decisions.

## **7. How Investment Decisions Are Made and the Impact of Financial Advice, Biases and Personality: An Analysis of Survey Data**

The survey data was analysed to identify how investors make investment decisions and the impact a number of variables, including overconfidence, risk aversion, time spent obtaining information, attitude to risk and financial advice, have on these. The perceived benefits of financial advice were assessed along with comparing and contrasting investors who previously had a financial adviser, but now make their own investment decision, to investors who make their own investment decisions and investors who currently have a financial advisor.

The following sections describe the data in more detail, explore the hypothesis and main findings, supported by a detailed empirical analysis, before concluding with a discussion.

This section aims to answer the following research questions:

- How personality impacts upon overconfidence, time spent obtaining information, attitude to risk, risk aversion and the use of advice.
- How personality impacts upon how investment decisions are made.
- How overconfidence impacts upon time spent obtaining information, attitude to risk, risk aversion, use of advice and how investments are made.
- What investors consider the benefits of financial advice to be.
- The characteristics of previously advised investors.
- How previously advised investors make investment decisions and what they perceive to be the main benefits of financial advice.



## 7.1 Survey Data Description

Surveys were sent via email in February 2016 to 1500 investors (1000 self-directed and 500 advised<sup>5</sup>) who held an account with the online investment platform. The investors were chosen at random and all surveys were completed online with a closing date of 31<sup>st</sup> March 2016. 218 questionnaires were fully completed and included within the study. Of these, 87 respondents (42%) identified themselves as currently having a financial adviser, 46 (22%) stated that they previously had a financial adviser but now make their own investment decisions and 73 (35%) stated that they have always made their own financial decisions. Table 7.1 sets out the demographic data for the 218 completed questionnaires. For each question, the respondent had the option to skip to the next question and some questions also had a “prefer not to answer” option. Therefore, the number of answers to each question may be lower than 218. The percentages shown are of the total number of questionnaires completed. If “prefer not to answer” was chosen or the question was not answered or skipped, these responses were grouped together as “prefer not to answer” and included within the table and the total percentage. The survey included questions on personality, overconfidence, time spent obtaining information, risk aversion and attitude to risk as well as how investment decisions are made and the use and benefits for financial advice. These variables were then assessed along with how the variables impact upon one another.

The demographic data, table 7.1, shows that the respondents to the questionnaire are older, more educated and wealthier investors than the general UK population. 80% of investors were over the age of 56 years with 67.3% going to university, as indicated by investors stating that their highest level of education was either university or postgraduate. Comparing these figures to the UK average, 28.3% of adults in the UK are aged over 55 years and around 42% of the UK population, aged 21 to 64 years, have achieved a higher education qualification (Higher Education Statistics Association, 2018; Office of National

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<sup>5</sup> An equal number of surveys (500) were originally sent to advised and self-directed investors. However, due to low response rates from the self-directed investors a further 500 surveys were sent. The first 1000 surveys were sent on 25<sup>th</sup> February 2016 and the additional 500 were sent on 29<sup>th</sup> February 2016.

Statistics, 2011). Therefore, the sample of investors who completed the questionnaire are older and more educated than the general population.

The majority of investors also earn significantly more than the UK average household and are significantly wealthier. The UK average household income is £29,400 (Office of National Statistics, 2019). Of the investors that answered the question about household earning 55% earned more than £39,000 per annum. Of the investors that answered the question about household investable assets, liquid financial assets that are, or could be invested, 60% had more than £250,000 in investable assets, which is far higher than the UK average. A study by NimbleFins found that average UK household savings, including deposits, savings, investments and pensions, were £79,296 (NimbleFins, 2021).

Investors who have always made their own investment decisions are younger, have attained a lower level of education and have lower levels of household investable assets than investors who have a financial adviser or those who previously had a financial adviser. The household earning of advised investors are lower than investors who have always made their own investment decisions and those who previously had a financial adviser.

**Table 7.1 - Summary of Demographic Data for Survey Responses**

	Total Dataset	Always made my own financial decisions	Currently have a Financial Adviser	Previously had a Financial Adviser but now make my own financial decisions
<b>Totals (N/%)</b>	218	73 (35%)	87 (42%)	46 (22%)
<b>Sex</b>				
Male (N/%)	179(82%)	60 (82%)	72 (83%)	38 (83%)
Female (N/%)	36 (17%)	13 (18%)	14 (16%)	6 (13%)
Did not answer	3 (1%)	-	1 (1%)	2 (4%)
<b>Age</b>				
Below 45 (N/%)	19 (9%)	15 (21%)	2 (2%)	2 (4%)
46-65 (N/%)	89 (41%)	28 (38%)	27 (31%)	27 (59%)
66 and over (N/%)	108 (49%)	29 (40%)	58 (67%)	16 (35%)
Did not answer	2 (1%)	1 (1%)	-	1 (1%)
<b>Highest Level of Education</b>				
Did not finish high school	2 (1%)	2 (3%)	1 (1%)	-
High school or equivalent	25 (11%)	12 (16%)	8 (9%)	3 (7%)
College	38 (17%)	8 (11%)	22 (25%)	7 (15%)
University/under graduate	73 (34%)	33 (45%)	20 (23%)	15 (33%)
Post graduate	73 (34%)	17 (23%)	31 (36%)	21 (46%)
Prefer not to answer	6 (3%)	1 (1%)	5 (6%)	-

**Household Earnings**

£0 to £19,999	12 (6%)	4 (5%)	4 (5%)	4 (9%)
£20,000 to £39,999	37 (17%)	12 (16%)	15 (17%)	8 (17%)
£40,000 to £69,999	42 (19%)	9 (12%)	23 (26%)	9 (20%)
£70,000 to £99,999	35 (16%)	11 (15%)	12 (14%)	9 (20%)
£100,000 +	42 (19%)	14 (19%)	13 (15%)	10 (22%)
Prefer not to answer	49 (23%)	23 (32%)	20 (23%)	6 (13%)

**Total of household investable assets**

0 to £49,000	10 (5%)	5 (7%)	4 (5%)	4 (9%)
£50,000 to £99,999	7 (3%)	6 (8%)	1 (1%)	-
£100,000 to £249,999	28 (13%)	13 (18%)	12 (14%)	2 (4%)
£250,000 to £499,999	34 (16%)	9 (12%)	15 (17%)	8 (17%)
£500,000 or more	96 (44%)	20 (27%)	40 (46%)	29 (63%)
Prefer not to answer	42 (19%)	20 (27%)	15 (17%)	6 (13%)

**Time Spent Obtaining Information**

0-2 hours	106 (49%)	39 (53%)	46 (53%)	19 (41%)
2-4 hours	63 (29%)	18 (25%)	27 (31%)	17 (37%)
4-6 hours	25 (11%)	11 (15%)	9 (10%)	4 (9%)
Over 6 hours	16 (7%)	5 (7%)	5 (6%)	6 (13%)
Prefer not to answer	8 (4%)	-	-	-

<b>Risk Aversion</b>				
Risk Averse	84 (39%)	28 (38%)	38 (44%)	16 (35%)
Not Risk Averse	125 (57%)	44 (60%)	49 (56%)	29 (63%)
Prefer not to answer	9 (4%)	1 (1%)	-	1 (2%)
<b>Attitude to Risk</b>				
Low risk and low return	16 (7%)	3 (4%)	11 (13%)	2 (5%)
Moderate return and moderate risk	148 (68%)	48 (66%)	66 (76%)	30 (65%)
High return and high risk	47 (22%)	22 (30%)	10 (11%)	14 (30%)
Prefer not to answer	7 (3%)	-	-	-
<b>Overconfidence</b>				
Know investments better than others (Overconfident)	102 (47%)	40 (55%)	40 (46%)	20 (43%)
Know investments the same as others	92 (42%)	24 (33%)	43 (49%)	22 (48%)
Know investments worse than others	16 (7%)	9 (12%)	4 (5%)	3 (7%)
Prefer not to answer	8 (4%)	-	-	1 (2%)
<b>Research</b>				
Do more research than others	87 (40%)	31 (42%)	30 (34%)	23 (50%)

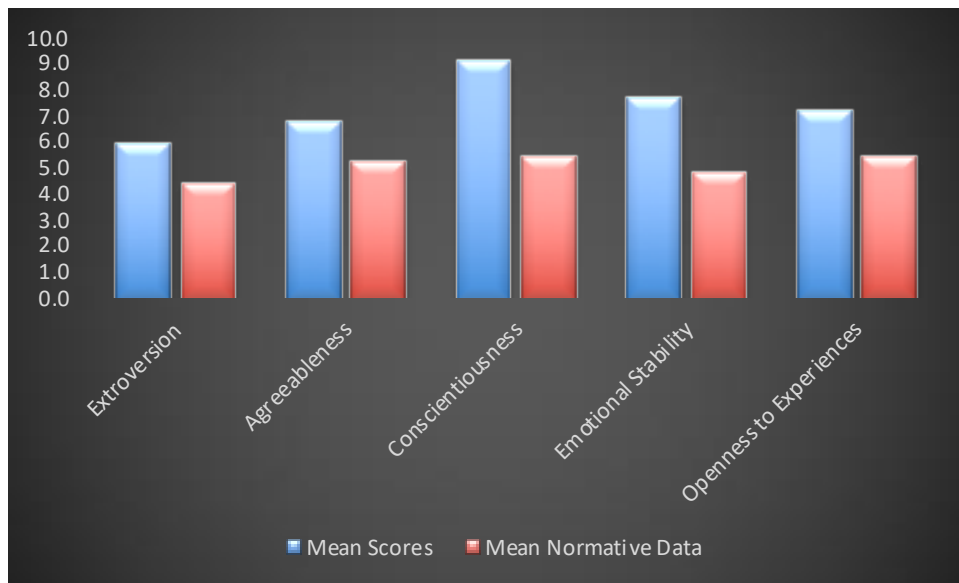
Do about the same amount of research as others	97 (44%)	35 (48%)	41 (47%)	19 (41%)
Do less research than others	24 (11%)	6 (8%)	15 (17%)	3 (7%)
Prefer not to answer	10 (5%)	1 (1%)	1 (1%)	1 (2%)

## 7.2 Personality

The measure used to assess personality, the TIPI, was scored using the methodology published by Gosling, Rentfrow and Swann (2013). The alpha reliability, Cronbachs Alpha, of the TIPI scale was found to be 0.65, which is higher than previous studies on the TIPI measure of personality (Gosling, Rentfrow and Swann, 2003; Muck et al, 2007; Romero et al, 2012). This also suggests that the reliability of the TIPI is not as much of an issue as previous studies have suggested (Donnellan et al, 2006; Jonason, Teicher and Schmitt, 2011) and supports its use as an acceptable measure of personality.

Table 7.2 and chart 7.1 show the results of the TIPI Personality Test along with normative TIPI results data taken from Gosling, Rentfrow and Swann (2013). The normative data was collected from a sample of 1,813 University of Texas and Austin undergraduates, 35% were male and 65% were female. Compared to the normative data, investors in this study scored much higher on all measures. Investors scored especially highly on conscientiousness, emotional stability and openness to experiences. This suggests that within this sample, the individuals are calm, more organised, more likely to venture beyond their comfort zones, are goal-orientated and ambitious, worry less and experience lower stress levels. Conscientious individuals also tend to deliberate over options rather than making impulsive decisions and have been found to be more loyal and motivated (Parks and Guay, 2009; Long-Yi, 2010; Penney, David and Witt, 2011). High openness to experiences has also been found to be linked to intellect and the ability to attend to and process complex stimuli (McCrae and Costa, 1987; Weisberg, DeYoung and Hirsh, 2011). The results may in part be due to the higher percentage of men included within the present study and average age of investors, which was 56 years. The average age of investors is likely to be much higher than the average age of the undergraduates surveyed for the normative data. Previous studies have found emotional stability and conscientiousness to increase with age (Scollon and Diener, 2007; Van den Akker et al, 2014). Table 7.2 also shows the personality scores split between a number of variables.

**Chart 7.1 – Mean Personality Scores Compared to Normative Data**





**Table 7.2 - Summary of Personality Data**

	<b>Extroversion</b>	<b>Agreeableness</b>	<b>Conscientiousness</b>	<b>Emotional Stability</b>	<b>Openness to Experiences</b>
Total Dataset	5.9	6.7	9.1	7.7	7.1
Mean Normative Data <sup>6</sup>	4.4	5.2	5.4	4.8	5.4
<b>Sex</b>					
Male	5.8	6.6	9.2	7.7	7.1
Female	6.7	7.0	8.8	7.6	7.2
<b>Age (Years)</b>					
45 and over	6.1	6.4	8.6	7.4	7.7
46 – 65	5.8	6.6	9.2	7.6	7.0
66 and over	6.0	6.9	9.1	7.8	7.1
<b>Use of Advice</b>					
I currently have a financial adviser	6.3	7.0	9.2	7.8	7.2
I have always made my own investment decisions	5.4	6.7	9.2	7.7	7.1
I previously had a financial adviser but now make my own investment decisions	6.1	6.6	8.8	7.6	7.2

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<sup>6</sup> Normative personality score data taken from Gosling, Rentfrow and Swann (2013)

<b>Time Spent Obtaining Information</b>					
0-2 hours	5.9	7.1	9.0	7.9	7.0
2-4 hours	5.8	6.3	9.4	7.3	7.3
4-6 hours	6.3	6.6	9.1	7.7	7.5
Over 6 hours	6.7	6.9	8.5	8.0	7.2
<b>Risk Aversion</b>					
Risk Averse	6.0	6.5	9.3	9.3	7.4
Not Risk Averse	5.8	7.1	8.9	8.9	6.9
<b>Attitude to Risk</b>					
High return and high risk	6.6	6.8	9.1	7.6	7.6
Moderate return and moderate risk	5.8	6.7	9.3	7.1	7.1
Low risk and low return	6.0	7.1	7.7	6.9	6.9
<b>Overconfidence</b>					
Know investments better than others (Overconfident)	6.1	6.7	7.5	9.3	7.3
Know investments the same as others	5.8	6.8	8.0	9.2	7.2
Know investments worse than others	5.9	7.0	7.2	7.9	6.8
<b>Research</b>					
Do more research than others	6.1	6.8	7.7	9.3	7.0

Do about the same amount of research as others	6.0	6.7	7.8	9.0	7.3
Do less research than others	5.5	6.7	7.6	9.0	7.1

Both men and women scored much higher than the normative data (Gosling, Rentfrow and Swann, 2013) on all measures. The results show that female investors are more extroverted and agreeable than men, but are less conscientious. Emotional stability and openness to experiences are very similar for both men and women. The differences observed in extroversion between men and women was significant at the  $<0.05$  level ( $z = 2.07$   $p = 0.038$ ) showing that female investors score significantly higher in extroversion. This would suggest that women have a more positive attitude towards risk and could lead to underestimating risks and overestimating potential positive outcomes, leading to a higher attitude to risk. Taken on its own, this result could suggest that women may hold higher risk portfolios and trade more frequently. However, this is not supported by the trade data collected in the first part of this study, Section 6, which found that women traded significantly less than men and portfolios held by women had more invested in low and medium risk investments and less in high risk. The finding that women traded less than men supports the findings of Durand, Newby and Sanghani (2008) who found that extroversion was associated with lower levels of trading. Although, other differences can be observed between the personalities of men and women, the other differences were not found to be significant.

Personality traits tended to differ between the lowest and highest age groups with more subtle changes in the middle band, however, further regression analysis revealed that none of these differences were significant. Analysis of the other demographic data revealed that none of the personality traits were found to significantly influence investable assets, education or income.

### **7.3 Regression Analysis**

A Logistic Regression Model was used to test the significance of the results observed. This model was chosen as it is the most appropriate for dealing with variables that are categorised, variables that are not continuous, such as survey responses. A Logistic Regression is a nonlinear regression model that estimates the probability of the dependent variable being equal to 1 by forcing the output, predicted values, to be either 0 or 1. For dependent variables that are categorical and had more than two outcomes, an Ordered Logistic Regression (a regression very similar to the Logistic Regression but used to model a non-binary dependent variable) was conducted.

Overconfidence was tested directly using a question taken from Guiso and Jappelli (2007). “Compared to other people who have a similar level of financial experience and knowledge, how well would you say you know investments? Much better, somewhat better, about the same, somewhat worse, much worse.” To aid the analysis, address any issues with low numbers of responses in some categories and draw out any differences in confidence level, for all regressions, the overconfidence measure was transformed into a binary variable. Investors who stated that they knew investments better than others were coded as 1 and with all other investors coded as 0. Investors who stated that they knew investments “Better” than others were categorised as being overconfident, as overconfident individuals have been found to overestimate their knowledge (Taylor and Brown, 1988).

To explore overconfidence further, two additional questions were asked. Both questions were also taken from Guiso and Jappelli (2007). The first question was, “Compared to other people who have a similar level of financial experience and knowledge, how much research would you say you do before deciding to invest? Much more, somewhat more, about the same, somewhat less, much less”. The second question was, “How much time do you usually spend, in a week, to obtain information on how to invest your savings? (Think about time reading newspapers, surfing the internet, talking to your adviser, reading company balance sheets etc) 0-2 hours, 2-4 hours, 4-6 hours, over 6 hours”. The responses to the research question were grouped into three distinct categories. Answers of “Much more” and “Somewhat more” were grouped as “More”, and “Somewhat less” and “Much less” were grouped as “Less”. The “About the same” response was unchanged. For the time spent obtaining information measure, the responses were re-categorised into 0-2 hours, 2-4 hours and over 4 hours due to a low number of responses in some categories.

Use of advice was included as a categorical variable based on the answers to the use of advice question, always made my own investment decisions, currently have a financial adviser and previously had a financial adviser but now make my own investment decisions. Use of advice was also transformed into a binary variable with investors who stated that they currently have a financial adviser being coded as 1 and all other investors coded as 0.

Table 7.3 shows the results of the regression analysis for personality traits and table 7.4 shows the results of the regression analysis for the key variables measured.

**Table 7.3 - Personality Trait Regression Analysis**

Dependent Variable	Extroversion	Agreeableness	Conscientiousness	Emotional Stability	Openness to Experiences
Use of Advice (Currently have a financial adviser) (obs = 206, R <sup>2</sup> = 0.03)	2.18*	1.08	1.25	-0.06	-0.52
Overconfidence (Overconfident) (obs = 210, R <sup>2</sup> = 0.02)	1.02	-0.11	1.40	-1.82	0.37
Time Spent Obtaining Information (obs = 210, R <sup>2</sup> = 0.02)	0.96	-1.41	0.03	-1.25	1.09
Research (obs = 208, R <sup>2</sup> = 0.01)	1.28	0.23	1.20	-0.14	-1.49
Risk Aversion (obs = 209, R <sup>2</sup> = 0.04)	-0.38	2.19*	-1.46	-0.36	-1.45
Attitude to Risk (obs = 211, R <sup>2</sup> = 0.03)	1.22	-0.63	1.04	1.40	0.90

The table shows the Logistic Regression Analysis z stats. \*\*, \* denote significance at 1% and 5% levels respectively

**Table 7.4 - Survey Data Regression Analysis**

	Dependent Variable					
	Overconfidence (obs = 201, R <sup>2</sup> = 0.22)	Time Spent Obtaining Information (obs = 201, R <sup>2</sup> = 0.09)	Research (obs = 201, R <sup>2</sup> = 0.14)	Risk Aversion (obs = 201, R <sup>2</sup> = 0.17)	Attitude to Risk (obs = 201, R <sup>2</sup> = 0.15)	Use of Advice (Currently have an adviser) (obs = 201, R <sup>2</sup> = 0.07)
<b>Use of Advice (Compared to I have always made my own investment decisions)</b>						
I previously had a financial adviser but now make my own investment decisions	-1.96	0.89	1.25	-0.55	-0.28	-
I currently have a financial adviser	-0.29	0.74	-1.06	-0.72	-2.99**	-
Overconfidence	-	3.07**	5.63**	-0.49	0.61	0.67
Risk Aversion (Risk Averse)	-0.48	-1.33	0.27	-	-4.47**	-0.55
<b>Time Spent Obtaining Information (Compared to 0-2 Hours)</b>						
2-4 Hours	2.23*	-	1.52	-0.65	0.21	0.46
Over 4 Hours	2.69**	-	1.60	-1.49	1.76	0.01
<b>Research (Compared to Less)</b>						
About the Same	2.05*	2.31*	-	-1.28	-0.05	-1.54
More	3.95**	2.48*	-	-0.45	0.13	-2.04*
<b>Attitude to Risk (Compared to Low Risk and Low Return)</b>						



<b>Moderate return and moderate risk</b>	-1.02	2.66**	0.08	-0.70	-	-1.46
<b>High return and high risk</b>	-0.08	2.31*	0.38	-3.71**	-	-2.80**

The table shows the Logistic Regression Analysis Z stats. \*\*, \* denote significance at 1%, and 5% levels respectively.

#### 7.4 Overconfidence

Previous research on overconfidence would suggest that younger investors and male investors would be more overconfident (Barber and Odean, 2001; Guiso and Jappelli, 2007; Hackethal, Haliassos and Jappelli, 2011; Pompian and Longo, 2004). In addition, the study by Guiso and Jappelli (2007), which the overconfidence measure is taken from, also found that overconfident investors spent more time obtaining information and were less likely to delegate investment decisions. All of these findings were tested along with exploring the impact of overconfidence on how investment decisions are made, risk aversion, attitude to risk and the perceived benefits of advice.

The results for overconfidence are asymmetric with overconfidence (those investors stating that they know investments better than others) being far more prevalent than investors stating that they know investments worse than others. The majority of investors (47%) were overconfident, however, this was only slightly higher than the number of investors who stated that they knew investments “About the Same” as other people (42%). A very small percentage (7%) of investors felt that they knew investments worse than others. This is in line with other studies on overconfidence that have found that the majority of individuals overestimate their abilities, are overconfident, and a very small number state that they are below average at a task (Guiso and Jappelli, 2007; National Opinion Research Center, US General Social Survey, 1991).

Over half of all male respondents, 52% were found to be overconfident compared to just 33% of women and a much higher percentage of women stated that they know investments worse than others (15% vs 5%). A Logistic Regression was run, with overconfidence as the dependent variable and the dummy variables of age, sex, education level, income and investable assets as the dependent variables. In contrast to the many studies that have analysed the impact of overconfidence on investment decisions (Barber and Odean, 2001; Dittrich, Guth and Maciejovsky, 2001; Finke, Howe and Huston, 2011; Guiso and Jappelli, 2007; Looney et al, 2007; Pompian and Longo, 2004), overconfidence was not found to be significantly influenced by any of the dummy variables. A separate regression analysis found that none of the personality traits had a significant influence on overconfidence.

## 7.5 Research and Time Spent Obtaining Information

The results of the research question were found to have a highly significant influence on overconfidence at the  $<0.01$  level (table 7.4). This provides support for the robustness of the results as the research question was a proxy for the overconfidence measure. The results show that overconfident investors were significantly more likely to state that they do more research than others ( $z = 5.63, p = 0.000$ ). Investors who stated that they conduct more research than others were significantly less likely to have a financial adviser ( $z = -2.04, p = 0.042$ ). This result is to be expected as investors who have a financial adviser are paying a professional to do the research for them. Any observed differences in the amount of research investors stated they did between men and women, age groups and personality were not found to be significant. Although some of the other dummy variables were found to significantly impact upon the amount of research an investor stated they did, as with overconfidence, once other variables were added, the impact was no longer significant.

Although a large percentage of investors (40%) stated that they conducted more research than other investors before deciding to invest, the majority spent just 0-2 hours per week obtaining information on how to invest their savings (table 7.1). Just 18% of investors spent more than 4 hours per week obtaining information. When the results for men and women are compared, although the general trend is the same, a much higher percentage of women spent two hours or less per week obtaining information compared to men (73% vs 46%). Only 6% of women spent four hours or more per week obtaining information compared to 22% of men. This is line with the results of the research question in which the majority of women stated that they do about the same amount of research as others before deciding to invest and the overconfidence question in which a smaller percentage of women were overconfident. When looking at male investors, the opposite is true; men were more overconfident, a higher percentage stated that they do more research than others before investing and they spent more time each week obtaining information. An Ordered Logistic Regression found that the differences observed between male and female investors was significant. Female investors were significantly more likely to spend less time obtaining information ( $z = -2.90, p = 0.004$ ). Although the amount of time spent obtaining information tended to increase with age and vary with personality, an Ordered Logistic Regression analysis revealed that these differences were not significant.

Compared to investors who did not finish school, all other investors were significantly more likely to spend more time obtaining information at the <0.01 level, table 7.5. Compared to investors whose household income was £20,000 - £39,000, investors whose household income was over £100,000 were significantly more likely to spend more time obtaining information ( $z = 1.97$ ,  $p = 0.049$ ). Also, investors who had over £500,000 in investable assets were significantly more likely to spend more time obtaining information, compared to investors who had £0 – 49,999 ( $z = 2.05$ ,  $p = 0.040$ ).

**Table 7.5 –Time Spent Obtaining Information and Highest Level of Education**

Dependent Variable – Time Spent Obtaining Information		
	z	P> z
<b>Highest Level of Education (compared to did not finish school)</b>		
High School	16.64	0.000
College	17.65	0.000
University	19.01	0.000
Post Graduate	18.54	0.000

There was little difference in the time spent obtaining information between investors who currently have an adviser and those who have always made their own investment decisions. This was confirmed by an Ordered Logistic Regression analysis that revealed use of advice did not have a significant impact on time spent obtaining information. Nearly all investors who stated that they know investments worse than others spent 0-2 hours per week obtaining information and none of these investors spent more than four hours per week obtaining information. Overconfident investors spent more time obtaining information compared to investors who stated that they know investments about the same or worse than others, 64% spent more than 2 hours per week obtaining information compared to 41% of “About the same” and 6.7% of “Worse” investors. These results were found to be significant at the <0.05 level and <0.01 level. Compared to investors who spent less than 2 hours obtaining information, investors who spent 2-4 hours ( $z = 2.23$ ,  $p = 0.026$ ) and over 4 hours ( $z = 2.69$ ,  $p = 0.007$ ) obtaining information were significantly more likely to be overconfident.

These results are in line with the results of the overconfidence and research questions, which found that a higher percentage of investors who stated that they knew investments worse than others, stated that they conducted less research than others before deciding to invest. In addition, a higher percentage of overconfident investors stated that they conducted more research than others. These findings also support those of previous studies, which have found that overconfident investors spend more time conducting research (Baber and Odean, 2001; Guiso and Jappelli, 2007).

The results of the research questions split by time spent obtaining information was very similar to the results of the overconfidence questions split by time spent obtaining information. This adds further support for the robustness of the results, as the research question was a proxy for overconfidence. The results also show that investors who stated that they do more research than others actually did spend more time obtaining information. Investors who stated that they did more research than others were significantly more likely to spend more time obtaining information when compared to investors who said that they do less research than others ( $z = 2.48$ ,  $p = 0.013$ ). This was also true for investors who stated that they did about the same amount of research ( $z = 2.31$ ,  $p = 0.021$ ). Although, investors who spent 2-4 hours ( $z = 2.94$ ,  $p = 0.003$ ) and 4 hours and over ( $z = 3.10$ ,  $p = 0.002$ ) obtaining information were found to be significantly more likely to state that they spent more time conducting research than other investors, compared to those who spent less than 2 hours obtaining information, this relationship was no longer significant when other variables were added to the model.

## **7.6 Risk**

Risk was measured using two questions. The first was a direct question on risk aversion followed by a direct question on attitude to risk. Both risk measures have been found to be highly correlated and were taken from a study by Guiso, Paiella and Visco (2006). Based on previous research, it would be expected that both risk questions are highly correlated with one another (Guiso and Jappelli, 2007; Guiso, Paiella and Visco, 2006), more extroverted investors, men and overconfident investors will have a higher attitude to risk and be less risk averse (Nofsinger, 2002; Pompian and Longo, 2004; Sharma and Vasakarla, 2013). All of

these findings are tested along with the impact of risk on how investment decisions are made, time spent obtaining information, use of advice and the perceived benefits of advice.

Overall investors had a relatively high tolerance for risk (table 7.1). Most investors were not risk averse, with 57% stating that they viewed risk as an uncertain event from which one can extract profit and 90% stating that they would be willing to take a moderate (68%) or high (22%) level of risk with their financial investments. These two results also demonstrate how the mention of a return may influence investment decisions. There is a clear inconsistency between the two measures, as 39% of investors stated that they view risk as an uncertain event from which one should seek protection, yet only 7% stated that they would be willing to take a low risk and low return when making investments.

The results for the risk aversion question did not differ significantly between men and women, and, although there were observed differences in attitude to risk, a regression analysis confirmed that there was no significant relationships between sex and risk aversion or attitude to risk. Perceptions of risk changed with age. Younger investors saw risk as an uncertain event from which one can extract profit and were not risk averse. However, this view changed as investors got older, with more investors seeing risk as an uncertain event from which one should seek protection, becoming more risk averse with age. This is mirrored by the level of risk investors state they are willing to take with 58% of the 45 years and below age group willing to take a high risk compared to just 19% of 46-65 year olds and 18% of investors aged 66 years or over.

Although age was not found to significantly influence the answers to the risk aversion question the differences observed between attitude to risk and age were significant. An Ordered Logistic Regression was run with attitude to risk as the dependent variable and the dummy variables of age, sex, education level, income and investable assets as the independent variables. The only variables found to have a significant relationship with attitude to risk were age and education level. Compared to investors aged 45 years and below, investors aged 46 -65 years ( $z = -2.75$ ,  $p = 0.006$ ) and 66 years and over ( $z = -2.78$ ,  $p = 0.005$ ) were significantly less likely to have a high attitude to risk. Compared to investors who went to university, those who did not finish school ( $z = -2.52$ ,  $p = 0.012$ ) and investors whose

highest level of education was college ( $z = -2.82$ ,  $p = 0.005$ ) were significantly less likely to have a high attitude to risk. Those who went to university were significantly more likely to have a higher attitude to risk. None of the other dummy variables had a significant relationship with attitude to risk.

No significant differences were found when the answers to the risk aversion question were split by use of advice, however, significant differences were found between use of advice and attitude to risk. Compared to investors who have always made their own investment decisions, investors who currently have a financial adviser were significantly less likely to have a high attitude to risk ( $z = -2.99$ ,  $p = 0.003$ ). No significant differences were found between investors who have always made their own investment decisions and those who previously had a financial adviser but now make their own investment decisions.

Differences observed between attitude to risk and personality traits were not found to be significant. The differences observed between the answers to the risk aversion question and personality traits were also not significant apart from agreeableness (table 7.2 and 7.3). Investors who were more agreeable were significantly more likely to be risk averse ( $z = 2.19$ ,  $p = 0.029$ ). Further analysis revealed that for a one unit increase in agreeableness, the odds of an investor being risk averse are 1.19 times greater, given the other variables are held constant in the model.

These findings do not support those of Weller and Tikir (2011) who found that emotionality, which reflects low emotional stability without anger, was associated with higher risk perceptions and conscientiousness was associated with lower risk perceptions in general. However, the results of a study by Pak and Mahmood (2015) are partly supported. In contrast to the present study, they found that openness to experience had a significant, positive correlation with risk tolerance. They also found that agreeableness had a significant, negative correlation with risk tolerance, which the present study supports, given that agreeableness was found to significantly increase the likelihood that an investor was risk averse.

## 7.7 Overconfidence, Research and Risk

A significant relationship was identified between overconfidence, time spent obtaining information and the amount of research an investor stated they did. Compared to those who spent 0-2 hours per week obtaining information, investors spending 2 -4 hours ( $z = 2.23, p = 0.026$ ) and over 4 hours per week ( $z = 2.69, p = 0.007$ ) were significantly more likely to be overconfident at the  $<0.05$  and  $<0.01$  level. This supports the hypothesis that overconfident investors will spend more time obtaining information. For these investors, the odds of being overconfident (stating that they know investments better than others), are 2.39 times more for those who spent 2-4 hours and 3.2 times more for those who spent over 4 hours obtaining information per week, given the other variables were held constant. These findings support those of Guiso and Jappelli (2007) who found that overconfident investors spent more time conducting research than other investors.

Compared to investors who stated that they conduct less research than others, investors who stated that they conduct “about the same” ( $z = 2.05, p = 0.041$ ) or “more” ( $z = 3.95, p = 0.000$ ) research than others were significantly more likely to be overconfident at the  $<0.05$  and  $<0.01$  level. Investors who stated that they conducted “about the same” amount of research as others were 5.8 times more likely to be overconfident and those who stated that they conducted “more” research than others were 24.06 times more likely to be overconfident given the other variables are held constant. This finding is in line with the findings of Guiso and Jappelli (2007) and demonstrates that the overconfidence question is a robust measure of overconfidence, as the investors who state that they conduct more research than others are significantly more likely to be overconfident. The results of previous research would suggest that overconfidence would be significantly influenced by attitude to risk (Looney et al, 2007; Pompian and Longo, 2004). However, no significant relationship was found between overconfidence and either of the risk questions. Use of advice was also not found to have a significant impact on the likelihood of an investor being overconfident.

Time spent obtaining information and the amount of research investors stated they did were not found to have a significant impact on attitude to risk. However, attitude to risk was found to have a significant relationship with risk aversion and use of advice. Investors who



were risk averse, stated that they view risk as an uncertain event from which one should seek protection, were significantly less likely to have a high attitude to risk ( $z = -4.47$ ,  $p = 0.000$ ). This finding provides evidence that the results of the attitude to risk questions are robust and supports the findings of Guiso, Paiella and Visco (2006) who found both risk measures to be highly correlated. This finding also shows that the observed contradictions between the answers to the risk aversion and attitude to risk questions were not significant.

Although use of advice did not have a significant relationship with the amount of research investors stated they did, time spent obtaining information or risk aversion, it did have a significant impact on attitude to risk. Investors who currently have a financial adviser were significantly more likely to have a low attitude to risk ( $z = -2.99$ ,  $p = 0.003$ ) compared to investors who have always made their own decisions. The odds of investors who currently have a financial adviser having a high attitude to risk was 0.31 times lower, versus the low and moderate attitude to risk categories combined and given the other variables are held constant. This finding was confirmed when use of advice (currently have an adviser) was regressed against a model containing the attitude to risk categories. Investors who currently have a financial adviser, were significantly less likely to have a high attitude to risk at the  $<0.05$  level.

### **7.8 How Investment Decisions Are Made**

Questions on how investment decisions are made were asked to assess use of advice and the impact of biases on investment decisions. It would be expected that investors who have a financial adviser are more likely to delegate investment decisions or consult a financial adviser and less likely to make their own investment decisions. Also, investors who spend more time obtaining information would be expected to be less likely to delegate investment decisions to a financial adviser. Previous research would also suggest that overconfident investors will be less likely to delegate investment decision to a financial adviser (Guiso and Jappeilli, 2007). These assumptions and previous findings were tested along with the impact of risk aversion, attitude to risk, sex and age on how investment decisions are made.

To ease analysis and comparisons between the questions, the answers to the investment decision questions were consolidated from “Strongly Agree/Agree/Neither Agree or Disagree/Disagree/Strongly Disagree” to just “Agree/Neither Agree nor Disagree/Disagree”. The consolidated answers are shown in table 7.6. The results show that investors generally did not delegate their investment decisions to a financial adviser, did not rely on their gut instincts or invest in what is popular. Instead, they conducted their own research and consulted a financial adviser before making their own investment decisions.

40% of investors agreed with the statement that they consult a financial adviser but make their own decisions. This result suggests that investors may feel that they are in control of investment decisions even when they have a financial adviser. In these cases, the adviser may be being viewed as a consultant rather than a decision maker by investors. However, the number of people agreeing and disagreeing with this statement was close, with 40% agreeing and 39% disagreeing, so some caution should be taken when interpreting this result. Only 16% of investors agreed that they delegated investment decisions to a financial adviser. These findings support those of Guiso and Jappelli (2007) who also found that a small number of respondents (12%) delegated their investment decisions to a financial adviser, but the majority (58%) agreed that they would consult a financial adviser when making investment decisions.

The finding that only 7% of respondents stated that they invest in what’s popular also suggests that investors are not aware of the biases, which may influence their behaviour and decision making. The results of the analysis on buy and sell trades in Section 6 would suggest that investors do invest in what is popular, as certain investments were found to attract a large proportion of the money invested. This finding would support previous studies that have found investors to not be aware of the subconscious biases that influence their investment decisions (Kahneman, 2011; Kahneman and Klein, 2009; Shefrin and Thaler, 1988)

**Table 7.6 - Summary of Investment Decision Questions and Consolidated Answers Split by Total Results, Male and Female**

<b>Question and Responses</b>	<b>Total</b>	<b>Male</b>	<b>Female</b>
<b>When making investment decisions I delegate decisions to a financial adviser</b>			
Agree	15.9%	15.5%	18.2%
Neither agree nor disagree	18.4%	18.4%	18.2%
Disagree	65.7%	66.1%	63.6%
<b>When making investment decisions I consult a financial adviser but make my own investment decisions</b>			
Agree	39.9%	37.7%	51.5%
Neither agree nor disagree	20.7%	20.0%	24.2%
Disagree	39.4%	42.3%	24.2%
<b>When making investment decisions I rely on my gut instincts</b>			
Agree	20.4%	17.8%	34.4%
Neither agree nor disagree	32%	33.9%	21.9%
Disagree	47.6%	48.3%	43.8%
<b>When making investment decisions I do my own research</b>			
Agree	67.1%	66.7%	69.7%
Neither agree nor disagree	19.3%	19.0%	21.2%
Disagree	13.5%	14.4%	9.1%
<b>When making investment decisions I invest in what's popular</b>			
Agree	7.2%	5.7%	15.2%
Neither agree nor disagree	45.7%	46.3%	42.4%
Disagree	47.1%	48.0%	42.4%

Compared to men, women were more likely to use a financial adviser, with 52% stating that they consult a financial adviser before making an investment decision, compared to 38% of men. Women were also more likely to rely on their gut instincts (34% vs 18%) and invest in what's popular (15% vs 6%). These results suggest that women may benefit more from financial advice as an adviser would be expected to prevent investments being made on gut instincts or investing in what's popular.

The differences between the use of a financial adviser for men and women, when asked how investment decisions are made, tends to contradict the results of the direct question about whether the investor has a financial adviser. For this question, the results for men and women were very similar. 42% of men and women stated that they currently have a financial adviser, but when asked about how investment decisions are made, 52% of women and just 38% of men said that they consult a financial adviser before making their own investment decisions. This could be due to the fact that men make some decisions on their own and some after consulting with an adviser. The difference could also be due to the investors thinking about how they make future decisions or how they have made decision in the past.

Logistic regression analyses were run to test the significance of the impact sex had on the answers to the investment decision questions. Investors who stated that they "agree" ( $z = 2.19, p = 0.029$ ) and "neither agreed nor disagree" ( $z = 1.99, p = 0.047$ ) that they consult a financial adviser before investing were significantly more likely to be female, when compared to investors who stated that they "disagree" with the statement. A significant relationship was also identified between women and investing in what's popular. Investors who stated that they agreed with the statement that they invest in what's popular were significantly more likely to be female ( $z = 2.09, p = 0.037$ ), when compared to those who disagreed with the statement. No other significant relationships were found between sex and the answers to the 'how investment decisions are made' questions.

Ordered Logistic Regressions revealed a significant negative relationship between investors agreeing with the statement "When making investment decisions I do my own research" and the age groups. The results show that investors who agreed with this statement were

significantly more likely to be in the lower age group ( $z = -2.19, p = 0.028$ ) when compared to those who disagreed with the statement. These findings support, and also provide further insights into, the impact age has on investment decisions. The results of the attitude to risk question identified a significant negative relationship between attitude to risk and age, showing that older investors are significantly more likely to have a low attitude to risk. This may help to explain why older investors are less likely to do their own research.

To gain a deeper understanding of how investment decisions are made investors were asked to choose, based on the statements used in the previous question, which one statement best described how they make investment decisions. Table 7.7 shows the total results for all investors and also for male and female investors.

**Table 7.7 – How Investment Decisions Are Made Split by Total Results, Male and Female**

<b>Which one of the following best describes how you make investment decisions?</b>	<b>Total</b>	<b>Male</b>	<b>Female</b>
<b>I consult a financial adviser but make my own investment decisions</b>	35.0%	34.1%	39.4%
<b>I delegate decisions to a financial adviser</b>	7.3%	6.9%	9.1%
<b>I do my own research</b>	52.9%	54.9%	42.4%
<b>I invest in what's popular</b>	1.0%	1.2%	0.0%
<b>I rely on my gut instincts</b>	3.9%	2.9%	9.1%

Investors stated that in order to make investment decisions, they either do their own research (52.9%) or consult a financial adviser (35%). The other options appeared to have very little impact on investment decisions. The finding that 35% of investors consult a financial adviser but make their own investment decision supports the findings noted earlier, where 40% of investors agreed with the statement that they consult a financial adviser before making their own investment decision. Taken with the result that only 7.3% of investors delegate their investment decisions to a financial adviser, this suggests that, as noted earlier, investors see financial advisers as consultants and consider themselves to be

fully responsible for making the investment decision, even if they do utilise the services of a financial adviser.

In contrast to the individual questions, fewer women than men stated that they do their own research before making an investment decision (42.4% vs 54.9%). However, the other results tended to mirror those of the individual questions with women being more likely to utilise the services of a financial adviser (39.4% vs 34.1%) and being more likely to rely on their gut instincts when making investment decisions (9.1% vs 2.9%). Logistic Regression analysis found that the differences observed between how male and female investors answered this question were not significant.

As investors get older they are much more likely to use a financial adviser, with 41.9% of the 66 years plus age group stating that they consult a financial adviser before making an investment decision, compared to 15.8% for the 45 years and below age group. In addition, 11.4% of investors aged 66 years and over delegate the decision to a financial adviser. This compares to no investors choosing this option in the 45 years and below age group. Older investors are also far less likely to do their own research (68.4% of the 45 years and below age group compared to 41% of the 66 years and above age group). Older investors also tended to rely less on their gut instincts and were less likely to invest in what's popular. This finding contradicts the findings of the UK regulator, the FCA (2016), who found that as individuals age, they rely more on gut instincts and rules of thumb rather than on well-reasoned, considered judgements. However, this relationship was not found to be significant.

Observed differences between use of financial advice and age were found to be significant at the <0.05 level. Compared to investors who stated that they prefer to do their own research, investors who stated that they consult a financial adviser ( $z = 2.93$ ,  $p = 0.003$ ) or delegate their investment decisions to one ( $z = 2.81$ ,  $p = 0.005$ ) were significantly more likely to be in the higher age group. Conversely, when compared to investors who stated that they delegate investment decisions to a financial adviser, investors who stated that they do their own research were significantly less likely to be in the higher age group ( $z = -2.81$ ,  $p = 0.005$ ).

A number of regressions were conducted to assess the impact of personality traits on how investment decisions are made. Ordered Logistic Regressions on the individual questions revealed that investors who were more extroverted were more likely to consult a financial adviser but make their own financial decisions ( $z = 2.80, p = 0.038$ ). Investors who were lower in emotional stability were less likely to invest in what's popular ( $z = -2.17, p = 0.030$ ). Regressions on the combined questions revealed that low levels of extroversion were significantly correlated with investing in what's popular when compared to all other answers at the  $<0.005$  level. When compared to investors who delegate their investment decisions to a financial adviser, investors who rely on gut instinct ( $z = -2.05, p = 0.042$ ) and invest in what's popular ( $z = -1.98, p = 0.049$ ) were significantly more likely to have lower levels of conscientiousness.

The impact of time spent obtaining information, research, overconfidence, risk aversion, attitude to risk and use of advice on how investment decisions are made was analysed through further regressions and analysis. Each of the above variables were regressed against a model containing the answers to the question in which investors had to choose one statement which best described how they make investment decisions (table 7.8). The results found were generally what would be expected, which suggests that the results and the measures are robust.

**Table 7.8 – Regression Analysis of How Investment Decisions Are Made (Single Question)**

	Dependent Variable				
	Overconfidence (obs = 211, R <sup>2</sup> = 0.03)	Time Spent Obtaining Information (obs = 208, R <sup>2</sup> = 0.03)	Research (obs = 206, R <sup>2</sup> = 0.08)	Risk Aversion (obs = 205, R <sup>2</sup> = 0.02)	Attitude to Risk (obs = 209, R <sup>2</sup> = 0.07)
	<b>Compared to “I delegate decisions to a financial adviser”</b>				
I rely on my gut instincts	0.90	1.49	0.66	1.54	0.31
I do my own research	2.14*	2.83**	4.10**	-0.39	2.76**
I consult a financial adviser but make my own investment decisions	2.25*	2.04 *	3.77**	0.37	0.30
I invest in what’s popular	-	-13.57**	2.51*	-	1.64

The table shows the Logistic Regression Analysis Z stats. \*\*, \* denote significance at 1%, and 5% levels respectively.



It could be expected that investors who agreed that they make investment decisions based on their gut instincts would be significantly more likely to be overconfident (Daniel, Hirshleifer and Subrahmanyam, 1998, 2001). However, no significant relationship was found between investors who stated that they make investment decisions by relying on their gut instincts and overconfidence, when compared to investors who delegate their investment decisions to a financial adviser. Also, investors who relied on their gut instincts when making investment decisions did not spend significantly more time obtaining information, did not state that they do more research than others and had no significant differences in risk aversion or attitude to risk, when compared to investors who delegate their investment decisions to a financial adviser.

Investors who stated that they conduct their own research were significantly more likely to be overconfident, spend more time obtaining information, state that they do more research than others and have a higher attitude to risk, compared to those who stated that they delegate their investment decisions to a financial adviser. No significant relationship was found between investors who stated that they conduct their own research and risk aversion, when compared to investors who delegate their investment decisions to a financial adviser. The finding that investors who conduct their own research were significantly more likely to state that they do more research than others adds supports for the validity and robustness of the questions.

Investors who consult a financial adviser but make their own investment decisions were significantly more likely to be overconfident, spent more time obtaining information and stated that they conducted more research than others, when compared to investors who delegate their investment decisions to a financial adviser. When compared to investors who delegate their investment decisions to a financial adviser, no significant relationship was found between investors who consult a financial adviser but make their own investment decisions and risk aversion and attitude to risk. The results for investors who consult a financial adviser but make their own investment decisions and investors who make their own investment decisions were very similar, the only difference was that investors who consulted an adviser were not significantly more likely to have a high attitude to risk. It may be that the adviser is helping to manage risk for these investors.

When investors were asked the individual questions about how investment decisions are made, (results not shown in the regression table) investors who agreed with the statement that they delegate investment decisions to a financial adviser and those who agreed that they consult a financial adviser but make their own financial decisions, were significantly less likely to have a high attitude to risk compared to investors that disagreed with these statements ( $z = -2.08, p = 0.037, z = -2.66, p = 0.008$ ). This finding was further supported when investors were asked to choose one statement which best described how they make investment decisions. Compared to those who do their own research, investors who consult a financial adviser but make their own investment decisions and those who delegate investment decisions to a financial adviser were again found to be significantly less likely to have a high attitude to risk ( $z = -3.92, p = 0.000, z = -2.76, p = 0.006$ ). This shows that investors who utilise the services of a financial adviser have a lower attitude to risk. Investors who invest in what's popular were likely to spend significantly less time obtaining information but significantly more likely to state that they do more research than others, ( $z = -13.57, p = 0.000$ ) when compared to investors who delegate investment decisions to a financial adviser. No significant relationship with attitude to risk was identified, when compared to investors who delegate investment decisions to a financial adviser.

Further regressions, that are not shown in the regression table, were conducted which identified some additional findings. Investors who stated that they rely on gut instincts were significantly more likely to be risk averse compared to investors who do their own research ( $z = 2.04, p = 0.041$ ). This finding suggests that investors who are using high risk strategies are not aware of the risk of doing this. They are significantly more likely to be risk averse but are relying on a high risk strategy, using their gut instincts. No other significant relationship was found between risk aversion and the answers to the questions around how investment decisions are made.

To more accurately assess the relationship between advice and how investment decisions are made, investors who have always made their own investment decisions and those who previously had a financial adviser but now make their own investment decisions were combined. When the results of the individual questions around how investment decisions

are made were regressed against use of advice the results show that investors who agreed with the statement that they invest in what's popular were significantly less likely to have a financial adviser, compared to investors who neither agreed or disagreed with the statement ( $z = -2.18, p = 0.029$ ). As would be expected, investors who agreed that they consult a financial adviser but make their own investment decisions were significantly more likely to have a financial adviser ( $z = 3.83, p = 0.000$ ). Those who disagreed were significantly less likely to have a financial adviser ( $z = -2.18, p = 0.029$ ), when compared to investors who neither agreed nor disagreed with the statement. Investors who disagreed that they delegate investment decisions to a financial adviser were significantly less likely to have a financial adviser ( $-2.11, p = 0.035$ ) when compared to investors who neither agreed nor disagreed with the statement.

Investors who agreed with the statement that they make investment decisions by doing their own research were significantly less likely to have a financial adviser, compared to those who neither agreed nor disagreed with the statement ( $z = -2.37, p = 0.018$ ). This finding was further supported when investors were asked to choose one statement which best described how they make investment decisions. Compared to investors who consult a financial adviser but make their own investment decisions, investors who do their own research were significantly less likely to have a financial adviser ( $z = -8.33, p = 0.000$ ). Investors who stated that they rely on their gut instincts to make investment decisions were significantly less likely to have a financial adviser, compared to investors who consult a financial adviser but make their own investment decisions ( $z = -2.91, p = 0.004$ ).

These results are to be expected, as investors who rely on what's popular, their gut instincts or doing their own research to make investment decisions would be expected to not utilise the services of a financial adviser. The finding that investors who make investment decisions using their gut instincts (compared to investors who consult a financial adviser) or by investing in what's popular (compared to investors who neither agreed nor disagreed with the statement) were significantly less likely to have a financial adviser does suggest that financial advice reduces biases and investment decisions being made using system 1.

## 7.9 Use of Financial Advice

Of the sample, 42% (87) of investors stated that they currently had a financial adviser, 35% (73) had always made their own investment decisions and 22% (46) had previously had a financial adviser but now make their own investment decisions. Younger investors tended to not use the services of a financial adviser (or have not previously used one.) Older investors were more likely to use a financial adviser or had used one in the past and were less likely to have always made their own decisions (table 7.1). This supports the earlier findings around how investment decisions are made, which also found that older investors were significantly more likely to use a financial adviser. To assess the relationship between age and use of advice further, a number of regressions were conducted. To gain further insights into the impact of age on the use of advice and remove any issues with sample size in each group, the answers to the use of financial advice question were consolidated into two groups. The two groups were “have a financial adviser” and “do not have a financial adviser” which incorporated investors who have always made their own investment decisions and those who previously had a financial adviser but now make their own investment decisions. As the combined grouping resulted in a binary dependent variable, Logistic Regressions were run.

The Logistic Regression analysis revealed that, compared to investors 66 years and over, investors in the 46-65 years age group and those in the 45 years and below age group were significantly less likely to have a financial adviser ( $z = -3.13, p = 0.002, z = -3.09, p = 0.002$ ). Although women were found to be significantly more likely to consult a financial adviser before investing, no significant relationship was found between use of advice, investors stating that they currently have a financial adviser, and sex. Income and investable assets were also not significantly correlated with use of advice. These findings are in contrast to previous studies on financial advice that have found sex, income and investable assets to be significantly correlated with use of advice (Bluethgen et al, 2008; Finke, Huston and Winchester, 2002; Guiso and Jappelli, 2007; Hackethal, Haliassos and Jappelli, 2011).

Only education level had a significant relationship with use of advice. Compared to investors who had achieved a post graduate qualification, investors whose highest level of education was a college qualification were significantly more likely to have a financial adviser ( $z = 2.42, p = 0.016$ ). This is an interesting finding as it shows that investors who are highly educated

(university and postgraduate qualifications) and those with lower education levels (high school qualification) were not significantly more or less likely to have a financial adviser. It is only those with a moderate level of education that do.

Table 7.2 shows that investors who have always made their own investment decisions, rather than utilising the services of a financial adviser, are less extroverted and agreeable. However, only the difference observed in levels of extroversion were significantly correlated with use of advice. Investors who were more extroverted were significantly more likely to have a financial adviser ( $z = 2.18$   $p = 0.030$ ). This may be because investors who are less extroverted are less outgoing, cooperative and social and, therefore, less likely to utilise the services of a financial adviser (Charles and Kasilingam, 2015; Pak and Mahmood, 2015; Sadi et al, 2010). The other personality scores between investors who had an adviser, had previously had an adviser and those who made their own decisions were very similar and no significant differences were found.

No significant relationship was found between the unconsolidated advice measure and the amount of research an investor stated they did. However, when the relationship between the consolidated advice measure and the amount of research an investor stated they did was analysed a significant relationship was identified. Investors who stated that they did more research than others were significantly less likely to have a financial adviser, when compared to investors who stated that they did less research than others (table 7.4). This finding makes sense, as the investors who do their own research would be expected to be less likely to have a financial adviser and pay for someone else to do the research for them. Investors with a high attitude to risk were also significantly less likely to have a financial adviser when compared to investors who had a low attitude to risk and when investors who currently have a financial adviser were compared to investors who have always made their own investment decisions.

Although no significant relationship was found between the consolidated advice and overconfidence measures, use of advice was found to have a significant relationship with the overconfidence measure that included the three categories of “Better”, “About the Same” and “Worse”. Investors who stated that they knew investments about the same as others ( $z$

= 2.33,  $p = 0.020$ ) and those who stated that they knew investments better than others - overconfident investors - ( $z = 2.33$ ,  $p = 0.020$ ) were significantly more likely to have a financial adviser, when compared to investors who stated that they knew investments worse than others. This finding shows that investors who thought that their knowledge of investments was worse than others were less likely to have a financial adviser.

### **7.10 Benefits of Financial Advice**

In order to explore the perceived benefits of financial advice, investors were asked to indicate how strongly they agree or disagree with a number of benefits associated with financial advice. To aid the analysis, the results of the benefits of advice questions were consolidated from “strongly agree/agree/neither agree or disagree/disagree/strongly disagree” to “agree”, “neither agree or disagree” and “disagree”. Table 7.9 shows the total results across all investors and for men and women.

**Table 7.9 – Benefits of Financial Advice (Individual Questions) and Answers Split by Total Responses, Male and Female**

Question and Responses	Total	Male	Female	45 Years and Below	46-65 Years	66 Years Plus
<b>A financial adviser gives me peace of mind</b>						
Agree	36%	35%	39%	16%	33%	43%
Neither agree nor disagree	34%	33%	42%	37%	30%	38%
Disagree	30%	32%	19%	47%	38%	20%
<b>A financial adviser will help me to achieve higher investment returns</b>						
Agree	38%	36%	50%	26%	34%	44%
Neither agree nor disagree	38%	38%	38%	42%	39%	34%
Disagree	25%	27%	13%	32%	28%	22%
<b>A financial adviser allows me to delegate investment decisions</b>						
Agree	39%	38%	44%	47%	40%	38%
Neither agree nor disagree	39%	40%	38%	42%	33%	45%
Disagree	22%	22%	19%	11%	28%	18%
<b>A financial adviser helps me ensure that I hold a diversified investment portfolio</b>						
Agree	65%	66%	56%	37%	64%	70%
Neither agree nor disagree	28%	26%	41%	58%	26%	25%

Disagree	8%	8%	3%	5%	10%	6%
<b>A financial adviser provides me with support</b>						
Agree	57%	59%	50%	32%	53%	65%
Neither agree nor disagree	31%	28%	44%	53%	35%	24%
Disagree	12%	13%	6%	16%	13%	11%
<b>A financial adviser helps me to not worry about my investments</b>						
Agree	30%	30%	34%	16%	28%	35%
Neither agree nor disagree	36%	36%	38%	32%	35%	38%
Disagree	34%	35%	28%	53%	38%	27%
<b>A financial adviser helps me to understand investments</b>						
Agree	60%	60%	59%	47%	60%	63%
Neither agree nor disagree	29%	29%	25%	37%	25%	29%
Disagree	12%	11%	16%	16%	15%	8%



The benefits of financial advice that most investors agreed with were that a financial adviser ensures that a diversified portfolio is held (65%), helps with understanding investments (60%) and provides support (57%). Although the difference between those who agreed and disagreed with the statement was much closer, the majority of respondents did also agree that a financial adviser helps to achieve higher investment returns (38% vs 25%). A similar split was observed for financial advisers allowing investors to delegate investment decisions (39% vs 22%). The differences between responses were very minor for the other benefits.

When the responses by men and women were compared, the largest difference was observed for the statement, "A financial adviser will help me to achieve higher investment returns". 52% of women agreed with this statement compared to 37% of men. A Logistic Regression confirmed that this relationship was significant, investors who agreed that a financial adviser helps to achieve higher returns were significantly more likely to be female ( $z = 2.25, p = 0.025$ ), compared to investors who disagreed with the statement. Also, investors who disagreed that a financial adviser helps to understand investments were more likely to be female ( $z = 2.46, p = 0.014$ ), when compared to investors who neither agreed or disagreed with the statement. No other significant relationships were found between sex and the benefits of advice.

As investors age, their views on the benefits of financial advice change. A higher percentage of older investors felt that financial advisers provide peace of mind, help to achieve higher investment returns, hold a diversified investment portfolio, allow investment decisions to be delegated, provide support and prevent worry. These findings could be expected, as the results have already indicated that older investors are more likely to have a financial adviser and will, therefore, have more experience of advice and be more aware of the benefits. An Ordered Logistic Regression analysis revealed that investors who agreed with the statement "A financial adviser allows me to delegate investment decisions" were significantly more likely to be younger, compared to investors who neither agreed nor disagreed with the statement ( $z = -2.16, p = 0.031$ ). Investors who agreed with the statement "A financial adviser helps me to understand investments" were also significantly more likely to be younger, compared to investors who neither agreed or disagreed with the statement ( $z = -2.45, p = 0.014$ ).

Average personality trait scores varied across answers to the benefits of financial advice questions. To explore this relationship further a number of regressions were run. Firstly, each individual question regarding the benefits of advice was regressed against all five personality traits using an Ordered Logistic Regression. These regressions revealed that more extroverted investors were significantly more likely to agree with the statement “A financial adviser will help me to achieve higher investment returns” ( $z = 2.67, p = 0.008$ ) and those who scored highly in openness to experiences were significantly less likely to agree with this statement ( $z = -2.36, p = 0.019$ ). Investors who scored more highly in agreeableness were found to be significantly more likely to agree with the statement “A financial adviser helps me to not worry about my investments” ( $z = 2.04, p = 0.041$ ).

Following the initial Ordered Logistic Regressions, further Linear Regressions were run to gain further insights into the relationship between personality traits and the benefits of advice. All five personality traits were regressed against each individual question on the benefits of advice.

Dealing with each personality trait in turn, the results found that investors who disagreed with the statement “A financial adviser helps me to not worry about my investments” were significantly less likely to be extroverted, compared to those who neither agreed or disagreed with the statement ( $t = -2.35, p = 0.020$ ). Although extroversion was initially found to have a significant relationship with the statement “A financial adviser will help me to achieve higher investment returns”, no significant relationship was found when the specific answers to the question were analysed. Extroversion was not found to have a significant impact on any of the other statements on the benefits of financial advice.

Agreeableness only had a significant impact on the answers to the statement “A financial adviser helps me to not worry about my investments”. Investors who agreed with this statement were significantly more likely to be agreeable, compared to investors who disagreed with the statement ( $t = 2.35, p = 0.020$ ). This finding mirrors that of the initial regression. Conscientiousness had a significant impact on the answers to the question around diversification. Investors who agreed with the statement “A financial adviser helps

me ensure that I hold a diversified investment portfolio” were significantly less likely to score highly on conscientiousness, compared to investors who disagreed with the statement ( $t = -2.36, p = 0.019$ ). Emotional stability was not found to have any impact on investors views on the benefits of advice.

The personality trait which had the largest impact on the answers to the questions around the benefit of financial advice was openness to experiences. Investors who disagreed with the statement that “A financial adviser gives me peace of mind” were significantly more likely to score highly in openness to experiences compared to those who neither agreed nor disagreed with the statement ( $t = 2.20, p = 0.029$ ). Investors who agreed with the statement “A financial adviser helps me ensure that I hold a diversified investment portfolio” were also significantly more open to experiences compared to those who neither agreed nor disagreed with the statement ( $t = 2.11, 0.037$ ).

The statement “A financial adviser provides me with support” produced some interesting results, with investors that agreed, and also those that disagreed, with this statement being significantly less open to experiences when compared to investors who neither agreed or disagreed ( $t = -2.20, p = 0.029$ ;  $t = -3.46, p = 0.001$ ). Openness to experiences also had a significant impact on investors who agreed with the statement “A financial adviser will help me to achieve higher investment returns”. Investors who agreed with this statement were significantly less likely to be open to experiences, compared to those who disagreed with the statement ( $t = -2.09, p = 0.039$ ).

Investors who had a financial adviser agreed more with each benefit of advice, compared to investors who have always made their own investment decisions and those who previously had an adviser but now make their own investment decisions. These results could be expected as investors who agree with the benefits are currently paying for financial advice. For investors who currently have an adviser the main benefits were helping to hold a diversified portfolio with 96% of investors who currently have an adviser agreeing with this statement. This was closely followed by providing support (84%), helping to understand investments (73%), achieving a higher investment return (71%) and peace of mind (62%).

Preventing worry (49%) and delegating investment decisions (46%) were the benefits that fewer investors who currently received financial advice agreed with.

The benefit which most investors who have always made their own decisions agreed with was “A financial adviser helps to understand investments” (53%). Helping to ensure a diversified portfolio is held was the second highest benefit (42%), followed by allowing investment decisions to be delegated (37%) and providing support (36%). Very few investors in this group felt that a financial adviser helped to achieve higher returns (15%), gave peace of mind (19%) or prevented worry (14%). The results for investors who previously had a financial adviser but now make their own investment decisions were very similar to those who have always made their own investment decisions. Across all groups, the main benefit of financial advice was “A financial adviser helps to ensure that a diversified investment portfolio is held”.

A regression analysis, table 7.10, revealed that investors who agreed that financial advisers helped to achieve higher returns were significantly more likely to have a financial adviser compared to investors who disagreed ( $z = 2.87, p = 0.004$ ). In a separate regression, not shown in the regression table, investors who agreed with the statement “A financial adviser helps me ensure that I hold a diversified investment portfolio” were also significantly more likely to have a financial adviser compared to those who neither agreed nor disagreed with that statement ( $z = 3.89, p = 0.000$ ).

These results are to be expected, investors who have a financial adviser should see the benefits of having one. However, one result demonstrated that having a financial advisor did not mean that all of the benefits are benefits that the investors feels they are receiving. Investors who agreed that “A financial adviser helps to understand investments” were significantly less likely to have a financial adviser when compared to investors who disagreed with this statement ( $z = -2.54, p = 0.011$ ). This shows that investors who did not currently have a financial adviser saw increasing understanding of investments as being a benefit of advice, however those who currently had an adviser did not feel that this was a benefit or was not a benefit that they received. No significant relationship was found between investors who had a financial adviser and a financial adviser preventing worry, allowing

investment decisions to be delegated, providing support or peace of mind. This suggests that investors who had a financial adviser either did not consider these things as benefits, or did not feel that they receive these from their adviser.

**Table 7.10 – Logistic Regression Analysis – Use of Advice as the Dependent Variable and Benefits of Financial Advice (Individual Questions) as the Independent Variable**

		Dependent Variable					
		Overconfidence (obs = 184, R <sup>2</sup> = 0.08)	Time Spent Obtaining Information (obs = 183, R <sup>2</sup> = 0.10)	Research (obs = 182, R <sup>2</sup> = 0.05)	Risk Aversion (obs = 183, R <sup>2</sup> = 0.10)	Attitude to Risk (obs = 184, R <sup>2</sup> = 0.09)	Use of Advice (obs = 168, R <sup>2</sup> = 0.43)
<b>Compared to Disagree</b>							
A financial adviser gives me peace of mind	Neither Agree nor Disagree	1.87	-0.33	0.53	1.10	-1.40	0.64
	Agree	2.21*	0.46	1.03	0.56	-1.50	0.60
A financial adviser provides me with support	Neither Agree nor Disagree	-1.30	2.10*	-1.33	0.20	-0.66	1.19
	Agree	-1.11	2.73**	0.26	0.34	1.21	1.87
A financial adviser helps me to not worry about my investments	Neither Agree nor Disagree	2.03*	0.67	1.25	-1.22	0.97	0.62
	Agree	0.73	0.68	-0.08	0.93	-0.72	1.32
A financial adviser helps me to understand investments	Neither Agree nor Disagree	-0.26	0.77	-1.09	-0.48	0.28	-1.42
	Agree	-0.25	-0.04	-0.42	-0.65	-0.24	-2.54*

A financial adviser will help me to achieve higher investment returns	Neither Agree nor Disagree	-2.50*	-2.83**	0.85	1.70	-1.99*	0.40
	Agree	-2.79**	-3.24**	-1.17	0.26	-1.42	2.87**
A financial adviser allows me to delegate investment decisions	Neither Agree nor Disagree	-1.57	-0.17	-0.44	1.50	-0.67	1.93
	Agree	-1.56	-2.41*	-0.66	0.28	-0.25	0.12
A financial adviser helps me ensure that I hold a diversified investment portfolio	Neither Agree nor Disagree	0.11	-0.10	-0.64	-1.61	0.47	-
	Agree	0.21	-0.08	1.21	-0.82	0.32	-

The table shows the Logistic Regression Analysis Z stats. \*\*, \* denote significance at 1%, and 5% levels respectively.

Investors who agreed, and also those who neither agreed nor disagreed, that a financial adviser helps to achieve higher investment returns were significantly more likely to spend less time obtaining information before investing, when compared to investors who disagreed with these statements ( $z = -3.24, p = 0.001, z = -2.83, p = 0.005$ ). This was also true for investors who agreed that a financial adviser enables investment decisions to be delegated, when compared to investors who disagreed with these statements ( $z = -2.41, p = 0.016$ ). Investors who agreed with the statements “A financial adviser provides me with support”, and also those who neither agreed nor disagreed with this statement, were significantly more likely to spend more time obtaining information ( $z = 2.73, p = 0.006, z = 2.10, p = 0.036$ ).

Investors who agreed that a financial adviser gives peace of mind were significantly more likely to be overconfident, when compared to investors who disagreed with this statement ( $z = 2.21, p = 0.027$ ). Investors who agreed that “A financial adviser helps to achieve higher investment returns” and those who neither agreed nor disagreed, were significantly less likely to be overconfident, when compared to investors who disagreed with this statement ( $z = -2.79, p = 0.005, z = -2.50, p = 0.012$ ). This shows that overconfident investors feel that a financial adviser does not help investors to achieve higher returns. In a separate regression, not shown in the regression table, investors who disagreed with the statement “A financial adviser helps me to not worry about my investments” were significantly less likely to be overconfident when compared to those who neither agreed nor disagreed with the statement ( $z = -2.03, p = 0.042$ ).

Given the significant relationships identified between overconfidence and the benefits of financial advice questions, it could be expected that how much research investors stated they do compared to others would also have a similar impact on these questions. However, this was not the case. The amount of research investors stated they do compared to others had very little impact on the answers to the questions. This was also the case for risk aversion, which did not have a significant impact on the benefits of advice questions. Attitude to risk also had very little impact. The only significant relationship was with a financial adviser helping to achieve higher investment returns. Investors who neither agreed



nor disagreed with this statement were significantly less likely to have a high attitude to risk, compared to investors who disagreed with this statement ( $z = -1.99$ ,  $p = 0.046$ ).

### **7.11 Survey Data Discussion**

Although trade data provides useful insights into investor behaviour and investment decisions, reasons for the observed behaviour can only be inferred from the results. Therefore, a survey was conducted with a sample of the same investors to specifically measure key variables such as the amount of time spent obtaining information, overconfidence, risk aversion and attitude to risk and assess how they impact upon one another. In addition, specific questions focused on how investment decisions are made and the benefits of financial advice.

#### **7.11.1 Research**

The majority of investors spent less than four hours obtaining information on how to invest each week. The question around how much research investors felt they did compared to others revealed that those who stated that they do more research than others actually did spend more time obtaining information. The research question and the amount of time spent obtaining information were further expanded upon when investors were specifically asked how they make investment decisions. Unsurprisingly, investors who make investment decisions by conducting their own research were significantly more likely to state that they do more research than others. Also, as would be expected, investors who invest in what's popular spent less time obtaining information. However, these investors were significantly more likely to state that they conduct more research than others. This could suggest that these investors were overconfident, however, no significant relationship was found between investors who invest in what's popular and overconfidence.

#### **7.11.2 Attitude to Risk**

Investors generally had a high tolerance for risk, the majority of investors were not risk averse and had at least a moderate attitude to risk. Unsurprisingly both risk questions, risk aversion and attitude to risk, were found to have a significant impact on one another.

Investors who were risk averse, stated that they view risk as an uncertain event from which one should seek protection, were significantly less likely to have a high attitude to risk.

Despite the significant relationship between attitude to risk and risk aversion a clear inconsistency was identified. 39% of investors stated that they are risk averse, they viewed risk as uncertain event from which one should seek protection, however only 7% were willing to take a lower risk and low return with their investments. Based on the results of the risk aversion question, a much higher percentage of investors would have been expected to have a low attitude to risk. This finding is in line with the results of Guiso and Jappelli (2007) who found that only 19% of respondents in their study selected “low risk and no risk” but 71% stated that risk “was an uncertain event from which one should seek protection”. Further inconsistencies were observed when investors were asked how they make investment decisions. Investors who stated that they make investment decisions by relying on their gut instinct were significantly more likely to be risk averse compared to investors who made decisions by doing their own research.

No significant relationship was found between attitude to risk and personality traits. However, investors who were more agreeable were significantly more likely to be risk averse. This finding contrasts those of Weller and Tikir (2011) who found that emotionality, which reflects low emotional stability without anger, and conscientiousness to have a significant impact on risk perceptions. However, the results of a study by Pak and Mahmood (2015) are partly supported. They found that agreeableness had a significant, negative correlation with risk tolerance but they also found openness to experience to have a significant positive correlation, which was not supported.

### **7.11.3 Overconfidence**

The majority of investors were found to be overconfident, with 47% stating that, compared to other people who have a similar level of financial experience and knowledge, they know investments better. Only 7% stated that they knew investments worse than others.

None of the personality traits were found to have a significant impact on overconfidence, disproving the hypothesis that investors scoring more highly in extroversion will be more overconfident. Attitude to risk also did not have a significant impact on overconfidence. The hypothesis that overconfident investors will spend more time obtaining information was supported.

Investors who do their own research were significantly more likely to be overconfident supporting the findings of Daniel, Hirshleifer and Subrahmanyam (1998, 2001). However, in contrast a study by the FCA (2021), no significant relationship was found between investors who stated that they rely on gut instincts when making investment decisions and overconfidence. Also, no significant relationship was found between relying on gut instincts and the amount of research investors said they did, the amount of time they spent obtaining information, risk aversion or attitude to risk.

#### **7.11.5 The Impact of Demographics on How Investment Decisions Are Made**

Compared to investors who went to university, investors who did not finish school and investors whose highest level of education was college were significantly less likely to have a high attitude to risk. This shows that investors level of education has an impact on their attitude to risk, with less educated investors having a lower attitude to risk. Although it may be expected that more educated investors also earn more money and have more money in savings, no significant relationship was found between attitude to risk and income or investable assets. In contrast to the many studies that have analysed the impact of overconfidence on investment decisions (Barber and Odean, 2001; Dittrich, Guth and Maciejovsky, 2001; Finke, Howe and Huston, 2011; Guiso and Jappelli, 2007; Looney et al, 2007; Pompian and Longo, 2004), overconfidence was not found to be significantly influenced by any of the dummy variables (age, sex, education, income, asset and assets under management).

Female investors were more extroverted than men supporting the findings of Durand, Newby and Sanghani (2008) who also found that women placed fewer trades, which is also supported by the results of the trade data analysis, Section 6. Despite the similar findings of these two studies, previous studies on extroversion and female investment behaviour

contrast these results. High levels of extroversion have been linked to higher levels of risk taking and overconfidence (Pompian and Longo, 2004; Sadi et al, 2011) and female investors have been found to have a lower tolerance for risk (Looney et al, 2007; Pak and Mahmood, 2015; Pompian and Longo, 2004). Generally, neither of these findings are supported as women were found to place fewer trades than men and no significant differences in overconfidence, attitude to risk and risk aversion were identified. The trade data analysed in Section 6 shows that women did hold a higher percentage of their portfolio in low and medium risk assets and less in higher risk assets, which provides some limited support for the findings of previous studies that found that women have a lower risk tolerance. These differences in the risk levels of assets held did not lead to any significant differences in volatility or risk adjusted returns, Sharpe Ratio. When making investment decisions, women were found to be more likely to invest in what's popular, which may explain these results. It could be that women are investing in what's popular rather than making an active choice to invest in low or medium risk investments, especially as no difference in risk aversion and attitude to risk were found.

The trade data analysed in Section 6 also found that men placed significantly more trades than women and held more investments in their portfolios. Although this was found to not significantly affect returns, male investors do have considerable time costs researching and managing these portfolios. This was supported by the finding that female investors spent less time obtaining information each week. These findings in part support those of Barber and Odean (2001) who found that men are more prone to overtrading but the finding that this leads to a lower return was not supported. The increased trading observed in male investors has often been attributed to overconfidence with many studies finding that overconfidence is higher in men (Barber and Odean, 2001; Guiso and Jappelli, 2007; Looney et al, 2007; Onsumu, 2014). A finding that was not supported as sex was not found to significantly influence overconfidence.

Overall, when the results from Section 6 and 7 are considered together they show that women achieved similar risk adjusted returns to men by spending less time obtaining information, holding fewer investments, placing fewer trades and holding portfolios that

were similar in terms of the volatility. These results show that women make more efficient investment decisions.

Younger investors have been found to overtrade and be more susceptible to biases such as overconfidence (Barber and Odean, 2001; Dittrich, Guth and Maciejovsky, 2001) and hold higher risk portfolios (FCA, 2021). The trade data analysis in Section 6 found that younger investors placed more trades, which would support this finding. The lower returns, higher attitude to risk and higher percentage held in high risk investments would suggest that younger investors are overconfident. This was partially supported by the finding that, compared to investors aged 66 years and over, investors aged 46 -65 years were significantly more likely to be overconfident. However, no significant relationship was found between investors aged 45 years and below and overconfidence and age was not found to have a significant impact on overconfidence once other variables were added to a model.

When making investment decisions younger investors were more likely to do their own research. Older investors were more likely to delegate investment decisions to a financial adviser or consult a financial adviser but make their own investment decisions. This was supported by the finding that older investors were less likely to make their own investment decisions and more likely to have a financial adviser. This finding is in-line with those of Hackethal, Haliassos and Jappelli (2011), Hoechle et al (2013) and Bluethgen et al (2008). The results of the attitude to risk question may help to explain this finding. Although age was not found to significantly influence the answers to the risk aversion question, compared to younger investors, those aged 45 years and under, older investors were more likely to have a lower attitude to risk. This was mirrored by the risk level of assets held, the trade data analysed in Section 6 found that older investors held a larger percentage of their portfolios in low and medium risk investments and less in high risk investments. Therefore, if financial advice is seen as lowering the risk of investing then this may be why older investors are more likely to use a financial advisor. This in turn would explain why younger investors are more likely to do their own research as they have a higher attitude to risk. However, it may just be that as investors age they accumulate more wealth and have more complex needs and therefore seek financial advice. Sex also had an impact on the use of advice. Women were more likely to consult a financial adviser before investing and agree that a financial

adviser helps to achieve higher returns, but they did not feel that a financial adviser helps to understand investments.

Despite many studies reporting changes in personality traits with age (Allemand, Zimprich & Hertzog, 2007; Lucas and Donnellan, 2009; Roberts et al, 2006; Scollon and Diener, 2007; Soto et al, 2011; Van den Akker et al, 2014), age was not found to have a significant impact on personality.

#### **7.11.6 How Investment Decisions Are Made**

As would be expected, investors stated that they make investment decisions in a variety of ways including consulting a financial adviser, delegating decisions to a financial adviser and doing their own research. However, the results of the question around investing in what's popular produced some interesting findings. Although the trade data analysed in Section 6 identified that a small number of investments attracted a large proportion of the money invested and buy trades placed over the observation period, only 7% of investors stated that they invest in what's popular. This finding supports those of previous studies that have found investors to not be aware of the subconscious biases that influence their investment decisions (Kahneman, 2011; Kahneman and Klein, 2009; Shefrin and Thaler, 1988).

Investing in what's popular may be driven by an investors personality as investors who were low in emotional stability were more likely to invest in what's popular. These investors will be more anxious, worry more about events that are out of their control, act less rationally and focus more on the negatives (Butrus and Witenberg, 2013; Graziano and Eisenberg, 1997; Soto et al 2011). Because of this these investors could be expected to rely more on heuristics, system 1, when making investment decisions, which makes these decisions susceptible to biases. Therefore, investors who are not emotionally stable may benefit the most from financial advice.

### **7.11.7 The Impact of Financial Advice**

Advised investors were more likely to have a low attitude to risk and less likely to have a high attitude to risk. This was mirrored by the trade data analysed in Section 6 with advised investors holding more money in low and medium risk assets and less in high risk assets. The questions around how investment decisions are made and the benefits of advice provided further support for these findings and the link between financial advice and risk. Investors who consulted a financial adviser but made their own decisions were more likely to be risk averse, seeing risk as an uncertain event from which one should seek protection, supporting the finding that advised investors are more likely to have a low attitude to risk and have a higher percentage of their portfolios invested in low and medium risk investments. This was further supported by the finding that investors who delegate investment decisions to a financial adviser, and those who consult a financial adviser but make their own decisions, were less likely to have a high attitude to risk.

In contrast to the findings of Guiso and Jappelli (2007), who found that time spent obtaining information was negatively correlated with use of advice due to investors being overconfident, no significant relationship was identified between time spent obtaining information and use of advice. However, investors who stated that they made investment decisions by consulting a financial adviser did spend significantly more time obtaining information. In addition, overconfident investors were significantly more likely to have a financial adviser (when use of advice was regressed against the unconsolidated overconfidence measure). Therefore, overconfidence not only made investors more likely to have a financial adviser but also affected how advice was consumed. Investors who made investment decisions by consulting a financial adviser but made their own investment decisions were more likely to be overconfident. In contrast, investors who delegated their investment decisions to a financial adviser were less likely to be overconfident. These results provide an insight into how overconfidence impacts upon financial advice and how it is viewed and consumed by investors. Overconfident investors see a financial adviser as a consultant, with them making the final decision, rather than seeing them as someone who they can delegate investment decisions to. This may give overconfident investors the feeling that they are in control and are making the decisions, which they can then attribute to their own ability if the investment is successful. This is supported by some of the other relationships identified between overconfidence and the benefits of financial advice.

Overconfident investors felt that a financial adviser gives peace of mind and that they do not help to achieve higher investment returns. This shows that overconfident investors see the financial adviser as supporting their investment decisions, but they are taking credit for the returns achieved.

These findings support the suggested interactions between investor sophistication and the use of advice by Hackethal and Jansen (2008). They suggest that investor sophistication may differentiate the form and quality of financial advice, with more sophisticated investors seeking support for their own analytical skills and further information that compliments their knowledge. Sophistication was defined as the extent to which an investor pays attention to their financial affairs, their financial knowledge and analytical skills. This definition is likely to mean that overconfident investors would be classified as sophisticated and it would explain why overconfident investors are more likely to have a financial adviser and are less likely to delegate investment decisions (Guiso and Jappelli, 2007). Hackethal and Jansen also suggest that less sophisticated investors will seek clear recommendations and more general guidance and should be encouraged to delegate investment decisions to the adviser. It could be sophistication that differentiates how advice is consumed by investor, with less sophisticated investors being those who are not overconfident and, therefore, delegate their investment decisions to a financial adviser.

Willingness to pay for advice involves the individual assessing the added value the advice will bring compared to what the individual could achieve on their own, with the amount paid for advice equal to the value added (Godek and Murray, 2008). Many studies have suggested that financial advisers have access to better quality information (Guiso and Jappelli, 2007; Ivkovic, and Weisbenner, 2005; Ivkovic, Sialm and Weisbenner, 2008; Massa and Simonov, 2006). It may be that overconfident investors realise this added value that advice will bring and, therefore, they are willing to pay for and seek advice, they just see themselves as making the decisions and attribute excess returns to their own ability.

Advice appears to prevent investment decisions being made using system 1. Investors who make investment decisions by investing in what's popular or by relying on gut instincts were less likely to have a financial adviser. In addition, the trade data analysed in Section 6 found that advised investors bought and sold the same investments, reducing the prevalence of



anchoring and/or the endowment effect. These results show that advised investors are making more considered decisions, are not using shortcuts such as relying on gut instinct or what's popular, making these decisions less susceptible to biases and are not buying and holding investments due to anchoring and/or the endowment effect. Advised overconfident investors do appear to suffer from self-attributions and randomness bias despite having a financial adviser. They view financial advisers as consultants who they discuss possible investment with but then make their own investment decisions and they do not feel that financial advice leads to higher investment returns. This suggests that advised overconfident investors are attributing any returns achieved by receiving advice to their own ability (Barberis and Thaler, 2003).

Overall, investors who had a financial adviser felt that the benefits of advice were to help achieve higher returns and hold a diversified investment portfolio. The results of the trade data support the views of advised investors as they achieved higher returns and portfolios of advised investors were more diversified. Investors who currently have a financial adviser did not feel that helping to understand investments was a benefit of advice, however, investors who did not currently have a financial adviser did see this as a benefit. This shows that there is a disconnect between what self-directed investors consider the benefits of advice to be and what advised investors consider the benefits to be. It may be these differences that prevent self-directed investors from seeking financial advice.

Overall, extroversion and openness to experiences were the personality traits which had the greatest influence on the perception and use of financial advice. Investors who were more extraverted were more likely to have a financial adviser, consult a financial adviser but make their own financial decisions. Investors who were more extroverted felt that a financial adviser helps to prevent worry. Those who scored highly in openness to experiences felt that a financial adviser does not help to achieve higher investment returns or give peace of mind but does help to ensure a diversified portfolio is held. These results may be due to more extroverted individuals being more optimistic and outgoing and, therefore, more likely to consult a financial adviser. Those who are more open to experiences are more likely to attend to and manage their own investments due to the high level of personal organisation, imagination and intellectual expression (Mayfield, Perdue and Wooten, 2008). Therefore,

they may not see the benefits of advice and do not choose to utilise their services. Investors who were less conscientious may benefit the most from financial advice as they made investment decisions by relying on gut instinct and investing in what's popular.

#### **7.11.8 Previously Advised Investors**

Following the introduction of the Retail Distribution Review (RDR) in the UK in June 2007 many advised investors found themselves in a position where they could no longer access financial advice due to the increased costs of the service or the high minimum amounts required to qualify for advice. This led to a large number of investors being "orphaned" by their financial advisers. At the time of writing no academic study has investigated the impact of becoming an orphaned investor, how that may affect investment decisions and whether advice has a lasting impact. Overall, previously advised investors behaved in a very similar way to self-directed investors. This suggests that any learning or experience gained from the adviser does not carry forward once the relationship ends.

Investors who previously had a financial adviser but now make their own investment decisions were more likely to have a high attitude to risk and state that they do more research than others. They also spent more time each week obtaining information. Although this finding was not statistically significant, along with other results it does reveal the impact of previously having financial advice. Investors who previously had a financial adviser appear to be trying to make up for the service they used to receive by spending more time obtaining information and stating that they do more research than others. This could be attributed to overconfidence, however, compared to investors who have always made their own investment decisions, investors who previously had a financial adviser were significantly less likely to be overconfident. The extra research and lack of overconfidence suggests that these investors have increased their decisions specific knowledge (Godek and Murray, 2008). They appear to be making investment decisions using the reflective, system 2, which may have been learnt whilst receiving financial advice. Further work is required to assess the impact of advice and the longevity of this on investment decisions.

Due to the unique structure of the dataset and the ability to identify and analyse the investment decisions made by previously advised investors, these findings can be used to provide some additional validation of the results. It is not usually possible to assess how advised investors would behave if they did not have a financial adviser, which raises questions over the validity of results – are the results due to the impact of financial advice or due to the type of individual who seeks and consumes financial advice. Previously advised investors can be used as a proxy for how advised investors would make investment decisions in the absence of financial advice. Although there are some differences between investors who have always made their own investment decisions and those who are previously advised, the general finding that previously advised investors behaved in a very similar way to self-directed investors suggests that the observed impact of financial advice is robust. Similarities between investors who have always made their own investment decisions and previously advised investors suggests that the impact a financial adviser has on investment decisions is due to the advice provided rather than the characteristics of the individuals who seek advice. However, it is worth bearing in mind that some of these investors may have chosen not to receive advice rather than being “orphaned”, which may mean that these investors are not representative of investors who are advised and may be the reason for the similarities between investors that have always made their own investment decisions and previously advised investors.

## **8. How Personality, Overconfidence, Financial Advice, Research and Attitude to Risk Impact Upon Trading Behaviour: A Comprehensive Analysis of UK Investors Trade Data and Survey Responses.**

Due to the unique nature of the dataset, the survey data could be matched to investment accounts enabling a detailed analysis of both survey responses and actual investment behaviour. The analysis focused on how the key variables of personality, overconfidence, research, financial advice and attitude to risk impact on trading decisions.

The following sections describe the data in more detail, explore the empirical hypothesis and main findings, supported by a detailed empirical analysis, before concluding with a discussion.

This section aims to answer the following research questions:

- How personality impacts upon returns and diversification of portfolios.
- How overconfidence, time spent obtaining information, attitude to risk and risk aversion impact upon trading behaviour, returns and diversification of portfolios.
- How biases impact upon returns.
- The impact of financial advice on biases.
- Which investors would benefit the most from financial advice.

## 8.1 Data Description

As the trade data and survey data were collected from the same group (customers of a discount broker), this enabled the survey responses to be mapped to the customers trading accounts, allowing the trade data and survey data to be combined.

Once combined, all accounts with less than twelve months performance data were removed from the dataset. Also, as a number of investors had more than one account (for example a general investment account, ISA and pension) the data for all accounts held by each investor were combined in order to produce a single dataset and remove replication. This means that the data in this section is viewed at an investor level rather than account level, as was the case in Section 6. If an investor had more than one account a total or an average across all accounts was calculated and used to form the dataset.

Due to the very small number of investors who were in the “previously had a financial adviser but now make my own investment decisions” category, previously advised investors were not assessed when the trade and survey data was combined. Also, due to the low number of investors in certain age ranges, investors were split into the age groups used in Sections 6 and 7 – 45 years and below, 46 – 65 years and 66 years and over. This enabled a more balanced comparison to be made between age groups.

The combined sample included 94 investors who in total held 210 accounts. The 94 investors included 19 women and 75 men with 31 investors holding an account designated as being under advice from the discount broker and 63 investors making their own investment decisions, holding a self-directed account. The average age of the sample was 61.4 years with an average portfolio across all account of £292,261.70.

**Table 8.1 - Summary of Demographic Data for Trade Data and Survey Responses**

	<b>Total Dataset</b>	<b>Self-Directed</b>	<b>Advised</b>
<b>Totals (N/%)</b>	94	63	31
Male (N/%)	75 (80%)	48 (76%)	27 (87%)
Female (N/%)	19 (20%)	15 (24%)	4 (13%)
<b>Age</b>			
Average Age	61.4	58.9	66.6
Below 65 (N/%)	59 (63%)	46 (73%)	13 (42%)
66 and over (N/%)	35 (37%)	17 (27%)	18 (58%)
<b>Highest Level of Education</b>			
Did not attend University	26 (38%)	15 (24%)	11 (35%)
Attended University	68 (72%)	48 (76%)	20 (65%)
<b>Household Earnings</b>			
Up to £69,999	33 (36%)	20 (32%)	13 (42%)
£70,000 to £99,999	20 (22%)	14 (22%)	6 (19%)
£100,000 +	20 (22%)	14 (22%)	6 (19%)
Prefer not to answer	20 (22%)	15 (24%)	6 (19%)
<b>Total of household investable assets</b>			

Up to £249,999	15 (16%)	8 (13%)	7 (23%)
£250,000 to £499,999	16 (17%)	10 (16%)	6 (19%)
£500,000 or more	50 (54%)	35 (55%)	15 (48%)
Prefer not to answer	12 (13%)	10 (16%)	3 (10%)

**Time Spent Obtaining Information**

0-4 hours	69 (73%)	41 (65%)	28 (90%)
Over 4 hours	24 (26%)	21 (33%)	3 (10%)
Prefer not to answer	1 (1%)	1 (2%)	-

**Risk Aversion**

Risk Averse	36 (38%)	24 (38%)	12 (39%)
Not Risk Averse	57 (61%)	38 (60%)	19 (61%)
Prefer not to answer	1 (1%)	1 (2%)	-

**Attitude to Risk**

High return and high risk	26 (28%)	21 (33%)	5 (16%)
Moderate return and moderate risk	64 (68%)	41 (65%)	23 (74%)
Low risk and low return	4 (4%)	1 (2%)	3 (10%)
Prefer not to answer	-	-	-

**Overconfidence**

Know investments better than others (Overconfident)	57 (61%)	38 (60%)	19 (61%)
Know investments worse or about the same as others	36 (38%)	24 (38%)	12 (39%)
Prefer not to answer	1 (1%)	1 (2%)	-

**Research**

Do more research than others	46 (49%)	35 (56%)	11 (35%)
Do less or about the same amount of research as others	46 (49%)	26 (41%)	19 (61%)
Prefer not to answer	2 (2%)	1 (3%)	1 (3%)



Table 8.1 shows that the sample were well educated, with over 72% going to university, had high levels of income, 44% earning a household income of £70,000 or more per annum, and high levels of investable assets, 71% had investable assets of £250,000 and over. The investors within this dataset were older, more educated and more wealthy than the UK average. In the UK, 42% of the population, aged 21 to 64 years, have achieved a higher education qualification, the UK average household income is £29,400 and average UK household savings, including deposits, savings, investments and pensions, are £79,296 (Higher Education Statistics Association, 2018; NimbleFins, 2021; Office of National Statistics, 2019).

Although 31 investor accounts were designated as advised, within the survey only 24 investors stated that they currently have a financial advisor. This discrepancy within the reporting was only made by advised investors – no self-directed investors stated that they were advised when they were not. This is an interesting finding and could indicate some form of bias, for example these investors may be overconfident in their own abilities and, therefore, do not consider their adviser to be providing advice to them. However, it may simply be because the investors adviser has a slightly different job title and is not simply called a financial adviser or that the investor does not consider that service to be financial advice as they are only advising on certain accounts and not across their entire wealth. For the purposes of the analysis the account designation, advised or self-directed will be used unless otherwise stated. Demographic results for personality traits were very similar to those reported for the survey data, detailed in Section 7, therefore they have not reported in this section.

## **8.2 Regression Analysis of Trade and Survey Data**

To further explore the relationship between the survey data and the trade data, identify additional findings and providing support and explanations for the results observed in Sections 6 and 7 a number of regression were run and the results are shown in table 8.2.

A Logistic Regression Model was used to test the significance of the results observed. This model was chosen as it is the most appropriate for dealing with variables that are categorised. For dependent variables that are categorical and had more than two outcomes,

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an Ordered Logistic Regression (a regression very similar to the Logistic Regression but used to model a non-binary dependent variable) was conducted. Due to the smaller dataset, investors who held accounts for a short period of time and only placed a small number of trades could skew the results. Therefore, the average number of trades placed across all accounts was used for the analysis rather than the total number of trades placed over the observation period. Averaging out the number of trades ensured that the length of time an account was open did not significantly impact upon the results.

To enable clearer comparisons between groups of investors, the results of the question around the amount of time spent obtaining information was split in to two groups, those who spent less than 4 hours obtaining information each week and those that spent over 4 hours each week. The number of investors that stated they conduct less research than others was very small and was made up of just four investors, two self-directed and two advised. To control for this, the responses were recategorised in to two groups, investors who stated that they do about the same or less research than others and those that stated that they do more. For the regression analysis the research measure was regressed as a binary variable (More Research). This was also the case for the overconfidence measure. Due to the low number of investors in the “Worse” category (4), this category was combined with the “About the Same” category so that the low number did not skew the results. For the regression analysis overconfidence was regressed as a binary variable (Overconfident). When applicable, where two groups were combined into one, an average for both groups was calculated.

**Table 8.2 – Trade and Survey Data Regression Analysis**

	Dependent Variable					
	Time Spent Obtaining Information (Over 4 Hours)  (obs = 93, R <sup>2</sup> = 0.12)	Overconfidence (Overconfident)  (obs = 93, R <sup>2</sup> = 0.02)	Research (More)  (obs = 92, R <sup>2</sup> = 0.03)	Risk Aversion (Risk Averse)  (obs = 93, R <sup>2</sup> = 0.03)	Attitude to Risk  (obs = 94, R <sup>2</sup> = 0.03)	Use of Advice (Advised)  (obs = 94, R <sup>2</sup> = 0.13)
<b>Average Portfolio Size</b>	-1.22	1.20	-1.14	-0.84	0.14	2.21*
<b>Average Number of Trades</b>	2.25*	0.52	0.46	-0.47	2.21*	-2.49*
<b>Returns</b>	0.61	0.44	1.74	-1.18	-0.52	1.05
<b>Volatility</b>	1.20	0.29	-0.58	0.26	-0.02	-1.11

The table shows the Logistic Regression Analysis Z stats. \*\*, \* denote significance at 1% and 5% levels respectively

### 8.3 Trade Data, Time Spent Obtaining Information and Research

Based on previous studies, it would be expected that investors who spent more time obtaining information would trade more, hold a higher percentage of their portfolios in single company shares, achieve lower returns and be less likely to have a financial adviser (Daniel, Hirshleifer and Subrahmanyam, 1998, 2001; Guiso and Jappelli, 2007). All these findings are tested.

Table 8.1 shows that the majority of investors, 73%, spent less than four hours obtaining information on how to invest each week. However, the amount of time spent obtaining information had a direct impact on the number of trades placed, table 8.2. Investors who spent more time obtaining information placed a significantly higher number of trades ( $z = 2.25$ ,  $p = 0.025$ ) supporting the findings of Odean (1998) and Barber and Odean (2000, 2001).

Self-directed investors spent far more time obtaining information compared to advised investors. Just 10% of advised investors spent four hours or more obtaining information compared to 33% of self-directed investors. Self-directed investors also traded far more than advised investors. Self-directed investors who spent under four hours obtaining information placed an average of 41.2 trades across all of their accounts during the observation period. This compared to an average of 28.1 trades across all accounts for advised investors. The difference in the number of trades placed by advised and self-directed investors was even greater for investors who spend more than four hours obtaining information. Within this group, self-directed investors placed an average of 98.9 trades and advised investors placed an average of just 14.7 trades. These results show that the amount of time spent obtaining information has a more pronounced impact on self-directed investors. A regression analysis, not shown in the regression table, confirmed that, within this sample, there was a significant relationship between the amount of time spent obtaining information and advice with advised investors spending significantly less time obtaining information ( $z = -2.34$ ,  $p = 0.019$ ). No significant relationship was found between advice and the amount of time spent obtaining information in Section 7, therefore, this results should be interpreted with caution as the sample size was much larger in Section 7. Advised investors also placed significantly fewer trades ( $z = -2.49$ ,  $p = 0.013$ ). This shows that self-directed investors spent more time

obtaining information and placed more trades. This could indicate overconfidence, however, self-directed investors were not found to be significantly more likely to be overconfident.

Although differences in returns were observed, extra time spent obtaining information does appear to pay off as time spent obtaining information and returns were not significantly correlated. This was also true for the Sharpe Ratio and time spent obtaining information. Therefore, investors who spent more time obtaining information did not achieve significantly higher returns than other investors or significantly higher risk adjusted returns. There were also no significant differences in volatility for investors who spent more time obtaining information.

#### **8.4 Trade Data and Perceived Amount of Research Conducted**

Investors who stated that they do more research than others before investing, on average placed more trades than those who do about the same or less than others. Investors who stated that they do more research than others on average placed 78.5 more trades over the observation period than those who stated that they do less research than others. However, further regression analysis revealed that there was no significant relationship between the number of trades placed and the amount of research investors stated they did.

Investors who stated that they do more research than others before investing achieved a higher return, a return that was 3.8% higher, than those who do about the same or less than others. This finding was also true for self-directed and advised investors who achieved returns that were 2.7% and 4.7% higher than investors who stated that they do about the same or less research than others. These findings suggest that the extra research that these investors state they do may be paying off and is enhancing returns. However, these differences were found to not be significant. In addition, no significant relationship was found between the amount of research investors stated they did and volatility or portfolio values.

## 8.5 Trade Data and Overconfidence

Based on previous studies, overconfident investors would be expected to place more trades, hold less diversified, higher risk portfolios and achieve lower returns (Barber and Odean, 2000, 2001; Guiso and Jappelli, 2007; Odean, 1998, 1999). All of these findings are tested along with how financial advice impacts upon them.

As in Section 7, the majority of investors were overconfident, 61%. Only 38% of investors stated that they know investments about the same or worse than others. When the total results for the combined dataset are compared to those for advised and self-directed investors, there is very little difference in the number of investors who are overconfident. For the total dataset, the average number of trades placed by overconfident investors and those who stated that they know investment about the same or worse than others is quite similar, 53 vs 43 trades. However, when the dataset is split into advised and self-directed investors it shows that investors who make their own decisions, self-directed investors, traded more heavily than advised investors. Overconfident self-directed investors trade far more heavily than those receiving advice, placing an average of 68 trades over the observation period compared to just 23 for overconfident advised investors. These results suggest that although self-directed and advised investors can be equally overconfident, advice appears to reduce the impact of this by reducing the number of trades placed. This was confirmed by a regression analysis, not shown in the regression table, which found that advice significantly reduced the number of trades placed by overconfident investors ( $z = -2.11, p = 0.035$ ).

Despite observed differences, no significant relationship was found between overconfidence and the number of trades placed, returns or volatility. This shows that although investors may be overconfident, this does not have a significant impact on outcomes and is not detrimental to these investors. These findings disprove the hypothesis that overconfident investors will place more trades and achieve lower investment returns. There was also no significant relationship found between average portfolio size and overconfidence.

When the initial data is assessed and returns and volatility are considered together, self-directed investors who state that they know investments about the same or worse than

others stand out. This group achieved a return of 0.02% over the observation period and had volatility of 33.3%. The volatility was higher than overconfident advised investors (31.5%) and very similar to other advised investors (33.1%). This suggests that, compared to the other investors, these investors are holding inefficient portfolios. Therefore, it may be this group of investors who would benefit from financial advice as the equivalent group of investors who had an adviser achieved much higher returns, 3.5% more, with a similar level of volatility.

### **8.6 Risk Aversion and Trade Data**

As in Section 7, the majority of investors (61%) were not risk averse, seeing risk as an event from which one can extract profit. Only 38% were risk averse, viewing risk as an event which one should seek protection from. Investors who felt that they can extract profit from risk held portfolios that were slightly more volatile than investors who sought protection from risk (35.3% vs 32.4%). Although investors who were not risk averse held more volatile portfolios, the difference was less than would be expected given the investors views on risk. This suggests that risk averse investors are holding portfolios that may be riskier than they think. This was confirmed by the regression analysis, which found no significant differences between risk aversion and volatility. The regression analysis also revealed that observed differences between risk aversion and average trades, average portfolios size and returns were not significant.

### **8.7 Attitude to Risk and Trade Data**

The majority of investors had a moderate attitude to risk (68%) with only a very small percentage having a low attitude to risk (4%). This finding was mirrored by advised and self-directed investors. Comparing the total responses to the risk aversion statements to total responses for attitude to risk shows that, although 38% of investors stated that risk was an event from which one should seek protection, were risk averse, only 4% stated that they have a low attitude to risk. Based on the risk aversion statements, a much higher percentage of investors would be expected to have a low attitude to risk. This is in line with the finding of the initial survey results in Section 7 and suggests that, although many investors are risk averse, they actually have at least a moderate attitude to risk. Despite this, the survey results revealed a significant relationship between the risk statements and attitude to risk.

This was further supported by a regression analysis in which risk aversion was regressed against attitude to risk for the combined survey and trade dataset. Investors who were risk averse were found to be significantly less likely to have a high attitude to risk ( $z = -2.36$ ,  $p = 0.018$ ).

Investors with a high attitude to risk placed a larger number of average trades across all accounts compared to those with a moderate or low attitude to risk. Investors with a high attitude to risk placed an average of 57.2 trades more than investors with a low attitude to risk over the observation period. This finding is also true for self-directed investors, however advised investors with a moderate attitude to risk placed slightly more trades than those with a high attitude to risk (25.4 vs 28.6 trades). A regression analysis, table 8.2, found that the observed differences between the average number of trades placed and attitude to risk were significant, with investors with a higher attitude to risk placing significantly more trades. No significant relationship was found between attitude to risk and average portfolio sizes or returns. This shows that investors who have a higher attitude to risk are not achieving significantly different returns to those with a low or moderate attitude to risk.

When self-directed and advised investors are compared, the number of trades placed by advised investors with a moderate attitude to risk was lower than the number placed by self-directed investors (28.6 vs 49.7) and slightly more for those with a low attitude to risk (15.9 vs 11). Advised investors with a high attitude to risk placed 57.5 fewer trades than self-directed investors with a high attitude to risk. These findings, along with the finding that advice significantly reduced the number of trades placed, suggests that advice reduced the number of trades placed by investors with a high attitude to risk and who are less risk averse and increased the number placed by investors with a lower attitude to risk and are risk averse.

When looking at attitude to risk and volatility, volatility was highest for investors who had a moderate attitude to risk (35.6%). Investors with a moderate attitude to risk held portfolios that were more volatile than investors with a high attitude to risk (35.6% vs 32.5%). This shows that although these investors achieved the highest returns they did have the riskiest portfolios. Investors with a low attitude to risk had the least volatile portfolio (23.7%). These



findings held true for both advised and self-directed investors. When returns are also taken into account this suggests that advised investors with a moderate attitude to risk are making better investment decisions than self-directed investors with a moderate attitude to risk. Advised investors with a moderate attitude to risk achieved a return that was 1.1% higher by having portfolios that were 4.1% less volatile. Advised and self-directed investors with a low attitude to risk held the least volatile portfolios, 27.2% and 13.2%. Although self-directed investors had less volatile portfolios than advised investors with the same attitude to risk, they achieved a return that was 6.7% lower. Therefore, the lower risk portfolios are detrimental to self-directed investors returns. These results suggest that this group may benefit from financial advice.

Although the initial regression model, table 8.2, found no significantly relationship between attitude to risk and volatility, further regression analysis, which is not shown in the regression table, revealed that the differences observed between volatility and attitude to risk were significant. When the relationship between each attitude to risk category and volatility was assessed and compared it was found that investors with a moderate ( $t = 3.01$ ,  $p = 0.003$ ) and high ( $t = 2.01$ ,  $p = 0.047$ ) attitude to risk held portfolios that were significantly more volatile, when compared to those with a low attitude to risk. The finding that levels of volatility were significantly different for each attitude to risk would suggest that the self-reported attitude to risk measure is robust. However, the highest levels of volatility were observed for investors with a moderate attitude to risk, which could also suggest that investors self-reported attitude to risk may not be consistent with the level of risk they are actually taking.

## **8.8 Diversification**

The study by Guiso and Jappelli (2007) found that overconfident investors and those who spend more time obtaining information before investing have a larger percentage of their portfolios in single stocks and hold less diversified portfolios. To test these findings along with the impact of personality and attitude to risk, diversification of investor portfolios was assessed.

### **8.8.1 Regression Analysis of Asset Classes and Survey Data**

To assess the relationship between the different asset classes and the survey data, the percentage held in each asset class was regressed against time spent obtaining information, overconfidence, the amount of research investors stated they did compared to others, risk aversion and attitude to risk, table 8.3. To further assess the results obtained for individual asset classes, the individual asset classes were then consolidated into risk levels and regressed against the same variables as the individual asset classes, table 8.4. As previously stated, as the combined survey and trade data is at investors level and not account level, all trade data is an average or total across all accounts. As the dependent variables were continuous, not categorical, an Ordinary Least Squares Regression model was used.

**Table 8.3 – Regression Analysis of Assets Classes and Survey Data**

Asset Class (Dependent Variable)	Time Spent Obtaining Information (Over 4 Hours)	Overconfidence (Overconfident)	Research (More Research)	Risk Aversion (Risk Averse)	Attitude to Risk (Compared to Low Risk)	
					Moderate Risk	High Risk
					<b>Absolute Return Fund</b> (obs = 90, R <sup>2</sup> = 0.07)	0.77
<b>Alternative</b> (obs = 90, R <sup>2</sup> = 0.05)	0.83	0.85	0.58	0.69	1.06	0.56
<b>Bond</b> (obs = 90, R <sup>2</sup> = 0.18)	-2.33*	1.36	-2.70**	0.76	-1.60	-1.53
<b>Cash</b> (obs = 90, R <sup>2</sup> = 0.04)	-0.97	0.95	0.98	-0.98	0.94	-0.85
<b>Emerging Markets</b> (obs = 90, R <sup>2</sup> = 0.06)	-1.58	-0.04	0.25	-1.37	2.33*	0.91
<b>Equity Fund</b> (obs = 90, R <sup>2</sup> = 0.17)	-2.83**	-1.53	2.14*	-1.05	0.50	0.57
<b>Investment Trust</b> (obs = 90, R <sup>2</sup> = 0.03)	0.92	-0.26	0.08	-0.91	0.95	-0.10

<b>Multi Asset – Aggressive</b>	1.00	1.14	0.40	1.70*	1.61	1.85
<b>(obs = 90, R<sup>2</sup> = 0.10)</b>						
<b>Multi Asset - Medium Risk</b>	1.33	-0.21	0.61	1.24	-0.17	-0.36
<b>(obs = 90, R<sup>2</sup> = 0.08)</b>						
<b>Multi Asset – Cautious</b>	0.19	0.35	-0.29	0.59	2.61*	1.94
<b>(obs = 90, R<sup>2</sup> = 0.02)</b>						
<b>Property</b>	-1.32	2.04*	-0.35	1.47	1.53	1.22
<b>(obs = 90, R<sup>2</sup> = 0.09)</b>						
<b>Share</b>	2.79**	-1.68	0.49	-1.21	-1.06	-0.19
<b>(obs = 90, R<sup>2</sup> = 0.18)</b>						
<b>Tracker</b>	0.10	0.90	-0.99	-0.02	1.22	1.27
<b>(obs = 90, R<sup>2</sup> = 0.02)</b>						

The table shows the Ordinary Least Squares (OLS) regression t stats. \*\*, \* denote significance at 1% and 5% levels respectively.

**Table 8.4 – Regression Analysis of Consolidated Risk Level of Assets Classes and Survey Data**

Risk Level (Dependent Variable)	Time Spent Obtaining Information (Over 4 Hours)	Overconfidence (Overconfident)	Research (More Research)	Risk Aversion (Risk Averse)	Attitude to Risk (Compared to Low Risk)	
					Moderate Risk	High Risk
No Risk (obs = 90, R <sup>2</sup> = 0.04)	-0.97	0.95	0.98	-0.98	0.94	-0.85
Low Risk (obs = 90, R <sup>2</sup> = 0.15)	-1.94	1.38	-2.65*	0.87	-1.31	-1.31
Medium Risk (obs = 90, R <sup>2</sup> = 0.16)	-2.75**	-0.79	1.86	-0.48	1.13	1.14
High Risk (obs = 90, R <sup>2</sup> = 0.23)	3.58**	-0.29	0.17	-0.13	-0.02	-0.01

The table shows the Ordinary Least Squares (OLS) regression t stats. \*\*, \* denote significance at 1% and 5% levels respectively.

### 8.8.2 Diversification and Time Spent Obtaining Information

Compared to investors who spent 0-4 hours obtaining information each week, investors who spent over 4 hours a week obtaining information had 7.3% less invested in bonds, 20.7% less invested in equity funds and 20.2% more invested in shares, supporting the finding of Guiso and Jappelli (2007). Regression analysis revealed that these findings were significant at the  $<0.05$  level. Investors who held a higher percentage in equity funds ( $t = -2.83$ ,  $p = 0.006$ ) and bonds ( $t = -2.33$ ,  $p = 0.022$ ) were significantly less likely to spend more time, over 4 hours per week, obtaining information. Investors who held a higher percentage of shares were significantly more likely to spend more time obtaining information ( $t = 2.79$ ,  $p = 0.007$ ). These findings generally make sense as an equity fund and bonds will require less research and management than individual shares.

When the portfolios of investors are broken down in terms of the risk level of each asset the differences between investors who spent more time and those who spent less time obtaining information becomes even clearer. Compared to investors who spent under 4 hours obtaining information each week, investors who spent over 4 hours obtaining information held 7% less money in low risk investments, 19.3% less in medium risk investments and 26.3% more in high risk investments. A regression analysis, table 8.4, revealed that the observed differences between time spent obtaining information and the percentage held in medium and high risk assets was significant. Investors who held a larger percentage of their portfolios in medium risk assets were significantly less likely to spend over 4 hours obtaining information each week ( $t = -2.75$ ,  $p = 0.007$ ). Conversely, investors who held a higher percentage of their portfolios in high risk assets were significantly more likely to spend over 4 hours obtaining information each week ( $t = 3.58$ ,  $p = 0.001$ ).

### **8.8.3 Diversification and Overconfidence**

Overconfidence has been found to increase the propensity to take risk and has been linked with less diversified portfolios (Guiso and Jappelli, 2007). These findings could be directly tested within the present study by comparing the portfolios of overconfident investors with other investors. Overconfident investors did not hold particularly concentrated portfolios and their portfolios were diversified across a number of assets. When looking at the percentage held in different asset classes, overconfident investors held very similar portfolios to other investors. This was confirmed by the regression analysis, table 8.3 and 8.4, which found that the only significant relationship between asset classes and overconfidence was the amount held in property funds, with investors who had a higher percentage of their portfolio held in property funds being more likely to be overconfident ( $t = 2.04$ ,  $p = 0.044$ ). No significant relationship between overconfidence and any of the other asset classes was found and overconfidence did not have a significant relationship with any of the consolidated risk levels of asset classes.

Although overconfidence was not found to have a significant impact on the percentage held in asset classes or the consolidated risk level of assets, the amount of research investors stated they did, which was a proxy for overconfidence, did. Investors who stated that they conducted more research than others held significantly less in bonds ( $t = -2.70$ ,  $p = 0.008$ ) and significantly more in equity funds ( $t = 2.14$ ,  $p = 0.035$ ). Investors who stated that they did more research than others also held significantly less in low risk investments ( $t = -2.65$ ,  $p = 0.010$ ).

### **8.8.4 Diversification, Risk Aversion and Attitude to Risk**

Risk aversion had little impact on the type of investments held. Investors who were risk averse held similar portfolios, in terms of the consolidated risk levels of assets, to those who were not risk averse. Further regression analysis confirmed this and found no significant relationship between the individual asset classes and the consolidated risk level of assets and risk aversion.

Attitude to risk had a little more of an impact on investments held within portfolios with investors who held more in emerging markets ( $t = 2.33$ ,  $p = 0.022$ ) and multi asset – cautious investments ( $t = 2.61$ ,  $p = 0.011$ ) being significantly more likely to have a moderate attitude to risk, compared to investors who had a low attitude to risk. Despite these significant relationships, regression analysis revealed there was no significant relationship between the consolidated risk level of assets and attitude to risk. This finding supports the suggestion that investors self-reported attitude to risk may not be consistent with the level of risk they are actually taking.

### **8.8.5 Education Level**

Regression analyses revealed that education was not significantly correlated with the average number of trades placed across all accounts during the observation period, use of advice, returns or volatility. This shows that education level did not have a significant impact on investment decisions.

## **8.9 Combined Trade and Survey Data Discussion**

The structure of the unique dataset used for this study meant that the trade data and survey data could be linked to investment accounts. This enabled a detailed analysis of both datasets in which the survey responses and actual trading behaviour could be compared and contrasted, providing further insights into how investment decisions are made.

### **8.9.1 Research and Investment Behaviour**

Although the majority of investors spent less than four hours obtaining information on how to invest each week, the amount of time spent obtaining information had a significant impact on investment behaviour and the composition of portfolios. Investors who spent more time obtaining information placed more trades, supporting the findings of Barber and Odean (2000, 2001), Bluethgen et al (2008), Guiso and Jappelli (2007) and Odean (1998). Investors who spent more time obtaining information were more likely to hold a higher percentage of their portfolios in directly held equities (single company shares) and less likely to hold equity funds and bonds. Investors who spent more time obtaining information also held a lower percentage of their portfolios medium risk assets and more in higher risk.



However, this extra time spent obtaining information did not appear to pay off as investors who spent more time obtaining information did not achieve significantly higher returns. A possible reason why time spent obtaining information did not correlate with returns could be because some investors will choose not to trade once they have obtained information, and this may not be reflected in the returns achieved. However, this is not supported by the number of trades placed. The fact that the number of trades placed increased as more time was spent obtaining information means that investors were deciding to trade after spending time obtaining information.

Investors who held a higher percentage in equity funds and bonds were significantly less likely to spend more time, over 4 hours per week, obtaining information and those who held a higher percentage of shares were significantly more likely to spend more time obtaining information. These findings generally make sense as equity funds and bonds require far less research and management than single company shares, so it would be expected that investors who hold a high percentage of their portfolio in shares will spend more time obtaining information each week.

These findings in part support those of Guiso and Jappelli (2007) who found that investors who spent more time obtaining information before investing had a larger percentage of their portfolios held in single stocks (shares). They explain this by suggesting that these investors are more likely to invest in shares and, therefore, the signal of whether to trade or not is more valuable to them, so they spend more time obtaining information. This was further supported by consolidating the asset classes into risk levels. Investors who held a larger percentage of their portfolios in medium risk assets were less likely to spend over 4 hours obtaining information each week and investors who held a higher percentage of their portfolios in high risk assets were more likely to spend over 4 hours obtaining information each week. Conversely, investors who spent more time obtaining information each week had a higher percentage of their portfolios invested in high risk investments and less in medium risk investments. Guiso and Jappelli's (2007) other finding, that these investors held less diversified portfolios, which reduces their Sharpe ratio, was not supported.

Guiso and Jappelli (2007) also proposed a model which suggests that, for rational investors, there will be a positive correlation between time spent obtaining information and returns. Overconfident investors will spend more time obtaining information but misinterpret this information, leading to them holding higher risk portfolios that are less diverse and achieve lower returns. Other studies have found that investors who spend more time obtaining information place more trades (Barber and Odean, 2000, 2001; Bluethgen et al, 2008; Odean, 1998). These studies have explained this relationship by suggesting that investors who spend more time obtaining information are more overconfident and, therefore, trade more.

Although investors who spent more time obtaining information placed more trades and had more money invested in shares and high risk investments, no significant relationship was found between overconfidence and the number of trades placed, returns, the amount held in any asset class or the amount held in the consolidated risk levels of assets. There was also no significant relationship found between the amount of time spent obtaining information and returns. The results suggest that the relationship between time spent obtaining information and overconfidence appears to be more complex than previous studies have suggested. Overconfidence appears to be just one factor which interacts with the amount of time spent obtaining information, time spent obtaining information then impacts upon the type of assets held and the risk level of them.

### **8.9.2 Attitude to Risk and Investment Behaviour**

Investors with a higher attitude to risk were found to place significantly more trades supporting the findings of Fellner and Maciejovsky (2007) and Lo et al. (2005). However, risk aversion did not have a significant impact on the number of trades placed. In contrast to previous studies that have found a link between risk tolerance and specific asset classes (Clark-Murphy and Soutar, 2004; Grable and Lytton, 2003; Keller and Siegrist, 2006; Pak and Mahmood, 2015; Wood and Zaichkowsky, 2004), no significant relationship was observed between risk aversion and any asset classes or consolidated risk levels of asset classes. Investors who had a moderate attitude to risk held significantly more in emerging markets and multi asset – cautious investments, when compared to investors with a low attitude to risk. No significant relationship was found between low and high attitudes to risk and any of

the individual asset classes and none of the attitude to risk categories had a significant relationship with the consolidated risk levels of assets.

The use of a variety of measures to assess risk revealed a number of inconsistencies and contradictions. These were observed between investors self-reported risk aversion, attitude to risk, how they make investment decisions and the risk level of the portfolios they held. The survey data analysed in Section 7 found that 40% of investors stated that they are risk averse, however only 7% were willing to take a lower risk and low return with their investments. Based on the results of the risk aversion question, a much higher percentage of investors would have been expected to have a low attitude to risk. The volatility of investor portfolios showed a similar pattern with volatility being highest for investors who stated that they had a moderate attitude to risk. These investors held portfolios that were more volatile than investors who stated that they had a high attitude to risk (35.6% vs 32.5%). Further inconsistencies were observed when investors were asked how they make investment decisions, which was analysed in Section 7. Investors who stated that they make investment decisions by relying on their gut instinct were significantly more likely to be risk averse compared to investors who made decisions by doing their own research.

Overall, the results show that many investors who were risk averse had an attitude to risk which was at least moderate. Despite these differences in attitudes to risk and risk aversion, investors overall held similar portfolios, even when asset classes were consolidated based on the risk level of assets, they also achieved similar returns, similar levels of volatility and similar risk adjusted returns. This suggests that investors self-reported attitude to risk may not be consistent with the level of risk they are actually taking or their levels of risk aversion. This supports the suggestion by Morse (1998) that individuals may struggle to assess the amount of risk associated with investments and may also have difficulty matching investments to the level of risk they are willing to take. This could also be another example of subconscious biases that investors are not aware of influencing investment decisions (Kahneman, 2011; Kahneman and Klein, 2009; Shefrin and Thaler, 1988). However, it could simply be due to the sample used within the study. All investors held an investment account, with the vast majority holding some form of stock or high risk investment within their

portfolio. This would suggest that most investors had a higher attitude to risk than other investors who choose to not to invest at all and just hold savings/deposit accounts.

### **8.9.3 Overconfidence**

Investors who were overconfident did not place significantly more trades than other investors disproving the findings of Barber and Odean (2001), Barberis and Thaler (2003) and Fischer and Gerhardt (2007). These studies found that overconfident investors traded more heavily and suggest that the increased trading observed is due to an overconfidence in their ability to pick winning stocks, misinterpreting cues, overestimating the accuracy of their own knowledge and ability to outperform the markets. Although overconfidence was observed and directly measured it did not lead to significantly more trades being placed or any difference in returns or volatility. Previous studies have also found that overconfident investors achieve lower returns through overtrading, poor stock picking and high transaction costs, however, overconfident investors achieved returns that were not significantly different to other investors. This shows that, although investors may be overconfident, they do not trade significantly more than other investors and overconfidence does not impact upon returns. The hypothesis that overconfident investors will place more trades and achieve lower investment returns was not supported.

Previous studies have found overconfident investors to hold concentrated, higher risk portfolios and have a higher attitude to risk (Guiso and Jappelli, 2007; Pompian and Longo, 2004; Looney et al, 2007). However, the portfolios of overconfident investors contained a variety of different investments, experienced levels of volatility that were in line with other investors, and no significant relationship was found between overconfidence and the risk level of assets held within portfolios.

Investors who had a higher percentage of their portfolio invested in property were significantly more likely to be overconfident. No other significant relationships were found between the amount held in different asset classes and overconfidence. These findings contradict some of the previous research that has found overconfident investors to invest more money in shares (Guiso and Jappelli, 2007). Property funds are actively managed funds that contain a variety of property assets that should be uncorrelated with other asset

classes. This finding suggests a well thought out approach to investing by overconfident investors, they have conducted sufficient research and chosen a fund that they feel will help to add extra diversification to their portfolio. Pompian and Longo (2004) suggest that overconfident investors are more likely to rely on biases and use system 1 when making investment decisions. This was not supported as the result show that overconfident investors are not investing in more speculative and high risk investments and would suggest that they are actually using systems 2 to make these decisions.

Fischer and Gerhardt (2007) suggest that overconfidence appears to be the result of how individuals perceive and judge information. They hold unrealistic beliefs about the size of the return that will be achieved, the accuracy of the expected return and spend too much time and money on information (Barber and Odean, 2001). In addition, investors are more likely to be overconfident about information they have worked hard to produce, especially if this information is private (Daniel, Hirshleifer and Subrahmanyam, 1998, 2001). This all leads to an overconfident investor overreacting to signals. Although no significant relationship was found between overconfidence and the number of trades placed, the amount of time spent obtaining information did have a significant impact on the number of trades placed. Investors who spent more time obtaining information placed significantly more trades and the results from Section 7 show that overconfident investors spent significantly more time obtaining information. Therefore, it maybe that overconfidence is one of the factors that influence the time spent obtaining information and it is actually the time spent obtaining information that leads to overtrading. It appears that the relationship between overconfidence and time spent obtaining information is more complex than initially thought and further research is required to understand this relationship in more detail.

Overconfidence did not have a significant impact on returns, with overconfident investors achieving returns that were not significantly different to other investors, contrasting the findings of many previous studies (Barber and Odean, 2000, 2001; Dittrich, Guth and Maciejovsky, 2001; Finke, Howe and Huston, 2011; Guiso and Jappelli, 2007; Looney et al, 2007; Odean, 1998; Pompian and Longo, 2004). However, these studies were not able to directly test the impact of overconfidence on actual trading behaviour. Some studies concluded that overconfidence was the reason for the results without actually assessing it

(Barber and Odean, 2000, 2001; Odean, 1998) while others measured overconfidence but relied on self-reported trade/investment data (Guiso and Jappelli, 2007). In the present study, overconfidence was directly measured and compared to actual trade data, which may explain why many of the results differ from previous studies, which either relied on self-reported trade data or did not directly measure overconfidence. The more robust analysis of how overconfidence impacts upon investment decisions shows that overconfidence does not have a significant impact on the number of trades placed, returns, volatility or the risk level of assets held in portfolios. Therefore, overconfidence does not appear to affect outcomes.

The results show that self-directed investors who stated that they know investments about the same or worse than other investors and those who have a low attitude to risk appear to be the groups who would benefit the most from financial advice as they held the least efficient portfolios. Self-directed investors who stated that they know investments about the same or worse than other investors experienced volatility of 33.3% and achieved a return of just 0.02% over the observations period. The equivalent advised group achieved a return which was 3.5% higher with a very similar level of volatility. In addition, the results in Section 7 revealed that investors who stated that they know investment worse than others, the least confident investors, were significantly less likely to have a financial adviser. Self-directed investors who had a low attitude to risk achieved a return that was 6.7% lower than the equivalent advised investors. Therefore, investors who are not overconfident and those who have a low attitude to risk may benefit most from financial advice as their underperformance appears to lie in the investments chosen rather than the risk level of portfolios.

## 9. Conclusion

The present study has utilised a unique dataset to build on previous research and overcome some of the limitations of these studies, provided greater clarity and further insights into how investment decisions are made. Many of the widely held theories around investment behaviour have been disproved and new insights into how various factors interact and influence investment decisions have been provided.

Generally, investors were overconfident, spent less than 4 hours a week obtaining information, had at least a moderate attitude to risk, were not risk averse and held undiversified, high risk portfolios. This all led to high levels of volatility and low returns. However, some groups of investors were able to achieve higher returns.

Overall, investors who achieved higher returns placed more buy trades had a higher percentage of their portfolio invested in high risk investments and held more volatile portfolios. To explore this further, investors were split into two groups, those who had a financial adviser and those who made their own investment decisions. This revealed that investors who achieved higher returns utilised the services of a financial adviser. These investors were older, had a lower attitude to risk, held higher percentages of their portfolios in low and medium risk investments and less in high risk investments. Advised investors achieved a return that was 4.7% higher than self-directed investors over the observation period. Financial advice not only led to higher returns but also reduced the number of trades placed and eliminated or reduced the impact of biases. Although advised investors did have more volatile portfolios, the risk adjusted returns were significantly better than self-directed investors.

The benefits of financial advice questions identified a disconnect between self-directed investors and advised investors. Self-directed investors saw increasing understanding of investments as being a benefit of financial advice and advised investors saw the benefits as achieving higher returns and holding a diversified investment portfolio. It may be these differences in the perceived benefits of financial advice that prevent self-directed investors

from seeking financial advice. Investors who are not overconfident and those who have a low attitude to risk and are less emotionally stable may benefit most from financial advice as their underperformance appears to lie in the investments chosen rather than the risk level of portfolios. These groups either held the least efficient portfolios, experiencing similar levels of volatility but achieving much lower returns, or invested in what's popular rather than what would be the most suitable investment for them.

In line with previous research, a number of biases were observed including home bias, the endowment effect, anchoring, overtrading, buying at the top of the market and selling at the bottom, overconfidence, self-attribution and randomness bias (Barber and Odean, 2000, 2001; Barberis and Thaler, 2003; Charupat and Deaves, 2004; Dittrich, Guth and Maciejovsky 2001; Ivkovic, Sialm and Weisbenner, 2008; Fischer and Gerhardt, 2007; Kahneman, 2011; Pompian, 2006; Sadi et 2010; Tversky and Kahneman, 1974). Although some biases such as buying at the top of the market and selling at the bottom did lead to lower returns, in contrast to previous research many of the biases observed did not actually lead to lower returns or poor outcomes. Overtrading is one behaviour that many studies have found to lower investment returns (Barber and Odean, 2000, 2001; Odean 1998, 1998; Shu et al, 2004). However, investors who placed more buy trades achieved higher returns. Therefore, if the investor is not attracting high transaction costs the overtrading leads to enhanced returns and could be considered a perfectly rational investment strategy. Also, investors placing more buy trades achieving higher investment returns, this is in contrast to previous studies that have considered buying and holding investments to be a common investment mistakes which leads to lower returns (Charupat and Deaves, 2004; Fischer and Gerhardt, 2007; Odean, 1998). The results suggest that buying and holding investments may be a perfectly rational investment strategy which leads to higher returns.

Overconfident investors spent more time obtaining information and invested more money in property funds. However, in contrast to many previous studies that have found overconfidence to lead to lower returns, overconfidence did not lead to significantly different investment returns (Barber and Odean, 2000, 2001; Dittrich, Guth and Maciejovsky, 2001; Finke, Howe and Huston, 2011; Guiso and Jappelli, 2007; Looney et al, 2007; Odean, 1998; Pompian and Longo, 2004). Investing into property funds will normally



not incur any transaction costs, therefore, the largest cost for these investors is the time spent obtaining the extra information. It has been suggested that overconfident investors are more likely to rely on biases and use system 1 when making investment decisions (Pompian and Longo, 2004). Generally, the results do not support this and show that overconfident investors are making well thought out decisions using system 2. They spent time obtaining information before trading, invested more money into investments that are uncorrelated with other asset classes, property funds, therefore further diversifying their portfolios, relied on their own research and did not invest in what's popular. These finds show that when all asset classes are included, and overconfidence and trading behaviour is directly measured, overconfidence does not lead to poor outcomes.

The majority of behaviours that are widely viewed as not being rational or logical when they are compared to economic models appear to be sensible investment decisions that do not lead to lower returns or poor outcomes. These decisions may make perfect sense to the individual at the time of making the decision and enable them to efficiently make investment decisions in complex situations (Behaviouralinsights.co.uk, 2014; Kahneman, 2011; Sugden, 2012). When making decisions, individuals maybe making "satisfying" decisions rather than "optimal decisions" which may be a more accurate description of the decision making process rather than referring to some decisions as "irrational" or "biased" as they do not conform with economic models (Simon, 1955). A good example of this is that women were found to be more likely to invest in what's popular. Although this may be considered an irrational decision or a bias, it appears to pay off. Women held fewer investments, placed fewer trades and spent less time obtaining information, but achieved returns and levels of volatility that were not significantly different to male investors. This suggests that investing in what's popular leads to more efficient investment decisions that avoid large time costs. These findings raise questions over the heuristics approach to explaining investment decisions and the use of conventional economics as the benchmark of rationality within it.

Although many of the biases observed do not appear to lead to poor outcomes, or better outcomes, investors do appear to be unaware of these factors that influence their investment decisions. This was evidenced by just 7% of investors stating that they invest in

what's popular yet a small number of investments attracted the majority of buy trades placed during the observation period. Also, the fact that nearly half of investors were risk averse yet hardly any were willing to take a low risk low return with their investments shows that investors are not aware of the risks they are taking with their investments.

Financial advice does appear to reduce some behaviours that have been viewed as biases and moderate others. Financial advice prevented the endowment effect and anchoring with advised investors buying and selling the same investments during the observation period. Advised investors also did not make investment decisions by investing in what's popular or relying on gut instincts. This shows that advised investors are making more considered decisions and are not using shortcuts, which make these decisions less susceptible to biases. However, advised investors do appear to still suffer from some biases such as overconfidence, randomness and self-attribution bias. Overconfident investors were found to spend more time obtaining information each week and utilise the services of a financial adviser. Unlike other overconfident investors, overconfident investors who had a financial adviser did not spend significantly more time obtaining information. Showing that financial advice reduces and moderates this behaviour. Despite this, advised overconfident investors appear to still suffer from self-attribution and randomness bias. They view financial advisers as consultants who they discuss possible investments with and feel that financial advice does not lead to higher investment returns. They make their own decisions after receiving the advice and take credit for advice received, attributing it to their own skill and ability (Barberis and Thaler, 2003). However, financial advice appears to render this bias harmless as it does not impact upon the returns achieved.

The results show that self-directed investors who stated that they know investments about the same or worse than other investors and those who have a low attitude to risk held the least efficient portfolios. Less emotionally stable investors appeared to succumb to a common bias when making investment decisions as they were more likely to invest in what's popular. Therefore, investors who are not overconfident, have a low attitude to risk and are less emotionally stable may benefit most from financial advice as their underperformance appears to lie in the investments chosen rather than the risk level of portfolios.

# 10. Policy Implications

## 10.1 Previously Advised Investors

Following the introduction of the Retail Distribution Review (RDR) in the UK in June 2007 many advised investors found themselves being “orphaned” by their financial advisers. At the time of writing no academic study has investigated the impact of becoming an orphaned investor. Overall, previously advised investors behaved in a very similar way to self-directed investors, however, these investors were more likely to have a high attitude to risk and state that they do more research than others. They also spent more time each week obtaining information and were significantly less likely to be overconfident.

The extra research and lack of overconfidence suggests that these investors have increased their decisions specific knowledge (Godek and Murray, 2008). They appear to be making investment decisions using the reflective, system 2, which may have been learnt whilst receiving financial advice. Therefore, any initiatives to improve access to financial advice or customer outcomes do not need to be targeted towards these investors, RDR does not appear to have caused these investors to experience poor outcomes. Instead, an initiative aimed at improving access to advice should be targeted towards investors who are not overconfident, have a low attitude to risk and are less emotionally stable as these investors are likely to benefit most from financial advice. This is because their underperformance appears to lie in the investments chosen rather than the risk level of portfolios.

## 10.2 Assessing Risk

Overall, the results show that investors who were risk averse had an attitude to risk which was at least moderate and investors with a moderate attitude to risk had the most volatile portfolios. Despite these differences in attitudes to risk and risk aversion, investors tended to hold similar portfolios, even when asset classes were consolidated based on the risk level of assets, they also achieved similar returns, similar levels of volatility and similar risk adjusted returns. This suggests that investors self-reported attitude to risk may not be consistent with the level of risk they are actually taking or their levels of risk aversion, with investors struggling to assess the amount of risk associated with investments and being

unable to match investments to the level of risk they are willing to take. New regulations should be considered which introduce clear labels for funds around the risk level of them with fund providers and platforms having to clearly show this before any investment is made. Self-directed investors should also be offered access to comprehensive tools, which include a number of risk measures, that will enable this group of investors to assess their attitude, capacity and tolerance for risk.

### **10.3 Access to Advice**

Given the significant difference in returns achieved by advised investors, new initiatives should be put in place to encourage wider access to advice for investors and the removal of the qualification criteria for advice. This would enable more investors to access advice and achieve better outcomes.

# 11. Further Research

Only a few personality traits were found to significantly correlate with the other variables and some of the findings, especially around the impact of consciousness on trading and overconfidence, were unclear. This may be due to the fact that the Big Five personality traits may encompass a number of more specific traits called “facets” (Costa and McCrae, 1992). Each facet captures unique personality information beyond that of the Big Five traits and can help predict a number of behaviours (Costa and McCrae, 1992 and 1995; Soto et al, 2011). It may be that the Big Five traits are not sensitive enough to pick up the correlations between personality and investments behaviour. Therefore, further research should be conducted to assess how the Big Five personality trait facets impact upon investment behaviour. It could also be that the TIPI measure of personality was too short to accurately assess investors personality traits. Therefore, future research should also look to utilise longer, more thorough measures of personality.

Investors who previously had a financial adviser appeared to try to make up for the service they used to receive by spending more time obtaining information and stating that they do more research than others. As no significant differences in overconfidence were found this would suggest that these investors are making investment decisions using the reflective, system 2, which may have been learnt whilst receiving financial advice. Further work is required to assess this group of investors and the longevity of the impact of advice on investment decisions.

## 12. Limitations of the Study

During the sample period changes to regulations meant that no trail commission could be received from investment funds after April 2016. This led to investment firms switching customer holdings from one share class (dirty) to a new share class (clean). This did not affect all funds and each fund house launched their clean share classes at different times, therefore it would be extremely difficult to control for this. Therefore, it was assumed that all trades were made by the investor.

Although the data only included retail investors, as the data was taken from a large online trading platform this could include a large number of investors who want to trade stocks and shares and have the confidence that they can effectively do so. This may mean that the data includes a large number of investors who are willing to lose money in order to gain pleasure from trading. However, the measures included within the survey as well as the large sample size, which included both advised and self-directed investors, helped to ensure that the sample is representative and mitigated the risk of these potential factors skewing the results.

The sample was skewed towards older wealthier investors. This may mean that the results are not representative of the general population or mass market of investors. These investors may be more experienced, more financially literate and be more willing and able to pay for financial advice than the general population.

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# 14. Appendices

## 14.1 Appendix 1: Calculating Returns and Volatility

The dataset was very comprehensive and included all trades, inflows and outflows and balances for each investment account at six monthly intervals throughout the observation period. Although the comprehensive data enabled some of the limitations of previous studies to be overcome, inflows and outflows were directly measured and did not have to be estimated, this did pose a number of challenges when calculating returns.

Initially, Holding Period Return,  $\ln C(T-t) + (\ln V(T) - \ln V(t))/\ln V(t)$ , was used to calculate returns, where  $\ln C$  is the cashflow,  $\ln V(t)$  is the investment amount at the start of the period,  $\ln V(T)$  is the investment amount at the end of the period, and  $T-t$  is the time period between the two. However, as the dataset only included cashflow (inflows and outflows) and balances every six months, the timing of the cashflow was unknown. The investor could have made a deposit or withdrawal on the first day of the period, or the last day, which would lead to very different returns figures using the initial calculation. To address this, it was assumed that the transaction (inflow or outflow) occurred in the middle of the period in question however, when the returns figures were reviewed at an investment account level, this also produced inconsistent and unreliable results.

Consideration was then given to using the geometric mean in order to calculate returns. Unlike the arithmetic mean, which uses the sum of the values, the geometric mean indicates the central tendency of the data set by using the product of the values. The geometric mean is used to calculate the returns of indices and investment returns as it provides a better indication of movements in value compared to the arithmetic mean. If returns are logarithmically distributed, investments with the same average logarithmic returns could have different arithmetic mean returns if their standard deviations differ. Therefore, higher volatility can lead to higher average arithmetic returns, skewing the results.

However, the geometric mean is only defined for positive inner products and any negative returns would need to be made positive by adding a number which is large enough to

achieve this. Due to the format of the dataset investors can achieve returns that are greater than -100%, meaning that a large number is required to convert these negative returns into positive data values. Using a large number to modify the geometric mean calculation has the impact of making the modified geometric mean a function of the exponentiation of the arithmetic mean, removing the advantages of using the geometric mean to calculate returns.

Consideration was also given to calculating the differences of the logs using the calculation  $\log(\text{Inv}(t_2) - \log(\text{Inv}(t_1) - \text{cashflow}))$ . However, similar issues to calculating the geometric mean were encountered as the negative numbers skewed the results. Also,  $\text{Inv}(t_1) - \text{cashflow}$  could be negative if the investment had grown over the period and the investors withdrew more than the original balance. Therefore, the arithmetic mean was used to calculate returns. The arithmetic mean produced the most accurate and consistent results across the data set with the lowest number of anomalies.

Due to the format of the dataset, for each account, only a total net cashflow (inflows and outflows) could be calculated for each six monthly period. To calculate returns it was assumed that all cashflows occurred at the end of each 6 monthly period. The calculation used for each period was  $(\text{Inv}(t_2) - \text{Inv}(t_1) - \text{cashflow}) / \text{Inv}(t_1)$ . Although outliers and anomalies were removed, this did skew some of the performance figures as money may have been paid into the investment account shortly after the balance had been observed. This meant that an investor may have had nearly six months of growth on a much larger sum of money which exaggerates the return. For example, if an investor had £1000 in their investment account at point t-1 and then shortly after t-1 pay in £50,000, at point t-2, although the £50,000 payment is subtracted from the balance, the net figure includes growth on £51,000 rather than on £1000 as the calculation expects. This may lead to the returns for some accounts being higher than the actual figure. However, given the large number of accounts and the fact that returns were averaged out over a four year period, this was not considered to be a significant issue.

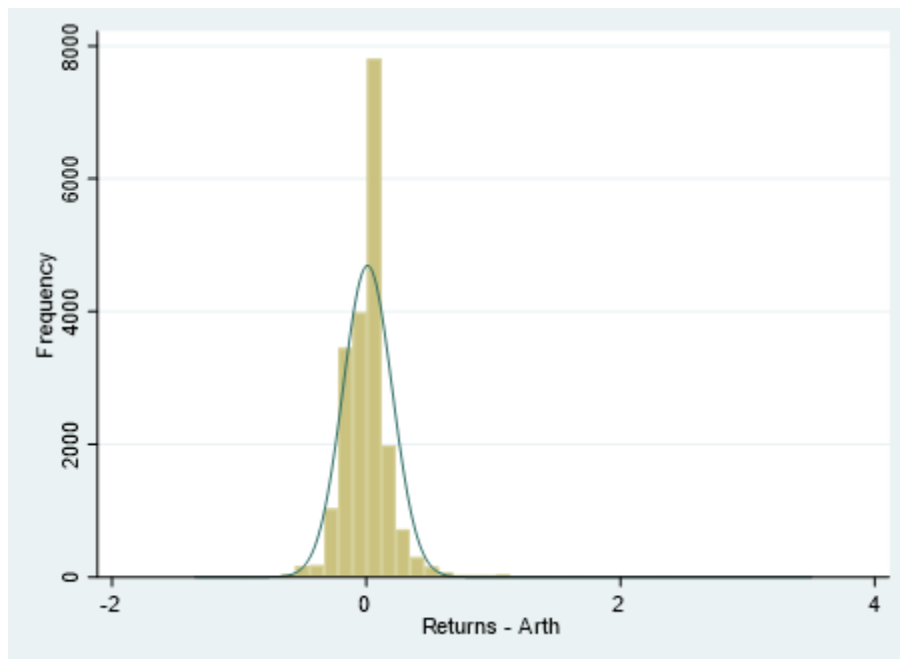
To calculate the returns data the following were removed from the raw dataset:

- All accounts with a balance of less than £1000 at each six monthly interval.
- Accounts where the balance was fully withdrawn during a six monthly period.
- Accounts open for less than six months.
- Any anomalies.
- Extreme Outliers.

After these exclusions returns data could be calculated for 20,098 investment accounts.

Once the above calculations and assumptions had been taken into account and returns had been calculated, the returns data still had a very large range, as shown in the histogram and summary statistics below.

**Chart 13.1 - Histogram - Returns**



**Table 13.1 - Summary Statistics – Advised(1) and Self-directed(0)**

AccountType	mean	p50	sd	variance	N	range	min	max	skewness	kurtosis
0	.002737	.0152789	.1935	.0374422	17261	4.760218	-1.254277	3.505941	1.426281	20.73381
1	.0606564	.0795835	.1809034	.0327261	2836	4.828576	-1.347878	3.480698	3.596191	63.77242
Total	.0109104	.0254	.1928255	.0371817	20097	4.85382	-1.347878	3.505941	1.64523	25.30749

**Table 13.2 - Summary Statistics – Female(1) and Male(0)**

sex	mean	p50	sd	variance	N	range	min	max	skewness	kurtosis
0	.008174	.0232729	.1945162	.0378365	12184	4.828576	-1.347878	3.480698	1.376825	21.46188
1	.0151236	.0277789	.1901281	.0361487	7913	4.688113	-1.182171	3.505941	2.092136	31.74411
Total	.0109104	.0254	.1928255	.0371817	20097	4.85382	-1.347878	3.505941	1.64523	25.30749

Due to the large range outliers could have an impact on the results. To help limit the impact of outliers on the results winsorizing was considered, removing the top and bottom 5% and 10% of returns observations. After analysing the data removing the top and bottom 10% did not provide any additional benefits, therefore winsorization was used to remove the top and bottom 5% of the return observations. After the winsorization the dataset included returns for 18,087 accounts.

The format of the dataset and the issues stated above led to similar issues when calculating volatility. Daily values were not included within the dataset and balances were only recorded half yearly. Therefore, calculating annualised historic volatility as the standard deviation of the square root of the variance was problematic. The square root would be the number of observations, which in this case would be four (the number of years the returns data covered), which produced very inconsistent results. A number of variations of this calculation were tested, however, none produced consistent and reliable results. Therefore, the standard deviation of half yearly returns for each account was calculated and used as a measure of volatility as this produced the most accurate and consistent results across investment accounts.

Using standard deviation as a measure of volatility assumes that investment return data is normally distributed, which is often not the case. Investment performance is typically skewed, which means that return distributions can be asymmetrical with investors experiencing abnormally high and low periods of returns. In addition, investments can exhibit abnormally large numbers of positive and/or negative periods of returns, exhibiting kurtosis. Both skewness and kurtosis can lead to investment performance data not being normally distributed. Returns data can also suffer from heteroskedasticity, as the data may not be consistent over time. All of these factors may mean that standard deviation could be an unreliable measure of volatility. However, given the format of the data and the fact that the observations are over a set period of time, standard deviation was used to measure volatility. This enabled the portfolios to be compared to one another and also to a benchmark. Whilst the limitations stated above are appreciated, standard deviation was seen to be an adequate measure of volatility for comparative purposes and for the purposes of this study.

Only investment accounts with one year or more of returns data (two data points at six monthly intervals) were included in the analysis. After removing all accounts with performance data of one year or less, 16,780 accounts were included in the analysis. In order to produce a comparative benchmark, the volatility of the FTSE All-share was calculated the same way, using the standard deviation of annual returns rather than the traditional method using daily closing values of the index.



## 14.2 Appendix 2: Description of Variables

Variable	Description
<b>Age</b>	Age was based on either the data extract from the platform provider, investor date of birth, at the end of the observation period or selected age band from the survey responses. All investors were split into 3 age groups, 45 years and below, 46 – 65 years and 66 years and over.
<b>Asset Class</b>	Value of buy trades placed over the observation period mapped to an asset class based on each funds Morningstar asset class categorisation and their asset allocation during January and February 2018 and divided by the total all buy trades placed during the observation period.
<b>Attitude to Risk</b>	Answer to risk aversion question - High return and high risk, Moderate return and moderate risk, Low risk and low return, No risk.
<b>Average Number of Trades Places</b>	The average number of trades placed across all accounts over the observation period.
<b>Average Trades</b>	Average of total trades placed across all account over the observation period.
<b>Benefits of Financial Advice</b>	Answers to the individual and combined question on benefits of advice consolidated into “Agree” “Neither Agree nor Disagree” and “Disagree”.
<b>Buy Trades</b>	Total buy trades placed during the observation period
<b>Consolidated Risk Level – No, Low, Medium and High Risk</b>	Asset Class data mapped to a risk level based on volatility.
<b>Education Level</b>	Answer to the survey question - Did not finish high school, High school or equivalent, College, University/under graduate, Post graduate.
<b>FTSE All-Share Returns</b>	Return of the FTSE All-share over the observation period. All figures based on market data from: <a href="https://www.londonstockexchange.com/statistics/ftse/ftse.htm">https://www.londonstockexchange.com/statistics/ftse/ftse.htm</a> <a href="http://www.swanlowpark.co.uk/ftseannual">http://www.swanlowpark.co.uk/ftseannual</a>
<b>FTSE All-Share Volatility</b>	Standard deviation of FTSE All-Share returns over the observation period.
<b>Household Income</b>	Answer to the survey question - £0 to £19,999, £20,000 to £39,999, £40,000 to £69,999, £70,000 to £99,999, £100,000 +.
<b>How Investment Decisions Are Made</b>	Answers to the individual and combined question on how investment decisions are made consolidated into “Agree” “Neither Agree nor Disagree” and “Disagree”.

<b>Investable Assets</b>	Answer to the survey question - 0 to £49,000, £50,000 to £99,999, £100,000 to £249,999, £250,000 to £499,999, £500,000 or more.
<b>Number of Investments Held</b>	Net number of trades, buy trades less sell trades, over the observation period. Negative numbers and zero investments removed.
<b>Overconfidence</b>	Answer to the overconfidence question transformed into a binary variable - better than others = 1 (overconfident), all other investors = 0.
<b>Personality</b>	Scores for each of the big-five personality traits assessed and calculated using the Ten Item Personality Index (TIPI).
<b>Portfolio Value</b>	Average account balance over the observation period. The average of this figure across all accounts held was used for the combined trade and survey data.
<b>Research</b>	Answer to the Research question consolidated into “more”, “about the same” and “less”.  For the trade and survey data comparison regressed as a binary variable - More Research = 1.
<b>Returns</b>	Mean return, net of all fees and charges, over the observation period.
<b>Risk Aversion</b>	Answer to risk aversion question and keyed as binary variable, risk averse = 1, not risk averse = 0.
<b>Sell Trades</b>	Total sell trades placed during the observation period
<b>Sex</b>	Keyed as a binary variable based on either the data extract from the platform provider or the survey responses. Female investors were keyed as 1 and Male 0.
<b>Sharpe Ratio</b>	Calculated using the annual average yield from British Government Securities, 10 year Nominal Par Yield (Bank of England, 2019) over the observation period as the risk free rate of the return.
<b>Time Spent Obtaining Information</b>	Answer to the time spent obtaining information question consolidated into 0-2 hours, 2-4 hours and over 4 hours.  For the trade and survey data comparison regressed as a binary variable – Over 4 hours per week = 1.
<b>Use of Advice</b>	Account designation from the data extract or the survey responses. Keyed as a binary variable – have an adviser/account advised = 1, all other investors = 0. If previously advised investors were included in the analysis - keyed as a categorical variable.
<b>Volatility</b>	Standard deviation of returns over the observation period.

### 14.3 Appendix 3: Survey

A little bit about you

1. Are you male or female?

- Male
- Female

2. What is your age?

- 18-25
- 26-35
- 36-45
- 46-55
- 56-65
- 66-75
- 76 or over

3. What is the highest level of education you have completed?

- Did not finish high school
- High school or equivalent
- College
- University/under graduate
- Post graduate
- Prefer not to answer

4. How much total combined money did all members of your HOUSEHOLD earn last year?

- £0 to £19,999
- £20,000 to £39,999
- £40,000 to £69,999
- £70,000 to £99,999
- £100,000 +
- Prefer not to answer

5. What is the total value of your household's investable assets? Investable assets include all liquid

financial assets that are, or could be invested (e.g. bank account balances, retirement accounts, trusts, etc.). Investable assets do not include businesses, real estate or other property.

- 0 to £49,000
- £50,000 to £99,999
- £100,000 to £249,999
- £250,000 to £499,999
- £500,000 or more
- Prefer not to answer

Here are a number of personality traits that may or may not apply to you. For each statement

please select the extent to which you agree or disagree with that statement. You should rate the

extent to which the pair of traits applies to you, even if one characteristic applies more strongly

than the other.

A little bit about how you see yourself

6. I see myself as extraverted, enthusiastic

- Disagree strongly
- Disagree moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

7. I see myself as critical, quarrelsome

- Disagree strongly
- Disagree moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

8. I see myself as dependable, self-disciplined

- Disagree strongly
- Disagree moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

9. I see myself as anxious, easily upset

- Disagree strongly
- Disagree moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

10. I see myself as open to new experiences, complex

- Disagree strongly
- Disagree moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

11. I see myself as reserved, quiet

- Disagree strongly
- Disagree moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

12. I see myself as sympathetic, warm

- Disagree strongly
- Disagree moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

13. I see myself as disorganized, careless

- Disagree strongly
- Disagree moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

14. I see myself as calm, emotionally stable

- Disagree strongly
- Disagree moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

15. I see myself as conventional, uncreative

- Disagree strongly
- Disagree moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

A little bit about how you invest

16. How much time do you usually spend, in a week, to obtain information on how to invest your savings? (think about time reading newspapers, surfing the internet, talking to your adviser, reading company balance sheets etc).

- 0-2 hours
- 2-4 hours
- 4-6 hours
- Over 6 hours

17. Compared to other people who have a similar level of financial experience and knowledge, how well would you say you know investments in general?

- Much better
- somewhat better
- about the same
- somewhat worse
- much worse

18. Compared to other people who have a similar level of financial experience and knowledge, how much research would you say you do before deciding to invest?

- Much more
- somewhat more
- about the same
- somewhat less
- much less

19. With which of the following statements do you agree most?

- Risk is an uncertain event from which one can extract a profit
- Risk is an uncertain event from which one should seek protection

20. Which of the following statements comes closest to describing the amount of risk that you are willing to take when you make your financial investments?

- High return and high risk
- Moderate return and moderate risk
- Low risk and low return
- No risk

Here are a number of statements about how you make investment decisions. Please indicate next to each statement how strongly you agree or disagree with it.

A little bit about how you make investment decisions

21. When making investment decisions I delegate decisions to a financial adviser

- Strongly Disagree
- Disagree
- Neither agree or disagree
- Agree
- Strongly Agree

22. When making investment decisions I consult a financial adviser but make my own investment decisions

- Strongly Disagree
- Disagree
- Neither agree or disagree
- Agree
- Strongly Agree

23. When making investment decisions I rely on my gut instincts

- Strongly Disagree
- Disagree
- Neither agree or disagree
- Agree
- Strongly Agree

24. When making investment decisions I do my own research

- Strongly Disagree
- Disagree
- Neither agree or disagree
- Agree
- Strongly Agree

25. When making investment decisions I invest in what's popular

- Strongly Disagree
- Disagree
- Neither agree or disagree
- Agree
- Strongly Agree

A little about how you make investment decisions and financial advice

26. Which **one** of the following best describes how you make investment decisions?

- I delegate decisions to a financial adviser
- I consult a financial adviser but make my own investment decisions



- I rely on my gut instincts
- I do my own research
- I invest in what's popular

27. Which of the following best describes your use of financial advice?

- I currently have a financial adviser
- I previously had a financial adviser but now make my own investment decisions
- I have always made my own investment decisions

28. What percentage of your investable assets are currently under advice from a financial adviser?

Investable assets include all liquid financial assets that are, or could be invested (e.g. bank account

balances, retirement accounts, trusts, etc.). Investable assets do not include businesses, real estate or other property.

- 0-20%
- 20-40%
- 40-60%
- 60-80%
- 80%+
- Prefer not to say

Here are a number of statements about financial advice. Please indicate next to each statement how strongly you agree or disagree with it. If you have never had financial advice please answer based on your understanding of financial advice.

A little bit about your views of financial advice

29. A financial adviser gives me peace of mind

- Strongly Disagree
- Disagree
- Neither agree or disagree
- Agree
- Strongly Agree
- Don't Know

30. A financial adviser will help me to achieve higher investment returns

- Strongly Disagree
- Disagree
- Neither agree or disagree
- Agree

- Strongly Agree
- Don't Know

31. A financial adviser allows me to delegate investment decisions

- Strongly Disagree
- Disagree
- Neither agree or disagree
- Agree
- Strongly Agree
- Don't Know

32. A financial adviser helps me ensure that I hold a diversified investment portfolio

- Strongly Disagree
- Disagree
- Neither agree or disagree
- Agree
- Strongly Agree
- Don't Know

33. A financial adviser provides me with support

- Strongly Disagree
- Disagree
- Neither agree or disagree
- Agree
- Strongly Agree
- Don't Know

34. A financial adviser helps me to not worry about my investments

- Strongly Disagree
- Disagree
- Neither agree or disagree
- Agree
- Strongly Agree
- Don't Know

35. A financial adviser helps me to understand investments

- Strongly Disagree
- Disagree

- Neither agree or disagree
- Agree
- Strongly Agree
- Don't Know