A STUDY ON SOME BEHAVIOURAL ANOMALIES FOR ASSOCIATION WITH SELECTED DEMOGRAPHIC PARAMETERS

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Abstract
Behavioural biases and its association with demographic factors are presently one of the most popular researched topics. This research paper analyses the effect of demographic variables like age, experience and income on behavioural biases: herd behaviour, loss aversion, and mental accounting of investors. To find out the impact of demographic variables on these behavioural biases, an ANOVA test was carried out in SPSS, with the construct score built in SMART PLS 4 for all dependent variables. The results indicated that the herd behavior tendency of investors differed with their age and experience in stock market.
Keywords: Herd behaviour, Loss aversion, Mental accounting, Demographic variables, Biases.

1. INTRODUCTION

Behavioural finance is all about irrationality demonstrated by investors in making investment decisions owing to psychological and behavioural biases. According to Statman "the inclination for risk, regret and maximation differs by country of origin and by gender." (Statman, 2008). Biases affecting psychology of investors can be overconfidence, herding, loss aversion, regret aversion etc. or any other heuristics, which an investor exploit to facilitate their risky decision-making process. The philosophy of traditional finance theory is that investors need to behave rationally since theories like Efficient Market Hypothesis (EMH), Capital Asset Pricing Model (CAPM), and Arbitrage Pricing Model (APT) are all delimiting rational behaviour. With the growth of investment and finance market, it becomes necessary to know the inclination and attitude of investors, the factors influencing their decision-making process, and their behaviour pattern while dealing in securities and investment so as to maximize their returns. This void is filled by behavioural finance.

2. OBJECTIVES

The objective of this research paper is:
1. To find out the association between the demographic variables, age, income and experience of investors with behavioural biases loss aversion, mental accounting and herd behaviour.

3. RESEARCH METHODOLOGY

A descriptive research was carried out in this paper. A questionnaire was framed on Google form and sent to the respondents. In total, 413 responses were chosen with complete answers. The questions were asked on five-point Likert scale. The responses were processed in SMART PLS 4 to obtain a construct score for all variables by running PLS SEM test. The construct score was then employed in SPSS for ANOVA test to find out the impact of independent variables, here, demographic variables age, income and experience, on dependent variables, here, behavioural biases loss aversion, mental accounting and herd behaviour.

4. LITERATURE REVIEW

Psychologists Daniel Kahneman and Amos Tversky, provided prospect theory (Kahneman & Tversky, 1979), which gave an inception to Behavioral economics/finance. Prospect theory explained the factual decision making by people in contrast to the utility decision-making strategies given by standard finance. Prospect theory justifies that people rely on the potential value of gains and losses while making decisions, not on the basis of the utility of the decision.

Mental accounting was proposed by Richard Thaler (1985). Mental accounting describes the tendency of people to place particular events into different mental accounts based on superficial attributes (Shiller R. J.,

1998). Standard financing proposes that wealth and money should be exchangeable, convertible or replaceable as and when required. Financial decisions should be based on rational calculation of its effect on overall financial position of the investor.

Thaler (Advances in Behavioural Finance, 1993) coincided psychology with economic and finance theories and proposed the ideas of mental accounting, the endowment effect and other biases.

Loss Aversion is ubiquitous and found in every individual decision-making pertaining to risk and uncertainty. It states that people are more sensitive to losses than gains. It plays an important role in Prospect Theory ((Kahneman & Tversky, 1974)), and (Tversky & Kanheman, 1992). Investors find it difficult to realize losses.

In *loss aversion*, the emotional impact is different for profit and loss. The emotional impact of loss if found to be two and a half times upwards of the impact of an equal profit. Obviously, due to great impact of loss, people try to avoid loss. In traditional finance all such frames are assumed to be transparent, allowing for every decision to be made on the same grounds. Frame dependency shows the propensity of people to increase the opaqueness of a frame. This propensity comes from reasons both emotional and cognitive (Shefrin, 2000).

Hersh Shefrin, (Beyond Greed and Fear: Understanding Behavioural finance and Psychology of Investing, 2000), illustrated that behavioural finance is the collaboration of psychology and financial decisions of "practitioners".

The propensity of investors to buy or sell a stock, on the basis of past returns, buying the profit-making stocks and selling the loss-making stocks, is momentum-investment strategy. This is a type of irrational herd behaviour under the efficient-markets hypothesis, which states that market prices reflect all available information. This kind of strategies are positive-feedback strategies and aggravates price movements leading to volatility (Bikhchandani & Sharma, 2001).

Robert J. Shiller (From Efficient Markets Theory to Behavioral Finance, 2003) analyzed evolution of behavioural finance through the decades. Shiller's view was that markets might be efficient on the micro level but inefficient on the macro level. To summarize, individual stock movement is significant than the movement of the entire market.

Herding can be identified when an investor imitates the other investors' behaviour. The possible causes for herd behaviour in financial markets are inadequate or flawed information, worried for reputation, and speculative mentality (Xiaqing, Baiyu, & Xiaoning, 2019).

5. DATA ANALYSIS

The demographic variables: age, income and experience, were analyzed to examine its impact on behavioural biases, loss aversion, mental accounting and herd behaviour.

5.1. Age:
Age, as a demographic factor was analyzed for its effect on behavioural biases, Loss Aversion, Mental Accounting and Herd Behaviour. The following null and alternative hypothesis were framed and tested.

5.1.1 Age against Loss Aversion:
H_0: Age of investors has no impact on loss aversion bias of investors.
H_1: Age of investors does have impact on loss aversion bias of investors.

One-way ANOVA:
One-way ANOVA was conducted to test the variance of means between the independent variable categories with respect to loss aversion. Since the Levene Test did not meet the assumptions of homogeneity of variances, a Welch test was done.

Table 1: Levene Test

Test of Homogeneity of Variances			
LOSSAVE			
Levene Statistic	df1	df2	Sig.
2.417	4	408	0.048

Source: Primary data

Table 2: Welch Test

Robust Tests of Equality of Means			
LOSSAVE			
	Statistic[a]	df1	df2	Sig.
Welch	2.148	4	186.799	0.077
a. Asymptotically F distributed.				

Source: Primary data

There was no statistically significant difference between categories of age of investors as demonstrated by Welch's test yields (F (4) = 2.148, p =0.077). The test was insignificant. Hence, we fail to reject the null hypothesis.

5.1.2 Age against Mental Accounting:
H_0: Age of investors has no impact on mental accounting bias of investors.
H_1: Age of investors does have impact on mental accounting bias of investors.

One-way ANOVA:
The one-way ANOVA test was performed to check the variances between the categories of independent variable with respect to mental accounting bias. The homogeneity of variance result was not significant, so ANOVA test was done.

Table 3: Levene Test

Test of Homogeneity of Variances			
MENACC			
Levene Statistic	df1	df2	Sig.
0.983	4	408	0.417

Source: Primary data

Table 4: ANOVA Test

ANOVA					
MENACC					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.622	4	1.155	1.154	0.331
Within Groups	408.363	408	1.001		
Total	412.985	412			

Source: Primary data

There was no statistically significant difference between categories of age of investors as demonstrated by one-way ANOVA (F (4,408) = 1.154, p =0.331).

5.1.3 Age against Herd Behaviour:
H_0: Age of investors has no impact on herd behaviour mentality of investors.
H_1: Age of investors does have impact on herd behaviour mentality of investors.

One-way ANOVA:

The one-way ANOVA test was performed to check the variances between the categories of independent variable with respect to herd behaviour bias. The homogeneity of variance result was significant, so WELCH test was done.

Table 5: Levene Test

Test of Homogeneity of Variances			
HERDBEH			
Levene Statistic	df1	df2	Sig.
3.733	4	408	0.005

Source: Primary data

Table 6: Welch Test

Robust Tests of Equality of Means			
HERDBEH			
	Statistic[a]	df1	df2	Sig.
Welch	2.483	4	187.533	0.045
a. Asymptotically F distributed.				

Source: Primary data

There was statistically significant difference between categories of age of investors as demonstrated by Welch's test yields (F (4) = 2.483, p = 0.045). The test was significant as p = 0.045< 0.05. Hence, we reject the null hypothesis and assume that age of investors does have impact on herd behaviour mentality of investors.

5.2. Income:

Income, as a demographic factor was analyzed for its effect on behavioural biases, Loss Aversion, Mental Accounting and Herd Behaviour. The following null and alternative hypothesis were framed and tested.

5.2.1 Income against Loss Aversion:

H_0: Income of investors has no impact on loss aversion behaviour of investors.
H_1: Income of investors does have impact on loss aversion behaviour of investors.

One-way ANOVA:

One-way ANOVA was conducted to test the variance of means between the independent variable categories against loss aversion.

Table 7: Levene Test

Test of Homogeneity of Variances			
LOSSAVE			
Levene Statistic	df1	df2	Sig.
0.628	4	408	0.643

Source: Primary data

Since the Levene statistic yields were not significant, we continued with ANOVA test.

Table 8: ANOVA Test

ANOVA					
LOSSAVE					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.711	4	0.678	0.674	0.610
Within Groups	410.302	408	1.006		
Total	413.014	412			

Source: Primary data

There was no statistically significant difference between categories of income of investors as demonstrated by one-way ANOVA (F (4,408) = 0.674, p =0.610). We fail to reject the null hypothesis and conclude that income of investors has no impact on loss aversion behaviour of investors.

5.2.2 Income against Mental Accounting:

H_0: Income of investors has no impact on mental accounting bias of investors.
H_1: Income of investors does have impact on mental accounting bias of investors.

One-way ANOVA:

The one-way ANOVA test was performed to check the variances between the categories of independent variable with respect to mental accounting bias. The homogeneity of variance result was not significant, so ANOVA test was done.

Table 9: Levene Test

Test of Homogeneity of Variances			
MENACC			
Levene Statistic	df1	df2	Sig.
2.312	4	408	0.057

Source: Primary data

Table 10: ANOVA Test

ANOVA					
MENACC					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.648	4	1.162	1.161	0.328
Within Groups	408.390	408	1.001		
Total	413.039	412			

Source: Primary data

There was no statistically significant difference between categories of income of investors as demonstrated by one-way ANOVA (F (4,408) = 1.161, p = 0.328). We fail to reject the null hypothesis and conclude that income of investors has no impact on mental accounting behaviour of investors.

5.2.3 Income against Herd Behaviour:

H_0: Income of investors has no impact on herd behaviour mentality of investors.
H_1: Income of investors does have impact on herd behaviour mentality of investors.

One-way ANOVA:

The one-way ANOVA test was performed to check the variances between the categories of independent variable with respect to herd behaviour bias. The homogeneity of variance result was not significant, so ANOVA test was done.

Table 11: Levene Test

Test of Homogeneity of Variances			
HERDBEH			
Levene Statistic	df1	df2	Sig.
0.563	4	408	0.690

Source: Primary data

Table 12: ANOVA Test

ANOVA					
HERDBEH					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.067	4	1.517	1.520	0.195
Within Groups	407.102	408	0.998		
Total	413.169	412			

Source: Primary data

There was no statistically significant difference between categories of income of investors as demonstrated by one-way ANOVA (F (4,408) = 1.520, p = 0.195). We fail to reject the null hypothesis and conclude that income of investors has no impact on herd behaviour of investors.

5.3. Experience:
Experience, as a demographic factor was analyzed for its effect on behavioural biases, Loss Aversion, Mental Accounting and Herd Behaviour. The following null and alternative hypothesis were framed and tested.

5.3.1 Experience against Loss Aversion:
H_0: Experience of investors has no impact on loss aversion behaviour of investors.
H_1: Experience of investors does have impact on loss aversion behaviour of investors.

One-way ANOVA:
One-way ANOVA was conducted to test the variance of means between the independent variable categories against loss aversion. Since the homogeneity of variances criteria was met, ANOVA test was followed.

Table 13: Levene Test

Test of Homogeneity of Variances			
LOSSAVE			
Levene Statistic	df1	df2	Sig.
1.019	2	410	0.362

Source: Primary data

Table 14: ANOVA Test

ANOVA					
LOSSAVE					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.488	2	0.244	0.243	0.785
Within Groups	412.461	410	1.006		
Total	412.949	412			

Source: Primary data

There was no statistically significant difference between categories of experience of investors as demonstrated by one-way ANOVA (F (2,410) = 0.243, p =0.785). We fail to reject the null hypothesis and conclude that experience of investors has no impact on loss aversion behaviour of investors.

5.3.2 Experience against Mental Accounting:
H_0: Experience of investors has no impact on mental accounting bias of investors.
H_1: Experience of investors does have impact on mental accounting bias of investors.

One-way ANOVA:
The one-way ANOVA test was performed to check the variances between the categories of independent variable with respect to mental accounting bias. The homogeneity of variance result was not significant, so ANOVA test was done.

Table 15: Levene Test

Test of Homogeneity of Variances			
MENACC			
Levene Statistic	df1	df2	Sig.
0.592	2	410	0.553

Source: Primary data

Table 16: ANOVA test

ANOVA					
MENACC					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.347	2	2.173	2.180	0.114
Within Groups	408.740	410	0.997		
Total	413.087	412			

Source: Primary data

There was no statistically significant difference between categories of experience of investors as demonstrated by one-way ANOVA (F (2,410) = 2.180, p =0.114). We fail to reject the null hypothesis and conclude that experience of investors has no impact on mental accounting behaviour of investors.

5.3.3 Experience against Herd Behaviour:
H_0: Experience of investors has no impact on herd behaviour mentality of investors.
H_1: Experience of investors does have impact on herd behaviour mentality of investors.

One-way ANOVA:
The one-way ANOVA test was performed to check the variances between the categories of independent variable with respect to herd behaviour bias. The homogeneity of variance result was not significant, so ANOVA test was done.

Table 17: Levene Test

Test of Homogeneity of Variances			
HERDBEH			
Levene Statistic	df1	df2	Sig.
1.878	2	410	0.154

Source: Primary data

Table 18: ANOVA Test

ANOVA					
HERDBEH					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.046	2	5.023	5.109	0.006
Within Groups	403.056	410	0.983		
Total	413.102	412			

Source: Primary data

There was statistically significant difference between categories of experience of investors against herd behaviour as demonstrated by one-way ANOVA (F (2,410) = 5.109, p = 0.006). Since p = 0.006 < 0.05, we reject the null hypothesis and conclude that experience of investors has impact on herd behaviour of investors.

A Post Hoc Test was performed to check the category wise comparison and Tukey HSD results were as follows.

Table 19: Tukey Test

Multiple Comparisons						
Dependent Variable: HERDBEH						
Tukey HSD						
(I) EXPERIENCE	(J) EXPERIENCE	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
0 to 2 years	2 to 5 years	-0.3421322*	0.1287016	0.022	-0.644871	-0.039393
	More than 5 years	-0.3043391*	0.1110311	0.018	-0.565513	-0.043166
2 to 5 years	0 to 2 years	0.3421322*	0.1287016	0.022	0.039393	0.644871
	More than 5 years	0.0377932	0.1291512	0.954	-0.266004	0.341590
More than 5 years	0 to 2 years	0.3043391*	0.1110311	0.018	0.043166	0.565513
	2 to 5 years	-0.0377932	0.1291512	0.954	-0.341590	0.266004
*. The mean difference is significant at the 0.05 level.						

Source: Primary data

A Tukey post-hoc test revealed a statistically significant differences between the effects of experience on investors falling in the category of 0 to 2 years and 2 to 5 years with a mean difference of -0.3421322. Further, there is a statistically significant differences between the effects of experience on investors falling in the category of 0 to 2 years and more than 5 years with a mean difference of -0.3043391. One of the categories demonstrated more experience than the other while dealing in stock market. We, therefore, reject the null hypothesis and conclude that there is significant difference between the mean scores of various categories of experience against herd behaviour exhibited by investors.

6. FINDINGS AND CONCLUSION

The ANOVA tests were found to be statistically insignificant for all categories of demographic variables against biases, except age and experience which were found to put impact on herd behaviour bias of investors. The post hoc test for age against herd behaviour yielded insignificant. However, post hoc test for experience and herd behaviour revealed differences in the effect for various experience categories. The investors with more experience in stock market act less in accordance to herding. The test between age and herd behaviour was significant, indicating that there is difference in herd behaviour tendency of investors that differs according to their age. The investors with more experience and matured age abstain from herding in stock market. The influence of age and experience on herding behavior of investors were discovered in this ANOVA tests, but further research with more psychological and demographic variables may be done for confirmation of association.

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