

UNIVERSITY OF CAPE TOWN



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# INVEST LIKE A WOMAN:

## An Analysis of Investment Performance in South Africa based on Gender

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## 1: ABSTRACT

The rise in popularity of behavioural finance has illustrated how investors do not always act and invest rationally, and as such do not always maximise their utility. Researchers in the field of behavioural finance have found that certain behavioural biases that exist in humans can explain these deviations from rationality by investors, and that certain biases manifest differently between male and female investors.

Men have been found to be more overconfident in their skill in investing than women, and to rate their chances of investing successfully as greater than women rate their chances of investing successfully. Further, men have been found to display higher risk tolerances than women, stronger self attribution and self-efficacy biases, as well as a propensity to overtrade when compared to women.

A sample of 2,801 investors from a large South African investment house was analysed over a 10 year period (1 January 2003 until 31 December 2012) for differences between the genders in trading frequency, investment returns and variance of returns.

The results showed that there is a statistically significant negative correlation between trading frequency and investment returns. There was no statistically significant difference identified between trading frequency for men and women (except for single men who trade significantly more than single women), nor between the returns earned by men and women. However, the variance of the returns earned by men are statistically significantly greater than the variance of returns earned by women.

Therefore the data shows that on an absolute basis, there is no significant difference between the returns earned by men and women. However, since the variance of returns earned by women is significantly lower than the variance of male returns, it may be argued that women are better investors in a risk-adjusted basis. These results are consistent with the findings of Willows (2012).

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### 3: DECLARATION

I hereby declare that:

1. this is my own unaided work, and that each significant contribution to, and quotation in, this dissertation from the work of other people has been cited and referenced.
2. neither the substance nor any part of the thesis has been submitted in the past, or is being, or is to be submitted for a degree at this University or any other University.

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Bartosz Marszalek

January 2014

## 4: INTRODUCTION

Behavioural biases between men and women have been analysed by psychologists for many years, and have been found to affect the ways that men and women behave and act. Recent research in behavioural finance has suggested that the behavioural biases between men and women have an impact on the way men and women invest, and as a result impact on the returns that are earned by men and women. Previous studies, notably by Barber and Odean (2001) and Willows (2012) have found that these behavioural biases do in effect reduce returns earned by male and female investors.

The objective of this study is to investigate if these assumed behavioural biases affect the investment returns of men and women in South Africa, and if either gender makes for a better investor than the other.

An analysis of relevant literature will be presented to offer suitable context for the study. This provides further insight into the concepts of a rational investor, deviations that have been observed from rational investing and how the field of behavioural finance attempts to explain these deviations from rationality. This field is further investigated to determine which behavioural biases exhibit the largest differences between men and women, and how these biases manifest themselves in the investments and investment returns that men and women make.

The findings of the literature review are used to structure research questions which are investigated in this study. An explanation of the data used in this study and the manipulations, calculations and methodologies applied to calculate results in order to answer the research questions is discussed.

The results of the tests performed are then discussed and analysed in detail. Relevant literature is compared to the results found in this study where possible, and explanations for the results of tests are discussed. Any particular findings that warrant specific investigation are discussed and analysed.

Based on the findings in the study and the literature analysed, certain conclusions are made on whether there are differences in returns for men and women investors.

Any shortcomings of this study are noted, and recommendations for further studies are given, based on any anomalies that may be identified.

## 5: REPLICATION OF “SHE’S BUILT FOR IT” BY WILLOWS (2012)

This study has been set out as a replication of a study performed by G. Willows (*“She’s Built For It: Differential Investment Performance in South Africa Based on Gender”*) performed in 2012. The objective of this study was to apply the same methodology, hypothesis and research questions as Willows (2012) to a different data set and to investigate if the findings, results and conclusions reached by Willows (2012) can be generalisable or if the findings, results and conclusions were specific to the data set that was analysed by Willows (2012).

In order to make the comparison between this study and the study of Willows (2012) more direct and simpler to follow, the structure of this study has tried to replicate the structure of Willows (2012) as much as possible. The following have been replicated from Willows (2012):

- layout of the study
- table of contents
- headings, sub headings and flow of information
- research methodology
- hypothesis
- research questions
- literature reviewed, save to the extent that any new literature published post Willows (2012) has been surveyed

The major differentiating factors between this study and the study performed by Willows (2012) is the data set that has been analysed, the duration of the time frame analysed and period of time analysed.

Willows (2012) obtained data from a large South African investment house over a cross section of funds (aggregate portfolios comprising one or more unit trust investments) on an individual investor basis. Willows (2012) was able to analyse the returns of individual investors over the period 1 January 2007 to 31 December 2011.

This study has used data from a different large South African investment house and from a single fund as opposed to a cross section of funds. Further, this study has analysed a ten year period as opposed to Willows (2012) who analysed a 5 year period,

from 1 January 2003 until 31 December 2012. Thus the period covered by Willows (2012) is the contained within the time period analysed by this study.

The differences in the data sets allowed for this study to focus on the investors timing of investment (i.e. investing or disinvesting into the fund) as opposed to the asset selection in Willows (2012) (by changing from one asset class fund to another e.g. equity fund to debt fund). The longer time frame also allowed for an analysis during different stages of the market cycle, both in times of growth before the 2008 crisis and in the recession that followed the crisis.

## 6: LITERATURE REVIEW

While conventional academic finance emphasizes theories such as modern portfolio theory and the efficient market hypothesis, the emerging field of behavioural finance investigates the cognitive factors and emotional issues that impact the decision-making processes of individuals, groups, and organizations (Ricciardi & Simon, 2000).

The research into behavioural finance has suggested that there are differences in the way men and women analyse, interpret and act on information, and that gender differentials may have an effect on investment decisions made (Barber & Odean, 2001; Willows & West, 2012). Due to these differentials it can be argued that one gender may be superior to another when it comes to investment returns.

Since this study is substantially a replication of the work of Willows (2012), there is little additional literature to support this study that would not amount to an unnecessary repetition of the comprehensive review of literature conducted by Willows (2012). As such, substantially all of the literature review conducted by Willows (2012) has been appendicised in this study (Appendix 11.3). The goal of the research in the literature review in Appendix 11.3 was to explore the effects of gender on investment performance.

The research reviewed concludes that behavioural biases in investors exist and explain deviations from classical finance theory, as is evidenced in the annexed literature review. Certain cognitive trait differences exist between men and women, and these differences have an impact on the investments and investment decisions made by men and women.

The literature shows that men are more overconfident than women in investing activities and that overconfidence leads to overtrading. Risk seeking and higher risk tolerance levels have also been found to lead to overtrading, both of which are more prolific traits for men. Overtrading has been found to reduce investment returns, both by trading costs and by the wrong investment decisions being made.

It therefore follows from the literature review annexed that as men are more overconfident and more risk seeking; they should trade more and reduce their investment returns by a greater margin than women.

## 7: METHOD

### 7.1: RESEARCH QUESTIONS

An analysis of the literate review performed suggests that women make better investments than men, due to the fact that previous studies show that women, on average, earn higher returns than men.

As a result, the research questions for study will be:

1. Does trading frequency influence investor returns?
2. Do men trade more than women?
3. Do men earn lower returns than women?

Further analysis of the literate review would suggest that over trading is caused by an investor's overconfidence or their propensity to take on risk. This study does not mean to focus on what cause investors to over trade, rather the focus is on whether differences in investment returns are caused by over trading.

The null hypotheses for the study are:

- There is no difference in trading frequency between men and women.
- There is no difference in investment returns between men and women.

If the null hypotheses are rejected, the implications are that men could be trading more than women (due to their overconfidence and propensity to take on more risk), and that the result of overtrading is that men's returns are lower compared to women's', due to the larger amount of research in support of this outcome than against it.

### 7.2: RESEARCH APPROACH

#### *7.2.1: BARBER & ODEAN (2001)*

The hypotheses to be analysed in this study are very similar in nature to those of Barber and Odean (2001). Barber and Odean (2001) were able to show that overconfidence leads to overtrading and found that men were more overconfident than women. Consequently, men traded more than women. The result was that men were found to have lower investment returns than women, owing to the costs associated with the

increased number of transactions, as well as poor stock selection (Barber & Odean, 2001).

The primary set of data used by Barber and Odean (2001) was from a large discount brokerage house on the investments of 78,000 households for the six years ending in December 2006. In addition, Barber and Odean (2001) were able to obtain month end position statements as well as trades, which allowed them to reasonably estimate monthly returns from February 1991 through to January 1997. Barber and Odean (2001) focused on common stock investments only, and excluded any households who had investments in mutual funds, American depository receipts, warrants and options.

The secondary set of data used by Barber and Odean (2001) was demographic information compiled by Infobase Inc., and was provided by the brokerage house. This allowed Barber and Odean (2001) to identify the gender of 37,664 of the person who opened the account with the brokerage firm.

In addition to gender, the information compiled by Infobase Inc. included data on the marital status, the presence of children, age as well as household income. This allowed Barber and Odean (2001) to stratify their data set in order to draw more detailed conclusions.

### *7.2.2: WILLOWS (2012)*

The hypotheses to be analysed in this study are very similar in nature to those of Willows (2012). Willows (2012) was able to show that there is a statistically significant negative correlation between trading frequency and investor return. Willows (2012) found that there was no statistically significant difference in the returns earned by men and women, even though men trade significantly more than women and had statistically significant higher variances of returns than women.

Willows (2012) data set was obtained from a South African investment house. Initial specifications were given to the investment house so as to enable them to extract information relating to the gender and age of individual investors. The nature of the investment house's investment offerings were collective investment schemes (commonly referred to as unit trusts) with various risk profiles which is distinctly different from Barber and Odean's (2001) use of stock portfolios.

Willows (2012) obtained data over a cross section of funds (aggregate portfolios comprising one or more unit trust investments) on an individual investor basis. Willows (2012) was able to analyse the returns of individual investors across their unit trust investments (i.e. for the investors' portfolio) over the period 1 January 2007 to 31 December 2011.

### *7.2.3: RESEARCH STRATEGY*

As a starting point, the possible replication of Barber and Odean's (2001) or Willows (2012) studies was considered, using South African data.

A large South African investment house with records of individual investor performance and demographic information was approached. The investment house offers collective investment scheme (referred to as unit trusts) investment offerings, with each individual fund having a different risk profile to the other. This is different from Barber and Odean's (2001) approach but consistent with the approach taken by Willows (2012).

Instructions were given to the investment house to enable them to extract the information relating to the returns earned by individual investors over a certain period in an equity fund, as well as the age, gender and marital status of the individuals invested in the equity fund. The data was requested over a 10 year period, from 1 January 2003 up until 31 December 2012.

The data included only non-advised, individual investors and excluded all investments by organisations, staff and group retirement annuity clients as these investments are likely to be advised. The particular emphasis on non-advised investors is in order to allow for behavioural biases between men and women to manifest, and not to distort them with the effect of a male financial advisor perhaps investing on behalf of a female client. This approach is consistent with Barber and Odean (2001) and Willows (2012).

The data received consisted only of investments that were invested in the fund for the entire duration of the period under examination. If an investor withdrew their investment in its entirety at any point within the period and subsequently reinvested,

that investor was excluded from the sample. This was done in order to eliminate any distortion to the risk/return profile for that investor, as due to the fact that they were not invested in the fund they were not exposed to the fund's risk, and their return would not be consistent with the remainder of the fund.

#### *7.2.4: TRADING FREQUENCY*

“Trading” in this study is defined as any lump sum contribution or withdrawal from the fund. A trade count will be calculated to include all contributions and withdrawals made into the fund over the duration of the period being analysed. Regular investments such as debit orders are excluded from the study. Further, annuity withdrawals are also excluded from the study. Both debit orders and annuity withdrawals are excluded due to the fact that these are often set-up at the inception of the investment and are executed automatically. It may thus be reasonable to assume that there is less explicit consideration given to these cash flows than to lump sum contributions or withdrawals. This approach is consistent with Willows (2012).

Further, any distributions of dividends made by the fund to investors are automatically re-invested into the fund, as per the investments house's business model. These automatic re-investments were also excluded from the trade count, as there is no explicit consideration given to these cash flows. This is consistent with the approach taken for debit order investments and annuity withdrawals.

### **7.3: RESEARCH METHOD**

The data that was received from the investment house excluded any personnel data about the individual investors. The investment house allocated a random number for each investor, in order to be able to identify separate investors. This was done in order to maintain the confidentiality of the investors. The data included investments and withdrawals into the fund for some 2,802 separate investors. Each investor was identified as either male or female, and further split into married or single categories. The single investor category includes single, divorced and widowed investors. This is because divorced and widowed investors are considered to be making their own investment decisions and not potentially investing on the advice received from their spouse or investing for the household.

The returns of the individual investors were calculated using the XIRR methodology. This is similar in nature to the traditional method of calculating the internal rate of return (IRR). XIRR is the IRR when the periodicity between cash flows is not equal, i.e. when investments or withdrawals do not happen at regular intervals. This is appropriate, as investors can invest or withdraw from their investments at any point in time, and not only on a regular basis (i.e. annually, semi annually etc). The XIRR is considered acceptable as it standardises the returns for investments and withdrawals. This is because it takes into account the cash inflows and outflows into the fund on the investment return.

In some instances, it was noted that certain investors did not have information regarding their marital status. As a result, these investors were included for the calculation and analysis of results where marital status was not applicable, such as when comparing all men to all women, and excluded from any calculation and analysis of results where this information would be required.

An analysis of the respective populations was performed to identify any apparent errors or large outliers.

	<b>Lowest returns</b>	<b>Highest returns</b>
<b>1</b>	-22.07%	41 041.15%
<b>2</b>	-16.44%	429.74%
<b>3</b>	-12.96%	199.56%
<b>4</b>	-12.13%	178.19%
<b>5</b>	-11.17%	60.56%
<b>6</b>	-10.57%	53.37%

*Table 1: Lowest and highest returns*

The 41,041.15% observation was removed from the population as an outlier. This was done in order to remove the obviously aberrant effects that the outlier would have on the results of the study. All remaining observations were left in the population.

After sorting the population into the respective groups, the resulting samples are as follows:

- 1,514 men and 1,287 women for the 10 year period between 1 January 2003 and 31 December 2012, resulting in a total of 2,801 investors
- 588 single men and 487 single women for the 10 year period between 1 January 2003 and 31 December 2012, resulting in a total of 1,075 investors
- 710 married men and 673 married women for the 10 year period between 1 January 2003 and 31 December 2012, resulting in a total of 1,383 investors

## 7.4: RESEARCH PROCESS

The three research questions are discussed below in order to explain how each will be addressed.

### *7.4.1: DOES TRADING FREQUENCY INFLUENCE INVESTOR RETURN?*

A correlation test will be performed whereby the number of trades performed by each investor will be correlated to their respective returns, over the 10 year period between 1 January 2003 and 31 December 2012. The number of trades performed will be the independent variable, and the respective return will be the dependant variable.

The null hypothesis (H0) is that there is no correlation between the number of trades made by an investor and that respective investors returns.

### *7.4.2: DO MEN TRADE MORE THAN WOMEN?*

The central limit theorem states that the sampling distribution of the sample mean will move towards the normal probability distribution and the larger the number of observations in each sample, the stronger the convergence (Lind, Marchal, & Wathen, 2005). As a result, a visual men test can be performed to support the presumption of normality of the distribution.

Both the populations of men and women, and then number of trades they made respectively, were inspected visually, as shown in Appendix 11.1.1. The number of trades is not normally distributed. As a result, the 2 sample t-test cannot be used to compare the number of trades between men and women. This is due to the fact that the 2 sample t-test requires the 2 samples to follow a normal distribution, and have an equal population variance. An alternative methodology will have to be used.

A Mann-Whitney rank sum test will be used to test if the differences in the number of trades between men and women are statistically significant. This is a non-parametric test, which does not require the data to be normally distributed. This test is based on the average ranks; the data is ranked as if it were part of one sample. If the ranks of the number of trades are more or less evenly distributed between the two samples, and the average of the ranks of the two samples is more or less the same, then the null hypothesis is accepted.

The null hypothesis (H<sub>0</sub>) is that there is no difference between the number of trades (trading frequency) of men and women.

#### *7.4.3: DO MEN EARN LOWER RETURNS THAN WOMEN?*

The central limit theorem will once again be relied upon, and a visual test for normality of distributions will be performed on the populations of investor's returns.

Appendix 11.1.2 shows that the returns are normally distributed. In order to test whether any difference in the mean return of men and women for each period is statistically significant a z-test will be used. The z-test is used, as opposed to the t-test, due to the fact that the research is able to determine the standard deviation of the sample. Also, owing to the large sample size the difference between the z and t values is minor, as the t distribution approaches a normal distribution as the sample size increases (Lind et al., 2005).

The null hypothesis (H<sub>0</sub>) is that there is no correlation between the number of trades made by an investor and that respective investors returns.

### **7.5: ETHICS**

A non-disclosure agreement was signed by the author, the University of Cape Town and the investment house from which the data was obtained. This was done so that the identity of the investment house, as well as the investors within the investment house, would be protected from disclosure.

Ethical clearance was not required for the study as the study has no interest in racial differences, nor does the study make use of human participants.

## 8: RESULTS

### 8.1: DOES TRADING FREQUENCY INFLUENCE INVESTOR RETURN?

A correlation test was performed and a significantly negative correlation at the 0.01 p-level was found to exist between the number of trades performed by the investors and the respective returns of the investor (Appendix 11.2.1.1). This result is consistent with the results of Odean (1999); Barber and Odean (2000); Barber and Odean (2001); Sieck and Arkes (2005) and Willows (2012) and shows that investors would be better off buying and holding their investments instead of trading repeatedly. The decrease in returns due to trading is as a result of two events happening, namely investors incurring higher trading costs (friction) and the effect of mistimed investments.

Investors' returns are also reduced due to the trading cost that they incur as a result of more frequent trading. As the return data used in this study is net of trading costs, it follows that investors who trade more frequently have will earn lower returns. Barber and Odean (2001) found that men trade more, and as a result incur higher trading costs as a result of their overconfidence.

The effects of mistiming the market are supported by Barber et al. (2009), who found that investors trading into overpriced markets and trading out of underpriced markets had negative effects on returns earned by the investors overall. Barber et al. (2009) further found that the stocks investors sold often over performed the stocks that investors bought. Barber et al. (2009) proposed that the reason for investors mistiming the market was that investors often traded speculatively, as a result of their over confidence in their skill and the want of entertainment from their investments.

Upon further observation of Appendix 11.1.1.1, the distribution in the number of trades, it was found that 78% of investors made no trades during the period, and that 96% of investors made 4 trades or less during the period under observation. A similar finding was made by Willows (2012), and as in Willows (2012), the correlation test was re-performed with 5 categories of trades, namely 0, 1, 2, 3, and 4+. Four percent of the total population was grouped into the last category. A similar significantly negative correlation at the 0.01 p-level was found to exist between the number of trades performed and the respective returns of the investors (Appendix 11.2.1.2).

## 8.2: DO MEN TRADE MORE THAN WOMEN?

Men were found to trade more than women, however the difference in the number of trades was not statistically significant at the 95% confidence level (Appendix 11.2.2.1). The results are in contrast with findings of Barber and Odean (2001), Pompian and Longo (2004), Bengtsson et al. (2005), Loibl and Hira (2011) and Willows (2012). The above mentioned studies found the difference in the number of trades between men and women to be significant at the 95% confidence level.

It was found that men have a mean of 0.82 trades over the 10 year period, and that women had a mean of 0.56 trades over the period (appendix 11.2.2).

Willows (2012) found that men traded 1.02 times on average over the period 1 January 2007 until 31 December 2012, while women on average traded 0.68 times. Barber and Odean (2001) used portfolio turnover rates to analyse the trading frequency of men and women, and found that men turned their portfolios 0.77 times per year, compared to women who had an annual portfolio turnover rate of 0.53 times. It must be noted that Barber and Odean (2001) examined actual stock portfolios, in comparison to the collective investment scheme analysed in this study and by Willows (2012). Nevertheless, the difference in the number of trades by men and women remains apparent, even though it was found to be not significant in this study.

## 8.3: DO MEN EARN LOWER RETURNS THAN WOMEN?

No statistically significant difference at the 95% confidence level was found in the returns earned by men and women for the 10 year period ending 31 December 2012.

Men were found to have an annualised return of 16.29% and women had an annualised return of 16.26% (Appendix 11.2.3.1)

These findings are supported by Willows (2012) who also found that there was no significant difference in the returns earned by men and women over the 5 year period ending 31 December 2011, with women earning on annualised returns of 9.11% and men earning annualised returns of 9.10%. Willows (2012) did find that for the 3 year period ending 31 December 2011, men were found to earn higher returns than women

at the 95% confidence level with annualised returns of 12.38%, compared to women who earned annualised returns of 11.95%.

### *8.3.1: VARIANCE IN RETURNS*

This study has shown that overtrading does lower returns of investors, and that men trade more than women (although be that not at a statistically significant level), it has not shown that men earn lower returns than women. In fact, it has shown that men earn higher returns than women (again not statistically significant). Barclay, Litzenberger and Warner (1990) found in their study that the greater the number of trades performed by an investor, the greater the variance of returns for the investor will be. Therefore, there is reason to consider that men, who were found to trade more than women, will have a higher volatility of returns than women. This would allow for a comparison of risk-adjusted returns for men and women.

A single sided F-test was performed on the two populations of men and women's returns to test if the populations that have equal variances. The null hypothesis ( $H_0$ ) is that women and man have the same variance of returns.

Men were found to have variance in returns of 36.43 (20.91% annualised standard deviation) and women had a variance of returns of 17.72 (14.58% annualised standard deviation), which is a statistically significant difference in variance at the  $<0.001$  p-level.

In his study regarding portfolio selection, Markowitz (1952) finds that a rational investor should, given the choice of investing in two different portfolios with the same return, should invest in the portfolio with the lower variance in returns. Having shown in this study that the returns earned by men and women are not statistically different, and that men have a statistically significant higher variance of returns, it follows that women earn better risk-adjusted returns than men. Further, it follows that a rational investor should invest in a women's portfolio.

## **8.4: GENDER DIFFERENTIAL BASED ON MARITAL STATUS?**

Statistical test to determine whether men trade more than women and whether women earn higher returns than men, both on an absolute and risk adjusted basis, were re-performed after the data was stratified into differing marital status i.e. single and

married. Those investors whose marital status could not be identified were excluded from testing.

The objective of performing an analysis based on marital status was to determine whether or not the trading frequency, return earned or variance in return between men and women within different marital status groups is any more or less statistically significant than the overall sample. The objective of this analysis was not to assess whether statistically significant differences in trading frequency, returned earned or variance in return are observable between the different marital groupings per say.

#### *8.4.1: SINGLE INVESTORS*

Single men were found to trade more than single women at the 95% confidence level, with a p-stat of 0.03 (Appendix 11.2.2.2). This is contrast to findings for all men and women, where no statistically significant difference was found in the number of trades performed. The mean number of trades performed by single men was 0.66 over the duration of the 10 year period ending 31 December 2012, compared to single women who had a mean number of trades of 0.57. It is worthwhile noting that single women had the higher maximum number of trades, 21, compared to single men who had a maximum of 20. Further, single men traded less than all men, with all men having a mean number of trades of 0.82 (Appendix 11.2.2.1), compared to 0.66 for single men (Appendix 11.2.2.2).

Single men are thought to have a higher risk tolerance than married men (Yao & Hanna, 2005), and as such should trade more than married men. The difference in the mean number of trades between married and single men is very small (0.63 compared to 0.66).

Single men earned lower returns than single women, although the difference in returns was not statistically significant at the 95% confidence level. This follows with the findings above that overtrading reduces returns. Single men were found to have an annualised return of 15.97% and single women have an annualised return of 16.26% (Appendix 11.2.3.2). This is consistent with Barber and Odean (2001) findings that single men trade more than single women, and earn lower returns as a result, and in

line with the findings for all men and women in this study as there is no statistically significant difference in returns.

It is interesting to note that even though single men trade more than single women, and have lower returns as a result, single men were found to have a lower variance of returns compared to single women (single men: 14.37, single women: 15.37 – Appendix 11.2.3.2).

Both single men and single women have lower variances in returns compared to married men and women and all men and women. This does not follow with the findings of Yao and Hanna (2005), who found that single investors have a higher risk tolerance compared to their married counterparts, and as such should also have a higher variance of returns. This anomaly should be investigated in subsequent research as such an investigation is beyond the scope of this study.

As a result, single men and single women were found to have the same returns, both on an absolute and risk adjusted basis, even though single men traded more than single women.

#### *8.4.2: MARRIED INVESTORS*

No statistically significant difference was found in the number of trades performed by married men and women (Appendix 11.2.2.3). The mean number of trades performed by married men was 0.63, compared to married women who had a mean of 0.96 trades. Married women had a higher mean number of trades than all women (0.96 compared to 0.56 – Appendix 11.2.2.1), which is supported by Agnew's, Balduzzi's and Sunden's (2003) findings that married investors trade more aggressively than all investors. The finding that there is no statistical difference in the number of trades performed by married men and women is in line with the findings for all men and women, where no statistically significant difference was found in the number of trades performed also.

It is worth noting that the mean number of trades performed by married women was greater than the mean for single woman. This finding is supported by Agnew, Balduzzi and Sunden (2003), who found that married investors trade more on average than single investors.

No statistically significant difference was found in the returns earned by married men, 16.53%, and married women, 16.33% (Appendix 11.2.3.3). Married men were found to have variance in returns of 60.28 and married women had a variance of returns of 19.15, which is a statistically significant difference in variance at the <0.001 p-level and in line with the findings for all men and women.

As in the case for all men and all women, due to the statistical significance in the variance of returns earned, married women are found to be better investors than married men on a risk adjusted basis.

## 8.5: SUMMARY OF RESULTS

The table below represents a summary of results of all statistical tests performed

	<b>Number of trades</b>	<b>Return</b>	<b>Variance in returns</b>
<i>All investors</i>	<i>NSSF</i>	<i>NSSF</i>	<i>M</i>
<i>Single investors</i>	<i>M</i>	<i>NSSF</i>	<i>NSSF</i>
<i>Married investors</i>	<i>NSSF</i>	<i>NSSF</i>	<i>M</i>

*Table 2 – Summary of results*

*M: Men’s trade frequency, return, or variance in returns is statistically significantly higher than women’s at the 95% confidence level*

*W: Women’s trade frequency, return, or variance in returns is statistically significantly higher than men’s at the 95% confidence level*

*NSSF: No statistically significant findings at the 95% confidence level were found*

## 9: CONCLUSION

### 9.1: DOES TRADING FREQUENCY INFLUENCE INVESTOR RETURN?

A statistically significant correlation exists between the number of trades made by investors and their respective returns. Trading frequency lowers the returns investors earn on their investments, due to the effects of friction costs and mistimed trades. Investors should buy and hold investments, as opposed to regularly trading their investments in order to maximise their return. This results is consistent with the results found by Willows (2012) in her study.

### 9.2: DO MEN TRADE MORE THAN WOMEN?

Men trade more than women, however at the 95% confidence level there is no statistically significant difference in the number of trades between men and women. This is contrast with findings of Willows (2012), who found that at the 95% confidence level, men trade more than women.

It was found that single men trade significantly more than single women, while there is no difference in the number of trades performed by married men and women at the 95% confidence level.

### 9.3: DO MEN EARN LOWER RETURNS THAN WOMEN?

No differences were found in absolute returns earned between men and women and married men and women. Further, no differences in absolute returns were found between single men and single women, even though single men trade more than single women at the 95% confidence level. These results are in line with the findings of Willows (2012).

Men were found to have a higher variance of returns than women. This is in line with the conclusion reached by Willows (2012). Similarly, married men had higher variances of returns than married women.

Due to their being no statistically significant difference in the returns earned between men and women and the statistically significant variance of returns for men, women and married women are more successful investors on a risk adjusted basis than men

and married men. No differences in risk adjusted returns were noted for single men and women.

#### 9.4: RECOMMENDATIONS AND AREAS FOR FUTURE RESEARCH

The presence in the sample of investors as young as 10 years old brings investors whose investment decisions are most likely being made by an older relative for which no information regarding gender is available in the data set used in this study (the “gender-switching” effect). Although investors under the age of 20 years only encompassed 8% of the total sample of investors, the statistical tests performed could be repeated after excluding any investors below a certain age to eliminate any contamination from gender-switching.

An anomaly was identified for single investors, were even though single men trade significantly more than single women, there was no difference in returns and variances of returns between single men and single women. This is in contrast with other results in this study, as well as with Barber and Odean (2001) and Willows (2012). This result warrants further investigation.

The data used in this study was obtained from a single investment house. It is possible that investors with similar behavioural traits invest in one type of investment house, and as a result skew the data. A larger data set obtained from a range of investment houses could be sourced to provide for greater insight and observations into the analysis of trading frequency, returns and variance of returns.

An analysis based on marital status was performed in order to inspect if results obtained for all men and women were supported by the results based on marital status. No statistical comparison was performed between single and married investors. Further statistical testing could be performed to analyse the differences in trading frequency, returns and variance of returns between married and single investors.

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# 11: APPENDIXES

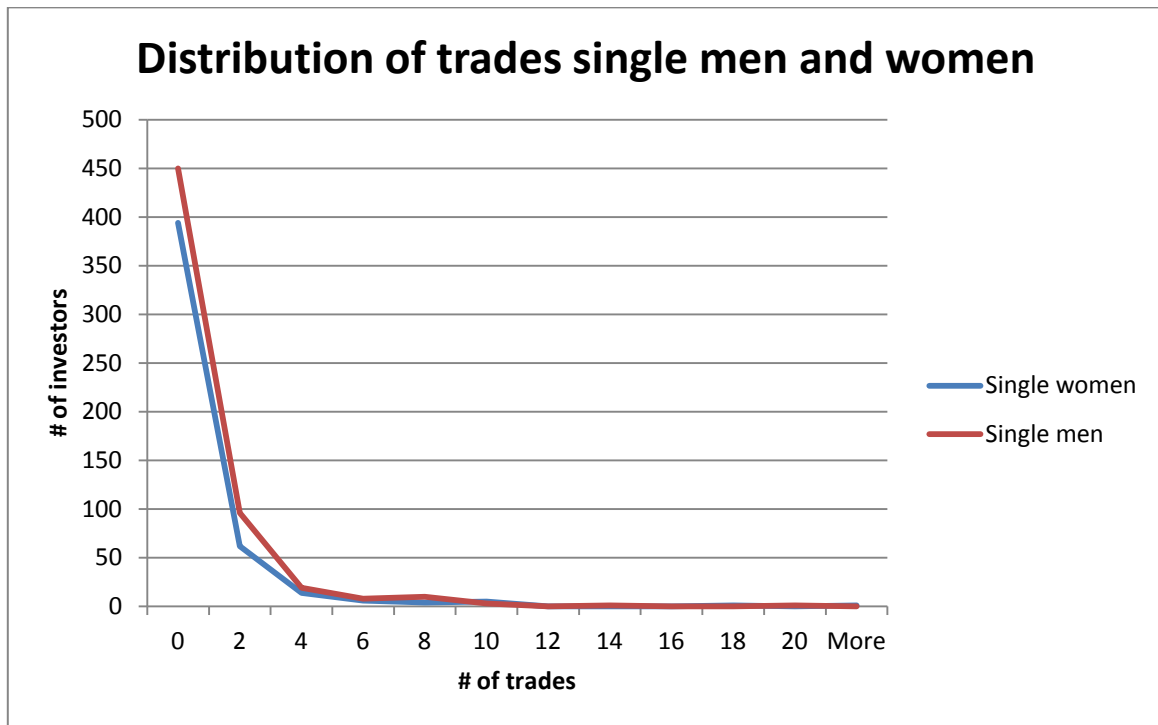
## APPENDIX 11.1: VISUAL TEST FOR NORMAL DISTRIBUTIONS

### 11.1.1: DISTRIBUTION OF TRADES

#### 11.1.1.1: Distribution of trades all men and women



### 11.1.1.2: Distribution of trades single men and women

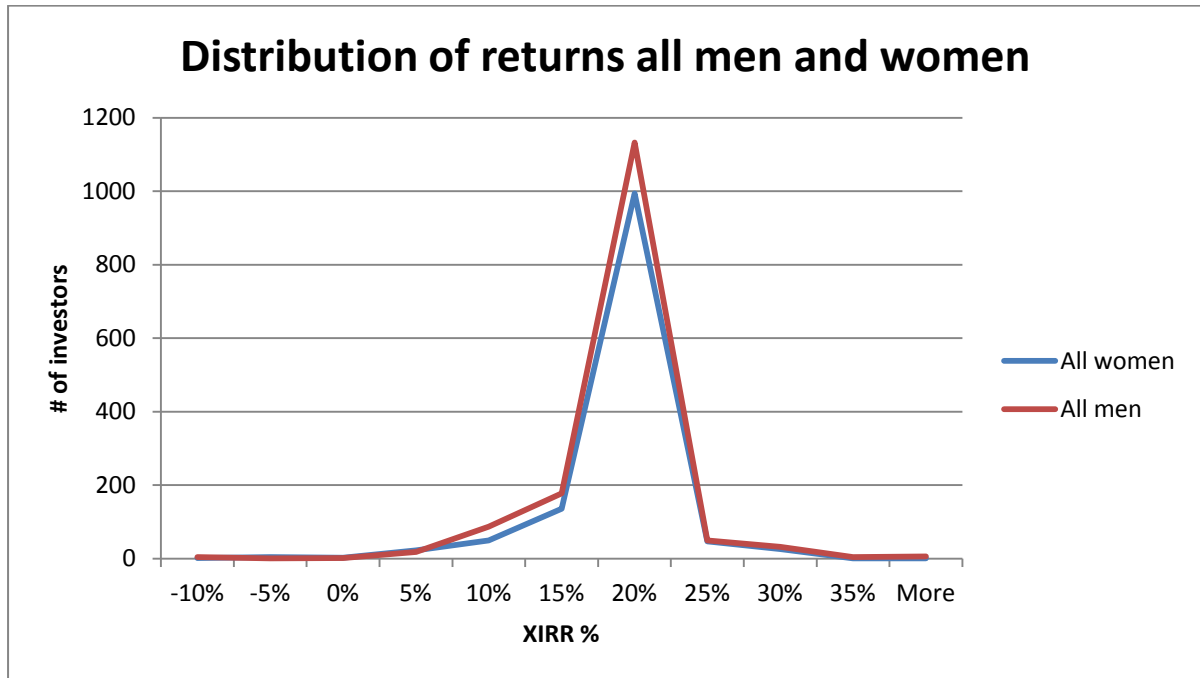


### 11.1.1.3: Distribution of trades married men and women



## 11.1.2: Distribution of returns

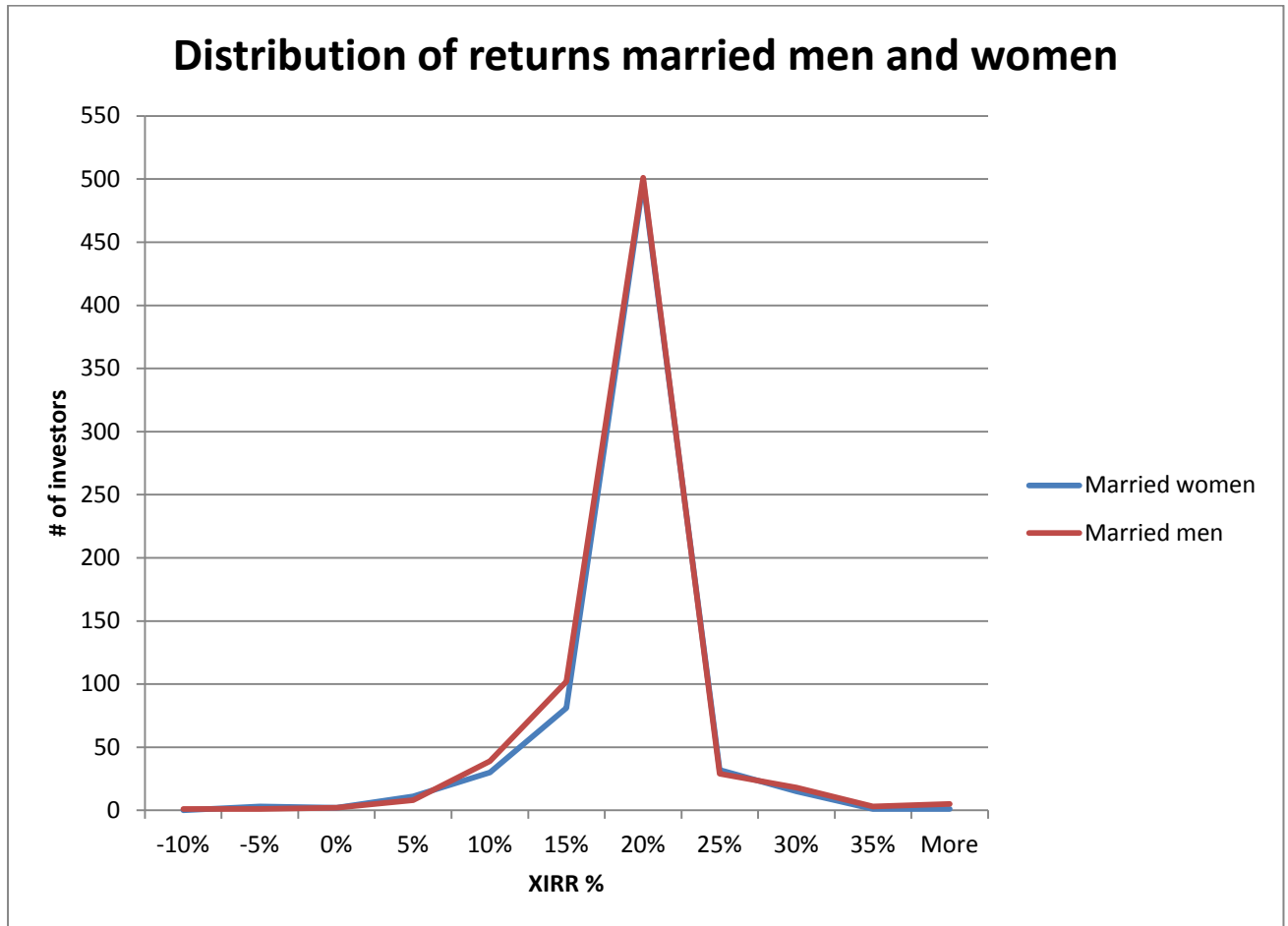
### 11.1.2.1: Distribution of returns all men and women



### 11.1.2.2: Distribution of returns single men and women



### 11.1.2.3: Distribution of returns married men and women



## APPENDIX 11.2: STATISTICAL TESTS

### 11.2.1: CORRELATION BETWEEN NUMBER OF TRADES AND RETURN

#### 11.2.1.1: All trades (0 - 47 trades)

	Trade count
<b>XIRR</b>	
Correlation coefficient	-0.044
No of observations	2,801
One-sided significance (P)	0.0104

#### 11.2.1.2: All trades (0 - 4+ trades)

	Trade count
<b>XIRR</b>	
Correlation coefficient	-0.039
No of observations	2,801
One-sided significance (P)	0.019

### 11.2.2: TWO-SAMPLE FOR MEAN NUMBER OF TRADES

#### 11.2.2.1: All men and all women

	<b>Number of Observations</b>	<b>Mean Rank</b>	<b>Maximum</b>	<b>Mean</b>	<b>Z</b>	<b>P</b>
<i>All men</i>	1,514	1408.94	47	0.82		
<i>All women</i>	1,287	1394.26	20	0.56		
<i>Total</i>	2,801				0.67 <sup>U-M</sup>	0.51

<sup>U-M</sup> Calculated using Mann-Whitney rank sum test which is a two-tailed test

#### 11.2.2.2: Single men and single women

	<b>Number of Observations</b>	<b>Mean Rank</b>	<b>Maximum</b>	<b>Mean</b>	<b>Z</b>	<b>P</b>
<i>Single men</i>	588	551.97	20	0.66		
<i>Single women</i>	487	521.13	21	0.57		
<i>Total</i>	1,075				-2.23 <sup>U-M</sup>	0.03

<sup>U-M</sup> Calculated using Mann-Whitney rank sum test which is a two-tailed test

#### 11.2.2.3: Married men and married women

	<b>Number of Observations</b>	<b>Mean Rank</b>	<b>Maximum</b>	<b>Mean</b>	<b>Z</b>	<b>P</b>
<i>Married men</i>	710	690.76	20	0.63		
<i>Married women</i>	673	693.30	36	0.96		
<i>Total</i>	1,383				0.16 <sup>U-M</sup>	0.88

<sup>U-M</sup> Calculated using Mann-Whitney rank sum test which is a two-tailed test

### 11.2.3: TWO-SAMPLE FOR MEAN RETURN AND VARIANCE IN RETURN

#### 11.2.3.1: Mean return and variance in return all men and women

	Number of Observations	Returns			Variance in returns		
		Mean	Z	P	Variance	F	P
<i>All men</i>	1,514	16.29%			36.43		
<i>All women</i>	1,287	16.26%			17.72		
<i>Total</i>	2,801		-0.48	0.42		0.49	<0.001

#### 11.2.3.2: Mean return and variance in return single men and women

	Number of Observations	Returns			Variance in returns		
		Mean	Z	P	Variance	F	P
<i>Single men</i>	588	15.97%			14.37		
<i>Single women</i>	487	16.26%			15.37		
<i>Total</i>	1,075		1.22	0.11		1.07	0.22

#### 11.2.3.3: Mean return and variance in return married men and women

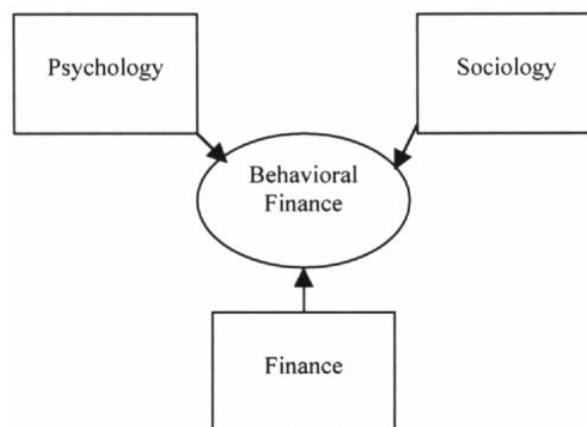
	Number of Observations	Returns			Variance in returns		
		Mean	Z	P	Variance	F	P
<i>Married men</i>	710	16.53%			60.28		
<i>Married women</i>	673	16.33%			19.15		
<i>Total</i>	1,383		-0.59	0.28		0.32	<0.001

## APPENDIX 11.3: LITERATURE REVIEW

This literature review is substantially the same as that of Willows (2012). Indeed, parts of this literature review are entirely attributable to Willows (2012). As such, it does not form part of the main body of this study and has been appendicised here.

### 11.3.1: INTRODUCTION

Research into behavioural finance and its popularity has increased over the last decade, in an attempt to understand the decision making process of individuals (Ricciardi & Simon, 2000; Subrahmanyam, 2007). According to Ricciardi and Simon (2000), behavioural finance can be broken down into 3 disciplines: psychology (the behavioural and mental processes), sociology (human social behaviour and groups) and finance (determining value and making decision).



*Figure 1: Behavioural Finance disciplines* (Ricciardi & Simon, 2000)

### 11.3.2: RATIONAL BEHAVIOUR

The efficient market hypothesis expects that individuals will act and make decisions in a way that will allow them to maximise their expected utility (Fama & French, 1992; Fama & Macbeth, 1973). However, the efficient market hypothesis theory has not always been able to explain certain empirical market patterns, such as market bubbles experienced in the U.S.A., Japan, Taiwan (Ritter, 2003) and the international financial crisis of 2008 (Willows & West, 2012). Further, individuals are expected to act rationally under the efficient market hypothesis, yet certain risk taking behaviour would suggest to the

contrary (Eckel & Grossman, 2008; Felton, Gibson, & Sanbonmatsu, 2003; Grinblatt & Keloharju, 2009; Harbaugh, Krause, & Vesterlund, 2002).

Certain errors in the way that individuals think have been found to occur when the individuals are overconfident, place too much weight on recent experiences, act on “rules of thumb” as well as act on personal preferences (Willows & West, 2012). The analysis of the way that individuals think is known as cognitive psychology, and the errors in individuals’ thought processes are known as cognitive biases. Behavioural finance is based on the assumptions that individuals do not act rationally (i.e. are not maximising their utilities), either due to personal preferences or due to cognitive biases (Ritter, 2003).

Kahneman and Tversky (1979) found that individuals do not always act in a way to maximise their utility. In particular, individuals’ underweight outcomes that are probable when compared to outcomes that are obtained with certainty. This means that individuals do not look to maximise their total utility, but would rather select options with higher probabilities than with higher total utility. Further, they found that individuals value gains differently from losses, rather than valuing the final utility of decisions made (Kahneman & Tversky, 1979). These findings point towards non rational behaviour by individuals.

A more recent study by Friedrichs and Opp (2002) found that individuals often made decisions based on their limitations and their personal preference. Certain limitations were imposed in Friedrichs and Opp’s (2002), with the major limitation being that the decisions of individuals tested in the study were ‘everyday behaviours’, defined in the Friedrichs and Opp’s (2002) study as “*behaviour that individuals engage in regularly*” (Friedrichs & Opp, 2002) with “*low opportunity cost*” (Friedrichs & Opp, 2002) and “*no need to perform calculations*” (Friedrichs & Opp, 2002). The study concluded that individuals would like to avoid making the wrong decision as well as the negative consequences that come with making the wrong decision. However, at the same time, the individual would like to make the decision as quickly as possible (Friedrichs & Opp, 2002). The study by Friedrichs and Opp’s (2002) further stated that cognitive constraints are present in the decision making process, and that this would affect the individuals’

ability to process certain relevant information, but due to the fact that the study was limited to 'everyday behaviour' it could be possible that the individuals have stored the necessary information related to that decision in their brains. A further limitation in the study of Friedrich and Opp's (2002) was that the sampled study ranged from 13 to 20 individuals, was collected in the same geographical area and that standardised questionnaires were given to these individuals. This is not a fair representation of the general population and limits any analysis into the actual decision making process that the individual will be going through.

Thus evidence shows that individuals do not always act in a rational way and that these deviations are not black swan events, but occurs on a day to day basis.

### 11.3.3: BEHAVIOURAL BIASES THAT MANIFEST

In an attempt to uncover investors biases, Pompian & Longo (2004) administered a Myers-Briggs Type Indicator® personality test and a questionnaire to 100 investors. The study found that *"men and women are markedly different in their susceptibility to behavioural biases"* (Pompian & Longo, 2004) and that men and extrovert, sensing, thinking and perceiving ('ESTP') personality types tolerate more risk than their gender and personality type opposites. Further, men with an ESTP personality type are found to be the most risk tolerant (Pompian & Longo, 2004).

From the behavioural basis that have been analysed the following biases have been identified as those that relate to differences between men and women in an investing capacity and have been analysed in detail below:

- Overconfidence
- Self-efficacy
- Self-attribution
- Time taken to reach a decision
- Use of resources
- Time spent in the market
- Disposition effect
- Risk Seeking
- Overtrading

### *11.3.3.1: OVERCONFIDENCE*

In one of the founding studies of behavioural finance, De Bondt and Thaler (1995) state that “perhaps the most robust finding in the psychology of judgements is that people are over confident”. Overconfidence reflects the tendency of individuals to overestimate their own knowledge, skills, and abilities; and therefore to overestimate their own chances of success (P. Y. K. Cheng, 2007).

In a study conducted by Fischhoff, Slovic and Lichtenstein (1977), participants were asked general knowledge questions and then had to indicate their degree of certainty in their answers were indeed correct. The results showed that the participants were consistently overconfident of their answers and even had sufficient faith in their confidence judgements to be willing to stake money on their validity.

Benos (1998) found in his study that overconfidence stemmed from individuals overestimates of the precision of their own information. This overestimate leads the individual to further overestimate the individuals’ self-value, which may not necessarily be true (Weinstein, 1980) and may result in further overconfidence. Weinstein (1980) went on to show that even if individuals are presented with proof that they are overestimating the precision of their information, the individuals still overestimate the precision of their information, although to lower degree.

Subrahmanyam (2007) alludes to the fact that male overconfidence is an evolutionary trait; where men in the past, as hunters and not gatherers, were required to be overconfident in their skills in order to take risks for the purposes of hunting and providing food.

In an experiment on 1,359 shareholders, security analysts, institutional investors and general business people, Estes and Hosseini (1988) found that “women had significantly lower confidence in an investment task than men” (Estes & Hosseini, 1988). After adjusting for experience, education and the value of the investment, women were still found to have a lower confidence than men in their investment decisions.

In a comparison between men's and women's overconfidence levels split into low knowledge and high knowledge groups, it was found that men are significantly more overconfident in both knowledge groups (Gysler, Kruse, & Schubert, 2002). Playing the lottery can be seen as an event where there is uncertainty about the outcome, known as ambiguity, which is different to the investment realm. In an investment realm the individual has a certain level of control over the outcome (Gysler et al., 2002). Men were found to be more willing to play the lottery than women. However as knowledge increased Gysler, Kruse and Schubert (2002) found that men became more risk averse (less likely to play the lottery), while women became more risk prone (more likely to play the lottery). This shows the women become more overconfident and men became less overconfident, and the gap in overconfidence narrowed. However, Bhandari and Deaves (2006) found that when there are no notable differences in men's and women's investment knowledge and that male pension plan participants in Canada are more overconfident than their female participants.

A study was performed on Macroeconomics I students at the Stockholm University by Bengtsson, Persson and Willenhag (2005) in which 5 sets of exam results (from the Fall term in 2001 to the Spring term in 2004) were analysed. The exams were structured in such a way that there were four compulsory questions. In order for a student to pass (P) the exam they must obtain a P for each of the four questions, else they will receive a fail (F) grade. If the student wishes to obtain a very good (VG) pass, the student must obtain a VG for each of the four questions, as well as a VG grade for a fifth optional question. When the student completed the four compulsory questions, they would not know whether they had obtained the four VGs, and therefore whether or not it was worthwhile answering the fifth question (as a P in any of the four question meant that they could not obtain an overall VG). Therefore the decision whether to do the fifth question was based on the students perception of their own results in the first four questions. The results showed that 78.8% of the women passed the exam, and 11.8% earned a VG grade. Among the male students, 76.5% passed the exam and 16.1% managed to obtain a VG grade, thus showing that women were better at passing the exam, while men were significantly better at passing with a VG grade. This was consistent with the findings of McNabb, Pal and Sloane (2002). Further, 87.1% of the 480 men that qualified to write the fifth question took the opportunity, while only

83.8% of 506 women that qualified took the opportunity to write the fifth question. The results show that more women had an opportunity to obtain a VG grade, while more men perceived they had the opportunity to obtain a VG grade and took that opportunity, showing that men were more overconfident in their answers for the four compulsory questions than women.

Bengtsson, Persson and Willenhag (2005) also wanted to further test if the actual exam scores by men had a variance different to women's exam scores. They did this by assigning an arbitrary value of 0 for an F, 1 for a P and 1.5 for VG in the four compulsory questions. They found that men had a higher dispersion of results than women, indicating that it might be rational for men to be more uncertain of their results, and thus to answer the fifth question (Bengtsson et al., 2005).

Bengtsson, Persson and Willenhag (2005) also split the population into two age groups, 18-22 and 22-62, and found that the difference in self assessment between men and women is more pronounced in the younger age group.

In a research project conducted on 911 U.S.A citizens across the whole of the U.S.A. with an average annual household income of \$ 126,290 in which the objective was to gain an understanding and knowledge about key factors that influence investment behaviour and the impact that these factors have on the decision making process of both men and women, Hira and Loibl (2008) found that:

1. More women reported that they wished they did not have to handle financial responsibility (men (M): 25%, woman (W): 40%)
2. Men found investing more exciting than women (M: 70%, W: 62%)
3. Men found investing more satisfying than women (M: 81%, W: 78%)
4. Men described themselves as being more confident about investing than women did (M: 70%, W: 50%)
5. Men described themselves as being more knowledgeable about investing than women did (M: 70%, W: 50%)
6. Men compared their investment performance to market benchmarks more regularly than women (M: 66%, W: 49%)

7. Men were more likely to make adjustments to their investments based on their performance. This finding is consistent with Barber and Odean's (2001) findings that men overtrade.

Barber and Odean (2001) found that overconfident investors overestimate the precision of their information and therefore expect gains from trading on their information. Further, they found men trade more than women (i.e. overtrade, discussed below) and as a result incur higher trading cost and therefore lower total returns. This study was also conducted in the U.S.A.

In a study conducted in Finland by Grinblatt and Keloharju (2009) the findings showed that overconfident investors were more disposed to over trading, thus confirming Barber's and Odean's (2001) findings in the U.S.A.

In a study performed in 1990, it was found that overconfident traders often underestimate risk and as a result hold high-risk, high-return portfolios (De Long, Shleifer, Summers, & Waldmann, 1990). As a result, the overconfident traders in the study were found to perform better than less confident traders because of the “overreaction in their assessments of mean, so that these investors exploit their information more aggressively in either a long or short direction” (De Long et al., 1990).

De Long, Shleifer, Summers and Waldmann (1990) defined overconfidence in their study as “investors who underestimate risk”. Hirshleifer and Ying Luo (2001) defined overconfidence in their study as “overestimation of the precision of private information signals”. Hirshleifer and Ying Luo (2001) went on to conclude that since the information the overconfident investors exploit is valid, their more aggressive use (in either a long or short direction) of it causes them to earn higher expected profits, thus agreeing with De Long, Shleifer, Summers and Waldmann (1990).

Neither De Long, Shleifer, Summers and Waldmann (1990) nor Hirshleifer and Ying Luo (2001) account for a situation where overconfident traders trade aggressively but incorrectly.

#### *11.3.3.2: SELF-EFFICACY AND SELF-ATTRIBUTION BIAS*

Self attribution bias occurs when people attribute successful outcomes to their own skills but blame unsuccessful outcomes on external factors (Hirshleifer and Ying Luo 2001). Hirshleifer and Ying Luo (2001) also state that self attribution bias in the learning process explains why overconfidence exists persistently. Self-efficacy is the measure of the belief in an individual's own ability to complete tasks and reach goals (Ormrod, 2006).

In a study by Gysler et al. (2002) , it was found that men perceived that their initial knowledge of a task was greater than women's as a result of their overconfidence in the ability to do the task (discussed above). This was regardless of whether the men in the study had the knowledge to do the task or not. Gysler et al. (2002) further found that as men gained knowledge in doing the task they became less confident in their ability to do the task and more risk averse. However, as women gained knowledge in doing the task, they became more confident in their skills to do the task and thus more risk seeking.

Hogan (1978) found that men judge their general intelligence as higher than women. This was a study based on self estimates of general intelligence, i.e. IQ tests. In a more recent study conducted by Rammstedt and Rammsayer (2002) based on Thurstone's primary mental abilities, it was found that men did not generally estimate their intelligence as higher than women. Rather, differences arose in self estimates within specific domains, i.e. mathematical/reasoning and artistic/cultural. Men estimated their mathematical intelligence and reasoning (cognitive) abilities as higher than women, and women estimate their artistic/musical abilities as higher than men.

Endres, Chowdhury and Alam (2008) set up a study to test whether men and women accurately perceive their self-efficacy and set personal goals in a complex financial decision situation. They found that men's self efficacy was significantly higher than women's, both men and women significantly underestimated their own self efficacy and that women were significantly less confident. They also found that women's personal goals were significantly less challenging than men's.

Where tasks are seen to be either gender neutral or feminine in nature, Beyer (1998) noted that there were no differences in self perception between men and women. However, where tasks were seen to be more masculine in nature; women

underestimated their own performance and showed a more conservative response bias. Women also showed a stronger negative recall bias by being more likely to remember the mistakes that they had made in the past than men (Beyer, 1998).

Investing is seen to be an environment that is more male orientated as it has historically been dominated by men (Barber & Odean, 2001). It would thus follow that a women's self perception in investing would be lower than a men's, and that women would underestimate their own performance in an investment environment.

Minter, Gruppen, Napolitano and Gauger (2005) found in a study conducted on surgical residence in U.S.A. that men and women assimilate success and failures differently. They found that if women perform a task well, they are more likely to attribute their success to external factors (i.e. mostly good luck), and when they perform a task poorly they will attribute that to a lack of skill. The opposite was found to be true for men, in that they will attribute good performance to their skills and bad performance to external factors (i.e. bad luck). With the self serving bias being more apparent in men it would follow that men would be more overconfident than women (Barber & Odean, 2001; Willows & West, 2012).

#### *11.3.3.3: TIME TAKEN TO REACH A DECISION AND THE USE OF RESOURCES*

In a study conducted by Powell and Ansic (1997) it was found that men take more time to make decisions than women do. This was due to the fact that men tend to use more information sources than women do to make financial decisions as well as applying multiple strategies in financial decision making, both of which are time consuming activities. Powell and Ansic (1997) noted that the use of many strategies and more information sources by men "*may explain the persistence of stereotypical attitudes about ability*" (Powell & Ansic, 1997) as men will take longer to make the decision, giving the perception that "*they know what they are doing*" (Powell & Ansic, 1997). Further, it was found that men tend to relatively over value the current state of the world, and women tend to relatively under value the current state of the world when making financial decisions (Powell & Ansic, 1997). Powell and Ansic (1997) also found that there were no differences between men and women when the decision to be made was a guess or random decision.

The difference in the way men and women seek information was further supported by Loibl and Hira (2011) who showed the differences in the type of information sources used and the frequency that these sources are accessed. Women have been found to prefer obtaining their information from financial advisors (and relying on this information) while men prefer to obtain their financial information on their own. This was supported by the fact that men were found to be more inclined to use mass media and online sources to obtain their financial information than women (Hira & Loibl, 2008; Loibla & Hira, 2006).

#### *11.3.3.4: TIME SPENT IN THE MARKET AND THE DISPOSITION EFFECT*

The disposition effect is the tendency of investors to hold losing investments too long and sell winning investments too soon (Odean, 1998a), or in other words to try ride out losses and lock in profits. Studies conducted by Odean (1998), Dhar and Zhu (2006), Grinblatt and Keloharju (2001) and Kahneman and Tversky (1979) have all documented the existence of the disposition effect among various market participants.

In two studies conducted by Feng and Seasholes (2005 and 2008) it was found that male investors are more likely to sell losers and realise their losses than their female counterparts, i.e. male investors show a lower disposition effect than female investors. In a more recent study conducted by Cheng, Lee and Lin (2013), it was again shown that woman show a stronger disposition effect than men. Cheng, Lee and Lin (2013) go on to further show that the disposition effect is stronger in more mature investors.

Men have been found to stay in the market place for a longer period of time than women regardless of the costs involved and whether they are sunk costs or not (Powell & Ansic, 1997). Powell and Ansic (1997) go on to explain that this greater amount of time spent in the market is due to the fact that men take a longer time to make a decision, as well as applying a multi strategy approach (discussed above). Further, this can also be explained by men's higher tolerance of risk (discussed below), and therefore higher tolerance of market risk by staying in the market for longer.

Grinblatt and Keloharju (2001) found that men and women have similar propensities to sell, be they winners or losers. Barber and Odean (2001) found that men traded more

often than woman, which may imply the willingness to sell could be influenced by gender.

#### *11.3.3.5: RISK SEEKING*

Hira and Loibl (2008) found that a significant factor for individuals' investment behaviour is the individuals risk tolerance level, as this will affect the investment decision making process which will in turn have an effect on the investment returns earned. Evidence has shown that gender preferential exists in risk taking preferences between men and women when it comes to financial decision making (Powell & Ansic, 1997). Feng and Seasholes (2008) found that men tend to buy riskier stocks than women and that women are more risk averse when it comes to gambles. Women have been found to be 33% more risk averse than men (Pompian & Longo, 2004).

In a study conducted by Hira and Loibl (2008), 51% of men indicated that they preferred taking on extra risk in order to earn an above average return, while 61% of women indicated that they preferred taking average, below average or no risk with their investments.

Olsen and Cox (2001) advanced two different classes of theories to explain women's generally greater perceptions of risk and response to risk. The first is that biological and evolutionary factors are responsible. Men, given a historical mating system of polygamy (to some extent), would favour more risk taking in order to gain a mate and support their offspring. However women, given their unique role as mothers, would be less risk seeking in order to ensure their offspring's survival. Zuckerman (1994) notes that women have higher levels of the enzyme monoamine oxidase, "*which retards sensation seeking*" (Zuckerman, 1994). The second class of theories suggest that social and cultural factors explain risk seeking tendencies. Olsen and Cox (2001) note that "*gender related risk-taking differences in childhood games developed only after an age when peer pressure and social expectancies became strong*", which is consistent with Slovic's (1996) findings.

Willows and West (2012) noted that from a behavioural perspective risk aversion is really loss aversion, and that women place a significantly larger emphasis on downside measure of risk and ambiguity than men do. Zinkhan and Karande (1990) found that

both female American MBA and Spanish MBA students were more risk averse in business decisions than their male counterparts, thus showing that the propensity for risk aversion is not restricted to a single culture.

Croson and Gneezy (2009) found that men and women have similar levels of social orientation, but that women's social preferences are more "*malleable*" (Croson & Gneezy, 2009), and that women are more sensitive to social cues in determining their appropriate behaviour than men are i.e. if a work culture dictates to be more risk averse, women are more likely to be more risk averse than men.

Bernasek and Shwiff (2001) found, by looking at assets allocations within defined-contribution pension funds, that women invest their pension funds more conservatively than men by allocating a smaller percentage of their pension assets to stocks than bonds (stocks being more risky than bonds).

In a study based on the Federal Reserve's Survey of Consumer Finances (SCF) conducted by Sunden and Surette (1998) on asset allocations in defined-contribution pension plans, it was found that both gender and marital status profoundly affect asset allocations. It was further found that single men chose to invest in mostly equities compared to married men and single women. It was also found that married women are more likely to invest in mostly bonds than single women (Sunden & Surette, 1998). This conclusion was supported by a later study conducted by Charness and Gneezy (2007).

In a study conducted by Yao and Hanna (2005) using all SCF cross-sectional surveys for the period 1983 – 2001 encompassing a total of 24,037 households, it was again found that both gender and marital status have a significant factor on risk tolerance levels. They found that risk tolerance levels, in descending order, were highest in:

1. Single men
2. Married men
3. Single women
4. Married women

This confirms research done by Jianakoplos and Bernasek (1998), which showed that single women are more risk averse than single men.

In a study conducted by Schubert et al. (1999) it was found that in an abstract lottery choice framing had an impact on choices made by men and women. It was also found that in the gain domain, where individuals are attempting to increase their wealth, men were significantly more risk seeking than women. However, for loss domain gambles, where individuals try to prevent losing their wealth, it was found that men are more risk averse than women. Schubert et al. (1999) went on to find that once the choices were put into context (i.e. no longer random lotteries, but as either an investment or insurance decision), framing had no impact on risk preferences between men and women. Schubert et al. (1999) concluded that *“In practice, risky financial decisions are inherently contextual. Our findings on contextual financial decisions suggest that preconceptions concerning risk attitudes of female investors and managers may be more prejudice than fact”*.

In further studies by Eckel and Grossman (2008) and Eckel and Grossman (2002), results showed that women were consistently more risk averse than men and that framing was found to have no impact on decisions made by individuals. These studies agreed with the findings of a previous study by Powell and Ansic (1997), which concluded that gender differences in risk preference do exist, but are not explained by gain and loss framing.

Block (1983) found that when a challenging (i.e. risky) environment is presented to individuals, men are more stimulated by their ego and therefore more likely to engage in the situation within the challenging environment. In Croson and Gneezy's (2009) more recent study this finding was confirmed, as it was found that men are more likely to interpret a risky situation as a challenge and pursue it while women would see the same situation as a threat.

Croson and Gneezy (2009) also found in their study that women are more reluctant than men to engage in competitive interactions and additionally that men's performance, relative to women's, is improved in a competitive environment. It is worthwhile noting that as the level of experience and professionalism was increased in the population tested, the gap in the willingness of men and women to engage in competitive activities decreased and that gap was not significant for managers and entrepreneurs.

Willows (2012) states that gender effects in decision making are dependent and contingent on individuals' sensitivity to the individual's self-efficacy. Studies by Whytel et al. (1997) and He et al. (2008) found that self-efficacy is strongly associated with increased risk taking, and that individuals with a greater belief in their own competence will take more risks than those with lower belief in their own competence.

The studies examined show consistently that men are more risk seeking than women and that women are more risk averse than men. Men also hold riskier investment portfolios than women (Bernasek & Shwiff, 2001; Feng & Seasholes, 2008; Hira & Loibl, 2008; Sunden & Surette, 1998; Yao & Hanna, 2005). Differences in risk tolerance have also been noted between both married men and women (Charness & Gneezy, 2007; Yao & Hanna, 2005). Women's risk aversion has been shown to exist across cultures (Zinkhan & Karande, 1990) and different theories have been used to try and explain the differences in risk aversion levels (Olsen & Cox, 2001; Slovic, 1996; Zuckerman, 1994). Framing was found to have no significant impact on risk aversion between men and women (Eckel & Grossman, 2008; Powell & Ansic, 1997).

#### *11.3.6: OVER TRADING*

Odean (1998b) found that overconfidence increases expected trading volumes and that the expected utility of overconfident investors is reduced. Odean (1998b) states in his study that trading volumes increase subsequent to market gains (Statman & Thorley, 1998) and that success in the market leads investors to become more overconfident (Gervais & Odean, 1997), than increases in trading volume may be driven by overconfidence.

In a continuation study performed by Odean (1999) on 10,000 discount brokerage accounts from 1987 until 1993, it was found that investors trade excessively in the sense that their returns are reduced by trading. Odean (1999) found that investors trade on average 1.44 times per year. Further, findings in the study showed that overconfident investors may trade even when their expected return from entering the trade is below the cost of trading and that, even if trading costs are excluded, investors that trade often still lower their overall returns. Odean (1999) states that "*On average, the stocks these investors buy subsequently underperform those they sell (gross of transactions costs)*" and that the worst performers are those that trade the most.

Barber and Odean (2000) performed a study on individual investors. They found that investors pay a *“tremendous performance penalty for active trading”* (Barber & Odean, 2000). They analysed 66,645 accounts at a discount broker for the period 1991 to 1996 and found that investors that trade the most earned an annual return of 11.4 %, while the average investor earned an annual return of 16.4% (the market return over the period was 17.9% annually). Barber and Odean (2000) concluded that the high trading levels and resulting poor performance can be directly explained by the overconfidence of the investors.

A year later, Barber and Odean (2001) performed a study based on 77,000 accounts at a large discount broker. They predicted that overconfident investors would trade more frequently than they should (based on findings from Barber and Odean (2000), discussed above) and that since men are more overconfident than women, men would trade more than women. They found that men turned their portfolios 0.77 times annually while women turned their portfolios 0.53 times annually (i.e. men traded 45% more than women). They also found that trading reduced men’s net returns by 2.65% and women’s net returns were reduced by 1.72% because of trading. When single men were compared to single women, Barber and Odean (2001) found that single men traded 67% more than single women, thereby reducing single men’s returns by 1.44% per year more than the returns of single women.

Agnew et al. (2003) investigated the trading behaviour of 6,778 401(k) (i.e. the U.S.A. tax defined defined-contribution pension plan) investors and found that male investors invested heavier into equities (riskier asset allocation) and traded more actively than women. The average number of annual trades for men was 0.28 while women’s average was 0.18 (i.e. men traded 56% more than women). This is a significantly lower amount of trades than was found by Barber and Odean (2001), however the percentage difference between male and female investors number of trades is still significant. Agnew et al. (2003) explained that the difference in the amount of trades between the two studies could be due to the fact that in a 401(k) plan an investor can effectively only select their asset allocations and not stock pick, which is possible for an investment in a discount broker. Marital status and the age of investors were also found to have an effect on the number of trades. Married investors were found to trade on average 0.28

times a year compared to single investors who traded 0.21 times a year (a statistically significant difference). Investors below the age of 35 traded on average 0.17 times a year while investors between the ages of 55-64 traded on average 0.60 times per year and investors over the age of 65 traded only 0.03 time a year, on average). Agnew et al. (2003) concluded that the number of trades per age group is rational due to the fact that as an individual approaches retirement age (55-64 age group) their financial wealth should have grown over time and they need to re-allocate to lower risk investments and that once retired, the investor should just be withdrawing an annuity.

In a study performed by Feng and Seasholes (2005) it was confirmed that men traded more than women but that once certain control variables were put in place, gender became less apparent in an individual's propensity to trade. In another study conducted by Feng and Seasholes (2008), men and women were given the same share and the time taken to sell the share was measured. Men were found to be 20.73% more likely to sell the share than women.

Men were found to be more likely to make adjustments to their investments by changing the investment allocations (which implies more trading by men) (Hira & Loibl, 2008). Hira and Loibl (2008) also found that men were more likely to be in charge of investing related activities than women. This supported previous findings by Lindamood and Hanna (2005) and Meier et al. (1999).

In a more recent study by Willows (2012), where 19,021 individual investors from a South African investment house were analysed over a 5 year period, results showed that there was a significant negative correlation between trading frequency and investor return. While there was no statistically significant difference in returns earned by men and women, men traded more than women and had a higher variance of returns than women did.

#### 11.3.4: GENDER DIFFERENTIALS IN BIASES

In the studies analysed above gender has been referred to as a human beings' biological sex. Social construction of gender needs to be considered when analysing differences in investment behaviour between men and women. Stronger arguments of social

construction argue that the differences in behaviour between men and women are entirely social conventions (West & Zimmerman, 1987) and not biological traits.

Felton et al. (2003) found that differences in investment strategies between men and women could be due to different sub- groups within these gender splits. They concluded that optimistic men (a sub group within the male group) were responsible for more risk-seeking behaviour amongst men, and not men as a whole.

According to Twenge (1997) masculine traits can no longer be applied to men only, and that the differences between men and women on the masculinity scale have decreased over the years. In a more recent questionnaire-based study on students at the University of Vienna it was found that men reported a higher identification with male traits than women (Meier-Pesti & Penz, 2008). The male traits identified in the study were found to influence the risk seeking behaviour of subjects. Meier-Pesti and Penz (2008) hypothesised in their study that the more people associate themselves with masculine traits, the more financial risks they tend to take, regardless of biological sex.

### 11.3.5: MARITAL STATUS DIFFERENTIALS IN BIASES

The marital status of an investor has been found to have an effect on the investment decisions made by an individual. Yao and Hanna (2005) found that single investors (both men and women) have a higher risk tolerance than their married counterparts. Sunden and Surette (1998) state in their study that researches should not only look to the gender of investor as a differentiation point but should consider both the marital status of the investor as well as the gender, as it is the combination of the two factors that best explains differentials in behavioural biases of investors.

Meier et al. (1999) found that spouses influence one another's investment decisions at the information stage (i.e. when assessing an investment) but do not influence one another's investment decisions. Further, it was found that the more experienced investor in the household will invest on behalf of the household. Another interesting finding was that a measure of "marital satisfaction" was introduced in the study and the higher the couples' marital satisfaction, the more likely it became for the more experienced investor in the household to manage the households' investment without the interference of the other spouse. This could result in less of the "gender switching"

effect being observable than expected as one spouse is managing the investment for the household, as opposed to both spouses trading on one spouse's account.

In another study performed by Bernasek and Shwiff (2001), it was found that men who have spouses or partners who are willing to take at least average risk for average return take greater risk in the allocation of their defined contribution pensions (401k plans) than men whose spouses or partners are unwilling to take any risks. On the other hand, women's response to having a spouse or partner who is willing to take at least average risk for average return in terms of taking less risk in how their pension is invested seems to indicate that they are probably less willing to take risk than their spouse or partner.

### 11.3.6: THE EFFECT OF GENDER DIFFERENTIALS ON INVESTMENT RESULTS

In Powell and Ansic's (1997) experimental analysis, financial compensation was used to reward investors based on the wealth they accumulated during the period of the experiment. The results showed that women's mean consideration was greater than that of men. Research has also shown that the stocks purchased by men underperform stocks purchased by women by 1.33 basis points (Feng & Seasholes, 2008). The same research, however, showed that the stocks that men sell dropped in value by 1.21 basis points more than the stocks that women sold.

Willows (2012) found that while there is no statistically significant difference between returns earned by men and women, men trade significantly more than women and have significantly higher variances of returns than women. Willows (2012) concluded that *"on a risk adjusted basis, women are better investors than men!"*

Barber and Odean (2001) found in their study that the difference in performance between men and women was as a result of overconfidence and risk aversion by overconfident men and women. This finding was supported by Barber et al. (2009), where two reasons were given as to why uninformed investors trade speculatively: overconfidence and entertainment.