Behavioral Factors Influencing Investment Decision of the Retail Investors of Dhaka Stock Exchange: **An Empirical Study**

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Abstract:

The collective decision of retail investors plays a significant role in influencing the price dynamics of the finance securities. Behavioral finance attempts to explain the anomalies that prevail in the market when factors in the empirical asset pricing and market microstructure models fail to explain the same. As the capital market of Bangladesh, particularly the stock market, has been developing rapidly since the last decade with an expanding investor population who are not 'financially literate', the aim of this paper is to synthesize the behavioral factors which affect the investment decision of the retail investors and also identify the relationship between their socio-economic characteristics and investment outcomes through discussing results of a survey conducted on 203 retail investors of Dhaka Stock Exchange. The responses of the survey provide evidence for a significant presence of behavioral bias in the investment outlook and decision of the investors and statistical significance between two personal characteristics and amount of their investment.

Keywords: Behavioral factors, Retail investors, Investment decision, DSE.

1.0 Introduction

Investor-base in Dhaka Stock Exchange (DSE) is mostly dominated by retail investors, whose size at the end of the financial year 2016-17 was around 2.9 million or 99.6 percent of total investors (Source: DSE). Financial literacy, or investing literacy to be specific, is at its nascent stage among the investors. This is partly attributable to an underdeveloped market infrastructure resulting in an opaque system of information transmission. Sensitivity to material public information and subsequent price adjustment process are very slow or irrational resulting in market panic by myopic investors. Recently, the Bangladesh Securities and Exchange Commission (BSEC) with the highest support from the Government of Bangladesh has extended tremendous effort to introduce new securities regulations and amended many of the existing laws. Among others, they have successfully executed the demutualization of Dhaka Stock Exchange and Chittagong Stock Exchange (CSE), set new Corporate Governance Guidelines, facilitated the enactment of the Financial Reporting Act and formation of the Financial Reporting Council (FRC) with a hope to stabilize the market volatility in prices, protect the small investors and punish manipulation. They have also launched a nationwide financial literacy program to educate and aware individuals on the basics of investing given an emerging market setting in Bangladesh. With multitude initiatives and positive feedback from authorities of the developed markets, the stock market of Bangladesh have been substantially successful in regaining the faith of the stakeholders of the market. The collective and cumulative decision of the retail investors is very important for the reputation of the corporate entities and also for ensuring better functioning of the financial market as the retail brokers become competitive. One of the primary missions of BSEC or any other regulatory authority of the financial market is to protect the retail investors. Therefore, it is very important to identify and understand the underlying demographic, socio-economic and behavioral factors

affecting individual's financing, specially investing decision, because their decision making channel that drives the price dynamics of the stocks in the market is not always objective or rational.

2.0 Objectives of the Study

The main objective of this study is to explain the results of a survey to identify the behavioral factors which influence the retail investors' investment decision making in stock and also to understand the relationship between demographic and socio economic factors and investment performance of the retail investors.

3.0 Traditional Finance Theory versus Behavioral Finance

In the framework of Efficient Market Hypothesis (EMH), a security's price equals its "fundamental value" in the absence of frictions and assumption of agents' rationality. The fundamental or intrinsic value of the financial security is the discounted sum of expected future cash flows, given that theinvestor can process all available information accurately with a discount rate which is consistent with the accepted preference specification (Barberis and Thaler, 2003, p.1054). This theory of market efficiency supports the opinion that actual prices reflect fundamental values, affirms that prices are right as they are determined by agents, who have sensible preferences and understand Bayes' law, which relates to conditional probabilities (the probability of an event given by another one). According to EMH, although not all investors are rational, the markets as whole are assumed to be rational.

However, the EMH brings with itself a number of theoretical and empirical challenges which can partly be explained by evidences from behavior finance. Behavioral finance believes that sometimes, financial markets do not have informational efficiency (Ritter, 2003, p.430). Due to the fact that people are not always rational, their financial decisions may be driven by behavioral preconceptions. Thus, studying behavioral finance plays an important role in finance, in which cognitive psychology is employed to understand human behaviors. In case the decisions of people do not follow rational thinking, effects of behavioral biases should be identified. It will be more important if their cognitive errors affect prices and are not arbitraged away easily (Kim and Nofsinger, 2008, p.2). The mid-1980s is considered as the beginning of this research area. Stock market is proved to overreact to information by DeBondt and Thaler (1985, pp.392-393). Moreover, Shefrin and Statman (1985, p.777) assert that stockholders tend to be more willing to sell their winning stocks rather than loosing ones even when putting these losers on sale is the best choice.

Studies on behavioral finance are mainly based on the data of stocks that do not match well with the theories of market efficiency and asset pricing model.

Therefore, they have their share of criticism of a slow start and less persuading to audiences who tend to be initially skeptical. This limitation is eliminated by using individual brokerage data. In many studies, it is showed that individual investors are affected by different behavioral biases (Kim and Nofsinger, 2008, p.2). Such behavioral biases are tested by many researchers, one of them is Hirshleifer (2001, pp.1576-1577), who provides empirical evidence regarding asset pricing. Nonetheless, the literature in this area is still very limited which makes it a very interesting field to study as alternative research area in finance which may explain some of the anomalies of market efficiency.

According to Ritter (2003, p.429), behavioral finance is explained by psychology suggesting that human decision processes are subject to several cognitive illusions. Theseillusions are divided into two groups: illusions caused by heuristic decision process andillusions rooted from the adoption of mental frames grouped in the prospect theory(Waweru et al., 2008, p.27). In this research, I have used these two categories as well as the herding and market factors to explain the retain investment behavior.

3.1 Heuristic Theory:

Heuristics are defined as the rules of thumb, which makes decision making easier, especially in complex and uncertain environments (Ritter, 2003, p.431) by reducing the complexity of assessing probabilities and predicting values to simpler judgments (Kahneman and Tversky, 1974, p.1124). In general, these heuristics are quite useful, particularly when time is limited (Waweru et al., 2008, p.27), but sometimes they lead to biases (Kahneman and Tversky, 1974, p.1124; Ritter, 2003, p.431).

In this research, five components of heuristics: Overconfidence, Gambler's fallacy, Availability bias, Anchoring, and Representativeness are used to explain the investment decision making as well as the investment performance of individual investors of Dhaka Stock Exchange.

3.2 Prospect Theory:

Expected Utility Theory (EUT) and prospect theory are considered as two approaches to decision-making from different perspectives. Prospect theory focuses on subjective decision-making influenced by the investors' value system, whereas EUT concentrates

on investors' rational expectations (Filbeck, Hatfield and Horvath, 2005, p.170-171). People tend to under-weigh probable outcomes compared with certain ones and people response differently to the similar situations depending on the context of losses or gains in which they are presented (Kahneman and Tversky, 1979, p.263). Prospect theory describes some states of mind affecting an individual's decision-making processes including Regret aversion, Loss aversion and Mental accounting (Waweru et al., 2003, p.28).

In this research, three elements of prospect dimension: Loss aversion, Regret aversion, and Mental accounting are used to explain the investment decision making as well as the investment performance of individual investors at the Dhaka Stock Exchange. Table 1 has shown the list of behavioral factors influencing the investment decision making under different groups of theories.

3.3 Market Factors:

Usually, the investors may have over- or under-reaction to changes in market information, fundamentals of the underlying stock, trend in the stock price, popularity of stocks and seasonal price cycles.Empirically, these factors haveproven to have significant influence on decision-making behavior of investors. Barber and Odean (2000) document that investors are affected by events in the stock market which catch their attention, even when they cannot assess the possibility of good future investment performance as a result of such events. Waweru et al. (2008) identifies such market factors: price changes, market information, past trends of stocks, customer preference, over-reaction to price changes, and fundamentals of underlying stocks. Some prior literature treat the market factors as external factors but since such factors influence investment decision not explained otherwise with rationality, I include them in the list of behavioral factors.

3.4 Herding:

In financial market, herding is defined as the tendency of investors' behaviors to follow others' investment and trading actions. Such behavior also help investors to possess a sense of regret aversion by the collective loss, if any. Practitioners are usually vigilant to the existence of herding, due to the fact that investors rely on collective information more than private information. This behavior, if persistent, can result

in significant price deviation of the securities from fundamental value. Informed and rational investors on the other hand usually ignore suchactivity flow of the masses if the latter is not justified, which, in turncorrects wrong signals. Herding, however, gives rise to a state of market inefficiency, leading to speculative bubbles of asset prices.

Waweru et al. (2008) posits that herding can drive stock trading and create momentum for stock trading. However, the impact of such herding behavior may halt at a certain level because the cost to follow the herd further may increase if the investor wants to achieve the increasing abnormal returns. For institutional investors, only the buying and selling decision may be caused by such herding spree. Waweru et al. (2008) identify few important elements of herding which impact investment decisions of retail investors: buying, selling, choice of stock, length of time to hold stock, and volume of stock to trade.

Table 1: Behavioral factors influencing the investment decision making

Group	Behavioral Variables
Heuristic Theory	• Representativeness • Overconfidence • Anchoring • Gambler's fallacy • Availability bias
Prospect Theory	• Loss aversion • Regret aversion • Mental accounting
Market Factors	• Price changes • Market information • Past trends of stocks • Fundamentals of underlying stocks • Customer preference • Over-reaction to price changes
Herding Effect	• Buying and selling decisions of other investors • Choice of stock to trade of others • Volume of stocks to trade of others • Speed of herding

Source: Waweru et al., 2008.

4.0 Hypotheses

The empirical work of the study starts with the intention to explore the impact of the behavioral factors on the investment decisions of investors in the financial markets, especially in the stock markets. This study explores the influence levels of the behavioral variables on the individual investors' decisions and their investment performance at the Dhaka Stock Exchange with the development of the following hypotheses:

Hypothesis 1: The behavioral factors have impacts on the investment decisions of individuals at the Dhaka Stock Exchange.

Hypothesis 2: The demographic and socio-economic factors have positive impacts on the investment performance of individual investors at the Dhaka Stock Exchange.

5.0 Methodology

The structure of the study is motivated by a previous study Luong and Thu Ha (2011) conducted on the retail investor behavior at the Ho Chi Minh Stock Exchange of Vietnam. This research is conducted based on mixed methods but focusing more on quantitative research strategy which is in line with the topic of behavioral finance. The main aim is exploring the factors that affect investors' decisions which may be only done effectively by employing quantitative research since quantitative research is designed for identification and description of variables in order to establish the relationship between them (Garner, Wagner and Kawulich, 2009, p.62). For achieving the valid results, the reliable and generalizable, adequate sample of investors was chosen employing scientific methods. A questionnaire was used for collecting data on different socio-economic, perceptional and behavioral aspects of investors. Prior to finalizing the questionnaire, pretesting was done to assess the relevance, adequacy and consistency of the questions and responses. Computer programs were used to process the data and analysis of the results was done by using statistical tools.

5.1 Survey Design:

The survey was designed keeping in mind the demographic, socio-economic and investment behavior parameters in mind. Hence the questionnaire was structured across two dimensions: personal characteristics and investment behavior.

As per the design of Luong and Thu Ha (2011), the questionnaire is divided into three parts: personal information, behavioral factors influencing investment decisions, and investment performance. In the part of personal information, nominal

and ordinal measurements are used. The set of questions related to behavioral factors influencing investment decisions and investment performance are rated in a 6-point Likert scale, which are rating scales widely used for asking respondents' opinions and attitudes and are utilized to ask the individual investors to evaluate the degrees of their agreement with the impacts of behavioral factors on their investment decision as well as with the statements of investment performance. The 6 points in the scale are respectively from 1 to 6: extremely disagree, highly disagree, somewhat disagree, somewhat agree, highly agree, and extremely agree. The 6-point Likert measurements are used in this research to limit the bias evaluation of respondents because the respondents cannot find the means of the 6-point scale in the questionnaire which they easily find in the 5-point or 7-point scales. The questionnaires were provided to respondents both in English and Bengali.

5.2 Sampling and Data Collection:

The data were collected from primary sources, as first hand responses of 203 retail investors of the Dhaka Stock Exchange. This size of sample was considered enough for assessing the parameters with 95% level of confidence. Face to face interviewing technique was deployed to collect data from the investors using the predesigned questionnaire. The data collected from questionnaires provided the basic understandings about the factors affecting investors' decisions and the results of data analysis guide the contents of the interviews. Finally, I have gathered responses from 203 retail investors of Dhaka Stock Exchanges and proceeded with the subsequent analysis with their answers.

6.0 Results and Discussion

6.1 Summary of the Survey Responses:

All of the questions except one in the heuristic metric received more than average rating with the highest proportion. The second highest proportions to the highest rating, "Extremely Agree" when asked if they prefer hot stocks, use trend analysis, can forecast termination of good or bad market return; "Highly Agree" for their confidence in outperforming market and forecasting ability based on current prices. Most of the respondents agree to the highest extent that they consider their previous

market experience for the next while also agreeing to the least of their consideration of the information from friends and relatives as reliable reference guiding their investment decision. These responses, on aggregate provide evidence that investors shape their investment decision by heuristics especially with regard to representativeness, overconfidence, anchoring, gambler's fallacy but less with regard to ability bias.

All of the question questions with regard to prospect theory received higher than the average rating of 3.5. In four of the six questions, the highest proportion of respondents agrees that they become more risk seeking and more risk averse after a prior gain and loss respectively, feel more sorrow about holding losers too long than about selling winning stocks too soon and ignore the connections among investment choices though the second majority respondents disagrees with the last question. For the remaining two questions, majority of the respondent extremely agree that they avoid selling shares that have decreased in value and readily sell shares that have gained value. Hence, the responses provide evidence in support of prospect theory in the context of loss aversion, regret aversion and mental accounting.

Waweru et al. (2008, p.36) identifies the factors of market that have impact on investors' decision making: Price changes, market information, past trends of stocks, customer preference, over-reaction to price changes, and fundamentals of underlying stocks. As a result, retail investors tend to focus on popular stocks and other attention-grabbing events that are relied on the stock market information. As previously, all of the questions with regard to the market factors received higher than the average rating of 3.5. In three of the five questions, the highest proportion of respondents agrees that they consider the prices changes, overreacts to those changes, analyze the companies' customer preference before investing in the stocks. For the remaining two questions, majority of the respondent extremely agree that market information is important for their stock investment and that they study the market fundamentals of the underlying stock before making investment decisions. Hence, the behavioral bias exists as consequences of changes in external market factors.

Evidence supporting the presence of herding effect is interesting. For three of the four questions, the highest proportion of respondents agrees that

they are affected by other investors' decisions of investment choice, volume, and trade. However, the second highest groups strictly disagree to these statements. For the last question, majority of the respondents extremely disagree when asked if they usually react quickly to the changes of other investors' decisions and follow their reactions while the second highest response group modestly agrees to such notions. Hence, the evidence supporting the presence of herding effect while is mostly inclined to the positive side of the spectrum but are closely followed by counter opinions in the market. We can remark such evidence as being mixed.

Table 2: Summary of the responses on investment factors and performance

Factors & Performannce	Statements	Extremely Disagree	Highly Disagree	Somewhat Disagree	Somewhat Agree	Highly Agree	Extremely Agree	Average
		1	2	3	4	5	6	
Heuristic	You buy 'hot' stocks and avoid stocks that have performed poorly in the recent past	9.85%	1.97%	8.87%	39.41%	17.73%	22.17%	4.20
	You use trend analysis of some representative stocks to make investment decisions for all stocks that you invest	3.94%	4.43%	7.88%	34.98%	24.14%	24.63%	4.45
	You believe that you knowledge of stock market can help you to outperform the market	3.45%	0.99%	12.81%	36.95%	23.15%	22.66%	4.43
	You rely on your previous experiences in the market for your next investment	2.96%	2.96%	6.40%	29.06%	28.08%	30.54%	4.68
	You forecast the changes in stock prices for future base on the recent stock prices	4.93%	3.94%	14.29%	39.41%	19.70%	17.73%	4.18
	You are normally able to anticipate the end of good or poor market returns at the Dhaka Stock Exchange	9.36%	8.37%	12.81%	44.83%	10.34%	14.29%	3.81
	You consider the information from your friends and relatives as the reliable reference for your investment decisions	38.92%	7.39%	9.36%	29.06%	8.87%	6.40%	2.81
Prospect	After a prior gain you are more risk seeking than usual	16.26%	6.90%	9.36%	41.38%	14.29%	11.82%	3.66
	After a prior loss you become more risk averse	2.96%	5.42%	9.36%	33.50%	16.75%	32.02%	4.52
	You avoid selling shares that have decreased in value and readily sell shares that have increased in value	5.42%	5.42%	13.79%	27.59%	19.70%	28.08%	4.35
	You feel more sorrow about holding losers too long than about selling winning stocks too soon	13.79%	7.88%	12.81%	32.02%	17.24%	16.26%	3.80
	You tend to treat each element of your investment portfolio separately	4.43%	4.43%	9.36%	31.03%	17.24%	33.50%	4.53
	You ignore the connection among different investment possibilities	14.29%	7.39%	21.18%	32.02%	11.82%	13.30%	3.60
Market	You consider carefully the prices changes of stocks that you intend to invest in	2.46%	2.46%	6.40%	34.48%	21.18%	33.00%	4.68
	You have the over-reaction to price changes of stocks	12.32%	6.90%	19.70%	25.12%	17.73%	18.23%	3.84
	Market information is important for your stock investment	2.46%	3.45%	7.39%	30.05%	19.21%	37.44%	4.72
	You analyze the companies' customer preference before you in invest in their stock	6.90%	3.94%	17.24%	34.48%	15.27%	22.17%	4.14
	You study the market fundamentals of the underlying stock before making investment decisions	2.46%	2.46%	7.39%	26.60%	21.67%	39.41%	4.81

Factors & Performannce	Statements	Extremely Disagree	Highly Disagree	Somewhat Disagree	Somewhat Agree	Highly Agree	Extremely Agree	Average
		1	2	3	4	5	6	
Herding	Other investors' decisions of choosing stock have impact on your investment decisions	24.14%	6.90%	11.33%	35.96%	11.33%	10.34%	3.34
	Other investors' decisions of stock volume have impact on your investment decisions	23.65%	7.88%	13.79%	37.93%	9.85%	6.90%	3.23
	Other investors' decisions of buying and selling stocks have impact on your investment decisions	20.20%	8.87%	17.24%	35.96%	8.37%	9.36%	3.32
	You usually react quickly to the changes of other investors' decisions and follow their reactions to the stock market	28.57%	10.84%	17.24%	27.59%	7.39%	8.37%	3.00
Invest-ment Perfor-mance	The rate of return of your recent stock investment meets your expectation	11.33%	3.45%	19.21%	47.78%	7.88%	10.34%	3.68
	Your rate of return is equal to or higher than the average rate of return of the market	11.33%	9.36%	16.75%	45.32%	7.39%	9.85%	3.58
	You feel satisfied with your investment decisions in the last year (including buying, selling, choosing stocks and deciding the stock volumes)	8.87%	6.40%	16.75%	41.38%	13.79%	12.81%	3.83

Source: Survey by the author.

The section of investment performance gathers information about the investor's personal belief and opinion about their investment outcome. It is rather a subjective interpretation than any objective performance evaluation of the returns of their portfolio. This will let us analyze how, in the backdrop of the preceding behavioral biases, the investors view the returns of their investment and its overall performance. Majority of the respondents agree that the return meets their expectation. They are able to beat the market on average and feel satisfied with their investment decision in the last year. The differences between the proportions of respondents agreeing to the statements of positive investment performance to rest of response group are markedly huge. Among the three statements of the investment performance, the mean rating is highest in the satisfaction of their last year's investment decision. In the following section, I have analyzed the relationship between the investment performance and few of the socio-economic factors of the investors.

6.2 Socio-Economic and Demographic Factors:

The following figures provide a summary of the socio-economic and biological characteristics of

the sample respondents. More than 30% of the respondents are aged between 36-46 years, while the following majority of investors is in the older age group. In terms of education, around 45% of the respondents hold a Master's degree indicating a modest rate of educated and learned investors as part of the retail investor base. However, with respect to monthly income, the largest group of respondents belong to the lowest income group. There was bias with answer to this particular question because of the tendency of the individuals to understate their earning power. The largest group with respect to the total amount invested in DSE till date consists of 36.56% of the sample investors whose total investment has been less than Tk. 10 lac till date. This statistic is explainable because the participation of retail investors has only lately increased over the last 5-7 years resulting in a small cumulative investment when measured with the investor base in aggregate.

The collective and cumulative decision of the retail investors is very important for the reputation of the corporate entities and also for ensuring better functioning of the financial market as the retail brokers become competitive.

Figure 1: Characteristic summaries of the sample respondents

Source: Survey Findings.
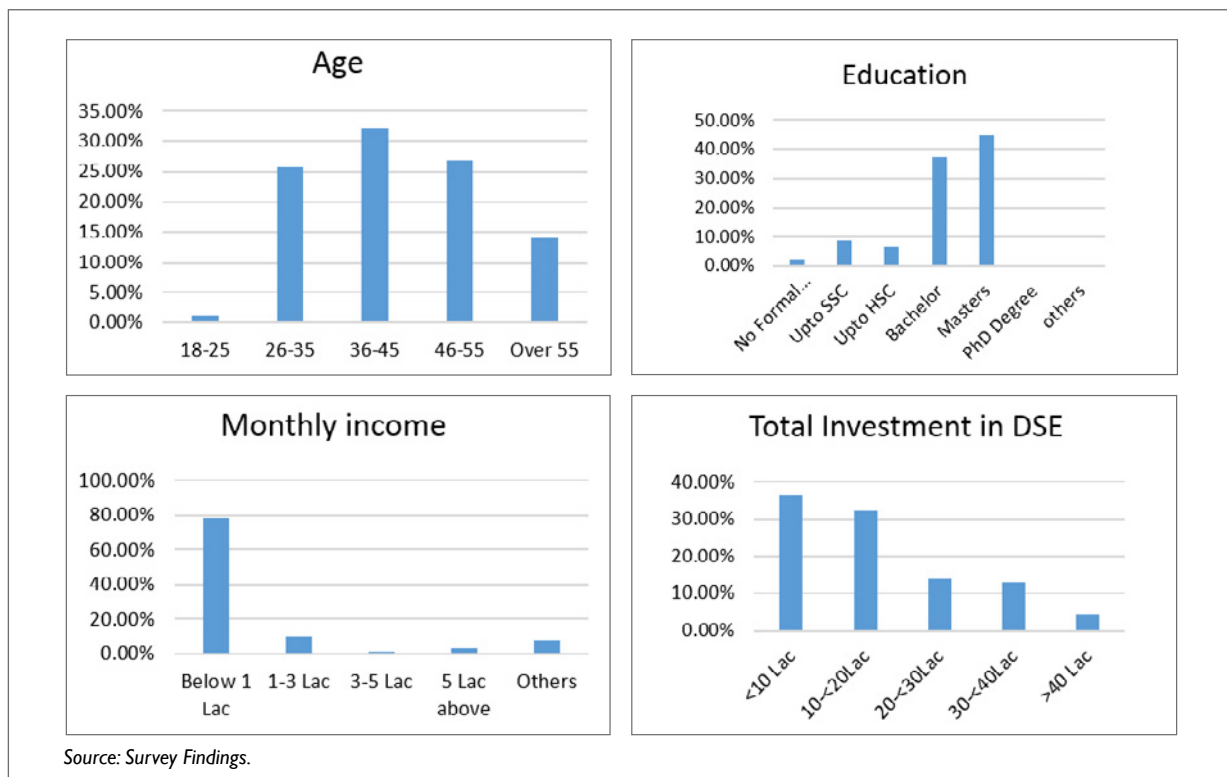
5.2 Cross table analysis

Total Amount invested in DSE and Age, Education and Monthly Income Respectively:

Age						Education							Monthly Income					
TINV	1	2	3	4	5	TINV	1	2	3	4	5	6	TINV	1	2	3	4	5
1	5	45	22	13	6	1	3	3	4	29	52	0	1	77	6	2	0	6
2	0	14	28	15	3	2	0	2	8	21	29	0	2	46	10	0	2	2
3	0	5	8	3	5	3	0	0	2	10	10	0	3	14	5	1	1	1
4	1	9	11	9	3	4	0	1	3	16	12	2	4	20	8	5	1	0
5	0	3	1	1	0	5	0	0	0	1	4	0	5	2	2	0	0	1

The table above presents the cross table analysis of the responses with respect to few major variables. Each of the three tables shows the distribution of the responses with respect to Total amount invested in DSE (TINV) and characteristic variable of the investors: Age, Education and Monthly income. Such cross tabulation is repeated with respect to investment performance variables too.

In terms of age, the middle aged population is the majority group having invested less than 20 lacs in DSE. Although around 19% of the sample have invested greater than 30 lacs. A slightly negative relationship prevails between age and total amounts invested.

Individuals holding higher education or postgraduate

degree have invested a greater amount than those with less formal education. This causation may be arising from some other endogenous variables because, for example, people with higher education is better employed with a higher salary which can result in a bigger capital to be invested.

Surprisingly, individuals in the lower income group have greater amount invested in the stocks than those in the higher income who might have their savings locked in other assets. This indicates that individuals with lower income are interested to increase their wealth by diverting their savings to the stock market and worry more on short term gains and losses because the amount invested is a substantial amount of their net worth.

Total Amount invested in DSE in the last year and Age, Education and Monthly Income respectively:

Age						Education							Monthly Income					
LINV	1	2	3	4	5	LINV	1	2	3	4	5	6	LINV	1	2	3	4	5
1	5	49	39	13	10	1	2	4	7	43	60	0	1	98	10	2	1	5
2	0	8	14	10	2	2	1	0	4	13	16	0	2	23	6	2	2	1
3	0	5	5	4	0	3	0	1	3	3	8	0	3	12	1	0	0	2
4	1	10	9	11	4	4	0	1	3	14	16	2	4	22	10	4	0	0
5	0	4	3	3	1	5	0	0	0	4	7	0	5	4	4	0	1	2

With respect to total amount invested last year(LINV), the highest proportion of investors are the middle aged group of 26-35 and 35-45 who invested less than 5 lacs in the last year. Less than 1 percent of the respondents have invested more than 10 lacs in the last one year. Interestingly, investors holding post-graduate education form the largest group of investors whose investment is also concentrated to less than 5 lac in the last year. With respect to income, people in the lowest monthly income group (less than one year) consists of the largest group of respondents, 48.27% whose last year investment has also been less than 5 lac. This class of investors also forms the second largest group, 10.84% to invest more than Tk. 10 lac in the last year.

Return beating the market and Age, Education and Monthly Income respectively:

Age						Education							Monthly Income					
RETBEAT	1	2	3	4	5	RETBEAT	1	2	3	4	5	6	RETBEAT	1	2	3	4	5
1	1	7	7	5	3	1	0	0	2	7	14	0	1	16	4	0	0	3
2	0	7	6	5	2	2	2	0	4	9	6	0	2	17	3	0	1	0
3	1	9	12	7	5	3	0	1	1	14	17	1	3	26	4	1	0	3
4	3	35	34	17	3	4	1	3	8	32	49	0	4	66	17	4	2	4
5	1	7	4	2	1	5	0	0	2	6	7	0	5	12	1	1	1	0
6	0	10	6	5	3	6	0	2	0	8	13	1	6	20	2	2	0	0

The cross tabulation of responses with respect to achieving a return that beats the market (RETBEAT), the major respondent groups who agrees to have outperformed the market on average belong to the age groups of 26-35 years and 36-45 years with education level bachelor and Masters. However, amidst investors whose monthly income is less than one lac, there is some kind of mixed opinion with regard to this even though majority of two major group of investors who believe to have outperformed market belong to the income groups of less than Tk. 1 lac and Tk. 1-3 lac.

Satisfaction from the investment decision and Age, Education and Monthly Income respectively:

Age						Education							Monthly Income					
SAT_INV	1	2	3	4	5	SAT_INV	1	2	3	4	5	6	SAT_INV	1	2	3	4	5
1	1	7	5	4	0	1	0	0	1	5	12	0	1	12	3	0	0	3
2	0	4	4	3	2	2	0	0	1	5	7	0	2	10	3	0	0	0
3	1	8	15	9	2	3	2	0	2	21	10	1	3	28	5	2	0	1
4	3	29	31	16	6	4	0	4	13	25	43	0	4	65	10	3	2	5
5	1	15	7	3	2	5	1	0	0	12	15	0	5	19	6	1	2	0
6	0	12	7	6	5	6	0	2	0	8	19	1	6	23	4	2	0	1

Similarly with respect to satisfaction of the investment decisions, the major respondent groups who agree to feel satisfied with their investment decision belong to the age groups of 26-35 and 36-45 with education level bachelor and Master's. However, amidst investors whose monthly income is less than one lac, in this case too there is some kind of mixed satisfaction rating as we see the two major groups, one of which disagree and another which agrees belong to this group, though the larger group agrees is more optimistic.

Total Amount invested in DSE and investment performance:

EXPRET							RETBEAT							SAT_INV						
TINV	1	2	3	4	5	6	TINV	1	2	3	4	5	6	TINV	1	2	3	4	5	6
1	12	6	18	38	5	11	1	9	8	17	41	5	10	1	7	5	16	38	10	14
2	4	0	16	31	5	3	2	7	8	6	25	6	7	2	5	6	9	25	8	6
3	3	0	2	10	4	3	3	4	2	0	11	3	2	3	2	2	2	9	4	3
4	4	1	5	19	2	3	4	3	3	8	16	1	3	4	2	0	9	12	6	5
5	1	0	0	3	0	1	5	0	0	3	0	0	2	5	2	0	0	1	0	2

With respect to total amount invested and the investment performance, the largest group of respondents who are satisfied with their investment performance with respect to the three variables are those belonging to lower investment groups. These are mostly the small investors. Of course the investment of small and large investors are not comparable in terms of asset allocation and pattern of trading.

Multiple Regression between Total amount invested in DSE and investors' personal characteristics:

In order to test the statistical significance of the relation between total amount invested and the investor's personal characteristics, the following multiple regression is conducted:

$$TINV = \beta_0 + \beta_1 Age + \beta_2 Edu + \beta_3 MI + \varepsilon$$

Multiple Regression Output

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lm(formula = TINV ~ Age + Education + MI, data = retail)
Residuals:
    Min     1Q  Median     3Q     Max
-1.8433 -0.8667 -0.1805  0.7066  3.1774
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.16673    0.52589   2.219   0.0276 *
Age          0.15692    0.07950   1.974   0.0497 *
Education    0.04409    0.09521   0.463   0.6438
MI           0.16568    0.07996   2.072   0.0395 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.169 on 209 degrees of freedom
Multiple R-squared:  0.03876,  Adjusted R-squared:  0.02496
F-statistic: 2.809 on 3 and 209 DF,  p-value: 0.04054
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Source: Author's computation.

Among the three personal characteristic variables, Age and Monthly Income hold a statistically significant positive relationship with the total amount invested in DSE indicating that older and richer investors tend to invest more in DSE. The significance of the intercept term shows the problem of a number of omitted control variables which will better explain the variability in the total amount invested in DSE. The R^2 of 3.9% is very small reflecting smaller variation in the response variable is explained by the variation in the explanatory variables.

7.0 Conclusion

The main objective of this paper is to identify the behavioral bias retail investors incorporate in their investment outlook and decision. With the response of a survey previously conducted in Ho Chi Minh Stock Exchange in an academic study and using the behavioral factors from Waweru et al., (2008), I identify the behavioral bias that govern the investment decision of the investors. By summarizing the survey findings, I find evidence for the significance presence of representativeness, overconfidence, anchoring, gambler's fallacy of heuristics theory, loss aversion, regret aversion and mental accounting of the prospect theory, bias from external market factors. However, the evidence from the herding effect is mixed and will be diminishing over time as investors are being more 'financially' educated over time. Analyzing statistical significance of such evidence is left for future research. Using cross table analysis, I discuss the distribution of the investors' opinion of their investment performance with regard to each of the few socio-economic and personal characteristics individually. It is found that people with small capital, and post-graduate education, aged between 25-45 years, are those who are mostly satisfied with their investment performance. A multiple regression is conducted to see if the size of their investment (capital) depends on their personal characteristics. Interestingly, it is found that age and monthly income are positively related to the size of their capital and this relationship is statistically significant. There are issues of omitted variables which also affect their perception of the market and investment decision. These should be incorporated and further studied in a future research.

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