

Does Gender Influence Investor Behavior in the Secondary Equity Market?

Dr. Renu Isidore. R*

*Research Associate, College: Loyola Institute of Business Administration,
Loyola College Campus, Nungambakkam, Chennai, Tamil Nadu, 600034, India.*

**Correspondence author*

Dr. P.Christie

*Director, Loyola Institute of Business Administration,
Loyola College Campus, Nungambakkam, Chennai, Tamil Nadu, 600034, India.*

Abstract

Research has proved that investors exhibit behavioral biases while making stock market decisions in the market owing to the emotions involved. This study examines if female investors behave differently when compared to their male counterparts. Eight behavioral biases namely, mental accounting, anchoring, gambler's fallacy, availability, loss aversion, regret aversion, representativeness and overconfidence are measured among the secondary equity investors residing in Chennai. Using Independent sample t-test, significant differences among the male and female investors are found to exist in six biases namely: mental accounting, anchoring, availability, loss aversion, regret aversion and representativeness. Female investors are found to be more prone to biases when compared to the male investors in all the six biases.

Keywords: Behavioral Finance, Behavioral Biases, Mental Accounting, Anchoring, Gambler's fallacy, Availability, Loss Aversion, Regret Aversion, Representativeness, Overconfidence, Secondary Equity Market, Equity Investors' Behavior

INTRODUCTION

In the decision of equity investment, emotions play an important role as information is abundant and uncertainties are high. With the market anomalies lining up due to the irrational behavior of the investors, academics are directed to look into psychology to explain the investor behavior (Phung, 2010). Psychologists have identified that more complex the decisions became, more is the probability of the decisions to be affected by emotions (Cianci, 2008). Moreover, Miller (1956) indicates that only seven plus or minus two pieces of information can be simultaneously processed by the human mind. Hence, in order to cope with the cognitive load which exceeds people's data processing capability, people are forced to access heuristics to facilitate decision making, hence leading to irrational decision making, (Gabaix & Laibson, 2000; Simon & Newell, 1971; Simon, 1979; Tversky & Kahneman, 1974). Kumar (2009) proves empirically that when the stocks are more difficult to value and when the market level uncertainty is on the rise, investors tend to be affected by stronger biases. Hence investors have the tendency

to make larger financial blunders, when valuation anxiety is high. Sahi et al. (2013) suggest that understanding the investor's psychology would help to better understand the way the investment decisions are made. They referred to the biases as "designs of the investor's mind" rather than "flaws of the mind" (p.94). Behavioral biases drive the stock prices in the equity market and make them follow the behavioral cycle (Bruce, 2017).

Several researchers like Dangi and Kohli (2018) and Singh et al. (2016) have applied many behavioral biases to study the behavior of individual investors. Ahmad et al. (2017) have examined the behavior of institutional investors. Waweru N. M. et al. (2008) find that behavioral factors play an important role in the decision making process of the investor in the highly overloaded information environment. "Behavioral finance attempts to explain and improve people's awareness about psychological processes and the emotional factors that influence the invest decisions" (Virigineni and Rao, 2017, p.456).

The 1970s mark the first empirical studies on individual investor behavior. Lease, Lewellen and Schlarbaum (1974) are the first to empirically examine the transaction data of individual investors in order to determine the transaction pattern of the investors, their decision methodology, the demographics and their portfolio composition. The impact of demographics on the process of portfolio composition is examined by the Wharton survey (Blume & Friend, 1978).

In this study, eight behavioral biases namely, mental accounting, anchoring, gambler's fallacy, availability, loss aversion, regret aversion, representativeness and overconfidence are studied in a survey of the secondary equity investors residing in Chennai. Five questions on a Likert scale are used to measure each bias. The study aims to determine if the male investors behave differently when compared to the female investors with respect to the biases they are likely to exhibit. The knowledge about the behavior of male and female investors and the biases they are likely to exhibit is important to financial advisors as they can advise allocation strategies according to their emotional profile. Advisors need to do behavioral rebalancing of the investors' portfolio according to their behavioral profile and the behavioral biases they are likely to exhibit. Behavioral rebalancing helps to increase their upside potential and protect the downside

(Statman, 2018). Navigating through the consumer biases is an essential element of behavioral finance (Gipple et al., 2018). Hence knowledge of the biases each gender is likely to exhibit is key to good financial advice. Communicating with the investors becomes easy for the financial advisors and wealth managers if the biases could be identified and handled well for each gender type.

LITERATURE REVIEW

Gender is an important determinant of investor behavior (Mayfield et al., 2008). The differences in gender existed right from management styles (Claes, 1999) to money styles, their perception of money and the way money is handled (Prince, 1993). The differences are also found in terms of item-specific confidence judgments depending on the content (Lundeberg et al., 1994). Gender has an important impact on the aversion to risk taking (Barber & Odean, 2001; Byrnes et al., 1999; Felton et al., 2003; Jianakoplos & Bernasek, 1998). Kabra et al. (2010) propose that both age and gender ascertain the risk taking capacity of the investor. Bajtelsmit and Bernasek (1996) find that men and women have different investment behavior. Women are found to be more cautious in their investment decisions and also more risk averse than men. Graham et al. (2002) prove that female investors have less confidence in their investment decisions compared to men in similar cases. They also show that women more exhaustively process financial information compared to men but trade less often than men. The difference in information processing capability accounts for the difference in risk-taking and confidence levels (Graham et al., 2002). Schmidt and Sevak (2006) find difference in wealth accumulation on the basis of gender and marital status in the US households.

Bajtelsmit et al. (1999) find that women display higher aversion to risk when compared to men in the wealth distribution of their pension plans. The not so willing attitude of women to invest in high risk investments compared to men is found in several studies (Hariharan et al., 2000; Olsen & Cox, 2001). In terms of financial literacy, the female investors are found to be less than men (Worthington, 2006). Hallahan et al. (2004) also provide evidence for women having lower risk tolerance than men. The female professional investors insist on reduction of risk more than men during portfolio assignment (Olsen & Cox, 2001). Sjöberg and Engelberg (2006) find that women are lower than men in terms of risk preferences but women have higher emotional intelligence compared to men.

Men and women are compared on the basis of three main grounds namely, (i) Risk taking (ii) Confidence level and (iii) Trading level. Bajtelsmit and Bernasek (1996), Bajtelsmit, Bernasek and Jinakoplos (1999), Hariharan, Chapman and Domian (2000), Olsen and Cox (2001), Barber and Odean (2001), Felton, Gibson and Sanbonmatsu (2003), Hallahan, Faff and McKenzie (2004), and Worthington (2006) have concluded that gender plays a key role in risk aversion.

A huge brokerage firm came out with a study which suggests that after age and income are considered, gender is the third most dominant factor which determines the process of

investing (Bajtelsmit and Bernasek, 1996). Women have a general propensity to avoid the risky nonfinancial assets. Women when compared to men are more conservative investors (Sung & Hanna 1996; Hinz, McCarthy & Turner 1997; Grable & Lytton 1998).

In the research titled, "Gender Differences in Revealed Risk Taking: Evidence from Mutual Fund Investors", proposed by Dwyer and others in 2002 there is an investigation as to whether gender and the risk taking ability are related, as shown in mutual fund investment decisions. In the latest, largest and riskiest mutual fund investment decision, it is proved that women are more risk averse when compared to men. Moreover, it is also proved that the relation between gender and risk taking is weakened significantly when the knowledge of the investor in money markets and investments is controlled in a regression equation. This proves that the frequent recordings in literature saying that women are more risk averse when compared to men is substantially, though not completely explained by the knowledge gap (Dwyer et al., 2002). Ajmi (2008) administers a survey to around 1500 respondents in order to understand the determinants of risk tolerance of individual investors. The results show that men are less risk averse when compared to women, less educated investors are less likely to take risk, age is also found to be a significant factor in risk tolerance, and the wealthy investors have more risk tolerance than the less wealthy investors.

Estes and Hosseini (1988) propose that even after controlling for background and ability and when the expected outcomes of the different investments are, for all intents and purposes, equivalent, the female investors are found to have less confidence when compared to the male investors. In the research titled, "Women are Different", organized by the Investment Marketing Group of America in 1992, it is proposed that women are less confident when compared to men in their ability to make financial decisions (Schumell, 1996). In 2001, Barber and Odean prove that men are more overconfident than women in areas of finance and hence men have a propensity to trade more excessively than women. This could be demonstrated by the presence of different beliefs and preferences among the men and the women (Barber and Odean, 2001). Surekha (2017) points out the difference in wealth holding among the male and female investors and how the wealth of female investors have been lower than that of male investors historically owing to several reasons like social, emotional, etc. Singh et al. (2016) explore the role of gender among individual investors located in the National Capital Region of India and document that women investors are more prone to self-attribution bias compared to the men investors and the men investors are more prone to overconfidence bias and regret avoidance bias when compared to the women investors. Jaiswal and Kamil (2012) explore the role of gender in investment decisions. The study documents that male investors are more inclined towards growth objective and female investors on the other hand are more prone towards either both income and growth or only income objectives. The male investors are found to be more susceptible to Prospect theory and more overconfident than their female counterparts. Mittal and Vyas (2011) find evidence for risk differential among the male and female

investors. The study documents that men take more risk and are more overconfident than women whereas women on the other hand invest more in low risk – low return investments. However, they do not differ in their information accumulation efforts and information processing styles. Mahapatra and Mehta (2015) examine if gender differentiation affects investment decisions. The study shows that female investors are risk neutral and male investors have risk taking and risk averse behavior based on their safety and return prospective. When they need more return, they take more risk and when they prefer safety they are risk averse.

This research paper examines the behavioral biases suggested by Chandra and Kumar (2012) and Jayaraj (2013). The eight behavioral biases considered are elaborated below:

Mental Accounting

“Mental accounting refers to the tendency for people to separate their money into separate accounts based on a variety of subjective criteria like the source of money and intent for each account” (Jayaraj, 2013, p.25).

Investors with mental accounting bias tend to allocate investments into different accounts based on their goals which in turn prevent them from looking at positions that correlate across accounts. These investors also have the propensity to irrationally discriminate between capital returns and return from income which results in investments, where the principal gets eroded in the long run. Mental accounting could also lead to formation of under diversified portfolios owing to loyalty to employer stock and failure to treat funds as fungible. Investors also refrain from selling stocks which once reaped huge gains but has fallen now because of the mental accounting bias (Pompian, 2006).

Anchoring

“Anchoring heuristics refers to individuals’ tendency to base estimates and decisions on known ‘anchors’ or familiar positions, with an adjustment relative to this starting point” (Chandra and Kumar, 2011, p.15). Adjustments from the anchor differ based on the source of the anchor (Epley & Gilovich, 2001).

The stock market is a highly ambiguous market and with the absence of good information about the prices, the past prices naturally become anchors to determine today’s price. Hence anchoring on past prices helps to determine the current price. The concept of anchoring helps to explain international anomalies in the stock market as well. The high P/E ratio in the Tokyo market is because of the readily available anchor, the US P/E ratio which is comparatively lower (Shiller, 1999).

Gambler’s Fallacy

Ray (2008) refers to gambler’s fallacy as “a pervasive belief in regression to the mean” (p.53). That is, an upward (downward) trend should be completed by a downward (upward) trend. Hence, investors develop the propensity to

anticipate the end of a series of good (bad) returns.

Johnson and Tellis (2005) explain that the heuristic, usage of past sequential information about the asset’s performance to make suboptimal decisions, leads to gambler’s fallacy. When faced with a sequence of events, investors expect a trend projection or trend reversal (gambler’s fallacy) depending on the length of the trend (Johnson et al., 2005). If the length of the trend is short (long), trend projection (reversal) is expected. Hence when stock’s performance is valued, they are viewed as a sequence of outcomes and after a series of positive returns, once the stock is overvalued, gambler’s fallacy sets in and the trend reverses. They propose that gambler’s fallacy explains why investors hold on to losing stock in the disposition effect explained by Shefrin and Statman (1985). Investors expect a reversal in the losing stock, which is essentially a random event and hence hold on to it. The trends in the stock market are insignificant, and the current price (not the past price) is the best estimate of the future price.

Availability

Kliger and Kudryavtsev (2010) define the availability bias as the tendency to overweight latest information, as against processing all necessary information. They define and test two forms of the availability heuristic namely, outcome and risk availability. The daily market return is proxied for the outcome availability and they document that there is stronger positive (negative) stock price reactions to the analysts’ recommendation upgrades (downgrades) when accompanied by positive (negative) stock market index returns. With respect to risk availability, they document that on occasions of significant market moves, the abnormal stock price reactions to analysts’ downgrades are stronger and weaker for upgrades.

In the financial world, the availability bias serves to explain several stock market anomalies. Frieder (2004) documents that investors tend to buy after a large positive earnings surprise and sell after a large negative earnings surprise because of the availability heuristic. This thus leads to an unequal amount of buying and selling activity in the market. Order imbalance data is used to document this evidence.

Loss Aversion

Ricciardi and Simon (2000) define loss aversion as, “The idea that investors assign more significance to losses than they assign to gains. Loss aversion occurs when investors are less inclined to sell stocks at a loss than they are to sell stocks that have gained in value” (p.8). According to Kahneman and Riepe (1998), loss aversion is the result of the asymmetry between the values people place on gains and losses. According to Soman (2004), the implication of loss aversion is that a variance between two options would have a larger impact when they are framed as a variance between two disadvantages instead of a variance between two advantages.

Investors who exhibit loss aversion bias tend to hold losing stocks for too long and also sell the winners too early fearing

losses. Holding on to losing positions for prolonged time periods like for example, holding the stocks of poorly performing companies would in turn lead to high risk levels. Loss aversion also causes investors to hold undiversified portfolios (Pompian, 2006). Kahneman and Riepe (1998) suggest that the financial advisors should first assess the degree of loss aversion of the investor. Depending on that, the appropriate risk should be allocated. Highly loss averse investors would accept risky portfolios only if they are very optimistic about it and underestimate the risk.

Regret Aversion

Shefrin and Statman (1985) define regret as “an emotional feeling associated with the ex-post knowledge that a different past decision would have fared better than the one chosen” (p.781).

Kahneman and Riepe (1998) document two types of regret among stock market investors. They include, regret of commission, where the investor regrets on doing something and regret of omission, where the investor regrets on failing to do something. They relate the regret of commission to loss and regret of omission to opportunity cost. Hence, investors are more affected by regret of commission. They suggest that the financial advisor need to be more cautious about suggesting changes which are unusual for the investors as they tend to regret more for such out of character recommendations. Another important documentation is that the investors who regret errors of omission tend to take more risk than those who regret failed attempts.

Representativeness

The classic example of the representativeness bias in the finance domain is the winner-loser effect by Bondt and Thaler (1985). The investors with the representativeness bias are found to give more weightage to recent information and make predictions accordingly. This overreaction leads to mispricing, making the past winners more valued and the past losers less valued. However, in the long run, the market autocorrects and the loser portfolios beat the winner portfolios.

Kahneman and Tversky (1973) show that when employing representativeness heuristic, people have the propensity to predict the outcome based on how representative it is of the evidence, thereby ignoring the prior probabilities of the outcome and the reliability of the evidence. People tend to predict even extreme values and rare events if these are representatives. They show using both numerical predictions and categorical predictions that these predictions ignore both prior probability of the outcome and the reliability of the evidence. With respect to numerical predictions, the consistency of the inputs is an important determinant of representativeness. This in turn boosts the confidence with which the predictions are made but in the process reduce the validity. This leads to a phenomenon called illusion of validity where highly confident predictions are made in fallible situations.

Overconfidence

Barber and Odean (2000) explain overconfidence in terms of three dimensions, being overconfident about one's own capabilities, about one's level of knowledge and about one's future plans. “Human beings are overconfident about their abilities, their knowledge, and their future prospects” (Barber & Odean, 2000, p.47). The capability of the investor in the stock market is the ability to find a stock which gives higher returns than competing stocks. “Security selection can be a difficult task, and it is precisely in such difficult tasks that people exhibit the greatest overconfidence” (Odean 1998b, p.1279).

“Overconfidence is a belief that a trader's information is more precise than it actually is” (Odean, 1998a, p.1893). Investors believe that their information is more definite than it is in reality. Overconfidence could be of two ways, overconfidence in one's information and overconfidence in one's own interpretation of information (Odean, 1998a). Hence, overconfidence is exhibited in the self-generated information itself or in the perception of the available information.

Objective of the study

The main aim of this study is to determine if the female investors behave differently when compared to the male investors with respect to the behavioral biases namely, mental accounting, anchoring, gambler's fallacy, availability, loss aversion, regret aversion, representativeness and overconfidence exhibited by the secondary equity investors residing in Chennai.

SAMPLE AND METHODOLOGY

The population for the study are the secondary equity investors residing in Chennai. The samples selected for the study are the members of the Tamil Nadu Investors Association (TIA) and the clients of a popular financial services company, Integrated. The data was collected via the questionnaire survey method.

TIA was selected as it was the only formal body which allowed access to collect data from its members. During the Tamil Nadu Investors Association (TIA) meetings, 65 questionnaires were distributed. Out of these 65 questionnaires, only 61 were returned. 7 questionnaires were incomplete and hence could not be taken as valid. Among the rest of the 54 completed questionnaires, all of the filled up questionnaires were taken as eligible.

Integrated was selected as it was the only company which allowed access to collect data from its clients. The clients of Integrated were met in person and 360 copies of the questionnaire were distributed. Among the 360 questionnaires distributed, 320 questionnaires were returned, among which 15 questionnaires were incomplete and hence taken as invalid. Among the 305 completed questionnaires all the filled up questionnaires were taken as valid. 77 questionnaires were completed through online questionnaires by investors selected via snow ball sampling techniques. Thereby a total of 436

valid questionnaires were collected. Out of the 436 respondents, 322 were male investors contributing to 73.9% of the total sample and 114 were female investors contributing to 26.1% of the total sample.

Analysis of Data

The eight behavioral biases, namely: mental accounting, anchoring, gambler's fallacy, availability, loss aversion, regret aversion, representativeness and overconfidence are measured based on five questions each on a Likert scale. The scores are then added to calculate the total score of each of the biases. The reliability score of the behavioral biases measured is determined by way of Cronbach's coefficient alpha technique which indicates the acceptable internal consistency (0.826).

Independent sample t-test is used to determine if the difference between the means of the two groups divided on the basis of gender is statistically significant. Independent sample t-test has been used in a number of studies in various fields. Ellis et al. (2010) employ independent sample t-test to examine if multitasking in class influences the grade performance of business students. The mean difference in test scores of the two groups divided in terms of texting and nontexting students is determined by the independent sample t-test. Frazier et al. (2012) use independent sample t-test to examine the role of gender in self-reported symptoms of depression among patients suffering from acute coronary syndrome. Carpenter et al. (2007) employ independent sample t-test to determine the efficacy of team teaching. For the groups divided in terms of solo-taught and team-taught sections of a graduate introductory course on research and statistics, independent sample t-test helps to determine student perceptions and achievement by analysing course grades and pre-post differences in achievement.

Among the eight behavioral biases analysed, only for six biases namely: mental accounting, anchoring, availability, loss aversion, regret aversion and representativeness, the difference is statistically significant.

Mental Accounting

Mental accounting bias indicates the bias in the investment decisions owing to the mental compartments in the human mind. This bias is measured in the study on a Likert scale ranging between Most likely (5) and Most unlikely (1) using the five questions: (i) You have a portfolio of say 10 stocks from different companies. If only two stocks depreciate by 50 %. Will you be worried? (ii) Do you assign different functions to different investments? For example, do you invest money in separate accounts for purposes like child's marriage, education, etc.? (iii) Do you sell all the losing stocks on the same day? (iv) Do you sell the winning stocks on different days? (v) In your equity portfolio, do you always consider the winning stocks and the losing stocks separately? The total mean is found to be 15.46 which is more than the average value of 15, thereby indicating the presence of the mental accounting bias. Table 1 indicates that the female respondents are more prone to mental accounting bias when compared to the male respondents as their means are higher.

Independent sample t-test is used to test the statistical significance of the difference. Based on the Independent sample t-test result in Table 2, (t, -2.421, p-value for one tail test, **0.008****), there is a statistically significant difference in the means of the mental accounting biases between the two groups divided on the basis of gender. This implies that the female investors (with mean, 16.16) are more prone to mental accounting bias compared to the male investors (with mean 15.21).

Table 1. Mental Accounting - Group Statistics

	Gender of the respondent	N	Mean	Std. Deviation	Std. Error Mean
Mental accounting	Male	322	15.21	3.813	0.212
	Female	114	16.16	2.799	0.262

Table 2. Mental Accounting - Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Mental accounting	Equal variances assumed	7.918	0.005	-2.421	434	0.016	-0.944	0.390	-1.710	-0.178
	Equal variances not assumed			-2.796	269.333	0.006	-0.944	0.337	-1.608	-0.279

Anchoring

Anchoring bias indicates the bias in the investment decisions owing to the usage of anchors like the purchase price of the stock while making stock investment decisions. This bias is measured in the study on a Likert scale ranging between Most likely (5) and Most unlikely (1) using the five questions: (i) You purchased some stock at a price of Rs. 2000. The price of that stock has come to Rs. 1500. You get to know some bad news about the company, also. You are advised to sell it. You do not want to sell it as you believe that the prices will go back to Rs. 2000 (the purchase price) or more. (ii) You and your friend buy the same stock at Rs. 2000, your friend however sold the stock at Rs.2500. But, you were holding on to the stock. Later, the price has fallen. You however hold your stock, waiting for the stock price to reach Rs.2500 (the price at which your friend sold the stock). (iii) Do you look at the 52 week high before you make the sell decision for a

stock? (iv) Do you look at the 52 week low before you make the buy decision for a stock? (v) You bought a stock for Rs.200. Your friend has the same stock but he bought it at Rs.100. The value of the stock now is Rs.150. Will you be worried? The total mean is found to be 16.63 which is more than the average value of 15, thereby indicating the presence of the anchoring bias. Table 3 indicates that the female respondents are more prone to anchoring bias when compared to the male respondents as their means are higher.

Independent sample t-test is used to test the statistical significance of the difference. Based on the Independent sample t-test result in Table 4, (t, -2.340, p-value for one tail test, **0.010***), there is a statistically significant difference in the means of the anchoring biases between the two groups divided on the basis of gender. This implies that the female investors (with mean, 17.34) are more prone to anchoring bias compared to the male investors (with mean 16.37).

Table 3. Anchoring - Group Statistics

	Gender of the respondent	N	Mean	Std. Deviation	Std. Error Mean
Anchoring	Male	322	16.37	4.016	0.224
	Female	114	17.34	3.226	0.302

Table 4. Anchoring - Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Anchoring	Equal variances assumed	4.484	0.035	-2.340	434	0.020	-0.976	0.417	-1.795	-0.156
	Equal variances not assumed			-2.595	245.074	0.010	-0.976	0.376	-1.716	-0.235

Availability

Availability bias indicates the bias in the investment decisions owing to the usage of the readily available information to make stock investment decisions. This bias is measured in the study on a Likert scale ranging between Most likely (5) and Most unlikely (1) using the five questions: (i) You buy stocks, which are the current flavor of the market, which are recommended by leading analysts and brokers, which are vividly displayed in the media by repeated recommendations, and about which information is readily available; you don't bother to cross check all these information before acting upon them (ii) You always consider all the necessary stock information before buying a stock and take effort to find the necessary information (iii) You generally buy a stock after continuous positive news about the stock. (iv) You generally sell a stock after continuous negative news about the stock. (v)

You prefer to buy stocks on the days when the value of the Index increases. The total mean is found to be 15.22 which is more than the average value of 15, thereby indicating the presence of the availability bias. Table 5 indicates that the female respondents are more prone to availability bias when compared to the male respondents as their means are higher.

Independent sample t-test is used to test the statistical significance of the difference. Based on the Independent sample t-test result in Table 6, (t, -2.120, p-value for one tail test, **0.0175***), there is a statistically significant difference in the means of the availability biases between the two groups divided on the basis of gender. This implies that the female investors (with mean, 15.73) are more prone to availability bias compared to the male investors (with mean 15.04).

Table 5. Availability - Group Statistics

	Gender of the respondent	N	Mean	Std. Deviation	Std. Error Mean
Availability	Male	322	15.04	3.137	.175
	Female	114	15.73	2.525	.237

Table 6. Availability - Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Availability	Equal variances assumed	2.597	0.108	-2.120	434	0.035	-0.691	0.326	-1.331	-0.050
	Equal variances not assumed			-2.349	244.542	0.020	-0.691	0.294	-1.270	-0.111

Loss Aversion

Loss aversion bias indicates the bias in the investment decisions owing to the tendency to hold on to losing stocks with the hope of price revival. This bias is measured in the study on a Likert scale ranging between Most likely (5) and Most unlikely (1) using the five questions: (i) You want to play it safe and do not want to lose even a part of your capital. So, you prefer to invest your money in safe fixed income securities (ii) Initially you had 30% of your portfolio in technology stocks. When the technology stocks fell, you gradually increased your commitment up to 100%, hoping that there would be a complete reversal. (iii) In a period of uncertainty in the stock market, when you have to sell the shares, you prefer to sell the winning stocks than the losing stocks (iv) You would sell the stock as soon as the stock price

crosses your desired price level (v) You would hold the stock till the stock reached your desired price level. The total mean is found to be 16.44 which is more than the average value of 15, thereby indicating the presence of the loss aversion bias. Table 7 indicates that the female respondents are more prone to loss aversion bias when compared to the male respondents as their means are higher.

Independent sample t-test is used to test the statistical significance of the difference. Based on the Independent sample t-test result in Table 8, (t, -2.7, p-value for one tail test, **0.0035****), there is a statistically significant difference in the means of the loss aversion biases between the two groups divided on the basis of gender. This implies that the female investors (with mean, 17.25) are more prone to loss aversion bias compared to the male investors (with mean 16.15)

Table 7. Loss Aversion - Group Statistics

	Gender of the respondent	N	Mean	Std. Deviation	Std. Error Mean
Loss Aversion	Male	322	16.15	3.810	.212
	Female	114	17.25	3.554	.333

Table 8. Loss Aversion - Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Loss Aversion	Equal variances assumed	0.132	0.717	-2.700	434	0.007	-1.102	0.408	-1.904	-0.300
	Equal variances not assumed			-2.792	211.319	0.006	-1.102	0.395	-1.881	-0.324

Regret Aversion

Regret aversion bias indicates the bias in the investment decisions owing to the tendency to follow up on the stocks already sold and thereby regret if the prices increased further. This bias is measured in the study on a Likert scale ranging between Most likely (5) and Most unlikely (1) using the five questions: (i) Before you take a decision to buy a stock you take into account all the consequences of your decision (ii) You postpone selling losing stocks as you want to avoid regretting later (iii) You speedup selling the winning stocks in order to enjoy the feeling of success (iv) Do you continue to monitor the winning stocks you have already sold and regret if the prices went up further? (v) If a stock is bought at Rs. 2000, the pain of seeing it fall to Rs.1000 is more than the joy of seeing it rise to Rs.3000. The pain of regret is always greater than the feeling of joy. The total mean is found to be 16.83

which is more than the average value of 15, thereby indicating the presence of the regret aversion bias. Table 9 indicates that the female respondents are more prone to regret aversion bias when compared to the male respondents as their means are higher.

Independent sample t-test is used to test the statistical significance of the difference. Based on the Independent sample t-test result in Table 10, (t, -1.842, p-value for one tail test, **0.033***), there is a statistically significant difference in the means of the regret aversion biases between the two groups divided on the basis of gender. This implies that the female investors (with mean, 17.36) are more prone to regret aversion bias compared to the male investors (with mean 16.62).

Table 9. Regret Aversion - Group Statistics

	Gender of the respondent	N	Mean	Std. Deviation	Std. Error Mean
Regret Aversion	Male	322	16.62	3.640	.203
	Female	114	17.36	3.730	.349

Table 10. Regret Aversion - Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Regret Aversion	Equal variances assumed	0.004	0.951	-1.842	434	0.066	-0.735	0.399	-1.520	0.049
	Equal variances not assumed			-1.820	194.272	0.070	-0.735	0.404	-1.532	0.061

Representativeness

Representativeness bias indicates the bias in the investment decisions owing to the tendency to consider the past prices as representative of the future. This bias is measured in the study on a Likert scale ranging between Most likely (5) and Most unlikely (1) using the five questions: (i) Do you think that the past performance of a stock indicates the stock's future return? (ii) Do you think it is easier to make the stock purchase decision when the stock has many positive resemblances to the past? (iii) You can see patterns in the stock prices even when the prices seem very volatile (iv) You would immediately buy a stock suggested by your favorite financial advisor/TV channel (v) You would immediately buy a stock suggested by a friend, on whose advice you had made a profit earlier. The total mean is found to be 15.9 which is

more than the average value of 15, thereby indicating the presence of the representativeness bias. Table 11 indicates that the female respondents are more prone to representativeness bias when compared to the male respondents as their means are higher.

Independent sample t-test is used to test the statistical significance of the difference. Based on the Independent sample t-test result in Table 12, (t, -2.344, p-value for one tail test, **0.01***), there is a statistically significant difference in the means of the representativeness biases between the two groups divided on the basis of gender. This implies that the female investors (with mean, 16.61) are more prone to representativeness bias compared to the male investors (with mean 15.64).

Table 11. Representativeness - Group Statistics

	Gender of the respondent	N	Mean	Std. Deviation	Std. Error Mean
Representativeness	Male	322	15.64	3.837	.214
	Female	114	16.61	3.700	.347

Table 12. Representativeness - Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Representativeness	Equal variances assumed	0.19	0.663	-2.344	434	0.020	-0.971	0.414	-1.786	-0.157
	Equal variances not assumed			-2.385	204.965	0.018	-0.971	0.407	-1.774	-0.168

SUMMARY

Table 13. ANOVA test – Bias vs. Gender

S.No	Bias	Mean (Male)	Mean (Female)	t value	p-value for one tail test
1	Mental Accounting	15.21	16.16	-2.421	0.008**
2	Anchoring	16.37	17.34	-2.340	0.010*
3	Gambler's Fallacy	15.78	15.82	-0.148	0.441
4	Availability	15.04	15.73	-2.120	0.0175*
5	Loss Aversion	16.15	17.25	-2.7	0.0035**
6	Regret Aversion	16.62	17.36	-1.842	0.033*
7	Representativeness	15.64	16.61	-2.344	0.01*
8	Overconfidence	17.02	16.86	0.370	0.36

** - rejected at 0.01 level * - rejected at 0.05 level

From the t-test results (Table 13) it is inferred that except in overconfidence and gambler’s fallacy, male and female respondents differ in all other biases. In addition, female respondents exhibit higher biases than the male respondents. Several researchers have proved that female investors are more risk averse compared to the male investors (Barber & Odean, 2001; Byrnes et al., 1999; Felton et al., 2003; Jianakoplos & Bernasek, 1998). This high risk aversion could explain the high loss aversion and regret aversion among the female investors. Worthington (2006) found that with respect to financial literacy, the female investors are found to be less than men. This could be one of the reasons for female investors to be more prone to biases than male investors.

CONCLUSION

This study examined if the female investors are more/less prone to behavioral biases when compared to the male investors by a questionnaire survey of 436 secondary equity investors residing in Chennai. Eight behavioral biases namely, mental accounting, anchoring, gambler’s fallacy, availability, loss aversion, regret aversion, representativeness and overconfidence are measured on a Likert scale. Among the eight biases measured, the mean difference among the groups divided on the basis of gender is significant for mental accounting, anchoring, availability, loss aversion, regret aversion and representativeness. The female investors are found to be more prone to biases when compared to the male investors with respect to all the six biases where the differences are significant. Hence the female investors need to

be more cautious while making investment decisions in the stock market. The financial advisors need to educate the female investors about the biases they are likely to exhibit and advise investment plans accordingly.

REFERENCES

- [1] Phung, A., 2010, "Behavioral finance," Retrieved from Investopedia website: <http://i.investopedia.com/inv/pdf/tutorials/BehavioralFinance.pdf>
- [2] Cianci, A. M., 2008, "The impact of investor status on investors' evaluation of negative and positive, separate and combined information," *The Journal of Behavioral Finance*, 9(3), pp. 117-131.
- [3] Miller, G. A., 1956, "The magical number seven, plus or minus two: Some limits on our capacity for processing information," *Psychological Review*, 63(2), pp. 81-97.
- [4] Gabaix, X., and Laibson, D., 2000, "A boundedly rational decision algorithm," *American Economic Review*, pp. 433-438.
- [5] Simon, H. A., and Newell, A., 1971, "Human problem solving: The state of the theory in 1970," *American Psychologist*, 26(2), pp. 145-159.
- [6] Simon, H. A., 1979, "Rational decision making in business organizations," *The American Economic Review*, pp. 493-513.
- [7] Tversky, A., and Kahneman, D., 1974, "Judgment under uncertainty: Heuristics and biases," *Science*, 185(4157), pp. 1124-1131.
- [8] Kumar, A., 2009, "Hard-to-value stocks, behavioral biases, and informed trading," *Journal of Financial and Quantitative Analysis*, 44(06), pp. 1375-1401.
- [9] Sahi, S. K., Arora, A. P., and Dhameja, N., 2013, "An exploratory inquiry into the psychological biases in financial investment behaviour," *Journal of Behavioral Finance*, 14(2), pp. 94-103.
- [10] Bruce, B. R., 2017, "Reflections on 25 Years of Behavioral Finance," *The Journal of Investing*.
- [11] Dangi, M., and Kohli, B., 2018, "Role of Behavioral Biases in Investment Decisions: A Factor Analysis," *Indian Journal of Finance*, 12(3), pp. 43-57.
- [12] Singh, H. P., Goyal, N., and Kumar, S., 2016, "Behavioural Biases in Investment Decisions: An Exploration of the Role of Gender," *Indian Journal of Finance*, 10(6), pp. 51-62.
- [13] Ahmad, Z., Ibrahim, H., and Tuyon, J., 2017, "Institutional investor behavioral biases: syntheses of theory and evidence," *Management Research Review*, 40(5), pp. 578-603.
- [14] Waweru, N. M., Munyoki, E., and Uliana, E., 2008, "The effects of behavioral factors in investment decision-making: A survey of institutional investors operating at the Nairobi stock exchange," *International Journal of Business and Emerging Markets*, 1(1), pp. 24-41.
- [15] Virigineni, M., and Rao, M. B., 2017, "Contemporary developments in behavioural finance," *International Journal of Economics and Financial Issues*, 7(1) Retrieved from <https://search.proquest.com/docview/1865227003?accountid=39490>
- [16] Lease, R. C., Lewellen, W. G., and Schlarbaum, G. G., 1974, "The individual investor: attributes and attitudes," *The Journal of Finance*, 29(2), pp. 413-433.
- [17] Blume, M. E., and Irwin Friend, 1978, *The changing role of the individual investor: A twentieth century report fund*, New York: John Wiley and sons.
- [18] Statman, M., PhD., 2018, "Rebalancing according to behavioral portfolio theory," *Journal of Financial Planning*, 31(2), pp. 29-31.
- [19] Gipple, Charlie, C.L.U., ChF.C., 2018, "The practice management minute... behavioral economics: Three nobel laureates can't be wrong!," *Broker World*, 38(1), 50. Retrieved from <https://search.proquest.com/docview/2013195473?accountid=39490>
- [20] Mayfield, C., Perdue, G., and Wooten, K., 2008, "Investment management and personality type," *Financial Services Review*, 17(3), pp. 219-236.
- [21] Claes, M. T., 1999, "Women, men and management styles," *International Labour Review*, 138(4), pp. 431-446.
- [22] Prince, M., 1993, "Women, men and money styles," *Journal of Economic Psychology*, 14(1), pp. 175-182.
- [23] Lundeberg, M. A., Fox, P. W., and Punčohaf, J., 1994, "Highly confident but wrong: Gender differences and similarities in confidence judgments," *Journal of Educational Psychology*, 86(1), pp. 114-21.
- [24] Barber, B. M., and Odean, T., 2001, "Boys will be boys: Gender, overconfidence, and common stock investment," *The Quarterly Journal of Economics*, 116(1), pp. 261-292.
- [25] Byrnes, J. P., Miller, D. C., and Schafer, W. D., 1999, "Gender differences in risk taking: A meta-analysis," *Psychological Bulletin*, 125(3), pp. 367-383.
- [26] Felton, J., Gibson, B., and Sanbonmatsu, D. M., 2003, "Preference for risk in investing as a function of trait optimism and gender," *The Journal of Behavioral Finance*, 4(1), pp. 33-40.
- [27] Jianakoplos, N. A., and Bernasek, A., 1998, "Are women more risk averse?," *Economic Inquiry*, 36(4), pp. 620-630.
- [28] Kabra, G., Mishra, P.K., and Dash, M. K., 2010, "Factors influencing investment decision of generations

- in India: An econometric study,” *Asian Journal of Management Research*, pp. 308-326
- [29] Bajtelsmit, V. L., and Bernasek, A., 1996, “Why do women invest differently than men?,” *Financial Counseling and Planning*, 7, pp. 1-10.
- [30] Graham, J. F., Stendardi Jr, E. J., Myers, J. K., and Graham, M. J., 2002, “Gender differences in investment strategies: An information processing perspective,” *International Journal of Bank Marketing*, 20(1), pp. 17-26.
- [31] Schmidt, L., and Sevak, P., 2006, “Gender, marriage, and asset accumulation in the United States,” *Feminist Economics*, 12(1-2), pp. 139-166.
- [32] Bajtelsmit, Vickie L., Alexandra Bernasek, and Nancy A. Jianakoplos, 1999, “Gender differences in defined contribution pension decisions,” *Financial Services Review*, 8(1), pp. 1-10.
- [33] Hariharan, G., Chapman, K. S., and Domian, D. L., 2000, “Risk tolerance and asset allocation for investors nearing retirement,” *Financial Services Review*, 9(2), pp. 159-170.
- [34] Olsen, R. A., and Cox, C. M., 2001, “The influence of gender on the perception and response to investment risk: The case of professional investors,” *The Journal of Psychology and Financial Markets*, 2(1), pp. 29-36.
- [35] Worthington, A. C., 2006, “Predicting financial literacy in Australia,” *Financial Services Review*, 15(1), pp. 59-79
- [36] Hallahan, T. A., Faff, R. W., and McKenzie, M. D., 2004, “An empirical investigation of personal financial risk tolerance,” *Financial Services Review - Greenwich-*, 13(1), pp. 57-78.
- [37] Sjöberg, L., and Engelberg, E., 2006, “Attitudes to economic risk taking, sensation seeking and values of economists specializing in finance,” SSE/EFI Working paper series in Business Administration, Centre for risk research, Stockholm School of Economics, Sweden. Retrieved from http://dynam-it.com/lennart/wp-content/uploads/downloads/2013/07/hastba2006_003.pdf
- [38] Sung, J., and Hanna, S., 1996, “Factors related to risk tolerance,” *Financial Counseling and Planning*, 7, pp. 11-20.
- [39] Hinz, R. P., McCarthy, D. D., and Turner, J. A., 1997, “Are women conservative investors? Gender differences in participant-directed pension investments,” *Positioning pensions for the twenty-first century*, pp. 91-103.
- [40] Grable, J. E., and Lytton, R. H., 1998, “Investor risk tolerance: Testing the efficacy of demographics as differentiating and classifying factors,” *Financial Counseling and Planning*, 9(1), pp. 61-73.
- [41] Dwyer, P. D., Gilkeson, J. H., and List, J. A., 2002, “Gender differences in revealed risk taking: evidence from mutual fund investors,” *Economics Letters*, 76(2), pp. 151-158.
- [42] Ajmi, J., 2008, “Risk Tolerance of Individual Investors in an Emerging Markets,” *International Research Journal of Finance and Economics*, 17, pp. 15-26.
- [43] Estes, R., and Hosseini, J., 1988, “The gender gap on Wall Street: an empirical analysis of confidence in investment decision making,” *The journal of psychology*, 122(6), pp. 577-590.
- [44] Schumell, D. G., 1996, “Trust Marketing: Increased Focus on Women as Financial Service Consumers,” *TRUSTS AND ESTATES-ATLANTA-*, 135, pp. 19-21.
- [45] Barber, B. M., and Odean, T., 2001, “Boys will be boys: Gender, overconfidence, and common stock investment,” *The quarterly journal of economics*, 116(1), pp. 261-292.
- [46] Surekha Rana, Vibha, 2017, “Marital status and Investment preferences,” *Online International Interdisciplinary Research Journal*, 7, pp. 91-98.
- [47] Jaiswal, B., and Kamil, N., 2012, “Gender, behavioral finance and the investment decision,” *IBA Business Review*, 7(2), pp. 8-22.
- [48] Mittal, M., and Vyas, R.K., 2011, “A study of psychological reasons for gender differences in preferences for risk and investment decision making,” *IUP Journal of Behavioral Finance*, 8(3), pp. 45-60.
- [49] Mahapatra, M. S., and Mehta, S., 2015, “Behavioral finance: A study on gender based dilemma in making investment decisions,” *Sumedha Journal of Management*, 4(1), pp. 4-16.
- [50] Chandra, A., and Kumar, R., 2012, “Factors influencing Indian individual investor behaviour: Survey evidence,” *Decision*, 39(3), pp. 141-167
- [51] Jayaraj, 2013, “The factor model for determining the individual investment behavior in India,” *Journal of Economics and Finance*, 1(4), pp. 21-32.
- [52] Pompian, M. M., 2006, *Behavioral finance and wealth management: How to build optimal portfolios that account for investor biases*, New Jersey: John Wiley & Sons.
- [53] Chandra, A., and Kumar, R., 2011, “Determinants of individual investor behavior: An orthogonal linear transformation approach,” (MPRA Paper No.29722), MPRA, Munich personal RePEc archive. Retrieved from <http://mpa.ub.uni-muenchen.de/29722/>
- [54] Epley, N., and Gilovich, T., 2001, “Putting adjustment back in the anchoring and adjustment heuristic: Differential processing of self-generated and experimenter-provided anchors,” *Psychological Science*, 12(5), pp. 391-396.

- [55] Shiller, R. J., 1999, "Human behavior and the efficiency of the financial system," *Handbook of Macroeconomics*, 1, pp. 1305-1340.
- [56] Ray, K.K., 2008, *Investor psychology and the behavior of stock market prices, Indian Stock Market*, Excel Books, New Delhi, 47-60.
- [57] Johnson, J., and Tellis, G. J., 2005, "Blowing bubbles: Heuristics and biases in the run-up of stock prices," *Journal of the Academy of Marketing Science*, 33(4), pp. 486-503.
- [58] Johnson, J., Tellis, G. J., and MacInnis, D. J., 2005, "Losers, winners, and biased trades," *Journal of Consumer Research*, 32(2), pp. 324-329.
- [59] Shefrin, H., and Statman, M., 1985, "The disposition to sell winners too early and ride losers too long: Theory and evidence," *The Journal of Finance*, 40(3), pp. 777-790.
- [60] Kliger, D., and Kudryavtsev, A., 2010, "The availability heuristic and investors' reaction to company-specific events," *The Journal of Behavioral Finance*, 11(1), pp. 50-65.
- [61] Frieder, L., 2004, "Evidence on behavioral biases in trading activity," Working paper, University of California, Los Angeles. Retrieved from <http://dx.doi.org/10.2139/ssrn.479983>
- [62] Riccardi, V., and Simon, H. K., 2000, "What is behavioral finance?," *Business, Education & Technology Journal*, 2(2), pp. 1-9.
- [63] Kahneman, D., and Riepe, M. W., 1998, "Aspects of investor psychology," *The Journal of Portfolio Management*, 24(4), pp. 52-65.
- [64] Soman, D., 2004, "Framing, loss aversion, and mental accounting," *Blackwell Handbook of Judgment and Decision Making*, pp. 379-398.
- [65] Bondt, W. F., and Thaler, R., 1985, "Does the stock market overreact?," *The Journal of Finance*, 40(3), pp. 793-805.
- [66] Kahneman, D., and Tversky, A., 1973, "On the psychology of prediction," *Psychological Review*, 80(4), pp. 237-251.
- [67] Barber, B., and Odean, T., 2000, "The courage of misguided convictions: The trading behavior of individual investors," *Financial Analysts Journal*, 55(6), pp. 41-55.
- [68] Odean, T., 1998b, "Are investors reluctant to realize their losses?," *The Journal of Finance*, 53(5), pp. 1775-1798.
- [69] Odean, T., 1998a, "Volume, volatility, price, and profit when all traders are above average," *The Journal of Finance*, 53(6), pp. 1887-1934.
- [70] Ellis, Y., Daniels, B., and Jauregui, A., 2010, "The effect of multitasking on the grade performance of business students," *Research in Higher Education Journal*, 8, pp. 1-10.
- [71] Frazier, L., Yu, E., Sanner, J., Liu, F., Udtha, M., Cron, S., Coulter, S., and Bogaev, R.C., 2012, "Gender differences in self-reported symptoms of depression among patients with acute coronary syndrome," *Nursing research and practice*, 2012, pp. 1-5.
- [72] Carpenter, D.M., Crawford, L., and Walden, R., 2007, "Testing the efficacy of team teaching," *Learning Environments Research*, 10(1), pp. 53-65.