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Does Age Influence Investor Behavior in the Secondary Equity Market?

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Abstract
The biological age of the investor was found to be an important factor with respect to the behavioral biases exhibited by the investors. Using a sample of 322 male secondary equity investors residing in Chennai, eight behavioral biases namely Mental Accounting, Anchoring, Gambler's Fallacy, Availability, Loss Aversion, Regret Aversion, Representativeness and Overconfidence were measured using the questionnaire survey method. When the normalised biases were divided on the basis of the age of the investor, and tested using ANOVA, the senior investors who were above 55 years old were found to be more prone to exhibit the Anchoring, Availability and Loss Aversion biases compared to the other age groups. The majority of the senior investors were found to be mainly retired individuals, with a bachelor's degree and some investment knowledge, earning low annual income and earning a mediocre actual return from stock investments. The financial advisors and wealth managers should thereby concentrate more on the aged investors who exhibit more behavioral biases compared to the other age groups and guide them to take appropriate trading strategies and investment plans.

Key words: Mental Accounting, Anchoring, Gambler's Fallacy, Availability, Loss Aversion, Regret Aversion, Representativeness, Overconfidence

INTRODUCTION

The assumption of rationality of investors has been the main foundation of most classical financial theories. A rational investor, according to Thaler (2005) is the one who always makes normatively acceptable decisions and amends his beliefs on a continuous basis based on the incoming information. Several researchers and behavioral economists have challenged this rationality assumption given the limited resources of time, money and processing capability of the human mind. According to them, the irrationality of the investors is reflected as random patterns in the stock prices in the stock market.

Several questions were raised by various researchers for the stock prices taking different random patterns. Some of these random patterns include: Short term momentum, where the stock prices continue to follow the same direction resulting in repetitive moves, thereby leading to momentum in the market; Long term reversal, where the stock prices reverse their direction in the long run; Weekend effect, where the stock returns are mostly negative on Mondays because of the negative returns on Fridays; Value premium anomaly, where the value stocks (stocks trading at prices lower than the fundamentals and hence considered undervalued) generate more returns than the growth stocks (stocks of successful companies whose prices are usually overvalued). These stock market anomalies have led to certain stocks being undervalued or overvalued.

A more practical explanation of the financial anomalies explaining the behavior of the stock market investors is necessary. Understanding the personality of the investor and the analysis of the financial market's efficiency is also important. Investors' behavior is the most important reason for most stock market anomalies which challenged the traditional paradigm of finance. It affects their decision making process in terms of their emotions, rationality and their reactions. As a result, the decisions taken by the investors are affected resulting in stock market anomalies.

This study analyses the behavior of secondary equity investors residing in Chennai in terms of eight behavioral biases suggested by Chandra and Kumar (2012) and Jayaraj (2013). The biases include Mental Accounting, Anchoring, Gambler's Fallacy, Availability, Loss Aversion, Regret Aversion, Representativeness and Overconfidence.Each behavioral bias leads to different investor behavior. Mental Accounting bias causes the investor to see the winning and losing stocks separately in different mental accounts in the mind. Anchoring bias causes the investor to adjust all the trading decisions based on an anchor like the purchase price of the stock. Gambler's Fallacy causes the investors to anticipate the rise or fall of a stock market trend. Availability bias causes the investors to look at only the readily available information before making a stock market decision. Loss Aversion bias causes investors to be averse to loss and losing stocks and hence hold them for longer periods. Regret Aversion bias causes investors to look at the stock price movements of the stocks they have already sold and makes them regret if the price increases further post the sale of the stock. Representativeness bias causes investors to assume that past prices are representative of the future stock prices. Overconfidence bias causes investors to overestimate one's skill set while taking investment decisions.

The behavioral biases measured were divided based on the biological age of the investor and the means were compared using Analysis of Variance test followed by Tukey Post hoc test. The tests revealed that the investors in the age group of above 55 years were more prone to behavioral biases when compared to the other age groups. Hence this age category of above 55 years was probed in by identifying their demographic and financial profile and generating a discriminant model.

2. Literature Review:

The demographic variable, the biological age of the investor has been used in a number of studies to analyse investor behavior. Palsson (1996) showed that with age, risk aversion increased. Riley and Chow (1992) showed that with age, risk aversion reduced; but however, increased after the retirement age of 65.They showed that risk aversion depended on various demographic factors. They recorded that risk aversion decreased with increase above the poverty line; but

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nevertheless, decreased drastically for the very rich. Mandot (2012) explored the relation between risk and demographic factors among the investors in Rajasthan. They showed that the correlation was negative between age and the level of risk taken. Sebai (2014) used account data of a Tunisian brokerage firm to study the influence of demographics on risk aversion. The study recorded that the risk aversion of the Tunisian investors increased with age. Dickason and Ferreira (2018) studied the impact of age and gender on the risk tolerance level of the investors in South Africa. They showed that investors in the age group of 50 years and above were more prone to take risk when compared to the younger investors in age groups, 35 to 49 and 16 to 34. In the age group of 35 to 49, male investors were more prone to take above average risk in comparison to female investors and in the 50+ age group, the female investors were not ready to take risk in comparison to the male investors.

Some studies showed that the age influences investor behavior negatively that is, as the age increases, the investors are less prone to behavioral biases owing to more knowledge gathered over the years.Rekik and Boujelbene (2013) surveyed investors in the Tunisian stock market and examined the influence of demographics on behavioral biases like anchoring, mental accounting, representativeness, herding behavior and loss aversion. They documented that as the older investors were more experienced they were less affected by psychological errors.Agnew and Szykman (2005) showed that younger individuals knew less compared to older individuals as aging increased financial experience and thereby financial literacy increased.Hayat et al. (2010) showed that the investors in the age group of below 30 years had less knowledge of the stock market compared to the older investors.Prosad (2014) showed that the age of the investor caused the biggest difference in the behavioral biases, then in the frequency of trading and then in the profession of the investors. Overconfidence was mostly exhibited by the male investors in the age category of 31-60 years with an annual income of either 8-11 lakhs or 2-4 lakhs. Optimism bias was mostly exhibited by men in the age category of 51-60 years with an annual income of either greater than 8 lakhs or 2-4 lakhs. Herd behavior was exhibited by the older investors in the age category of 51-60 years and the disposition effect was exhibited by the female and male investors in the age category of 31-40 years.Willows and West (2015) analysed the trading behavior of the investors in a South African investment house. They documented that women above 60 years of age earned significantly more returns compared to men and in the lower age groups, no statistically significant differences were determined in the returns gained. Men had a higher trading frequency compared to women in most age categories except in the 50 and 60 year age category and the 30 and 40 year age category. The older investors had more variance in return than the younger investors. Jamshidinavid et al. (2012) surveyed the investors in the Tehran stock market to study the effect of psychological characteristics and demographics on the investment prejudices. They showed that older investors exhibit less mass behavior. Kumar and Goyal (2016) surveyed Indian investors and showed that significant differences exist in disposition effect with reference to the age of the investor and no significant differences in herding and overconfidence in terms of the age. The young and middle- aged investors in the age group of 25 to 45 years were more likely to exhibit disposition effect when compared to the older investors.

Some studies showed that the age influences investor behavior positively that is, as the age increases, the investors are more prone to behavioral biases. Korniotis and Kumar (2011) investigated the investment decisions of elderly investors and determined that their decisions reflected higher knowledge but their investment skill reduced with age owing to the harmfulimpact of cognitive aging. Nguyen and Schuessler (2013) surveyed German investors to record the behavioral differences with respect to demographics. The study recorded that older investors exhibitedequity home bias compared to the younger investors as higher age was connected with a higher proportion of home stocks. Age was found to be negatively related to herding andanchoring biases. Chandra (2009) surveyed individual investors in the Delhi-NCR region in order to examine their trading behavior. The study documented that as the investor ages, the trading frequency reduced and the competence also diminished. The middle-aged investors were found to have higher competence and they trade more frequently compared to the younger and older investors. Lin (2011) examined the relationship between behavioral biases and demographic factors for the investors in the Taiwan equity market and showed that age of the investor was positively associated with overconfidence bias and disposition effect. Bashir et al. (2013) examined the effect of personality traits and demographics on the behavioral biases like overconfidence, herding behavior and disposition effect of the investors in Pakistan. The study documented that age was positively related to risk taking, herding and overconfidence and negatively related to disposition effect. This implied that as investors got older, disposition effect would decrease but the overconfidence bias, herding and risk taking would increase. Fares and Khamis (2011) investigated the factors affecting individual investors' stock trading behavior in the Amman stock exchange and found that the investor's age significantly influenced stock trading behavior positively.Onsomu (2015) identified the influence of age on investor decisions in the Nairobi Stock Exchange. The age categories considered were 18-30, 31-40, 41-50 and above 50. Among the disposition effect,overconfidence bias, confirmation bias and representativeness bias studied, the overconfidence bias and age were found to have a significant relationship. The relation between age and disposition effect, confirmation bias and representativeness bias were insignificant at 5% significance level. Jain andObamuyi (2013) examined the factors affecting the investment decisions of the investors in the Nigerian stock market. The study showed that age was a factor which influenced the factors influencing investors' investment decisions like past performance of the company, get-rich-quick, dividend policy, expected stock/bonus/capital increases and anticipated corporate earnings.

Some studies proved that the age of the investor did not influence investor behavior. Zaiane and Abaoub (2010) surveyed Tunisian investors to check if they were affected by the overconfidence bias. They recorded that overconfidence bias was not related to the investor's age. Geetha and Ramesh (2012) surveyed investors in the Nagapattinam district of Tamil Nadu to study the influence of demographics in investment decisions. They found that age had no significant relationship with the period of investment made by the investor. However, there was a significant relationship between age and the sources of awareness obtained by the investors.Kannadhasan (2006) found that age did not influence their investment behaviorbut, the income of the retail investor played aprominent role in moulding their behavior. Zaidi and Tauni (2012) studied the investors' behavior in the Lahore securities exchange to determine the influence of various personality traits and demographics on the overconfidence bias of the investor. They documented that age has no effect on the overconfidence bias but there was arelation between the overconfidence bias and investment experience.

3. Objective of the study:

The main focus of this study is to determine if the age of the investor played an important role with respect to the behavioral biases namely, mental accounting, anchoring, gambler's fallacy, availability, loss aversion, regret aversion, representativeness andoverconfidence exhibited by the secondary equity investors residing in Chennai.

4. 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. Integrated was selected as it was the only company which allowed access to collect data from its clients. The total valid questionnaires collected were 322 and hence the total sample size was 322.

Out of the 322 respondents, 92 respondents belonged to the age category of 35 years and below and were hence named as young investors. 108 respondents belonged to the age category of 36 to 55 years and were hence named as middle-aged investors and the remaining 122 respondents belonged to the age category of above 55 years and were hence named as senior investors. The terminology of young investors and middle-aged investors were used in studies like Kumar and Goyal (2016) and Chandra (2009).

5. Data Analysis and Discussion:

The eight behavioral biases namely, Mental Accounting, Anchoring, Gambler's Fallacy, Availability, Loss Aversion, Regret Aversion, Representativeness and Overconfidence were measured on a Likert scale with five questions to measure 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). These eight variables were normalized using the Transform function's IdfNormal command. These Normalised variables have skewness within the acceptable range of -1 to +1 and kurtosis within the acceptable range of -3 to +3 indicating normality. The descriptives of these normalised biases are given (Table1) below:

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Table1: Descriptives of the Normalised Behavioral Biases.

Normalised Behavioral Bias	Skewness	Kurtosis
NormMA	.012	-.203
NormAnchoring	.033	-.108
NormGF	.053	-.114
NormAvailabilty	-.012	-.175
NormLossAversion	.027	-.137
NormRegretAversion	-.038	-.285
NormRepresentativeness	.030	-.126
NormOverconfidence	-.024	-.259

Comparison of Means:

Analysis of Variance test is done to compare the means of the normalised behavioral biases of the respondents belonging to the age categories of senior, middle-aged and young investors.

Table 2:ANOVA test – Behavioral Bias vs Age.

S.No	Bias	F value	p-value
1	Mental Accounting	2.039	0.132
2	Anchoring	8.156	0.000
3	Gambler's fallacy	0.675	0.510
4	Availability	6.282	0.002
5	Loss Aversion	7.531	0.001
6	Regret Aversion	6.768	0.001
7	Representativeness	3.106	0.046
8	Overconfidence	2.445	0.088

The summary of the test results shown in the Table 2 above shows that in only the behavioral biases: Anchoring, Availability, Loss Aversion, Regret Aversion and Representativeness, the respondents belonging to the various age groups differed. For each of the significant biases, the descriptives according to age categories and the Tukey Post hoc results are given below:

Anchoring Bias:

With respect to the Anchoring bias, the senior investors had the highest mean of 17.5131 and the middle aged investors had the lowest mean of 15.7278 as shown in Table 3.

Table 3: Descriptives of Anchoring Bias according to Age categories.

NormAnchoring	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Young Investors	92	15.7682	3.67147	.38278	15.0078	16.5285	6.60	23.68
Middle Aged Investors	108	15.7278	3.73826	.35971	15.0147	16.4409	6.60	22.47
Senior Investors	122	17.5131	3.96794	.35924	16.8019	18.2243	6.60	27.01
Total	322	16.4157	3.89249	.21692	15.9890	16.8425	6.60	27.01

Based on the Tukey post hoc test (Table 4), the mean of the Anchoring bias in the senior investors' age group was significantly more than the means of the Anchoring biases in the remaining two age groups of middle aged and young investors' categories. Thus, the respondents in the senior investors' age group were more prone to the Anchoring bias than the other age groups. Hence it seemed that higher was the age, more was the propensity to exhibit the Anchoring bias.

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Table 4: Tukey Post hoc test of Anchoring Bias vs Age categories.

(I) Age Categories	(J) Age Categories	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Young Investors	Middle Aged Investors	.04039	.54034	.997	-1.2319	1.3127
	Senior Investors	-1.74490*	.52588	.003	-2.9832	-.5066
Middle Aged Investors	Young Investors	-.04039	.54034	.997	-1.3127	1.2319
	Senior Investors	-1.78529*	.50318	.001	-2.9701	-.6004
Senior Investors	Young Investors	1.74490*	.52588	.003	.5066	2.9832
	Middle Aged Investors	1.78529*	.50318	.001	.6004	2.9701

*. The mean difference is significant at the 0.05 level.

Availability Bias:

With respect to the Availability bias, the senior investors had the highest mean of 15.7716 and the middle aged investors had the lowest mean of 14.4274 as shown in Table 5.

Table 5: Descriptives of Availability Bias according to Age categories.

NormAvailability	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Young Investors	92	14.7765	2.99864	.31263	14.1555	15.3975	8.50	21.57
Middle Aged Investors	107	14.4274	3.15463	.30497	13.8228	15.0321	7.10	23.33
Senior Investors	122	15.7716	2.81280	.25466	15.2675	16.2758	8.50	21.57
Total	321	15.0384	3.03228	.16925	14.7054	15.3713	7.10	23.33

Based on the Tukey post hoc test (Table 6), the mean of the Availability bias in the senior investors' age group was significantly more than the means of the Availability biases in the remaining two age groups of middle aged and young investors' categories. Thus, the respondents in the senior investors' age group were more prone to the Availability bias than the other age groups. Hence it seemed that higher was the age, more was the propensity to exhibit the Availability bias.

Table 6: Tukey Post hoc test of Availability Bias vs Age categories.

(I) Age Categories	(J) Age Categories	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Young Investors	MiddleAged Investors	.34910	.42419	.689	-.6498	1.3479
	Senior Investors	-.99509*	.41195	.043	-1.9651	-.0250
MiddleAged Investors	Young Investors	-.34910	.42419	.689	-1.3479	.6498
	Senior Investors	-1.34419*	.39515	.002	-2.2747	-.4137
Senior Investors	Young Investors	.99509*	.41195	.043	.0250	1.9651
	MiddleAged Investors	1.34419*	.39515	.002	.4137	2.2747

*. The mean difference is significant at the 0.05 level.

Loss Aversion Bias:

With respect to the Loss Aversion bias, the senior investors had the highest mean of 17.1942 and the young investors had the lowest mean of 15.4607 as shown in Table 7.

Table 7: Descriptives of Loss Aversion Bias according to Age categories.

NormLossAversion	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Young Investors	92	15.4607	3.73368	.38926	14.6875	16.2339	5.75	24.88
Middle Aged Investors	108	15.6566	3.82830	.36838	14.9263	16.3868	7.71	26.27
Senior Investors	122	17.1942	3.46809	.31399	16.5726	17.8158	8.65	26.27
Total	322	16.1832	3.74198	.20853	15.7729	16.5934	5.75	26.27

Based on the Tukey post hoc test (Table 8), the mean of the Loss Aversion bias in the senior investors' age group was significantly more than the means of the Loss Aversion biases in the remaining two age groups of middle aged and young investors' categories. Thus, the respondents in the senior investors' age group were more prone to the Loss Aversion bias than the other age groups. Hence it seemed that higher was the age, more was the propensity to exhibit the Loss Aversion bias.

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Table 8: Tukey Post hoc test of Loss Aversion Bias vs Age categories.

(I) Age Categories	(J) Age Categories	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Young Investors	Middle Aged Investors	-.19586	.52041	.925	-1.4213	1.0296
	Senior Investors	-1.73346*	.50649	.002	-2.9261	-.5408
Middle Aged Investors	Young Investors	.19586	.52041	.925	-1.0296	1.4213
	Senior Investors	-1.53760*	.48463	.005	-2.6788	-.3964
Senior Investors	Young Investors	1.73346*	.50649	.002	.5408	2.9261
	Middle Aged Investors	1.53760*	.48463	.005	.3964	2.6788

*. The mean difference is significant at the 0.05 level.

Regret Aversion Bias:

With respect to the Regret Aversion bias, the senior investors had the highest mean of 17.4652 and the young investors had the lowest mean of 15.6726 as shown in Table 9.

Table 9: Descriptives of Regret Aversion Bias according to Age categories.

NormRegretAversion	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Young Investors	92	15.6726	3.63192	.37865	14.9205	16.4248	6.40	24.23
Middle Aged Investors	108	16.5548	3.73390	.35929	15.8426	17.2671	7.24	24.23
Senior Investors	122	17.4652	3.29347	.29818	16.8749	18.0555	8.46	24.23
Total	322	16.6477	3.60623	.20097	16.2523	17.0431	6.40	24.23

The Tukey post hoc results were not significant with respect to the Regret Aversion bias (Table 10).

Table 10: Tukey Post hoc test of Regret Aversion Bias vs Age categories.

(I) Age Categories	(J) Age Categories	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Young Investors	MiddleAged Investors	-.88220	.50268	.187	-2.0659	.3015
	Senior Investors	-1.79257*	.48924	.001	-2.9446	-.6406
MiddleAged Investors	Young Investors	.88220	.50268	.187	-.3015	2.0659
	Senior Investors	-.91037	.46812	.128	-2.0127	.1919
Senior Investors	Young Investors	1.79257*	.48924	.001	.6406	2.9446
	Middle Aged Investors	.91037	.46812	.128	-.1919	2.0127

*. The mean difference is significant at the 0.05 level.

Representativeness:

With respect to the Representativeness bias, the senior investors had the highest mean of 16.3369 and the middle aged investors had the lowest mean of 15.2064 as shown in Table 11.

Table 11: Descriptives of Representativeness Bias according to Age categories.

NormRepresentativeness	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Young Investors	92	15.3390	3.77410	.39348	14.5574	16.1206	5.94	21.89
Middle Aged Investors	108	15.2064	3.90752	.37600	14.4610	15.9517	5.94	25.85
Senior Investors	122	16.3369	3.59774	.32572	15.6921	16.9818	8.57	25.85
Total	322	15.6726	3.77881	.21058	15.2583	16.0869	5.94	25.85

The Tukey post hoc results were not significant with respect to the Representativeness bias (Table 12).

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Table 12: Tukey Post hoc test of Representativeness Bias vs Age categories.

(I) Age Categories	(J) Age Categories	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Young Investors	Middle Aged Investors	.13264	.53264	.966	-1.1216	1.3869
	Senior Investors	-.99790	.51839	.133	-2.2186	.2228
Middle Aged Investors	Young Investors	-.13264	.53264	.966	-1.3869	1.1216
	Senior Investors	-1.13055	.49602	.060	-2.2985	.0374
Senior Investors	Young Investors	.99790	.51839	.133	-.2228	2.2186
	Middle Aged Investors	1.13055	.49602	.060	-.0374	2.2985

Hence the respondents in the senior investors' age group of above 55 years were found to have the highest mean in all the significant biases and the Tukey post hoc results also proved that the senior investors were more prone to exhibit the behavioral biases namely: Anchoring, Availability and Loss Aversion.

Previous studies explain why older investors were more prone to behavioral biases compared to investors in other age groups. Korniotis and Kumar (2011) investigated the investment decisions of elderly investors and determined that their decisions reflected higher knowledge but their investment skill reduced with age owing to the harmful impact of cognitive aging. Chandra (2009) also documented that as the investor ages, the trading frequency reduced and the competence diminished. Hence as the investor ages, their investment skill and competence reduced hence making them vulnerable to behavioral biases. Many studies have shown that as the investor ages, risk aversion increases. Riley and Chow (1992) showed that risk aversion increased after the age of 65 (retirement age) and Sebai (2014) also recorded that the risk aversion of the Tunisian investors increased with age. This explains the increase in loss aversion and regret aversion for the aged investors. Prosad (2014) showed that Overconfidence was mostly exhibited by the male investors in the age category of 31-60 years with an annual income of either 8-11 lakhs or 2 to 4 lakhs, Optimism bias was mostly exhibited by men in the age category of 51-60 years with an annual income of either 2-4 lakhs or more than 8 lakhs and Herd behavior was exhibited by the older investors in the age category of 51-60 years. Nguyen and Schuessler (2013) recorded that older investors exhibited Equity Home bias compared to the younger investors as higher age was related to a higher proportion of home stocks. Bashir et al. (2013) documented that as investors got older, the Overconfidence bias and Herding would increase. Hence all these studies support the finding that older investors are more prone to behavioral biases compared to investors in the other age categories.

Hence the characteristics of the senior investors' category were probed in and their descriptives are given below in the Tables 13, 14 and 15.

The demographics in Table 13 show that most senior investors had completed Bachelor's degree/Diploma (45.1%) and they were mostly Retired (61.5%).

Table 13: Demographic Characteristics of Senior Investors.

S.No	Demographic Dimension		Count	Percentage	Cumulative%	Mean
1	Education	SSLC/Plus 2	11	9.0	9.0	-
		Bachelor's degree/Diploma	55	45.1	54.1	
		Master's degree	35	28.7	82.8	
		Professional degree	21	17.2	100.0	
2	Occupation	Business	9	7.4	7.4	-
		Service	13	10.7	18.0	
		Professional	10	8.2	26.2	
		Homemaker	1	.8	27.0	
		Salaried	14	11.5	38.5	
		Retired	75	61.5	100.0	

The financial characteristics of the senior investors show that their average annual income is around Rs. 3.79 lakhs with nearly 33.6% in the low annual income range of Rs. 2 lakhs and below. The proportion of monthly savings out of monthly income averages to 11.24% with nearly 33.6% in the lowest range of 5% and below. The average of the proportion of direct investment in equity out of monthly savings is 9.56% with nearly 40.2% in the lowest range of 5% and below. The average equity investment experience is 12.01 years with 23.8% in the range of 5.01 to 10 years. Most of them monitor the equity investment value on a daily basis, around 48.4% and most of them have some investment knowledge around 43.4%. The average risk level of these investors is 2.89 with nearly 53.3% taking risk level 3 and the average actual capital appreciation in the last two years in equity investment is 9.55% with around 27% in the 5.01 to 10% range. Hence the senior investors group who are more than 55 years old are mostly retired individuals with low annual income, low monthly savings, low equity investment, having mediocre investment experience and investment knowledge, taking medium risk and earning mediocre actual returns.

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Table 14: Financial Characteristics of Senior Investors.

S.No	Financial Dimension		Count	Percentage	Cumulative%	Mean
1	Annual Income	2 lakhs and below	41	33.6	33.6	3,78,689
		2.01 to 4 lakhs	37	30.3	63.9	
		4.01 to 6 lakhs	19	15.6	79.5	
		6.01 to 8 lakhs	13	10.7	90.2	
		8.01 to 10 lakhs	4	3.3	93.4	
		More than 10 lakhs	8	6.6	100.0	
2	Proportion of monthly savings out of monthly income	5% and less	41	33.6	33.6	11.24
		6% - 10%	27	22.1	55.7	
		11% - 15%	10	8.2	63.9	
		16% - 20%	22	18.0	82.0	
		More than 20%	22	18.0	100.0	
3	Proportion of direct investment in equity out of monthly savings	5% and less	49	40.2	40.2	9.56
		6% - 10%	36	29.5	69.7	
		11% - 15%	8	6.6	76.2	
		16% - 20%	8	6.6	82.8	
		More than 20%	21	17.2	100.0	
4	Length of experience in the stock market	5 years or less	27	22.1	22.1	12.01
		5.01 - 10 years	29	23.8	45.9	
		10.01 - 15 years	24	19.7	65.6	
		15.01 - 20 years	13	10.7	76.2	
		Above 20 years	29	23.8	100.0	
5	Frequency of monitoring the value of equity investment	Daily	59	48.4	48.4	-
		Weekly	25	20.5	68.9	
		Monthly	19	15.6	84.4	
		Quarterly	8	6.6	91.0	
		Yearly	8	6.6	97.5	
		Never	3	2.5	100.0	
6	Equity Investment Knowledge	Very little knowledge	30	24.6	24.6	-
		Some investment knowledge	53	43.4	68.0	
		Good knowledge	34	27.9	95.9	
		Very good knowledge	3	2.5	98.4	
		Business investor	2	1.6	100.0	

Table 15: Contd. Financial Characteristics of Senior Investors.

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S.No	Financial Dimension		Count	Percentage	Cumulative%	Mean
7	Risk taken by the investor	Level 1 (Lowest)	17	13.9	13.9	2.89
		Level 2	15	12.3	26.2	
		Level 3	65	53.3	79.5	
		Level 4	14	11.5	91.0	
		Level 5 (Highest)	11	9.0	100.0	
8	Actual capital appreciation in equity investment	0% and below	12	9.8	9.8	9.55
		0.01 - 5%	25	20.5	30.3	
		5.01 - 10%	33	27.0	57.4	
		10.01 - 15%	24	19.7	77.0	
		15.01 - 20%	14	11.5	88.5	
		20.01 - 25%	9	7.4	95.9	
		above 25%	5	4.1	100.0	

Discriminant Analysis:

Discriminant analysis was done to predict the membership into the senior investors' age group with the demographics and financials used as the predictor variables. The two groups split were the senior age group with the age of investor being above 55 years and the non-senior group with the age of the investor being 55 years and below.

The Discriminant analysis was conducted with the demographics: marital status, education, occupation and financials: annual income, monthly savings, proportion of equity investment, investment experience, monitoring frequency, investment knowledge, risk level and actual capital appreciation as the predictor variables. The results are discussed below:

The Canonical correlation score was 0.667 which was high enough to indicate that the discriminant function discriminated well between the two groups.

The Eigen Value was high, 0.801 and it described the extent of the discriminating ability of the discriminant function developed. This high Eigen value indicated that the function discriminated well.

Table 16: Discriminant Model – Eigen Table.

Eigenvalues				
Function	Eigen value	% of Variance	Cumulative %	Canonical Correlation
1	.801[a]	100.0	100.0	.667

a. First 1 canonical discriminant functions were used in the analysis.

The Wilks' Lambda, 0.555 indicated that 55.5% proportion of the total variance in the discriminant scores was not explained by the differences among the groups. Lower the value of Wilks' Lamda the more desirable it was. The Chi-square statistic with respect to Wilks' Lambda was statistically significant indicating that there was a relationship between the independent variables and the dependent groups.

The Chi-square test whose null hypothesis stated that the discriminant function had no discriminating ability, had a significant p-value of 0.000. This was significant even at the level at 0.001. The Chi-square indicated that the two levels of the function, senior investors and non-senior investors differed from each other significantly according to the discriminant function. The huge Chi-square value of 184.956 indicated that the discriminant function discriminated well between senior investors and non-senior investors.

Table 17: Discriminant Model -Wilks' Lambda Table.

Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.555	184.956	11	.000

The Discriminant equation was given by:

$D = 0.447 X_1 + 0.028 X_2 + 0.848 X_3 - 0.3 X_4 - 0.062 X_5 + 0.049 X_6 + 0.57 X_7 - 0.261 X_8 - 0.066 X_9 - 0.209 X_{10} - 0.106 X_{11}$

X_1 is marital status of the respondent
X_2 is highest education completed
X_3 is occupation of the respondent
X_4 is annual income of the respondent
X_5 is proportion of monthly savings out of monthly income
X_6 is proportion of direct investment in equity out of monthly savings
X_7 is length of experience in the stock market
X_8 is frequency of monitoring the value of equity investment
X_9 is equity investment knowledge
X_{10} is risk level of the respondent
X_{11} is actual capital appreciation in equity investment

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The magnitude of the coefficients indicated how strongly the discriminating variables influence the discriminant score. In this discriminant equation, occupation had the highest magnitude of 0.848 followed by length of experience in the stock market (0.57) and marital status (0.447) when compared to the other coefficients. Hence occupation status of the respondent had the greatest impact on the discriminant score compared to the others. Annual income, proportion of monthly savings out of monthly income, monitoring frequency, equity investment knowledge, risk level of the respondent and actual capital appreciation in equity investment have negative coefficients indicating that they have a negative influence on the discriminant score.

Table 18: Discriminant Model - Coefficients Table.

Standardized Canonical Discriminant Function Coefficients	
	Function
	1
marital status of the respondent	.447
highest education completed	.028
occupation of the respondent	.848
annual income of the respondent	-.300
proportion of monthly savings out of monthly income	-.062
proportion of direct investment in equity out of monthly savings	.049
length of experience in the stock market	.570
frequency of monitoring the value of equity investment	-.261
equity investment knowledge	-.066
risk level of the respondent	-.209
actual capital appreciation in equity investment	-.106

The classification summary table indicated that 83% in the first group and 81.1% in the second group were correctly classified by the discriminant function. Overall, 82.3% of original grouped cases were correctly classified which indicated that the discriminant function was robust in discriminating between senior and non-senior groups.

Table 19: Discriminant Model – Classification Summary Table.

Classification Results[a]					
		Age Discriminant	Predicted Group Membership		Total
			Non - Senior	Senior	
Original	Count	Non - Senior	166	34	200
		Senior	23	99	122
	%	Non - Senior	83.0	17.0	100.0
		Senior	18.9	81.1	100.0
a. 82.3% of original grouped cases correctly classified.					

6. Managerial Implications:

Wealth managers and financial advisors serve several clients coming from various walks of life. In an ever changing equity market where several factors drive the stock prices, emotions are in full swing while making investment decisions. Emotions drive the investors to make irrational decisions as a result of the behavioral biases exhibited by them. Guiding the investors to make the correct decisions within the constraints of time and money is a challenging task as different investors exhibit different biases. This study would help the wealth managers andfinancial advisors give age appropriate financial advice as this study proved that investors of different age groups exhibit different behavioral biases. The advisors need to give more attention to the senior investors who are more than 55 years old as they exhibit more biases according to this study. Literature has also proved that as the investor ages, their investment skill and competence diminish hence aged investors need to be given special attention.

7.Conclusion:

This study examined if the age of the investor played an important role in the behavioral biases exhibited by the investors using a questionnaire survey of 322 male secondary equity investors residing in Chennai. Eight behavioral biases namely, Mental Accounting, Anchoring, Gambler's Fallacy, Availability, Loss Aversion, Regret Aversion, Representativeness and Overconfidence were measured on a Likert scale. Among the eight biases measured, the mean difference among the groups divided on the basis of age was significant for Anchoring, Availability, Loss Aversion, Regret Aversion and Representativeness. Further Tukey Post hoc test showed that the senior investors who were above 55 years old were more prone to exhibit the Anchoring, Availability and Loss Aversion biases compared to the other age groups. When the characteristics of the senior investors were probed in, they were found to be mostly retired individuals with low annual income, low monthly savings, low equity investment, having mediocre investment experience and investment knowledge, taking medium risk and earning mediocre actual returns. The discriminant model showed that the occupation of the senior investor group was the major discriminating variable. Hence the aged investors need to be more cautious while making investment decisions in the stock market. The financial advisors need to educate the senior investors about the biases they are likely to exhibit and advise investment plans accordingly.

8.Limitations and Recommendations:

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This study is limited only to the secondary equity investors residing in Chennai and the sample points were taken mainly from Integrated and Tamil Nadu Investors Association. This study could be extended to other parts of the country which would be useful to generalize the results across Indian investors. Other players in the market like the primary equity investors, mutual fund investors, etc could also be studied in the future in order to understand their behavior better. This study is limited to measuring only eight behavioral biases. In future, more biases like optimism bias, conservatism bias, endowment bias, etc could be studied.

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