

# Study of the factors influencing the behavioral biases of the Secondary Equity Investors in Chennai

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**Abstract :** Investor behavior is influenced by various factors like the monitoring frequency, stock market experience and the risk tolerance level. Using a sample of 436 secondary equity investors residing in Chennai, nine behavioral biases were measured and tested against these factors. The biases include: Mental Accounting, Overconfidence, Optimism, Representativeness, Loss Aversion, Regret Aversion, Gambler's fallacy, Anchoring and Availability. Significant relationships were determined between the biases and the factors. Wealth managers and financial advisors would benefit from these results as they would be able to classify the investors better in terms of their biases and trading behavior and hence advice them accordingly.

**IndexTerms - Mental Accounting, Overconfidence, Optimism, Representativeness, Loss Aversion, Regret Aversion, Gambler's fallacy, Anchoring, Availability.**

## I. INTRODUCTION

Investors investing in the equity market are influenced by various factors which influence the emotions and thus the behavior of the investors. The behavior of the investors is expressed in terms of the behavioral biases exhibited by the investors. Biases are exhibited as a result of the heuristics adopted by the investors when faced with difficult decisions. In the equity market, all the decisions taken are difficult and are constrained by conditions like limited time, money and information. Hence the biases take an upper hand while making investment decisions.

The biases are influenced by various market factors. This study focuses on three such factors namely: stock market experience, monitoring frequency and the risk level of the investor. Stock market experience refers to the years of trading experience the investor has had in the stock market. Monitoring frequency refers to the frequency of monitoring the equity investment values in the portfolio. Risk level refers to the level of risk tolerated by the investor. All these factors were tested against the nine behavioral biases measured via the questionnaire survey method. Significant relationships were determined using the Analysis of Variance test.

## II. LITERATURE REVIEW

### 2.1 Mental Accounting

"Mental accounting concerns the way investors evaluate outcomes using the value function, whether investors evaluate the overall outcome or evaluate each outcome separately is a question of mental accounting" (Lim, 2006, p.2540).

### 2.2 Overconfidence

Barber and Odean (2000) explained 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).

### 2.3 Optimism

"Optimism is associated with a feeling of personal control, and the stock market is indeed a place where confident people can attempt to exert their influence" (Ciccone, 2011, p.166). Dimson et al. (2004) explained irrational optimism in the equity market as the attitude of the investors that the market would revive after a bubble to keep up with the inflation.

### 2.4 Representativeness

"Representativeness is a cognitive bias in which an individual categorizes a situation based on a pattern of previous experiences or beliefs about the scenario" (Jayaraj, 2013, p.24).

### 2.5 Loss Aversion

Ricciardi and Simon (2000) defined 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).

### 2.6 Regret Aversion

Shefrin and Statman (1985) defined 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).

### 2.7 Gambler's Fallacy

Ray (2008) referred 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 developed the propensity to anticipate the end of a series of good (bad) returns.

### 2.8 Anchoring

“Anchoring bias occurs when investors are influenced by purchase points or arbitrary price levels, and tend to cling to these numbers when facing questions like ‘should I buy or sell this investment?’”(Pompian, 2008, p.66).

### 2.9 Availability

Daniel et al. (2002) defined the availability bias as “heavy focus on information that stands out or is often mentioned, at the expense of information that blends in with the background” (p.143).

## III. OBJECTIVE OF THE STUDY

The main objective of the study is to analyse the nine behavioral biases namely: Mental Accounting, Overconfidence, Optimism, Representativeness, Loss Aversion, Regret Aversion, Gambler’s fallacy, Anchoring and Availability exhibited by the secondary equity investors residing in Chennai with respect to the characteristics namely: monitoring frequency, stock market experience and risk level.

## IV. 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 436 and hence the total sample size was 436.

## V. RESULTS AND DISCUSSION

The majority of the respondents, around 39.7% had an investment experience in the lower range of 5 years and less in the equity market. The average investment experience of the sample in the stock market was 8.6 years. The majority of the respondents, nearly 35.6% of the sample monitored the value of their equity investment on a daily basis. In the risk category, the majority of the sample, around 38.8% had taken a medium risk of 3. The average risk taken by the sample was 2.94. The summary of the investor’s profile with respect to financial characteristics of the sample is shown below in Table 5.1.

Table 5.1: Financial profile of the sample

S.No	Financial Dimension		Count	Percentage	Cumulative%	Mean	S.D
1	Length of experience in the stock market	5 years or less	173	39.7	39.7	8.6	6.64
		5.01 - 10 years	120	27.5	67.2		
		10.01 - 15 years	65	14.9	82.1		
		15.01 - 20 years	30	6.9	89		
		Above 20 years	48	11	100		
2	Frequency of monitoring the value of equity investment	Daily	155	35.6	35.6	-	-
		Weekly	86	19.7	55.3		
		Monthly	112	25.7	81		
		Quarterly	34	7.8	88.8		
		Yearly	26	6	94.7		
		Never	23	5.3	100		
3	Risk taken by the investor	Level 1 (Lowest)	70	16.1	16.1	2.94	1.228
		Level 2	71	16.3	32.3		
		Level 3	169	38.8	71.1		
		Level 4	66	15.1	86.2		
		Level 5 (Highest)	60	13.8	100		

### 5.1 Behavioral Bias versus Length of Experience in the stock market

Among the nine behavioral biases tested, in only overconfidence and optimism biases, the respondents belonging to the various groups divided on the basis of the stock market experience differed.

#### 5.1.1 Overconfidence bias

Based on the one-way ANOVA test results in Table 5.2, (F, 3.013, p-value, 0.018), there was a difference in the means of the overconfidence biases of the various groups divided on the basis of the length of equity investment experience in the stock market. Based on the results in Table 5.3, the respondents with the equity investment experience of more than 20 years in the stock market had the highest mean of 18.02 and the respondents with the equity investment experience of 15.01 to 20 years in the stock market had the lowest mean of 15.53.

Table 5.2: ANOVA results of Overconfidence bias vs. Stock market experience

	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
<b>Between Groups</b>	190.965	4	47.741	<b>3.013</b>	<b>.018</b>
<b>Within Groups</b>	6829.850	431	15.847		
<b>Total</b>	7020.814	435			

Table 5.3: Descriptives of Overconfidence bias vs. Stock market experience

<b>Experience in the stock market</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Std. Error</b>	<b>95% Confidence Interval for Mean</b>	
					<b>Lower Bound</b>	<b>Upper Bound</b>
<b>5 years or less</b>	173	16.76	3.708	.282	16.21	17.32
<b>5.01 - 10 years</b>	120	16.72	3.954	.361	16.00	17.43
<b>10.01 - 15 years</b>	65	17.94	4.475	.555	16.83	19.05
<b>15.01 - 20 years</b>	30	<b>15.53</b>	4.688	.856	13.78	17.28
<b>Above 20 years</b>	48	<b>18.02</b>	3.818	.551	16.91	19.13
<b>Total</b>	436	16.98	4.017	.192	16.60	17.36

### 5.1.2 Optimism bias

Based on the one-way ANOVA test results in Table 4, (F, 7.067, p-value, 0.000), there was a difference in the means of the optimism biases of the various groups divided on the basis of the length of equity investment experience in the stock market. Based on Table 5, the respondents with the equity investment experience of more than 20 years in the stock market had the highest mean of 15 and the respondents with the equity investment experience of 5 years or less in the stock market had the lowest mean.

Table 5.4: ANOVA results of Optimism bias vs. Stock market experience

	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
<b>Between Groups</b>	58.390	4	14.597	7.067	.000
<b>Within Groups</b>	890.326	431	2.066		
<b>Total</b>	948.716	435			

Table 5.5: Descriptives of Optimism bias vs. Stock market experience

<b>Length of Experience</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Std. Error</b>	<b>95% Confidence Interval for Mean</b>	
					<b>Lower Bound</b>	<b>Upper Bound</b>
5 years or less	173	<b>2.54</b>	1.481	.113	2.32	2.76
5.01 - 10 years	120	2.81	1.386	.127	2.56	3.06
10.01 - 15 years	65	3.35	1.230	.153	3.05	3.66
15.01 - 20 years	30	3.27	1.413	.258	2.74	3.79

Above 20 years	48	<b>3.50</b>	1.663	.240	3.02	3.98
Total	436	2.89	1.477	.071	2.75	3.03

Both the results showed that the investors with higher stock market experience exhibited higher overconfidence bias and optimism bias. Hayat et al. (2010)313 showed that investors with more investment experience in the stock market tend to be more overconfident in their stock picking ability and had complete knowledge about the market. This explained the high levels of overconfidence and optimism among the investors in the sample with more than 20 years of equity investment experience. The summary of the ANOVA results for all the biases is shown below in Table 6.

Table 5.6: Summary of ANOVA test – Bias vs. Length of Experience in the stock market

S.No	Bias	F value	p – value
1	Mental Accounting	2.074	0.083
2	Anchoring	0.863	0.486
3	Gambler's Fallacy	1.051	0.380
4	Availability	1.9	0.109
5	Loss Aversion	1.002	0.406
6	Regret Aversion	0.312	0.870
7	Representativeness	0.854	0.492
8	Overconfidence	3.013	<b>0.018*</b>
9	Optimism	7.067	<b>0.000**</b>

\*\* rejected at 0.01 level \* rejected at 0.05 level

### 5.2 Behavioral Bias versus Frequency of Monitoring the Value of Equity Investment

Among the nine behavioral biases tested, in only representativeness and optimism biases, the respondents belonging to the various groups divided on the basis of the monitoring frequency differed.

#### 5.2.1 Representativeness bias

Based on the one-way ANOVA test results in Table 7, (F, 2.759, p-value, 0.018), there was a difference in the means of the representativeness biases of the various groups divided on the basis of the monitoring frequency. Based on Table 8, the respondents with a yearly frequency of monitoring the equity investment have the highest mean of 17.54 and the respondents with a quarterly frequency of monitoring the equity investment had the lowest mean of 14.44.

Table 5.7: ANOVA test of Representativeness bias vs Monitoring Frequency

	Sum of Squares	df	Mean Square	F	Sig.
<b>Between Groups</b>	197.439	5	39.488	<b>2.759</b>	<b>.018</b>
<b>Within Groups</b>	6154.917	430	14.314		
<b>Total</b>	6352.356	435			

Table 5.8: Descriptives of Representativeness bias vs Monitoring Frequency

Monitoring Frequency	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
<b>Daily</b>	155	16.05	3.798	.305	15.45	16.65
<b>Weekly</b>	86	15.27	3.469	.374	14.52	16.01
<b>Monthly</b>	112	16.28	3.773	.357	15.57	16.98
<b>Quarterly</b>	34	<b>14.44</b>	3.823	.656	13.11	15.78
<b>Yearly</b>	26	<b>17.54</b>	4.519	.886	15.71	19.36

<b>Never</b>	23	15.65	3.915	.816	13.96	17.35
<b>Total</b>	436	15.90	3.821	.183	15.54	16.26

### 5.2.2 Optimism bias

Based on the one-way ANOVA test results in Table 9, (F, 2.472, p-value, 0.032), there was a difference in the means of the optimism biases of the various groups divided on the basis of the monitoring frequency. Based on Table 10, the respondents with a weekly frequency of monitoring the equity investment had the highest mean.

Table 5.9: ANOVA test of Optimism bias vs Monitoring Frequency

	<b>Sum of Squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
<b>Between Groups</b>	26.508	5	5.302	2.472	.032
<b>Within Groups</b>	922.208	430	2.145		
<b>Total</b>	948.716	435			

Table 5.10: Descriptives of Optimism bias vs Monitoring Frequency

<b>Monitoring Frequency</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Std. Error</b>	<b>95% Confidence Interval for Mean</b>	
					<b>Lower Bound</b>	<b>Upper Bound</b>
<b>Daily</b>	155	2.82	1.565	.126	2.57	3.07
<b>Weekly</b>	86	<b>3.22</b>	1.296	.140	2.94	3.50
<b>Monthly</b>	112	2.96	1.461	.138	2.68	3.23
<b>Quarterly</b>	34	2.94	1.434	.246	2.44	3.44
<b>Yearly</b>	26	2.50	1.421	.279	1.93	3.07
<b>Never</b>	23	<b>2.17</b>	1.466	.306	1.54	2.81
<b>Total</b>	436	2.89	1.477	.071	2.75	3.03

The test results summarize that the respondents did not majorly differ in their behavioral biases when divided in groups based on the frequency of monitoring the equity investment value. The difference was only with respect to the representativeness bias and optimism bias. Among these biases, the investors who monitored less frequently, were more prone to exhibit the representativeness bias and those who monitored more frequently, were prone to exhibit the optimism bias. The summary of the ANOVA results for all the biases is shown in Table 11 below.

Table 5.11: Summary of ANOVA test – Bias vs. Frequency of Monitoring

<b>S.No</b>	<b>Bias</b>	<b>F value</b>	<b>p – value</b>
1	Mental Accounting	1.486	0.193
2	Anchoring	1.309	0.259
3	Gambler's Fallacy	0.996	0.420
4	Availability	1.687	0.136
5	Loss Aversion	1.157	0.330
6	Regret Aversion	1.866	0.099
7	Representativeness	2.759	<b>0.018*</b>
8	Overconfidence	1.963	0.083

9	Optimism	2.472	<b>0.032*</b>
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\*\* rejected at 0.01 level \* rejected at 0.05 level

### 5.3 Behavioral Bias versus Risk taken by the investor

Among the nine behavioral biases tested, in only anchoring, loss aversion and optimism biases, the respondents belonging to the various groups divided on the basis of the risk level differed.

#### 5.3.1 Anchoring bias

Based on the one-way ANOVA test results in Table 12, (F, 4.683, p-value, 0.010), there was a difference in the means of the anchoring biases of the various groups divided on the basis of the risk level. Based on Table 13, the respondents with a low risk had the highest mean of 17.27 and the respondents with a high risk had the lowest mean of 15.84.

Table 5.12: ANOVA test of Anchoring bias vs Risk level

	Sum of Squares	df	Mean Square	F	Sig.
<b>Between Groups</b>	136.198	2	68.099	<b>4.683</b>	<b>.010</b>
<b>Within Groups</b>	6296.359	433	14.541		
<b>Total</b>	6432.557	435			

Table 5.13: Descriptives of Anchoring bias vs Risk level

Risk Level	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
<b>Low</b>	141	<b>17.27</b>	3.617	.305	16.67	17.87
<b>Medium</b>	169	16.66	3.352	.258	16.15	17.17
<b>High</b>	126	<b>15.84</b>	4.540	.404	15.04	16.64
<b>Total</b>	436	16.62	3.845	.184	16.26	16.98

#### 5.3.2 Loss Aversion bias

Based on the one-way ANOVA test results in Table 14, (F, 6.686, p-value, 0.001), there was a difference in the means of the loss aversion biases of the various groups divided on the basis of the risk level. Based on Table 15, the respondents with a low risk had the highest mean of 17.20 and the respondents with a high risk had the lowest mean of 15.53.

Table 5.14: ANOVA test of Loss Aversion bias vs Risk level

	Sum of Squares	df	Mean Square	F	Sig.
<b>Between Groups</b>	185.424	2	92.712	<b>6.686</b>	<b>.001</b>
<b>Within Groups</b>	6004.026	433	13.866		
<b>Total</b>	6189.450	435			

Table 5.15: Descriptives of Loss Aversion bias vs Risk level

Risk level	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
<b>Low</b>	141	<b>17.20</b>	3.966	.334	16.54	17.86

<b>Medium</b>	169	16.49	3.383	.260	15.97	17.00
<b>High</b>	126	<b>15.53</b>	3.877	.345	14.85	16.22
<b>Total</b>	436	16.44	3.772	.181	16.09	16.80

### 5.3.3 Optimism bias

Based on the one-way ANOVA test results in Table 16, (F, 8.123, p-value, 0.000), there was a difference in the means of the optimism biases of the various groups divided on the basis of the risk level. Based on Table 17, the respondents with a low risk had the lowest mean of 10.3014 and the respondents with a high risk had the highest mean of 13.8889.

Table 5.16: ANOVA test of Optimism bias vs Risk level

	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
<b>Between Groups</b>	857.742	2	428.871	<b>8.123</b>	<b>.000</b>
<b>Within Groups</b>	22860.147	433	52.795		
<b>Total</b>	23717.890	435			

Table 5.17: Descriptives of Optimism bias vs Risk level

<b>Risk Level</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Std. Error</b>	<b>95% Confidence Interval for Mean</b>	
					<b>Lower Bound</b>	<b>Upper Bound</b>
<b>Low</b>	141	<b>10.3014</b>	7.08038	.59628	9.1226	11.4803
<b>Medium</b>	169	11.8787	6.96922	.53609	10.8203	12.9370
<b>High</b>	126	<b>13.8889</b>	7.83936	.69839	12.5067	15.2711
<b>Total</b>	436	11.9495	7.38403	.35363	11.2545	12.6446

The test results showed that the respondents did not majorly differ in their behavioral biases when divided in groups based on their risk. The difference was only with respect to the anchoring, loss aversion and optimism biases. In anchoring and loss aversion biases, the investors with a high risk had a low score on the biases and the investors with a low risk had a high score. Das (2012)287 insisted the importance of the knowledge levels of the investors to assess the risk of the investment which in turn helped them engage in risky transactions. Our results also supported that knowledgeable investors tend to be risk taking as they were able to assess the risk levels. Hence due to the high knowledge levels they were able to take high risks and also exhibited lower propensity to the behavioral biases. The summary of the ANOVA results for all the biases is shown in Table 18 below.

Table 5.18: Summary of ANOVA test – Bias vs. Risk level

<b>S.No</b>	<b>Bias</b>	<b>F value</b>	<b>p – value</b>
1	Mental Accounting	1.187	0.306
2	Anchoring	4.683	<b>0.010*</b>
3	Gambler's Fallacy	0.077	0.926
4	Availability	1.663	0.191
5	Loss Aversion	6.686	<b>0.001**</b>
6	Regret Aversion	1.838	0.160
7	Representativeness	2.423	0.090
8	Overconfidence	1.511	0.222
9	Optimism	8.123	<b>0.000**</b>

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

## VI. CONCLUSION

By employing a sample of 436 secondary equity investors residing in Chennai, significant relationships between the biases and the factors of stock market experience, monitoring frequency and risk level were determined. The study found that among the nine biases, in only overconfidence and optimism biases, the investors belonging to the various groups divided on the basis of the stock market experience differed. The investors with higher stock market experience of more than 20 years exhibited higher overconfidence bias and optimism bias. In only representativeness and optimism biases, the investors belonging to the various groups divided on the basis of the monitoring frequency differed. The investors who monitored less frequently, were more prone to exhibit the representativeness bias and those who monitored more frequently, were prone to exhibit the optimism bias. In only anchoring, loss aversion and optimism biases, the respondents belonging to the various groups divided on the basis of the risk level differed. In anchoring and loss aversion biases, the investors with a high risk level were less likely to exhibit the biases and the investors with a low risk level were more likely to exhibit the biases. On the other hand, the investors with a high risk level were more optimistic. These significant relationships would help the financial advisors to profile the investors and understand them better.

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