An empirical analysis on disposiztion effect and investor performance in Bangladeshi stock market

Prepared By

Dipu Rani Bhowmik

GSEAS

The Graduate School of East Asian Studies
Yamaguchi University

THIS WORK IS DEDICATED TO MY HUSBAND WHO HAS ALWAYS BEEN MY NEAREST AND HAS BEEN SO CLOSE TO ME THAT I FOUND HIM WITH ME WHENEVER I NEEDED. I ALSO DEDICATE MY THESIS TO MY TWO SONS WHO SUFFERED A LOT FOR MY DOCTORAL COURSE.

PREFACE

The inconsistency between the efficient market hypothesis and reality of the business encouraged the theorists to a deeper insight focused on behavior and psychology, as an important factor in financial theory. The emerging discrepancy of conventional models (how investors should behave) and the behavior of investors (what are they doing) instigated the platform on behavioral finance, which was formulated - a new branch of theory, combining the knowledge of psychology, economics and other social sciences (Bernheim, D. *et al*., 2008, p. 40). When making decisions under uncertainty and risk conditions, people experience the effect of different illusions, emotions, false perception of information and other "irrational" factors (Guzaviciusa *et al*., 2014, p. 518). Behavioral finance illustrates market anomalies and financial behavior of individuals better than rationale theory due to the combination of various scientific knowledges.

Theory of behavioral economics hypothesizes that investors while making profits, become biased with some mental illusions. In order to better understand the financial decision procedure of an individual investor, the behavioral theories of psychology, sociology, and anthropology are applied. All the rational models are associated with the theory of rational expectations, including the assessment of all information about the property. The question arises if there are many irrational investors and their financial behaviors have an impact on prices. Thus the poor assessment of the irrational investor impacts on the market.

The prime concern of the financial market is to minimize loss and maximize return. To fulfill this goal, many investors may behave irrationally, become biased by some psychological factors. Among the biases, the tendency of investors to be

disposed of is prominent all over the world. The tendency of the investors to sell the profitable stocks earlier than losers is defined as disposition effect (DE).

The aim of the study is to understand the behavior of Bangladeshi investor as an emerging market investor. The disposition effect on the basis of investors' acquired and inherent experience and the demographic characteristics are the main objective of the study. However, the presence of DE has been illustrated in some countries; no such investigation has yet been carried out in Bangladesh. The contribution of this study is to be the first one on the Bangladeshi market and the most comprehensive in the South Asian context.

This research will throw light on individual differences of investor behavior. Including the USA, disposition effect has been found in different countries with different magnitude (see reference). Recent researches are searching the causal factors that differ the magnitude of disposition effect. This study may expose some factors provoking the magnitudes of this behavior across the countries and the findings will be the preliminary one for the further research on DE on Bangladeshi investors.

ABBREVIATIONS

BO	**Beneficiary of Owner**
OTC	**Over The Counter**
GPRS	**General Packet Radio Service**
IPO	**Initial Public Offering**
GDP	**Gross Domestic Production**
BDT	**Bangladeshi Taka**
NASD	**NASDAQ (National Association of Securities Dealers Automated Quotation)**
DE	**Disposition Effect**
PGR	**Proportion of Gain Realized**
PLR	**Proportion of Loss Realized**
ASE	**Australian Stock Exchange**
NYSE	**New York Stock Exchange**
CHESS	**Clearing House Electronic Subregister System**
PMM	**Professional Portfolio Money Manager**

LIST OF CONTENTS

Abstract

The discrepancy between the rational hypothesis and reality of investment made the researchers focusing on behavior and psychology, as an important part in financial theory. How investors should behave and what are they doing, created the question among the researchers which is the platform of behavioral finance (BF). BF is formulated as a new branch of theory, combining the knowledge of psychology, economics and other social sciences (Bernheim, D. *et al*., 2008, p. 40). When making decisions under uncertainty and risk conditions, people experience the effect of different illusions, emotions, false perception of information and other "irrational" factors (Guzaviciusa, *et al.*, 2014, p. 518).

Due to the integration of various kinds of scientific knowledge, this research studies individual investors' behavior as an alternative way to study the stock market anomalies rather than efficient market theories. The author investigates the tendency of Bangladeshi investors to hold losers too long and sell winners too soon which is known as disposition effect (DE). Among the other behavioral heuristics, DE is the most documented bias all over the world. Disposition effect is caused by a combination of prospect theory, mental accounting, regret aversion, self-control issues and mean reversion.

The results demonstrate that Bangladeshi individual investor has a historical preference for realizing their winning investments more than their losing ones. This study also tests the disposition effect of traders on the basis of acquired and inherent experience and then judges the role of investors' personal and demographic characteristics on the trading decision. The main objective of this study is to find out the presence of this bias across the Bangladeshi individuals and their relationship

with personal characteristics.

On the basis of the previous research findings, I predict that different levels of investor sophistication are responsible for the different magnitude of the individual investors' disposition effect. I calculate 125 individual investors' daily transactions using a large brokerage account database between 2011 and 2016 in Bangladesh. I analyze and justify the disposition effect of investor and the relation of their personal characteristics to it. I use individual trading frequency, gender, financial and occupational categories as proxies for investor sophistication. I find empirical evidence that wealthier individuals with high income and individuals employed in professional occupations exhibit a lower disposition effect.

Then I perform the regression analysis to analyze the relationship between investor personal and demographic characteristics and the disposition effect. From the findings, it is established that Bangladeshi investors show a historical preference for gain realization. Male, frequent, older and wealthy investors are less inclined to realize gain. In another test, professional and investors with high income show less preference to the disposition effect.

This empirical study may provide guidelines for investment advisors or agent, policymakers, and investment communities of Bangladesh to utilize my findings and help investors for better decisions making. The study would be also useful for the investors' group who are actively involved in the stock market and the group of people who are thinking to start investing in the market. Finally, this study gives some recommendations on the strategies for the development of stock business and for making a profit of individual investors.

CHAPTER 1

INTRODUCTION

1.1 Traditional financial concepts vs. behavioral financial concepts

Traditional or standard finance has assumed that investors always behave rationally as a rational and knowledgeable economic agent whose financial decisions reflect all rational concepts, models and available information. Consequently, it finds out the rational solution to the problem by developing different concepts and models as for how investors should behave. It does not emphasize the investor behavior or psychology toward investment. According to conventional financial theory, emotions and other cognitive factors do not influence people during making financial decisions.

In contrast, behavioral finance throws light on investor's psychology and behavior towards investment. The micro foundation of behavioral finance is behavioral decision making. Recent research has shown that during financial decision, human is not always being perfectly rational or logical. Behavioral finance argues with evidence that social, cognitive, and emotional factors affect the economic decisions of individuals and institutions during resource allocation. Individual investors trade too much even though trading is hazardous to their wealth (Barber and Odean, 2000, p. 773). Investors have a tendency to invest in stocks that are close to their locality even though the investments appear lower return (Barber and Odean, 2011, p. 1534). Due to the accumulation of various scientific knowledges, behavioral finance better describes market anomalies and financial behavior of individuals. The prime concern of the financial market is to minimize loss and maximize return. To fulfill this goal, many investors behave irrationally, become

biased by psychological factors. Scientists argue that investor's psychological biases are human tendencies that lead them to follow a particular semi-logical path based on predetermined mental shortcuts and beliefs rather than long analytical process. When investors become biased, they do not consider the full information and can ignore the evidence that contradicts their predetermined opinions. People generally think that they are better decision makers than they really are. In addition, they seek information that confirms their belief.

Some common psychological biases that are cursing investors includes disposition effect, overconfidence, representative bias, cognitive dissonance, familiarity bias, illusion of knowledge, illusion of control, endowment effect, status quo bias, reference point and anchoring, confirmation bias, hindsight bias, gambler's fallacy, availability bias, changing risk preference, social interaction, consultation with brokerage houses staff, consultation with investors in broker houses at trading time and success of other investors. These cognitive errors are sometimes minor and sometimes become fatal which causes severe harm to investor's wealth. This ongoing self-deception leads to decision errors. Observing these situations in Bangladesh, my study will focus on this emerging issue.

1.2 The Disposition Effect (DE)

Many investors seem to have difficulty during maximizing their profit. They tend to quickly sell the price appreciated assets and to hold longer the price depreciated stocks. The tendency of investors to hold losers (previously purchased stocks that have lost value) too long and to sell winners (previously purchased stocks that have increased value) too soon has been described as the disposition effect (DE) by Shefrin and Statman (1985, p. 777). The propensity to avoid regret and seek pride

causes investors to be predisposed of selling winners too early and riding losers too long. Disposition effect is one of the well-documented regularities in the behavior of investors. An investment decision-making application of mental accounting (Thaler, 1985, p. 183) is the process in which the mind keeps track of gains and losses on each stock held rather than at the portfolio level (Shefrin and Statman, 1985, p. 780). Including the USA, disposition effect has been found in different countries with different magnitude (Shapira and Venezia, 2001, p. 1573, for Israel, Grinblatt and Keloharju, 2001, p. 589, for Finland, Chen *et al*., 2007, p. 425, for China, Shu *et al*., 2005, p. 201, for Taiwan, and Brown *et al*., 2006, p. 43, for Australia). Although there are much more evidence that, individual investors in the stock market exhibit the DE, it is now the issue of study whether investors in the market other than the stock market also suffer from the same behavioral bias[1]. To test the disposition effect in Bangladesh, I observe the trading records from July 2011 through June 2016 for 400 accounts at a large brokerage house. My analysis of these samples shows that, overall, Bangladeshi investors realize their gaining investment more readily than their losing investments. Shefrin and Statman (1985, p. 778) explain the disposition effect to a combination of prospect theory, mental accounting, regret aversion, and self-control issues[2].

1.2.1 Prospect theory

The most principal psychological explanation for disposition effect is the implication of "prospect theory to investments", which was developed by Kahneman and Tversky (1979, p. 263). According to this theory, investors evaluate gains and losses with respect to a reference point; the purchase price is the most commonly used reference point.

Here, figure 1

When people face a lottery with choices of two or three outcomes, people behave for maximizing their "S" shaped value function (See figure 1), which is the base of this explanation. Because the value function (psychological) is concave in the domain of gains and convex in the domain of losses. It is steeper for losses than for gains. For us humans, losing something makes sorrow more than gaining it. This happens because we are loss averse. In fact, the science of loss aversion says that losing something makes us feel sad twice as much as we feel happy when we gain something.

Suppose, an investor purchases a stock with an expectation of high return enough to justify its risk. If the stock price rises higher than the buying price, the investor shows the risk-averse behavior in the domain of gains of the value function. The investor thinks that the expected return now continues to justify its risk. He may sell the stock if the expected return is perceived as too low. What will happen if the stock price declines? If the price of that stock drops, the investor keeps the stock in the domain of losses because he becomes risk loving in the hope of breaking even rather than realizing a sure loss. The difference in risk attitudes for gains and losses is called a 'reflection effect' by Weber and Camerer (1998, p. 167). This leads to the disposition effect. According to Kahneman and Tversky (1979, p. 287), a person who has not made peace with his losses is likely to accept gambles that would be unacceptable to him otherwise.

1.2.2 Mental accounting

Mental accounting is the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities (Thaler, 1999, p. 183). He also constructs a framework of mental accounting to provide a foundation for the way that decision makers frame gambles. According to Shefrin and Statman (1985), the main idea underlying mental accounting is that decision makers tend to segregate the different types of gambles faced into separate accounts, and then apply prospect theoretic decision rules to each account by ignoring possible interaction. Mental accounting also explains the cause of investors' tendency to refrain from readjusting the reference point for a stock. Usually, the reference point is the stock purchase price. When a stock is purchased, investor's mind opens a new mental account. A running score is then kept on this account indicating gains or losses relative to the purchase price (Shefrin and Statman, 1985, p. 780).

1.2.3 Regret aversion

To avoid the regrets is another cause of the tendency of investors to be reluctant to recognize their losses. Barber and Odean (2011, p. 1558) suggest that the emotions of regret for realizing a loss and the emotions of pride in realizing a gain contribute to the disposition effect. Nofsinger (2007, p. 4) illustrates that selling the ''winner'' (the stock that has increased in price) approves a good decision to purchase that stock in the first place and stimulates pride. Selling the ''loser'' (the stock that has depreciated in price) causes the realization that the former decision to purchase it was poor, and thus stimulates regret. Investors are human being and they keep track of their good decisions and bad decisions in separate mental accounts. Human being always tries to recognize their good decisions rather than the bad and

appreciate their decision-making ability. When an investor has observed losses, he finds it psychologically painful to acknowledge his mistakes. An unpleasant feeling is triggered and makes him reluctant to recognize the loss. The self-deception theory attenuates this argument because a loss is an indicator of low decision-making ability. Some previous researchers find empirical results related to this theory. Strahilevitz, Odean, and Barber (2011, p. s102) report that investors are more interested to repurchase a stock that they previously sold if the stock is currently trading at a lower price. They explain that an investor who sells a stock and repurchases it at a lower price feels good about these transactions, while an investor who repurchases a stock at a higher price than he sold regrets having sold in the first place. To avoid this regret, investors refrain from repurchasing for a higher price. Odean (1998, p. 1794) finds that investors are more likely to buy additional shares of a stock that has lowered in price since purchased than a stock that has increased in price.

Summers and Duxbury (2007) study the role of emotions in the creation of disposition effect. They find no disposition effect in experimental markets when investors do not actively choose the stocks in their portfolios. If investors do not feel responsible for decisions leading to gains and losses, they no longer sell winners more readily than losers. Alternatively, this finding supports the "Agency theory" to mitigate the disposition effect. Weber and Welfens (2011, p. 139) corroborate in experiments that investors attribute this behavior only when they were responsible for the sale, suggesting that investors stay away from repurchasing stocks at a higher price than their previous sale price to avert regret.

1.2.4 Mean reversion

Some researchers explain disposition effect on the basis of mean reversion of stock prices. It means that investors believe poorer-performing stocks will better perform tomorrow and that better-performing stocks will down in price and return will reverse to mean (Shu *et al.* (2005, p. 201), Weber and Camerer (1998, p. 181)). Lakonishok and Smidt (1986, p. 955) show that investors who purchase stocks on favorable information may sell if the price gets high rationally believing that price fully now reflects this information, and may continue to hold if the price falls, rationally believing that their information is not yet incorporated into the price. Investors may rationally, or irrationally, believe that their current losing stocks will outperform in the future than their current winning stocks. This alternative explanation has been proposed by researchers for why investors might realize their price appreciated stocks while retaining their price depreciated stocks.

Both prospect theory and a belief in mean reversion forecast that investors will be more prone to sell their profitable investment too soon and more prone to hold their losing investment too long. Both predictions support the investor's psychology for purchasing more additional shares of losers than of winners. However a belief in mean reversion is applicable for both the stocks that are purchased and not purchased by the investor, but prospect theory is applicable for only to the stocks that are purchased. Thus a belief in mean reversion signifies the tendency of investors to buy stocks that had previously decreased in price even if they don't already have these stocks, and prospect theory has no significance in this case.

1.3 Importance of disposition effect

The disposition effect is one of the most robust cognitive errors documented in studies of trading behaviors. Recently researchers are interested in finding the reasons and the factors provoking the magnitudes of this behavior across the countries. These inquiries are important in many aspects. DE may cause harm to individual investors by lowering their average return, paying more capital gain taxes[3] or by increasing inferior performance. Lower decision-making ability focusing on the purchase price decreases the performance of investor. Even the market may be affected by similar systematic behavior of many investors, through changing the market price and influencing trading volume that ultimately might cause a market crash. If many investors purchase a stock at a particular price, that price may turn into their reference point and may affect the supply of shares in the market. If the stock price decreases below this reference point, disposed investors will be relaxed to sell for a loss, reducing the supply of potential sellers. A reduced supply of potential sellers could slow further decrease of price. On the other hand, if the stock price increases above the reference point, disposed investors will be more willing to sell, increasing the supply of potential sellers, and possibly slowing the further increase of price. It may affect market stability.

Of course, rational explanations can justify this tendency; portfolio rebalancing, diversification or higher trading costs of low priced asset, for instance. However, none of these explanation has been found convincing enough by researchers (Odean, 1998, Boolell Gunesh S., 2009).

Recently researchers have investigated under which conditions the bias has prevalent and has there any relationship between investor's characteristics and DE

that might provoke the magnitudes of this behavior across the countries. These inquiries are important for many reasons. First, if it proves that specific investor characteristics are correlated with trading behavior, this may have strong impacts for the dynamics of asset prices in long-term business which may stop the possibility of the crashes. Second, if the inquiry points that a certain category of individual investor is more prone to the biases, it may have welfare and regulatory implications. Particularly regulations may be designed for the social security and pension fund investments that will lead to the greater good of the investor population. A third implication is that financial managers or brokerage houses may profit from the poor biased irrational investors by receiving a portion of investors' profit as incentives.

This is the first empirical research in Bangladesh context where I investigate the existence and propensity of DE of individual investors using a data set obtained from a Bangladeshi brokerage house. This paper affords a cross-sectional study of the disposition effect by multifactor sub sampling of the data to evaluate the heterogeneity of investor characteristics in the tendency of investors to keep losing investment and sell the winners.

I analyze the DE on the basis of trading frequency and gender differences by subsampling the investors. I find a negative relationship between trading frequency and the magnitude of the disposition effect which confirms the previous findings (Odean, 1998, Shu *et al.*, 2005, Dhar and Zhu., 2006).

Specifically, individuals who trade frequently are less reluctant to sell their losers, implying that trading frequency might help investors to be less disposed. My results remain unchanged with other alternative measures of the disposition effect and various robustness checks.

For a better understanding of the consequence of DE, I calculate the average return. I examine the DE whereas it is motivated or not by the desire of portfolio rebalancing and diversification. I show that when the data are controlled for rebalancing and for diversification, the disposition effect is still observed.

Some recent researches, for example, Dhar and Kumar (2002), Shu *et.al.* (2005) and Dhar and Zhu (2006) find significant heterogeneity in investor behavior and trading styles. Such differences conclude that the mean DE is not the standard point to justify the bias. To justify the point, I demonstrate individual characteristics (inherent and acquired) such as account age, account value, investor's age, and location. By the regression analysis of investor characteristics, I analyze the relationship between DE and investor's characters. I show that acquired experiences correspond to investment knowledge and literacy, which are the proxies for sophistication, can reduce the tendency of DE.

Then I analyze the DE by sub sampling the investors on the basis of their occupation and income. For a better understanding of the correlation of DE and investor characteristics, I perform the regression analysis on the pooled data set and the subsamples too. I find that individual demographic characteristics which related to greater literacy about investment products, such as their income and occupational status, attenuate the magnitude of the disposition effect. Specifically, my result represents those individuals who are wealthier and work in professional occupations show a significantly smaller disposition effect than the others.

My findings have important implications for policymakers and regulators of Bangladesh as well as for behavioral financial theorists in the Asian context.

First, as certain investors (infrequent, investor with less income and account value, non-professional) are more susceptible to the disposition effect than others; individual investor organizations such as brokerage or exchange houses should focus on the awareness of this tendency at early stage and adjust the trading of these investors accordingly to minimize their loss.

Second, because of having a higher rate of disposed of investors in Bangladesh compared to western countries, my study suggests that brokerage firms should try to educate their clients about the disposition effect. Better awareness of cognitive bias can motivate investors to sell their losers earlier, deduct trading costs and improve portfolio performance. This will increase the reputation and value of brokerage firms' services.

Finally, the increase in self-investing with the awareness of trading biases highlights the role of government agencies and nonprofit organizations of a country by increasing the market capitalization to the GDP.

The next chapter of the paper discusses an overview of the Bangladeshi stock market; chapter 3 reviews the literature related to it. Chapter 4 describes the data set and methodology with the hypothesis. Chapter 5 presents the empirical study and its findings with the comparison to previous researches. Chapter 6 concludes and proposes some policy recommendations.

CHAPTER 2

OVERVIEW OF BANGLADESHI STOCK MARKET

2.1 Overview of the Stock market

Market inefficiency is the major drawbacks for Bangladesh as a developing country. As emerging market investors, they are less familiar, experienced and educated with investment process compared to investors from more capitalistic oriented societies. Thus in Bangladesh, these heuristics simplification may be even stronger. Emerging market investors are less experienced about investment because of the regulatory system and information transparency which are not too efficient to get the information and confidence of the investors for analyzing the data without anomalies. The capital market of Bangladesh is comprised of Dhaka Stock Exchange (DSE established in 1954) and Chittagong Stock Exchange (CSE established in 1995), is regulated by The Bangladesh Securities and Exchange Commission (BSEC). Recently these exchanges become more active and are more supervised by BSEC. Following table shows the daily turnover rate in DSE.

Here, Table- 1

There are 563 companies listed on DSE and CSE; the dual listing is permitted.

The World Bank provides data of market capitalization for Bangladesh from 1993 to 2017. The average value for Bangladesh during that period was 13.96 percent with a minimum of 1.4 percent in 1993 and a maximum of 37.08 percent in 2011 whereas it is 61.29 percent in 2011 for Japan (Source- World Bank)[4]. Total market capitalization was about $41.74 billion in June 2015(Annual Report of DSE-

2015). It is usually reported as percent of GDP. By this percentage we can evaluate the size of the stock market relative to the size of the economy.

Here, figure 2

Generally, Trading Time is from 10:30 am to 02:30 pm and working days are from Sunday to Thursday. The total number of securities stood at 65 (Sixty five) under OTC facility as on 28th December 2017. Investment in approved debenture or debenture stock, stocks or shares is exempted from capital gain tax.

Tax rate from capital gain received from selling the capital asset (other than securities of listed companies) is 15%.

Capital gain tax arising from the sale of stocks of the listed entity in the hands of non-resident is exempt from tax provided. However, any income which is exempted in other countries will be exempted in Bangladesh[5]. According to the regulation 47, transfer of securities by way of gift among the family members i.e. spouse, son, daughter, father, mother, brother, and sister is applicable other than cash.

According to DSE, the criteria for opening a BO account are as follows:

- Should be a citizen of Bangladesh

- Age should be 21 years or more

- Graduation from any recognized University from Bangladesh or abroad

- Must possess the "Fit and Proper" criteria as may be prescribed by the Exchange/BSEC from time to time

- Has not been convicted by any court for moral turpitude

- Any other qualification as may be notified by the Exchange from time to time.

- Comply with all the Rules and Regulations framed out in this regard. Trading Sessions conduct trading in-4-phases[6].

Recently DSE is offering GPRS services. With regard to the capital market, for the last couple of years, there has been a high percentage of over-subscription for the Initial Public Offerings (IPOs). Although the number of IPOs is increased by 50 percent during the last fiscal year, the demand versus the supply gap is yet to converge. Significant oversubscription validates the presence of excess liquidity in the capital market to cater to financing both private and public investments. However, this will require measures to stabilize the market to raise investors' confidence. It is important that more IPOs get listed in the capital market.

2.2 Overview of Bangladeshi investors

Arifuzzaman *et. al*. (2012) show the statistics of the demographic characters of investors.

Here, Table-2

About 35 percent investors lie between the ages of 25-35 years whereas the investors of western countries and some Asian countries depend on pension holders for their stock market (Odean, 1998, Shu *et.al*., 2005 and Dhar and Zhu., 2006).

Here, Table-3

Thus the table explains the turnover rate which becomes lower of the Bangladeshi investor. Arifuzzaman *et. al*. (2012) also find that the preference for holding stocks less than six months is also stronger in younger traders. However, some matured citizens prefer to hold for more than 6 months. This indicates that investors irrespective of their age are very short-sighted.

They mention that the majority of the traders look forward to a minimum of 0%-40% profit before selling their stock. This tendency is prominent among female investors. They tend to require less minimum target profit than male counterparts as

can be seen that at 0%-20% profit more female investors are willing to sell their stocks. Very few female investors sell their stocks at a profit level higher than 20%.

Arifuzzaman *et al*. (2012) find that higher level of profit is expected by the younger investors. Female traders tend to be more tolerating to lose at loss level of less than 40%, however, at above 40%, male traders are more tolerant. However, it can be observed that the tolerance level increases with age but again decline for the oldest group. Traders of all age group spend the maximum amount of their investment money in the Banks and financial institutions. Age group below 25 prefers to have a maximum portfolio size of less than 500,000 BDT while only one group (age 35-45) has invested more than 5,000,000 BDT. The result also shows that the younger age group do not spend a good amount of money in the mutual funds.

Barua et. al. (2009) show that investor mostly has an investment amount of 500,000 BDT and are mostly mid-aged with the approximate age of 36. On average respondents have 5 persons as their family members though mostly have 3 persons as family dependents. Investors on average have earned 50.92 percent profit from their investment in the year 2007. They save around 12.19 percent only from their monthly income which reflects the reality of the inflationary pressure on the investors. Most of the investors are male and are naturally by profession merchant, operate their investment in the stock market by themselves except a few who delegate the authority to others.

Barua et. al. (2009) also find that investors are responded for what they want to invest for both long and short-term to maximize their wealth from this market and on average they have been in the market for the last 5 to 6 years. Almost 72 percent of investors in the stock market have monthly income less than 40,000 BDT. They

explain it by the way that the boom and rush in the stock market investment have been due to the overwhelming participation of many new investors in the last few years.

Assuming the market boom of the last 3 years from 2007, their data shows that, almost 88 percent of investors, in the micro group, are experienced with very recent 3 years of investment. Therefore, this is evidenced clearly that the last 3 years have seen the participation of thousands of new investors especially those with small or moderate income level in expectation of profiting highly. This situation has created a high demand for and less supply of quality stocks in the whole market.

Around 50 percent of all investors are participating currently in the stock market, have investment experience of 3 years or less. This is an interesting observation in their study that complies with the general observation of steep growth in market capitalization; both the number of investors and the size of the market have increased in the last few years. But also worth noting that still the market has been entertaining some 23 percent investors who have been investing for the last 12 years or more and they have learned the lesson of 1996 crash in DSE. The existence of these real investors and evolution of a new generation to the stock market in the last 2 to 3 years have a great importance for all market participants and regulatory bodies.

Attraction by the over-enthusiasm in making the profit and recent mass-participation in the expectation and common misunderstanding that stock market is the best alternative for making money very quickly, in the recent tide, they conclude that thousands of new investors form the limited income groups have joined the stock market. Almost 75 percent of investors belong the age less than 40. Notably, experience shows that investors in the age range 20 to 40 are generally less risk

averse than those over than 40 or less than 20. Therefore, these investors typically love to take the risk and to invest without hesitation. Very interestingly, survey data also shows that 90 percent of the investors in the micro group and a very small group of investors are less than 20 years, supports the enthusiasm of the new generation with subsequent growth of the overall market. This is also evident from survey data that around 75 percent micro investors have only 2 to 4 members in their family and investors who have only 2 or fewer members are largely (70 percent) very small investors.

Around 77 percent of investors are doing business than followed by 10 percent private service-holders. About 80 percent of them have an investment experience of equal to or less than 1 year. Analysis of risk scores shows that 67 percent of the investors are moderate risk taker, whereas only 2.2 percent presents themselves as risk aggressive investors. This finding contradicts with the general understanding of the practitioners and academicians regarding the individual investors' attitude towards risk in Bangladesh. Barua et. al. (2009) believe that a strong portion of individual investors is risk aggressive, which has instigated the recent boom in the market growth and pushing the market index to new high every day. The principal justification of the finding may be that due to the large-scale inefficiency of the market, existence of manipulation by certain groups of investors in fairly large scale and very poor education of the individual investors regarding stock market, a majority of individual investors even do not know how much risk they are bearing inherently for investing in the market.

Bangladesh is in the demographic revolution. The population growth in the country is going down due to the reduction in fertility and the mortality due to the

control of contagious diseases and other communicable diseases. As a result, the age structure of the population is changing over time. The demographic transition results in an increase in the working age population and physical stamina of the population which enhances growth termed as the demographic dividend.

A higher proportion of the working age population leads to relatively higher per capita income, higher growth, and higher employment.

CHAPTER 3

REVIEW OF LITERATURES

3.1 Discovery of the disposition effect

Shefrin and Statman (1985, p. 777) provide the first formal documentation on disposition effect. They argue for the existence of DE on the basis of the result of Schlarbaum, Lewellen, and Lease (1978) analysis. They calculate the return for only the stocks bought and subsequently sold without considering the performance of stocks that were bought but not sold during the period. They show that 60 percent trades of the individual investors resulted in a profit by judging their realized return.

They conclude that individual investor possesses a respectable stock selection skills and their good performance is due to the tendency to sell the winners and hold the losers.

Shefrin and Statman (1985, p. 785) question about those realized returns which come only from the successfully sold stocks while the unsuccessful stocks remain in the investor's portfolio in Schlarbaum *et al*. (1978, p. 303) methodology. Taking all argues into consideration, they present a formal disposition effect hypothesis and suggest a theoretical framework on an aggregate mutual fund performance. Since then, several previous kinds of research find empirical support for DE (Odean, 1998; Grinblatt and Keloharju, 2001; Barber and Odean, 2000; Dhar and Zhu, 2006) and show that individual investors posses less skill and significantly underperform to choose the good stock for selling.

3.2 Hard evidence

Around 20 years from 1978 to 1998, investors' behavior is seemed to be uninteresting to the researchers. Odean (1998) conducts a meticulous test of the DE hypothesis. Odean (1998, p. 1781) develops a specific method to measure the existence of disposition effect by considering the stocks that are remaining in the investor's portfolio[7].

The situation is changed with the analysis of Odean (1998) by using a large important database containing stock market investments of 10000 USA accounts. Later, a lot of studies are conducted by using this method. He is the first who studies the decision process of individuals based on daily transactions from 1987 through 1993. In his method, for one day, he classifies of all stocks in a particular investor's portfolio into four groups on the basis of their return.

The stock is (1) sold for a gain, (2) sold for a loss, (3) not sold showing a gain and (4) not sold showing a loss. Type 1 and 2 are real trades on which investor makes profit or loss. Type 3 and 4 are named as paper gain or paper loss using the daily closing price for their hypothetical selling price[8].

He aggregates all transactions over all investor and finds that the proportion of realized gains (PGR) is significantly higher than the proportion of realized losses (PLR) except in December, which provides evidence on favor of disposition effect in individual investors' behavior. On average, 14.8 percent gains are realized whereas only 9.8 percent losses are realized. Thus the investors realize their gain 50 percent more than their losses. Investors hold losers longer (a median of 124 days) than they hold winners (104 days). Odean (1998, p. 1789) is able to test the hypothesis based on mean reversion that investors are rational to keep the shares with the lower price

and sell the shares with the higher price, because they guess correctly that the current losers will rebound and the winners will slip back in price. This proves to be false from average returns counting. Unsold losers return only 5% over the subsequent year, while winners that are sold would have returned 11.6%.

Odean (1998, p. 1790) proves that selling's on the expectation that the losers will outperform the winners in the future are, on average, mistaken. The average excess returns for winners that are sold, over the six year is 3.4 percent more than it is for losers that are not sold. It has been also demonstrated in Odean (1998) work that after controlling for diversification, rebalancing, and stock prices, the DE is still observed.

Grinblatt and Keloharju (2001, p. 589) examine the preference for selling winners using the trading records for all types of Finnish investors (households, nonfinancial corporations, government institution, non-profit institution, and financial institution) during 1995 and 1996[10]. They follow the Odean (1998) method for counting the gains and losses (realized and paper). Financial institutions are the most sophisticated of all investors in their study. For all type of investors, selling of loser stocks is half compared to winners.

Weber and Camerer (1998, p. 177) perform a laboratory experiment to test the disposition effect. They define the DE as $(S+ - S-) / (S+ + S-)$, where $S+$ and $S-$ are the numbers of sales of winners and losers, respectively. To control the investors' expectations, as well as individual decisions, Weber and Camerer (1998, p.181) perform the experimental investigation of the disposition effect rather than using real market data.

In a controlled environment, they obtain the result that investors tend to pick up their gaining stocks from day to day 50 percent more than their losses. In their experiment, the stocks that are not sold on that day of selling are simply overlooked.

Barber, Lee, Liu, and Odean (2007, p. 423) report the disposition effect of all trading activities on the Taiwan stock exchange between 1995 and 1999. Individuals show the strongest bias than the USA investors[10].

Brown *et al*. (2006, p. 44) study the disposition effect among investors in 450 IPO stocks and 380 Australian Stock Exchange (ASX) index stocks between 1995 and 2000. They use the stocks on CHESS register to eliminate representativeness problems inherent in survey data. They conclude that Australian investors realize their gains more frequently than their losses. They also test the DE for the portfolio diversification explanation. The result shows that both findings for IPOs and index stocks are not substantially changed, indicating that the disposition effect is not attributable to portfolio rebalancing or trading cost explanation.

3.3 Influence of investor's sophistication

Odean (1998, p. 1785) notes that the PGR and the PLR measures are dependent on the average portfolio size from which they are calculated. When the portfolio sizes are large, both of these proportions will be smaller. Thus these proportions are smaller for the account with more frequent traders and generally have larger portfolios than for those who trade less frequently and have smaller portfolios.

In both time periods and for both the frequent and the infrequent traders (see table 4), a significantly greater proportion of all possible gains are realized throughout the year than of all possible losses (*t* greater than 22, in all cases).

Here, Table-4

He argues that in order to portfolio reconstruction over time for active accounts, average portfolio sizes are larger for the later years of the sample. PGR and PLR are therefore smaller for the period from 1990 to 1993 and for frequent traders. Thus frequency and trading experience can reduce the tendency of DE.

The prime focus of my study is to examine whether and why the disposition bias might vary across individual investors in Bangladesh. According to Odean (1998, p. 1784), measuring the disposition effect at the aggregate level may hamper in cross-sectional variations in understanding individual behavior. Followed by Odean, many researchers conduct the study of individual investor disposition effect.

The differences of knowledge about investment products across individuals are predicted by the theorists in behavioral finance as the factor of differences in the disposition effect. Dhar and Zhu (2006, p. 728) predict two theoretical reasons for looking at the role of knowledge. First, the lack of knowledge about how investment valuation working inherently increases the reliance on the price paid in inferring value. Second, an awareness of situations in which one is more or less reluctant to trade is likely to lead the correcting mechanisms. Thus, individuals who are conscious of the selling of losers can take more responsibilities for the consequences of their decisions, leading to behavior modification.

Dhar and Zhu (2006, p. 730) analyze the DE on US investors between 1991 and 1996 using the same dataset of Odean (1998). They find that investor characteristics corresponding to sophistication such as investors' income, profession, trading experience, age, and portfolio size lessen the magnitude of the DE. They assure that 20% of individuals exhibiting no DE tend to have the higher trading frequency, higher income, and work in professional occupations.

Income and occupation are potentially correlated among individuals; it is possible that their effects are confounded. To address this issue, they calculate the DE of different occupations within the same income group and similarly calculate the DE for different income levels within the same occupation group. The DE for high-income individuals is 10 percent smaller than the DE for low-income individuals for both types of occupations.

They also find that individual investors working in nonprofessional occupations are biased to the endowment effect 20 percent more than individuals working in professional occupations. High-income investors are found 18% less likely to exhibit DE, and individuals working in nonprofessional occupations are 50% more likely to exhibit DE. These professional investors are likely to be rational and use all available analytical tools[11].

The DE on all trading activities made on Taiwan stock exchange between 1995 and 1999 is documented by Barber *et al*. (2007, p. 424). They explain their findings by the fact that Taiwanese traders exhibit a stronger DE on belief in mean reversion than U.S traders[11]. 85 percent of all investors realize gains at a faster rate than losses (i.e., PGR > PLR). They continue that Taiwanese short sellers are also reluctant to realize losses from short sales. The propensity to sell winners, relative to losers, declines strong market returns.

Barber et al. (2007, p. 434) identify that both men and women are reluctant to realize losses which is consistent with Barber and Odean (2001)[13]. They find that though men realize both gains and losses at a faster rate than women, they exhibit a somewhat lower preference than women for realizing gains rather than losses (the ratio of PGR to PLR for men is 3.56 and for women is 4.66).

In the case of Bangladesh, the investment scenario is reverse compared to Taiwan. As a developing country few women show interest in the stock market and the ration between men and women is very low. I attempt to shed some light on the comparison of average trading frequencies between men and women.

Shapira and Venezia (2001, p. 1573) analyze the trades of Israeli investors during 1994 and show that losers are held two to three times longer than winners; consistent with the predictions of prospect theory. They compare the behavior of investors making investment decision independently to that of investors whose accounts are managed by brokerage professionals. They also report that self-managed investors are more prone to realize gains than professionally managed accounts in Israel. They argue that professional managers are able to reduce judgmental biases by more information and experience[14]. They also find that managed group makes more transaction (48.83 transactions per client) and more active than the independent group (16.30 transactions per client).

Shu et al. (2005, p. 201) report the relationship between DE and stock characteristics among Taiwanese investors between January 1998 and September 2001 from a Taiwanese brokerage house. Taiwanese investors realize gains 2.5 times more than losses; exhibit a stronger disposition effect than US investors.

They focus on the cultural difference between the East and the West. Taiwanese investors exhibit stronger beliefs in mean reversion which is not reinforced by trading experiences. They also find that the stock's characteristics are different for winning stocks and losing stocks, though all categories show DE.

They observe that inherent characteristics of individual e.g. gender and age rather than acquired experience e.g. trading frequencies and length of trading affect

the magnitude of DE. In their study, elder female non-professional individual investors with limited knowledge show more inclination towards DE whereas investors with margin trading were less.

The DE also appears to be positive on average but of different magnitude across countries and investors. Chen *et al*. (2007, p. 425) study behavioral heuristics on 46,969 Chinese investors from 1998 to 2002 and observe that individual investors make poor trading decisions whereas institutional investors in China appear to make good trading decisions.

Experience (length of a brokerage account, investor age, trading frequency, and account value) seems to lead to better investing performance. The institutional investors are less prone to DE than Chinese individual investors. For institutional investors, the difference between PGR and PLR is only 0.0877, which is more than half the difference between the PGR and PLR difference for Chinese individual investors. The regression result of Chen *et al*. (2007, p. 437) suggest that investors who trade often and investors who have larger accounts suffer less from a disposition effect. However, middle-aged investors and investors from cosmopolitan cities seem to suffer more from a disposition effect[15].

Choe and Eom (2009, p. 496) find strong evidence for the DE and explain this in terms of investor characteristics on Korean stock index futures market. They show that individual investors are much more susceptible to the DE than institutional and foreign investors. In their findings, sophistication and trading experience tend to reduce the DE and there is a negative relationship between the DE and investment performance.

Boolell-Gunesh *et al.* (2009, p.13, 14) study the DE of individual investors on a French discount brokerage house database between 1999 and 2006. They find that investors realize their gains 60 percent more than their losses. The older account shows less DE, however, sophistication attenuates the degree of DE but does not eliminate the DE. They show that with the advancement of years, investors show less DE, but the ratio of PGR/PLR does not show any monotonic trend over time. They also test the DE as the result of restoring the diversification and find no positive relation. They measure the investor's sophistication on the basis of the trader's business experience locally and internationally. The result brief that DE for local traders (0.093) is twofold greater than that for international traders (0.048).

Krueger and Rouse (1998, p. 61) examine a relationship between the educational background and investment literacy like better decisions and performance in general. Bailey *et al.* (2001) and Chevalier and Ellison (1999), Golec (1996) demonstrate the same relationship in the case of financial decisions. Alexander *et al.* (1998, p. 315) observe a link between financial literacy and demographic characteristics on mutual fund investors. They find that college graduates are more knowledgeable about financial investment products.

Feng and Seasholes (2005, p. 305) study the impact of investor experience on the disposition effect in China. They show that sophistication (static differences across investors) and trading experience (evolving behavior of a single investor) eliminate the reluctance to realize losses. However, an asymmetry exists as sophistication and trading experience reduce the propensity to realize gains by 37% (but fail to eliminate this part of the behavior.)

According to the line of previous studies, I predict and find that individual investors who trade more frequently and actively will have a lower disposition effect than investors who trade less. Simultaneously, investors with differences in experiences (inherent and acquired) about investments report for the variation in the reluctance to sell losers.

Educational background of the individual has a direct effect on investment literacy. Because of the lacking of direct data on educational background and individual knowledge about investments, I rely on demographic variables (occupation and income) as proxies for education that have been shown to proxy differences in investment behavior. This is based on the motive that certain occupations are more likely to correspond to a higher level of education and consequently higher financial literacy. Past researches focus that individuals who work in "professional" occupations have, on average, higher education than those working in "non-professional" occupations, exhibit smaller disposition effect. Accordingly, I propose that demographic characteristics are strongly correlated with the financial status of the clients. High-income clients are more likely to have access to financial advice such as financial and tax agents, as they can afford value-added services. Wealthier individuals also have more investment involvement in share business, and therefore find it more worthwhile to utilize such services. An individual with higher income and professional occupation have been shown to correlate with better access to information and understanding of stock investments will have a significantly lower disposition effect than other investors. Specifically, I test the effect of individuals' income and occupational status on the magnitude of the disposition effect.

The contribution of this study is to understand the DE of Bangladeshi investor by analyzing all trades of 125 investors (from a large brokerage firm). This research is able to document that investors show the preference for selling the winners even controlling the rational motivation like portfolio rebalancing. Long-time period analysis shows valid evidence that both the individual and the aggregate investors are reluctant to realize losses. Cross-sectional tests are also able to establish that sophistication can mitigate the DE.

CHAPTER 4

DATA, METHODOLOGY, AND HYPOTHESES

The sample period for the study is from July 1, 2011, to June 30, 2016. The data set is provided by a brokerage firm in Bangladesh[16]. This brokerage house randomly selected 400 individual accounts. There are two data files: a trade file and a demographic file. For calculation, I use the trade files consisting of the records of all trades made in 125 accounts under Dhaka Stock Exchange and Chittagong Stock Exchange.

I also use the data archives file from BSEC for daily opening and closing stock prices. I discard the accounts which have no transaction within two consecutive years during my study period. As a result, among 275 accounts, 182 are discarded due to lack of continuation of trading for consecutive two years. 51 accounts are discarded because of purchasing before July 2011 which purchase prices are not available and 42 are limited to test DE because there are selling later after the end of my study periods, though they are bought in the sample periods.

I also discard the accounts who execute only buying trades or only selling trades within my sample period[17].

The trade file consists of the records of all trades made in 125 accounts from July 2011 to June 2016. This file has 18,766 records. Each record is made up of investor's security traded, the prices at which stocks are bought or sold, the quantity of trade, the commission paid, the principal amount and the date and time of such trades. Each demographic file contains individual account code, investor age, sex, account age, the location, and the brokerage house internal number for the security

traded (BO number), profession and income. Multiple buys or sells of the same stock, in the same account, on the same day, are aggregated. This data is compiled and provided by the brokerage house and is not available for all individuals.

4.1 Investor Characteristics

A strong psychological difference exists between Bangladeshi investors and investors in developed Western cultures. Hofstede (1980) mentions in his second dimension, that cultural difference are generally expressed in cognitive studies as individualism–collectivism context. Asian cultures, especially Muslims tend to be more socially collective paradigm than Western cultures. In Asian cultures, family or other social members (especially neighbors) will step in to help the other member who faces a large economic loss by discussing in case of decision making and sharing the financial. In Western cultures, a person bears all liabilities and responsibilities of the adverse consequences of his or her risky decisions as an individualist.

Collective-oriented societies make the social diversification of risky decisions in a similar manner to the purchase of an insurance policy or bond against pension fund. Therefore, the gross financial loss is different between Asian and Western cultures.

According to Wolosin, Sherman, and Till (1973, p. 220), cognitive biases may be learned. Thus, differences in tradition, education, and culture of life may cause differences in cognitive biases. Yates *et al*. (1989, p. 148) state that Chinese students follow their traditions and precedents rather than criticism and their educational system encourages them to do so. On the other hand, the American students are encouraged to challenge others' and their own opinions by the education

system. They also suggest that this critical thinking style of Western cultures lower the tendency to be overconfident. Very few psychology literature suggest that Asian cultures have a higher degree of overconfidence than Western cultures. Very limited work has been done on the cultural implications of the disposition effect. Individuals in China and Japan, as more collectivist oriented societies should show a different level of regret than compared to those in the individualist society of the United States (Gilovich, Wang, Regan, and Nishina, 2003, p. 61). They find that regret is observed nearly similar among the three cultures.

Though institutional investors, overall, show less cognitive bias and think more rationally in comparison with individual investors, all individual investors do not behave the same during taking a decision. Some individual investors behave one way while other individuals behave another way[18].

Psychologists find that different groups of people account different levels of cognitive biases. For example, men seem to be more overconfident investors than women (Lundeberg, Fox and Puncochar, 1994, p. 114, Barber and Odean, 2001, p. 289). Additionally, different experiences seem to lead to different behaviors (Wolosin *et al*., 1973, p. 220, Gervais and Odean, 2001, p. 1). Therefore, I identify five investor characteristics related to the sophistication that I predict, will be less prone to behavioral biases. Specifically, I identify (a) Experienced investors (account age), (b) investor's age, (c) active investors (frequently traders), (d) wealthier investors (high account value), and (d) investors from large cosmopolitan cities to estimate their inclination toward disposition effect. Next, I brief each investor characteristic accordingly.

Experienced investors (Basis on account age)

Usually, it is guessed that investors who have held their brokerage account for a relatively long period of time might be less inclined to make mistakes. They may become more rational during taking a financial decision by accumulating their investing experience. Investors may lose money and leave the market who fail to learn and improve their skill of calculation over time. Thus, older account age may also represent a survivorship bias (however, there are some researchers that believe irrational investors can survive) [19]. List (2003, p. 41) provides some experimental evidence in support of the learning of the investors to become rational. More experienced investors hold less risky portfolios, are better diversified, and trade more frequently.

Investor's age

According to Chen *et al*. (2007, p. 430), in China, younger people tend to be more educated and willing to participate in capital market activities. However, older people have more life experience. Therefore, the most sophisticated investors are likely to be young enough to have a market-oriented education but old enough to have accumulated and learned from ''life's lessons''.

In Bangladesh, economic reforms have started in 1990. Information technology and online access have started and updated from 2000. After that time, the youth has become more interested about the market, has been acquiring knowledge and experience in investment. This group stands for the proxy of sophistication in my study with their age.

Active investors (Basis on trading frequency)

The more often trading makes an investor to gain more trading experience. As previously mentioned, experienced traders may be less inclined toward behavioral biases in their trading decisions. On the other hand, Odean (1998) and Barber and Odean (2000) assume that investors who trade more, suffer from overconfidence and access trading costs. They find that investors who trade more achieve worse performance. Chen *et al.* (2007) assume that active trading could be a sign of either an investor who has learned to be more rational or one who is overconfident.

Wealthier investors (Basis on account value)

Wealthier individuals who have more account value may be more knowledgeable about finances than other individuals. It is predicted that higher account value encourages investors to take more risk and to be more overconfident. Another prediction is that investors with high account value perform better because their financial status allows them to purchase more information about market efficiency. Researchers study that although these investors suffer from several psychological biases, having higher levels of wealth diminishes these biases somewhat. I use the value of the equity in the brokerage account as a proxy for an investor's wealth.

Investors from large cosmopolitan cities

Accounts are located in eight different divisions under Dhaka and Chittagong stock exchange. Among the divisions in my study, nearer cities of Dhaka are the most cosmopolitan. Maximum major factories, firms, Government and elite universities of Bangladesh are located in Dhaka. As such, the overall technology and education levels are higher in Dhaka than Chittagong. The total population of Dhaka

division is 47.4 million whereas the total population of Bangladesh is 153.9 million (Population and Housing Census 2011, Bangladesh). Therefore, investors who have accounts in Dhaka may be better investors than those from the more rural parts of Bangladesh.

4.2. Descriptive statistics on investors

Here, table-5

I present the descriptive statistics of my data in table 5. Active accounts are those with at least one transaction over 2 years (consecutive or not). In my study, the minimum account age is 1 year and maximum account age is 12 years. The average stock account has been opened for 6 years 4 months. Average investor age is 39 years old. Younger investors of 25 years old as well as older investors of 62 years old are also observed. "Trading Activity from 2011-2016" is the total number of trades (Sales and Purchases). The average number of trading is 150.

4.3. Summary statistics on investors

Here, table- 6

The summary statistics of my data is presented in table 6. Though the older accounts in my data show periodic trading over the period, they have the continuation of trading. For example, an account performs 3or 4 trades in a year, but no trade in the next year. Again that account performs 20 to 30 trades in the following year. Percentage of older aged investors is the lowest among the others. Bangladesh faced stock market crash at 2010-2011 and millions of fresh investors lost their money, investment become a panic for the pension holder or house money keeper. But the knowledge and investment literacy become available by the development of information technology at the recent era makes young generation

more interested to investment as the way of early return. Location means, under which stock exchanges (Dhaka and Chittagong); the account holder maintains his account. Among two cities, Dhaka and the nearer area of Dhaka are more cosmopolitan than Chittagong. Percentage of investors who have the account value below 500,000 BDT is the highest.

4.4. Investor's demographic characteristics

To investigate the relationship between the demographic characteristics of individual investors and variations in the disposition effect, I construct several "income" and "occupation" categories. Investors are divided into three categories on the basis of their income, namely "high-", "medium-", and "low-income". I classify investors with monthly income lower than 25,000 BDT into the "low income" category; investors with monthly income between 25,000 to 80,000 BDT into the "medium-income" category; and investors with monthly income above 80,000 BDT into the "high-income" category.

The statistical data indicates that average monthly income per household is estimated at 11,479 BDT at the national level in 2010 (BBS, 2010). The mean and median of monthly income for my sample investors are 30,833 BDT and 34,310 BDT, respectively. Individuals who maintain brokerage accounts have a higher income (surplus money) than those who do not. Therefore, I choose 25,000 BDT as the cutoff point for my "low-income" group, as it lies between the mean monthly household income of the nation and the mean monthly household income of my sample investors. I classify investors with monthly income greater than 80,000 BDT as "high-income" investors because 80,000 BDT is the highest salary scale in the

public sector in Bangladesh in 2010. My observations also allow me to have such a division in each of the income groups.

Further, the sample has been divided into two categories: "professional" and "non-professional" occupations on the basis of their BO account information from the personal file. I classify individuals as working in "professional" occupations if they are reported as working in "professional/ technical" or "managerial/administrative" positions. I classify individuals as working in "non-professional" occupations if they are reported as working in clerical, service, sales, students, housewives, agriculturist, and pensioner. All demographic information is not available on all investors; it is possible that an individual investor does not belong to any income or occupation category.

4.5. Methodology

My research tests whether investors are disposed to sell their winning stocks more readily than losing stocks. For examining the disposition effect I follow the methodology of Odean (1998).

1. From the trading records of each account, I build up a portfolio of securities for each selling date. The one-day portfolio is the part of investor's total portfolio. The purchase date and prices of those securities are known[20]. I like to explain it with an example. For example, investor "i" purchases 10 shares of stock "k" at 5\$ per share in day 1. In day 2, "i" purchases again 5 shares of stock "k" at 4\$ per share. Thus the average purchase price for stock "i" will be ((10 x 5) + (5 x 4))/ (10+5) or 4.67 \$.

2. If a sale takes place in a portfolio, I compare the selling price of the stock to its average purchase price[21] on that selling day to determine whether the stock is sold for a gain or for a loss.

3. Each stock that is in that portfolio at the beginning of that day but is not sold is calculated as a paper (unrealized) gain or loss. Whether the holding stock is a paper gain or loss is examined by comparing it's high and low price for that day to its average buying price.

4. For the daily stock price (upper and lower), I obtain data from the daily stock file of data archive of DSE & CSE. I prefer the stocks for which the daily stock prices are available.

5. If both its daily high and low prices are above its average buying price, it was considered as a paper gain; if they both are below its average buying price it is considered as a paper loss; if its average buying price lies between the high and the low, neither a gain nor loss is counted.

6. On days if there is no sale in an account, no gains or losses (realized or paper) is counted.

7. After counting the real gain, real loss, paper gain, and paper loss, proportion of gain realized (PGR) and proportion of losses realized (PLR) are computed as follows:

$$\frac{\text{Number of Realized Gains}}{\text{Number of Realized Gains} + \text{Numbr of Paper Gains}} = \text{Proportion of Gains Realized}$$

………(1)

$$\frac{\text{Number of Realized Losses}}{\text{Number of Realized Losses} + \text{Number of Paper Losses}} = \text{proportion of Losses Realized}$$

………(2)

In my study, the difference of this proportion is defined as the disposition effect (DE).

$$DE = PGR - PLR \ldots\ldots (3)$$

Here, table-7

For example, table 7 shows two individual's (IND 1 and IND 2) two date's portfolios. IND 1 has 5 stocks in his portfolio, A, B, C, D and E on day 1. He sells stock A for real gain and stock C is for real loss. B is held as paper gain and D is as paper loss. The purchase price of stock E lies between the highest and lowest daily price, so no paper gain or loss is counted. IND 2 has 3 stocks in his portfolio, F, G and H on day 2. He sells stock F for real gain. G is held as a paper loss and H is the same as stock E.

So for these two investors over these two days, two real gains, one real loss, two paper gains, and three paper losses are counted. Realized gains, paper gains, realized losses, and paper losses are summed for each account and across accounts. Thus, PGR = 2/ (2+1) = .67, PLR = 1/ (1+2) = .33 and DE = .34 (Followed by the equation 1, 2 and 3). If the differences between PGR and PLR for all transactions show positive value, it indicates that investors are more reluctant to realize their losses. T statistics are calculated by the following way to test the hypothesis.

$$t = \cfrac{\overline{}}{\sqrt{\dfrac{PGR\,(\qquad)}{} + \dfrac{PLR\,(\qquad)}{}}}$$

Where NRG, NPG, NRL, and NPL are the number of realized gains, paper gains, realized losses, and paper losses.

4.6. Hypotheses

The focal hypothesis is that investors tend to sell their winners more readily and hold their losers for long. That means the proportion of gains realized (PGR)

should be greater than the proportion of losses realized (PLR). In equation it is stated as:

PGR > PLR (For the entire period).

The null hypothesis, in this case, is PGR ≤ PLR. This hypothesis is applicable at the aggregate level of the investors. My study also tests this hypothesis for cross-sectional studies as rebalancing or portfolio diversification, gender variations, and average return calculation.

There are three bilateral hypotheses to be tested for which the null hypothesis remains the same as PGR ≤ PLR.

Hypothesis 1: Trading frequency and gender differences are reversely related to the magnitude of the disposition effect.

According to the previous authors, I predict that male investors and individual investors who trade more frequently would have a lower disposition effect than infrequent investors.

Hypothesis 2: Experience related to sophistication lowers the disposition effect.

This is consistent with hypothesis 1 in that investors with more trading, older account, high account value, older age and the location of cosmopolitan cities tend to be more sophisticated and experienced than other individual investors.

Hypothesis 3: Individual with professional occupation and higher income show less DE than the individual with non-professional and lower income.

This hypothesis is also consistent with hypothesis 1 and 2 in that way, investors in professional occupations are assumed to be more educated in financial

literacy and stand as sophisticated investors. The investor with higher income may have higher equity value and access to information which make them also sophisticated investors.

CHAPTER 5

EMPIRICAL RESULTS

5.1. PGR and PLR for the entire data set

Here, Table-8

In table 8, I provide an overview of evidence on the performance of all investors. This table compares the aggregate Proportion of Gains Realized (PGR) to the aggregate Proportion of Losses Realized (PLR) where PGR is the number of realized gains divided by the number of realized gains plus the number of paper (unrealized) gains, and PLR is the number of realized losses divided by the number of realized losses plus the number of paper (unrealized) losses, conforming to Odean (1998, p. 1782). Each sale for a gain (or loss), paper gain (or loss) on the stock that is not sold on the day of the sale is separate independent observations. Realized gains, paper gains, losses, and paper losses are aggregated over time (2011-2016) and across all accounts (125) in the data set. From the entire sample, we see that the difference between PGR and PLR (DE) is statistically significant. That means investors prefer to sell a greater proportion of their winners than of their losers. In a one-tailed test, the null hypothesis (PGR ≤ PLR) is rejected with a t statistic 35.07 at 5 percent significant level[22]. In my sample, the number of gain realized and the number of losses realized are near about same. In contrast, the number of paper gains and paper loss that are not realized differs very much. Thus the proportion of gain realized and proportion of loss realized vary strongly only for the big variation in paper gain and paper loss.

44.25 percent shares of stocks are realized as gain among the shares that

would have possibilities to be realized, whereas only 19.68 percent losses are realized among the shares of stocks that would have possibilities for realization.

In table 8, the ratio of these proportions (PGR to PLR) for the entire year is 2.2, indicating that a stock with increased value is realized 2.2 times more likely to be sold than a stock with decreased value. The proportion is around 1.5 in Odean (1998, p. 1786) and in Weber and Camerer (1998, p. 175) in an experimental study on disposition effect. Brown *et al*. (2006, p. 53) and Chen *et al*. (2007, p. 437) get 1.6 and Boolell-Gunesh *et al*. (2009, p. 13) get 1.7. DE showed by Bangladeshi investors is of much higher magnitude than USA investors (Odean, 1998) and a little similar magnitude of China (Chen *et al*., 2007) and Taiwan (Shu *et al*., 2005).

Here, Table-9

To test the density of the disposition effect, the data set is partitioned into six (2011, 2012, 2013, 2014, 2015 and 2016) years. Table 9 compares the aggregate Proportion of Gains Realized (PGR) to the aggregate Proportion of Losses Realized (PLR) year by year. The table shows that PGR/PLR values gradually increase from 2011 to 2012 and then are declining from 2013. PGR/PLR ratio is defined as the rate at which individual investor sell their winner rather than loser. The table displays the results, where for every year; a significantly greater proportion of all possible gains than of all possible losses are realized (t is greater than 7.35 in all cases and significant at 5 percent level).

Here, Figure-3

In figure 3, DE has significantly presented over the years in different magnitudes. However, trends of DE, PGR, and PLR do not show uniform tendency over time. For example, DE values increase gradually from 2011 to 2012, peak in

2013 and then is declining from 2014. One clear assumption can be done from the figure that the increasing rate for both the realization of losses and gains are higher than the previous year. Due to the market disaster in Bangladesh at 2010, investors kept aside themselves from the investment and realized more the winning stocks than the losers. It is possible therefore that, after 2013, they reconstructed their portfolios by realizing more gains and losses. Thus both the proportions increase from 2013 and their differences decrease.

5.2. PGR and PLR partitioned by sex and trading activity

Men are more confident, risk-seeking, trade more excessively and have lower net returns, whereas women are more risk-averse and trade less than men (Barber and Odean, 2001, p. 262). Does gender difference play any role in the disposition effect? Usually, men are active in trading than women; therefore, they try to adjust their reference points (the average purchase price) more quickly than women and decrease the rate of DE.

Both of PGR and PLR depend on average portfolio size and trading frequency. As frequent traders trade excessively and possess larger portfolio, both of the proportions of them become smaller than infrequent traders (Odean, 1998, p. 1785). Frequent traders realize more losses as well as gains, thus the disposition effect becomes smaller than those who trade less frequently. Mechanical relationship[23] between PGR/PLR ratio and trading intensity are another explanation of lower DE in frequent traders (Shu *et al*., 2005, p. 215).

To test the prediction about frequent and male traders, I partition the data into four groups of traders: male traders, female traders, top 10 percent frequent traders and 90 percent infrequent traders. In my dataset, frequent 10 percent of the investor's

account trades for 44 percent of all trading. Of 125 individual investors, 19 (15.2 percent of all investors) are women and 106 (84.8 percent of all investors) are men. In contrast, 51 percent of the Bangladeshi population between the ages of 25-54 is the female (BBS, 2011). Thus the number of the female who invest in share market is very low.

Here, Table-10

Table 10 compares the aggregate Proportion of Gains Realized (PGR) to the aggregate Proportion of Losses Realized (PLR) of all four groups. DE of all four groups of traders is reliably different from zero at the 5 % significance level. But, the difference in proportions is greater in the case of female and infrequent traders. That means females are more risk-averse over gains and risk-seeking over losses which is similar to Shu *et al*. (2005, p. 216). Thus they realize their gains more than the male traders in Bangladesh.

This table also reports that females realize their gains at a faster rate than males (PGR is greater than males). This explanation is also applicable for infrequent traders as their PGR is greater than frequent traders which are similar to Odean (1998), Dhar and Zhu (2006), Brown *et al*. (2006) and Chen *et al*. (2007). This concludes that frequency and active trading can minimize the DE because losses are realized more, compared to gain in frequent trading.

5.3. Average returns

Here, Table-11

In table 11, I provide an overview of evidence on the performance of all gaining and losing stocks. This table compares the return on realized gain and realized loss, paper gain and paper loss based on aggregating trades of all investors

for the entire year. The result represents the average returns from the day of purchase for both realized and paper gains and losses for the entire sample to understand the attitude of the investors. Return on realized gain and loss are much smaller than return on paper gain and loss which is consistent with Odean (1998, p. 1788) and Boolell-Gunesh *et al*. (2009, p. 13). Followed by Odean (1998), these results give a basis of confirmation that investors are more likely to realize smaller gains and losses. If the disposed investors sell the loser stocks earlier than the winners', they can increase their returns from price appreciated stock and decrease their losses from price depreciated stocks. Prospect theory (Kahneman and Tversky, 1979) supports my empirical result. Thus the consequence of DE lowers the return of the investors.

5.4. Disposition effect when the entire position in a stock is sold

In portfolio rebalancing, investors follow some methods like asset allocation. During buying and selling stocks, investors might sell some shares of winning stocks rather than losers and buy another new stock to rebalance their portfolio (Lakonishok and Smidt, 1986, p. 954). According to Odean (1998, p.1788), investors, who have a desire to rebalance their portfolio, will sell a portion of shares of holding stock for asset allocation. Investors, who sell the entire position of a stock, do not have a desire to rebalance the portfolio. Thus the DE becomes lower when the entire position in a stock is sold.

Here, Table-12

To confirm the prediction, I analyze the data with discarding the selling for which the entire position has not been cleared. For the test, I calculate realized gains and realized losses on those sales for which the entire position in a stock is sold. Paper gains and losses of another stock in the portfolio are also counted on those

selling dates. If DE is motivated by the portfolio rebalancing, discarding the partial sales will tremendously reduce the magnitude of DE. In table 12, for the entire year, I find that after the removal of partial selling, the difference of the proportions is still significantly observed. My result is similar to Shu *et al*. (2005), Boolell-Gunesh *et al*. (2009) and Odean (1998). Thus the preference for selling winner more readily than loser is not the result of portfolio rebalancing.

5.5. Disposition effect when no new stock is purchased within three weeks of the sale

Odean (1998, p. 1789) explains that investors who sell winners for the purpose of rebalancing and diversification of their portfolios are likely to make new purchases. In another alternative attempt to eliminate trades that may be motivated by a desire to diversify the portfolio, I calculate realized gains and realized losses using only sales for which there is no new purchase into a portfolio on the sale date. I also discard the sales for which there is a new purchase during the following three weeks.

Here, Table-13

Paper gains and losses of another stock in the portfolio are also counted on those selling dates. If DE is motivated by the desire of diversification, discarding those sales extremely reduce the magnitude of DE. Table 13 reports that, when sales, motivated by a desire to diversify, are eliminated in this way, investors continue to prefer to sell winners. My result is similar to Shu *et al*. (2005), Boolell-Gunesh *et al*. (2009) and Odean (1998). Thus the preference for selling winner more readily than loser is not the result of portfolio rebalancing or restoring diversification.

5.6. Investor characteristics and the disposition effect

As I hypothesized in bilateral hypothesis 2, I investigate the influence of investor's sophistication (experience) on DE. In this study, I consider account age, account value and trading activity (the frequency of trades) as the acquired experience and gender and investor's age as inherent experience. Frequent Trading is a dummy variable that indicates when the account is in the top 10 percent with regards to trading activity, is assumed as 1, if not then 0. Dhaka is a dummy variable that indicates when the accounts are located in the cosmopolitan city, it values 1, if not then it values 0. To search the multivariate effects of individual investors' personal characteristics, I estimate regression (4) followed by Chen *et al*. (2007, p. 437), where the dependent variable is PGR, PLR, or the difference (PGR–PLR).

PGR (or PLR or PGR-PLR) = α + $\beta1$(Account Age*)* + $\beta2$(Investor Age)+ $\beta3$ (High Trade Freq Dummy) + $\beta4$(Account Value) + $\beta5$(Dhaka Dummy) . ……… (4)

Table 14 reports the coefficient estimates. The first column of results, where PGR is the dependent variable, shows that individuals with older account age and larger account value are less inclined to realize gains, whereas individuals living in cosmopolitan cities are more inclined to realize gains.

Here, Table-14

The second column of results, where dependent variable of interest is PLR, shows that individuals with larger account value are less inclined to realize losses, whereas investors with older account age and investors living in cosmopolitan cities, who trade often, are more inclined to realize losses. In third regression, the difference of the proportions (DE) is the dependent variable. The regression result suggests that investors with older account age who trade often and aged investors suffer less from

the DE. However, wealthier investors less realize both gaining and losing stocks. So account value has no significant effect on disposition in Bangladeshi investors. This explanation is same for the investors of cosmopolitan cities as they realize more both the gainers and losers. Both the proportions are significantly larger for the investors from cosmopolitan cities (first and second column of results). So they show no significance for DE.

From the above discussion, it can be assumed that acquired experience (sophistication) can reduce the tendency of DE. Account age, value, and trading frequency may help investors lower the DE as they gather knowledge from repetitive trading. My result is consistent with Dhar and Zhu (2006) and Chen *et al*. (2007) who both find that lack of sophistication related to investor's characteristics may cause large DE. Among the U.S. individual investors, wealthier, frequent-traders and professional individual investors exhibit less DE (Dhar and Zhu, 2006). However, sophisticated Taiwanese investors (i.e. more trading frequency and trading experience) fail to minimize the realization of gains (Shu *et al*., 2005). Grinblatt and Keloharju (2001) report that investors from financial institutions show less disposition effect in the analysis by using a regression method. Investors from financial institutions are the most sophisticated of all investors in their study.

An inherent experience like investor age can also mitigate the DE. But gender difference is very much related to DE as female investors are more prone to disposition effect. Shu *et al*. (2005) provide empirical support that gender and age show more individual disposition effect.

Overall, we see that Bangladeshi investors exhibit a higher magnitude of DE than the other Western countries and some East Asian countries. Cultural differences

may be one of the reasons in Bangladesh because the individual decision is very much motivated by his or her surroundings. Collectivism and whimsical behaviors are more prominent in Bangladesh than individualism (Dutta *et al*., 2016, p. 37). Recently, women have become self-dependent economically. Thus from my analysis, investor sophistication or experience can mitigate individual investor's net DE, depending on the measure of sophistication or experience.

Here figure 4

Distribution of disposition effect is presented in figure 4. The DE is widely distributed between -1 and 1. A surprising finding is that not all individuals exhibit the disposition bias. Specifically, 9 percent (13) of individuals in my sample do not exhibit any DE or exhibit behavior opposite (DE ≤ 0). It seems that this is opposite to the prediction of the DE. I consider this a conservative measure has given that 9 percent of all individual investors never realize any winning stocks in the sample period. While previous theory implies that tax benefits should lead to lower DE during December, my result shows that even for the whole period from January through December, there are a significant number of investors exhibiting negative disposition effect, meaning that they realize more losses than winners in their portfolios.

5.7. Characteristics of investors showing positive Disposition Effect

In order to test the robustness of influence of investor's personal characteristics on DE (only for the investors showing positive Disposition Effect), I go through a regression analysis (5) followed by Chen *et al*. (2007) for only the investors showing positive DE. The table reports the coefficient estimates where DE is the dependent variable for all columns.

PGR-PLR (DE) = α + $\beta 1$(Account Age) + $\beta 2$(Sex) + $\beta 3$(Investor Age)+ $\beta 4$
(High Trade Freq) + $\beta 5$(Account Value) + $\beta 6$(Dhaka Dummy)................(5)

Here, Table-15

In Table 15, the overall sample is partitioned into two subsamples with the cut off as the median DE and number of trades of the individual investors showing positive DE. The median DE is 0.24 and the median number of trades is 81. Here, sex and Dhaka are the dummy variables. Sex dummy assigns the value 1 for men and 0 for women. Dhaka dummy assigns the value 1 for Dhaka district and 0 otherwise.

Table 15 reports that coefficient of account age for all the groups are negative and highly significant. This indicates that account age has a negative impact on the estimation of the dependent variable (DE). The coefficient of trading activity is also negative for all quartiles but significant for higher DE and more frequent traders DE. Empirical result shows that higher account age and the trading frequency decrease the magnitude of DE. Infrequent male investors are less inclined to DE which is consistent with Shu *et al*. (2005). This result supports my previous findings that females are more risk-averse over gains and risk-seeking over losses which corroborate the findings of Odean (2001). Investor age in Bangladesh has no significant effect on disposition for the investor showing positive DE. Development of IT sector and educational level has been changing the socioeconomic culture of the investor's day by day (BBS, 2017, p. 19, 41). Thus, age becomes the less important factor toward the bias which differs with the previous findings of other researchers. The coefficient of account value is negative for less frequent traders DE and positive for more frequent traders DE. But this coefficient is statistically significant in both cases. The account value is related to the investor's income and

occupation. High income can make an infrequent investor more professional by receiving more information and wise direction from the agents. On the other hand, more frequent wealthier investors become overconfident and more inclined to realize gains which can be defined by "Gambler's fallacy"[24]. Thus less frequent investors can lower the DE by increasing their account value. Individuals living in cosmopolitan cities are more inclined to realize gains that increase DE.

From the above discussion, my previous findings assure that acquired experience like account age can reduce the tendency of DE. But active investors and magnitude of the DE of investors might change the impact of trading activity, account value and location on DE.

5.8. Investor demographic Characteristics with or without DE

Here, Table-16

The table shows that 13 investors (9 percent of total investors), exhibiting no DE, have higher income and work in professional occupations which are consistent with Dhar and Zhu (2006). But the trading frequency of these individuals is very low. However, it is established that frequency can minimize the DE. This abnormal finding of Bangladeshi investors possessing negative DE may be explained by the "Agency Theory"[25]. My sample confirms that investors with non-positive DE are mainly professional and possess a higher income. These accounts are regulated by a personal manager (PMM) or agent. Lack of accountability, incentives and tendency to take more risk of the agent might rest behind the cause of not realizing the gains. Thus after a long time, smaller trades make them to face losses realization. Therefore DE becomes negative.

Odean (1998) mentions that a larger portfolio size decreases the magnitude of DE. Dhar and Zhu (2006) find that the average number of stocks held by individuals categorized as high and low income is 4.7 and 4.2, and the average number of stocks held by individuals in "professional" and "non-professional" occupations is 4.4 and 4.2, respectively. They conclude that DE is not driven by portfolio size as all of them are near about same. In my findings, the average number of stocks held by individuals categorized as high and low income is 5.3 and 4.6 respectively. The average number of stocks held by individuals in "professional" and "non-professional" occupations is 4.8 and 4.1. The result can be interpreted as the respondents with high income and professional respondents belong to more stocks and show less disposition effect which is consistent with Odean (1998) findings.

5.9. Disposition Effect and Demographic characteristics of investors

Here, Table-17

Next, I examine the variation in the DE across demographic characteristics. I report the DE for different income and occupation groups in table 17. As predicted, the mean DE for the high-income (0.07) is lower than that for the low-income groups (0.29). The mean DE for the investors working in professional occupations (0.12) is lower than that for investors working in the nonprofessional occupations (0.33) in table 18 which are statistically significant at 5 percent level. The differences between individuals in high-income and low-income groups and between professional and nonprofessional occupations are both negative. The median for high-income and low-income DE are 0.068 and 0.45, and the median for individuals in professional and nonprofessional occupations are 0.066 and 0.35. Thus the result supports my

prediction that individuals with high income and working in professional occupation show lower DE than others[26].

Here, Table-18

The effects of income and occupation together may disconcert investor behavior. Usually, there is a strong correlation between income and occupation among individuals. Addressing this view, I calculate the DE of different occupations within the same income group and similarly calculate the DE for different income levels within the same occupation group.

Here, Table-19

I report the results in table 19. The DE for high-income individuals is smaller than the DE for low-income individuals for both types of occupations. The difference between income groups is much larger for individuals who are in the nonprofessional occupations. The difference between the DE of individuals in professional and nonprofessional occupations is small for the high-income group while it is much bigger for the mid-income and low-income groups. The results conclude that profession and income have the separate impact on individual investor's DE. High-income individuals might receive advice from financial managers and control the bias regardless of their education and investment knowledge. My empirical findings are consistent with Dhar and Zhu (2006).

For better understanding of the impact of demographic characteristics on DE, I perform a regression analysis specified as follows:

$$DE = \alpha + \beta 1 x1 + \beta 2 x2 \ldots\ldots(6)$$

Here, DE is the difference between PGR and PLR as the dependent variable. Income and profession are the independent variables. For calculation purposes, the

dummy is introduced as x1 and x2. β1 is the estimated β for categorical dummy variable x1 = income. β2 is the estimated β for categorical dummy variable x2 = profession. Being a binary categorical variable, the sample respondents are divided into high income and low income category. Respondents with high income are marked as 1 and with low income category are marked as 0.

Similarly, x2 is a categorical variable. All respondents are either professional (engineer, doctor, manager etc.) are marked as 1 or non-professionals (housewives, students, pensioners etc) are marked as 0.

Here, Table-20

In table 20, the coefficient for low-income group is positive and highly significant. This indicates that low income has the positive impact over the estimation of the dependent variable (DE). If the low income group of investors increases, the DE increases. The coefficient is also positive and significant for the investors working in non-professional occupation. These findings support the hypothesis that DE becomes higher for the low-income group and the individual investors working in non-professional occupation. My result is consistent with Dhar and Zhu (2006). One potential concern is that account value is directly related to income and occupation. Investors with high income are more exposed to market information and hold market portfolios. Thus I can summarize that demographic characteristics (income and occupation) that are the proxies for investment literacy, can also minimize the DE.

CHAPTER 6

CONCLUSION

Due to demographic transition, Bangladesh is in an advantageous position with respect to the huge working-age population particularly educated and trained youth which should be engaged in stock business in home and abroad. Skill development will be a great challenge for the youths of Bangladesh. Without proper education and skill, the unemployment rate of the youth may increase which will be detrimental to the growth of the country. The increasing volume of the aged population will also need to be addressed for the welfare of these worthy citizens.

This paper strongly supports the previous findings that individual investors of Bangladesh, on average, exhibit the historical preference (2011-2016) for disposition effect. This study also investigates the relationship among the disposition effect and the investor's personal characteristics. The study exhibits significant disposition effect (PGR/PLR=2.24) among investors for all time periods than the US investors (PGR/PLR=1.5, Odean, 1998). The proportion of individual investors, realizing gains is 2.2 times (PGR/PLR) higher than that of those realizing losses.

This study also investigates the role of behavioral bias on sophisticated investor's motivation. Here I show that there is wide dispersion in the DE across Bangladeshi individual investors. The result showed that investor's personal characteristics such as age, wealth and investor's location were related to disposition effect. The female and infrequent investors show more willingness to realize their gains than male and frequent investors. Regression analysis demonstrates that investor's characteristics and experience influence their behavior and trading

performances. Such heterogeneity induces different levels of behavioral bias among individual investors, which leads to further questions about who should trade on their own. The larger the DE, the more an investor could suffer from this bias. This research shows that individuals who are occupied in low-income group and work in non-professional occupations show the highest DE among all investors.

The findings of the disposition effect will have regulatory and welfare implications. With demographic information, the brokerage firms could effectively target low-income and non-professional clients who are most likely to suffer from the DE. By utilizing the research output, the professional advisor or manager can offer a good suggestion to their clients. Thus the relationship benefits both the rational advisor and the less experienced irrational investors.

The research findings stress on sophistication process to reduce the disposition effect on Bangladeshi investors by the following guidelines. Firstly, brokerage firm or organization could focus on training of the new or less experienced investors highlighting the importance of behavioral bias towards the realization of stock gain or losses. Thus, by reducing investor's loss and increasing return, brokerage house also can improve their reputation. By advertising the return rate, more new investors will be interested to invest in the stock market which will increase the market capitalization to GDP of Bangladesh.

Secondly, the professional manager should advise their clients at the early stage of this tendency. The author believes that the brokerage firms will be more profitable if their clients enjoy a higher rate of return in their investments. By making a better awareness of this heuristic process, they can protect investors from a big loss. Thus research on the mitigation process by analyzing the factors that affect the

disposition effect will be the object of future analysis.

This study is the initial research on DE of Bangladeshi investors. An extended research with a wide sample range is needed for better understanding the factors of DE in Bangladesh. The correlation between income and occupation that proxy for knowledge about investment will create the aspects of the future study, who should trade on their own. The justifications of disposition effect in believe in mean reversion of price and disposition effect related to stock characteristics in Bangladesh context would be the future field of study. The same study could be done to compare the disposition effect of institutional investors influenced by agency issue to individual investors of the retail brokerage house.

FOOTNOTE

[1] It is known that participants in various markets exhibit other types of behavioral biases. Heath, Huddart, and Lang (1999) investigate the option-exercising behavior. Genesove and Mayer (2001) shed further light on investor irrationality by analyzing loss aversion and seller behavior in the housing market, and O'Connell and Teo (2003) analyze the trading decisions of institutional investors in the currency market.

[2] Recently this interpretation has been developed by Muermann and Volkman (2006). They explain the disposition effect as the combination of regret and pride anticipation and loss aversion which is shown by Barberis and Xiong (2006).

[3] Suppose, an investor needs money and must sell some stocks. But he has no appropriate information to suggest which of the stocks will be the better performer. In this case, to minimize the taxes, he should liquidate the losing stock or a combination of losers and gainers. A failure to minimize taxes decreases the wealth of the investor.

[4] Stock market capitalizations of about 50 percent of GDP and more is an indication of a well-developed stock market. Market capitalization (also known as market value) is the share price times the number of shares outstanding (including their several classes) for listed domestic companies. Investment funds, unit trusts, and companies whose only business goal is to hold shares of other listed companies are excluded.

[5] Any Foreigners residing in Bangladesh or abroad willing to invest in Bangladesh Capital Markets are considered Foreign Investors. Bangladesh provides a very friendly and open investment atmosphere for foreign investors. No Capital Gains Tax on the individual. Long established legislative and legal framework protects foreign investment in Bangladesh. Foreign Investor (FI) can manage their account by fund Manager through international broker or global custodian / local custodian / local broker through BO with CDBL or Local Stock Exchange.

[6] Inquiry: In this session Brokers can log in to the system. No order will be submitted in this session. No trade will be executed. Only previous orders can be withdrawn in this session.

Opening: The Opening is a pure, single-price auction. All buy and all sell orders are compared and calculate the open-adjust price. No trades will be executed in this session.

Continuous Trading: During this phase, participants enter orders and immediate execution or for inclusion in the book. Automatic matching and execution takes place based on best price/ first in, first out trading rules.

Inquiry: Closing prices are calculated and disseminated to the market participant. The market will be closed in this session & inquiry session.

[7] Various researches used the alternative approaches to measure the disposition effect. For example, Shefrin and Statman (1985) and Shapira and Venezia (2001) calculate the disposition effect by comparing the length of the round-trip holding period for winners and losers (Round trips are transactions where there was a buy and a subsequent sale so that at the end of the round trip the client had a zero position in the holding security). Weber and Camerer (1998) define the DE as the difference between the number of sales of winners and losers divided by the total number of sales of winners and losers.

[8] Odean (1998) illustrates that in an upward-moving market investors would have more gaining stock in their portfolios and would tend to sell more gaining stocks than losing stocks even though they had no preference for doing so.

[9] Different types of investors show different reactions to the past performance of a stock. Some follow the momentum style for repurchasing while other follows the contrarian style. Momentum style for repurchasing the stocks mean to buy the stock with a good prior performance (Grinblatt, Titman and Wermers, 1995, Badrinath and Wahal, 2002) whereas contrarian style means to buy the stock with below average past performance (Grinblatt and Keloharju, 2000).

[10] It also presents in institutional investors (corporations, dealers) but not for mutual fund and foreigners. They interpret their findings by the fact that Taiwanese traders exhibit a stronger belief in mean reversion than U.S traders.

[11] Previous researches investigated only non professional (see Ferris et al., 1988, Schlarbaum et al., 1978, Odean, 1998, Weber and Camerer 1998). In this context Genesove and Mayers (2001) found on housing market that the loss aversion exists for both the more sophisticated (investor in real

estate) and less sophisticated (owner occupants) traders in Boston real estate market where less sophisticated were more prone to the bias.

[12] They categorize investors into five broad categories: individuals, corporations, domestic mutual funds, foreigners, and dealers. Individuals, corporations, and dealers are reluctant to realize losses, while mutual funds and foreigners, who together account for less than 5 percent of all trades (by value), are not. For the average investor, the proportion of gains realized is 9.4 percent, while the proportion of losses realized is only 2.3 percent.

[13] Among the investors, 55 percent are women and 45 percent are men. In contrast, 51 percent of the Taiwan population is male. This is largely a cultural phenomenon of Taiwan that women invest more than men in the TSE market.

[14] The average duration of a winning (losing) round trip is 24.84 (55.42) days for the managed group and 20.24 (63.27) days for the independent group/ individual investors. The average duration of losers is significantly longer than that of winners for both groups, as suggested by the disposition effect. The average duration of the winning round trip is longer while the duration of the losing round trip is shorter in comparison with the independent group. Therefore, DE, defined between the duration of the losing and winning round trip, is smaller for the managed group. Managed clients had three times more round trip trades (20.69) than individual investors (6.51).

[15] They also notice the round trip (round trip is one purchase of a stock followed by the sale of all shares of that stock) selling for both individual and institutional investors. Individuals take over 35 days to sell a losing position and only 26 days to sell a winning position. On the other hand, institutional clients take nearly 26 days to sell and 16 days to sell a winner. The difference between the loser and winner durations is similar for institutions and individuals.

[16] The sample collection is supported by Modern Exchange House in Bangladesh.

[17] Selection procedures of investors may be affected by selection bias in favor of more successful investors. But excluding of extremely infrequent traders should not bias our concern as these inactive investors have no significant impact on DE.

[18]Chen et al. (2007) find limited variability in institutional investor characteristics (e.g., institutions do not have an age in the same way as individuals do, most institutional investors have large accounts, most are located in cosmopolitan cities, etc.). Thus, I can compare individual investors as non-professional to institutional investors as professional, my study is limited to conduct cross-sectional tests on professional investor behavior.

[19] See Kogan, Ross, Wang, & Westerfield (2006) and references therein.

[20] Though investor's selling date portfolio is the part of each investors total portfolio, the selection process will bias these partial portfolios toward stocks for which investor's have unusual preferences for realizing gains or losses followed by Odean (1998).

[21] Individual investors may have purchased the stock at different times and prices. Thus purchase prices are adjusted to the average purchase price. The average purchase price is a commonly used term in the stock market and also used in previous researches. In equation, it can be shown in the following way.

Average purchase price = $\dfrac{\sum_{t=1}^{N}(Number\ of \qquad\qquad \times \qquad price/ \qquad)_t}{\sum_{t=1}^{N} Number\ of \qquad\qquad\qquad t}$

[22] For simplicity, we did not consider commission when counting gains or losses. The commission should not have a particular impact on Individuals' realized winner or loser stocks (Odean 1998).

[23] Mechanical relationship means trading intensity is mechanically related to the DE rather than to prove its universality. For example, if the realized gains, paper gains, realized losses, and paper losses for infrequent are 3, 2, 2, and 2, respectively. The corresponding PGR, PLR, and PGR/PLR ratio will be 3:5, 2:4, and 12:10 (or 1.2). We assume that frequent traders trade more excessively and have realized gains, paper gains, realized losses, and paper losses of 4, 3, 3, and 3, respectively. Their corresponding PGR, PLR, and PGR/PLR ratio would be 4:7, 3:6, and 24:21 (or 1.14) (Shu, 2005).

[24] "Gambler's fallacy" also known as the Monte Carlo fallacy or the fallacy of the maturity of chances, is the mistaken belief that, if something happens more frequently than normal during a

given period, it will happen less frequently in the future or vice versa.

[25] "Agency theory" is used to understand the relationships between agents and principals. Agents are also called "Professional portfolio Money Manager (PMM)" in share market who also acts as broker (See Shapira and Venezia, 2001). They are not a member of DSE or CSE. They execute the trading through other financial institutions i.e. brokerage firm or exchange house. When a client chooses to have her portfolio managed by a PMM or an agent, she opens an account at that firm and authorizes the agent to execute it. Some clients contact their agent frequently, while other give them complete freedom for executing the portfolio. The agent represents the principal (owner) in a particular business transaction and is expected to represent the best interests of the principal without regard for self-interest. The different interests of principals and agents may become a source of conflict, as some agents may not perfectly act in the principal best interests. The resulting miscommunication and disagreement may result in various problems within companies. Incompatible desires may drive a wedge between each stakeholder and cause inefficiencies and financial losses. This leads to the principal-agent problem.

The principal-agent problem occurs when the interests of a principal and agent are in conflict. Companies should seek to minimize these situations through solid corporate policy. These conflicts present normally ethical individuals with opportunities for moral hazard. Incentives may be used to redirect the behavior of the agent to realign these interests with the principal's. Corporate governance can be used to change the rules under which the agent operates and restore the principal's interests (Source - Investopedia).

[26] Shapira and Venezia (2001) conform that professional investors are better informed than amateurs. Professional brokers reap rewards both for wise investment decision and for executing trades on behalf of their clients. Due to their freedom in trading activity, sometimes they are blamed for excess activity (i.e. churning). Owners thus face a tradeoff between the benefits of a professional superior knowledge and expertise and the possible losses incurred by paying unnecessary transaction costs. In an experimental market analysis, Haigh and List (2005) replicate that professional traders show more tendencies to symptoms of myopic loss aversion than undergraduate students.

REFERENCES

1. Alexander, Gordon J., Jonathan D. Jones, Peter J. Nigro, 1998, Mutual fund shareholders: Characteristics, shareholder demographics, and sources of information, Financial *Services Review*, vol. 7 (4), 301–316.

2. Arifuzzaman, S.M., Md. Noman Hossain Chowdhury and Md. Abdus Shahed, 2012, Investors' stock trading behavior: Perspective of Dhaka Stock Exchange, *IOSR Journal of Business and Management (IOSRJBM),* ISSN: 2278-487X Volume 1, Issue 3 (May-June 2012), PP 08-15, www.iosrjournals.org.

3. Bailey, Thomas, Peter Berg, Carola Sandy, 2001, The effect of high-performance work practices on employee earnings in the steel, apparel, and medical electronics and imaging industries, *Industrial Labor Relations Review*, 54-2A, 525–543.

4. Baker, H.K. and J. R. Nofsinger, 2010 (Edition), Book of Behavioural Finance – Investors, Corporations and Markets.

5. Barber, B. M. and T. Odean, 2000, Trading is hazardous to your wealth: The common stock investment performance of individual investors, *Journal of Finance* (April), 773–806.

6. Barber, B. M. and T. Odean, 2001, Boys will be boys: Gender, overconfidence, and common stock investment, *Quarterly Journal of Economics,* 116(1) 261–292.

7. Barber, B. M., Y. T. Lee, Y. J. Liu and T. Odean, 2007, Is the Aggregate Investor Reluctant to Realize Losses? Evidence from Taiwan, *European Financial Management,* 13(3), 423 - 447.

8. Barber, B. M. and T. Odean, 2011, The Behavior of Individual Investors, *Handbook of the Economics of Finance (Book)*, (22), 1533-1570.

9. Barberis, N. and W. Xiong, 2006, What Drives the Disposition Effect? An Analysis of a Longstanding Preference Based Explanation, *Journal of Finance*, 64(2), 751-784.

10. Barua, Suborna and Anup Chowdhury, 2009, General characteristics and investment determinants in Bangladesh capital markets: evidence from dhaka stock exchange, *World Congress Journal*, Vol. 54, June 2009, ISSN 2070-3724.

11. BBS, 2010, 2011 and 2014, 2017, Population and Housing Census 2011, *National Volume-I Analytical Report (Draft)*.

12. Bernheim, Douglas, 2008, Beyond revealed preference: Choice theoretic foundations for behavioral welfare economics, Working Paper 13737, National Bureau Of Economic Research.

13. Boolell-Gunesh. S., M. H. Broihanne, M. Merli, 2009, Are French Individual Investors reluctant to realize their losses? *Paris December 2008 Finance International Meeting, AFFI - EUROFIDAI*.

14. Brown, P., N. R. Chappel, Silva Rosa, and T. Walter, 2006, The reach of the disposition effect: Large sample evidence across investor classes, *International Review of Finance*, 6(1-2), 43-78.

15. Centre for Policy Dialogue, 2003, *Demographic Transitional Policy & policy changes.*

16. Chen, G., K. Kim, J. Nofsinger and O. Rui, 2007, Trading Performance, Disposition Effect, Overconfidence, Representativeness Bias, and Experience of Emerging Market Investors, *Journal of Behavioral Decision Making,* 20:425-451.

17. Chevalier, Judith, Glenn Ellison, 1999, Are some mutual fund managers better than others? Cross-sectional patterns in behavior and performance, *Journal of Finance,* 54, 875–899.

18. Choe, H. and Y. Eom, 2009, The Disposition Effect and Investment Performance in the Futures Market, *Journal of Futures Markets*, 29:496-522.

19. Dhar, Ravi and Alok Kumar, 2002, A non-random walk down the main street: Impact of price trends on trading behavior of individual investors, Working paper, International Center for Finance, Yale University, New Haven, CT.

20. Dhar, R., and N. Zhu, 2006, Up Close and Personal: Investor Sophistication and the Disposition Effect, *Management Science,* 52:726-740.

21. Dutta, B. and Kazi Maruful Islam, 2016, Role Of Culture In Decision Making Approach In Bangladesh: An Analysis From The Four Cultural Dimensions Of Hofstede, Bangladesh e-Journal of Sociology, V- 13 (2), 30-38.

22. Feng, L. and M. Seasholes, 2005, Do Investor Sophistication and Trading Experience Eliminate Behavioral Biases in Financial Markets? *Review of Finance, 9:305-351.*

23. Ferris, S., R. Haugen and A. Makhija, 1988, Predicting Contemporary Volume with Historic Volume at Differential Price Levels: Evidence Supporting the Disposition Effect, *Journal of Finance*, 43(3), 677-697.

24. Genesove and C. Mayer, 2001, Loss aversion and seller behavior: evidence from the housing market, *The Quarterly Journal of Economics*, November 2001, 1233-1260.

25. Gervais, S. and T. Odean, 2001, Learning to be overconfident. *Review of Financial Studies*, v. 14, 1–27.

26. Gilovich, T., R. F. Wang, D. Regan and S. Nishina, 2003, Regrets of action and inaction across cultures, *Journal of Cross-Cultural Psychology*, 34, 61–71.

27. Golec, Joseph H., 1996, The effects of mutual fund managers' characteristics on their portfolio performance, risk and fees, *Financial Service Review,* 5, 133–148.

28. Grinblatt, Mark and M. Keloharju, 2001, What Makes Investors Trade? *Journal of Finance*, 56, 589-616.

29. Guzaviciusa A., V. Barkauskasc, V. Rita, 2014, Behavioural finance: corporate social responsibility approach, *Social and Behavioral Sciences,* 156 (2014), 518 – 523.

30. Heath, C., S. Huddart and M. Lang, 1999, Psychological Factors and Stock Option Exercise, *The Quarterly Journal of Economics*, V (114), 601–627.

31. Hofstede, G., 1980, Culture's consequences: International differences in work-related values, CA: *Sage Publication,* Beverly Hills.

32. Kahneman, Daniel, and Amos Tversky, 1979, Prospect theory: An analysis of decision under risk, *Econometrica,* 46, 171-185.

33. Kahneman, Daniel, 1992, Reference points, anchors, norms, and mixed feelings, *Organ. Behavior Human Decision Processes,* 51, 296–312.

34. Kahneman, Daniel, M. Riepe, 1998, The psychology of the nonprofessional investors, *Journal of Portfolio Management*, 24, 52–65.

35. Kaustia, M., 2010, Disposition Effect, in Behavioral Finance: Investors, Corporations, and Markets, H.K. Baker and J.R. Nofsinger, eds, (John Wiley & Sons: Hoboken, New Jersey) 171-189.

36. Kogan, Ross, Wang, & Westerfield, 2006, The Price Impact and Survival

of Irrational Traders, *The Journal of Finance*, VOL. LXI, NO. 1, February 2006, 195-229.

37. Krueger, Alan, Cecilia Rouse, 1998, The effect of workplace education on earnings, turnover, and job performance, *Journal of Labor Economics,* 16(1) 61–94.

38. Lakonishok, J. and S. Smidt, 1986, Volume for Winners and Losers: Taxation and Other Motives for Stock Trading, *Journal of Finance*, 41(4), 951-974.

39. List, John A., 2003, Does market experience eliminate market anomalies? *Quarterly Journal of Economics,* 118(1) 41–71.

40. Lundeberg, M. A., P.W. Fox and J. Puncochar, 1994, Highly confident but wrong: Gender differences and similarities in confidence judgments, *Journal of Educational Psychology*, 86, 114–121.

41. March, J.G., Z. Shapira, 1992, Variable risk preferences and the focus of attention, *Pshychological Review,* 99, 172-183.

42. Nofsinger , O. Rui, J., G., Chen and K. Kim, 2004, Behavior and performance of emerging market investors: Evidence from China, working paper.

43. Odean, T., 1998, Are investors reluctant to realize their losses, *The Journal of Finance,* vol. Liii, no. 53, 1775-1798.

44. Odean, T., 1999, Do investors trade too much? *American Economic References*, 89(5) 1279–1298.

45. Schlarbaum, Gary, Wilber Lewellen and Ronald Lease, 1978, Realized returns on common stock investments: The experience of individual investors, *Journal of Business* 51, 299–325.

46. Shapira, Zur and I. Venezia, 2001, Patterns of Behavior of Professionally

Managed and Independent Investors, *Journal of Banking and Finance*, 25(8), 1573-1587.

47. Sharpe, F., William, 1966, Mutual Fund Performance, *Journal of Business,* 39:1 (Part 2), 119-38.

48. Shefrin, Hersh and Meir Statman, 1985, The disposition to sell winners too early and ride losers too long: Theory and evidence, *Journal of Finance*, 40, 777-790.

49. Shu, P.G., Y.H. Yeh, S.B. Chiu and H.C. Chen, 2005, Are Taiwanese individual investors reluctant to realize their losses? *Pacific Basin Finance Journal*, 25(2), 201-223.

50. Strahilevitz, M., T. Odean and B. Barber, 2011, Once Burned, Twice Shy: How Naive Learning, Counterfactuals, and Regret Affect the Repurchase of Stocks Previously Sold, *Journal of Marketing Research,* November 2011, Vol. 48, No. SPL, pp. S102 - S120.

51. Summers, B. and D. Duxbury, 2007, Unraveling the Disposition Effect: The Role of Prospect Theory and Emotions, *Working paper, Leeds University Business School*.

52. Thaler, R. H. and Johnson, E. J., 1990, Gambling with the house money and trying to break even: the effects of prior outcomes on risky choice, *Management Science*, 36(6) , 643-660.

53. Thaler, R. H. and Shefrin, H. M. ' An economic theory of self-control', Jo47. The World Bank online report. *The Global Economy.com.*

54. Weber, M. and C.F. Camerer, 1998, The Disposition Effect in Securities Trading: An Experimental Analysis, *Journal of Economic Behavior and*

Organization, 33:167-184.

55. Weber, M. and F. Welfens, 2011, The Follow-on Purchase and Repurchase Behavior of Individual Investors, *An Experimental Investigation," Die Betriebswirtschaft, 71:139-154.*

56. Wegener, Duane and R. Petty, 1995, Flexible correction processes in social judgment, *Journal of Personality Social Psychology*, 68(1) 36–52.

57. www.dsebd.org. Annual report of DSE-2015 and 2017.

58. Wolosin, R. J., S. J. Sherman, and A. Till, 1973, Effects of cooperation and competition on responsibility attribution after success and failure, *Journal of Experimental Social Psychology,* 9, 220–235.

59. Yates, J. F., Y. Zhu, D. L. Ronis, D. F. Wang, H. Shinotsuka and W. Toda, 1989, Probability judgment accuracy: China, Japan, and the United States, *Organizational Behavior and Human Decision Processes*, 43, 147–171.

60. Yates, J. F., J. Lee, and J. G. Bush, 1997, General knowledge overconfidence: Cross-national variations, response style and ''reality'', *Organizational Behavior and Human Decision Processes*, 70, 87–94.

ACKNOWLEDGMENT

TABLES

Table-1

The daily turnover rate in Dhaka Stock Exchange (DSE)

Note: This table shows the daily turnover rate in DSE from 2011 to 2017.

Daily turnover in 2011	USD 20bn
Daily turnover in 2013	USD 40bn
Daily turnover in 2015	USD 42bn
Daily turnover in 2017	USD 87bn

(Source - www.dsebd.org)

Table-2

Overview on Bangladeshi investors

Note: This table illustrates that 55 percent stock traders are male whereas 45 percent are female in Bangladeshi stock market. The percentage of young investors between the age of 25 and 35 is the highest. Dominating investors group is bachelor's degree holders.

	Status	Percentage
Gender	Male	55
	Female	45
Age (In years)	Less than 25	22.22
	Between 25 to 35	35.16
	Between 35-45	20.22
	Between 45-55	14.2
	Above 55	8.2
Education	Below SSC	2.6
	S.S.C	4.23
	H.S.C	6.22
	Bachelor's Degree	60.22
	Master's Degree	25.63

(Source: Arifuzzaman *et. al*. (2012))

Table- 3

Overview on Bangladeshi investors

Note: This table shows that majority of the female traders (51.22 percent) have invested less than 500,000 BDT whereas majority male traders' (42.33 percent) investment size is above 1,000,000 BDT. The majority of investors prefer to hold stocks for period less than six months, but the preference tends to be stronger in female traders. For holding period of more than six months, the percentage is higher for male traders.

	Categories	Percentage	
		Male	Female
Amount/ Account Value (In BDT)	Less than 500,000	12.1	51.22
	500,000-1,000,000	15.33	43.77
	1,000,000-3,000,000	42.33	2.32
	3,000,000-5,000,000	16.25	1.47
	Above 5,000,000	13.99	1.22
Average Holding Period	Less than a month	37.5	27.2
	Between 3 to 6 month	48.7	69.5
	Over 6 months	13.8	3.3

(Source: Arifuzzaman *et. al*. (2012))

Table-4

PGR and PLR Partitioned by Period and Trading Activity

Note: Odean (1998) partitions the data set into two time periods and also into two groups of traders. Time periods includes the stocks sold from 1987 to 1990 and 1990 to 1993. Two groups of traders include the one decile of traders who trade most frequently and the nine deciles of traders who trade least frequently. In his data set, the most active 10 percent of the traders transact for 57 percent of all stock trades. This table compares the aggregate Proportion of Gains Realized (PGR) to the aggregate Proportion of Losses Realized (PLR).

	1987–1990	1991–1993	Frequent Traders	Infrequent Traders
Entire year PGR	0.201	0.115	0.119	0.452
Entire year PLR	0.126	0.072	0.079	0.296
Difference (PGR-PLR)	20.075	20.043	20.040	20.156
t statistic	30	25	29	22

(Source: Odean (1998))

Table 5

Descriptive Statistics of the data

Note: The table contains results based on 18,766 trades (9,459 purchases and 9,307 sales) for 125 active accounts from July, 2011- June, 2016. "Account Age" is considered on 01/01/2011 from the account opening date. "Age" of the investors is also computed on the 01/01/2011. "Account value" means average equity value of investor in Bangladeshi taka. The currency exchange rate during this time was approximately 77 taka (TK.) to $1.

	Number	Minimum	Maximum	Mean	Std. Deviation
Account Age (In years)	125	1	12	6.31	2.847
Investor Age (In years)	125	25	62	39.19	9.900
Trading Activity (2011-2016)	125	7	1157	150.13	197.733
Account Value (In BDT)	125	11507.78	3694979.97	559740.62	635752.48

Table 6

Summary statistics of the data

Note: Table shows the summary statistic of 125 investors. The percentage of male investors is 5.5 times (total 106) higher than female investors (total 19), though the sex ratio of male and female in Bangladesh was 100.3 in 2011 (Source BBS, 2011). The percentage of the accounts that have been opened for 7 years to 10 years is the highest; on the other hand, percentage of accounts older than 10 years is the lowest.

	Mean		Number	Percentage
Gender of investor		Male	106	84.8
		Female	19	15.2
Time from opening Account/ Account Age (In years)	6.31	Above 10	5	4
		7-10	62	49.6
		4-6	32	25.6
		Below 4	26	20.8
Investor Age (In year)	39.19	Above 50	19	15.2
		41-50	34	27.2
		31-40	42	33.6
		Below 31	30	24
Account Location		Dhaka	80	64
		Chittagong	45	36
Account Value (In BDT)	5,59,741	Below 500,001	76	60.8
		500,001-1,000,000	28	22.4
		Above 1,000,000	21	16.8

Table – 7

An example for DE calculation

Note: This table gives the example for the counting of real gain, real loss, paper gain, paper loss, proportion of gain realized (PGR) and proportion of loss realized (PLR). This table shows two individual's (IND 1 and IND 2) two date's portfolios. IND 1 has 5 stocks in his portfolio, A, B, C, D and E on day 1. He sells stock A for real gain and stock C is for real loss. B is held as paper gain and D is as paper loss. Purchase price of stock E lies between the highest and lowest daily price, so no paper gain or loss is counted. IND 2 has 3 stocks in his portfolio, F, G and H on day 2. He sells stock F for real gain. G is held as paper loss and H is same as stock E.

So for these two investors over these two days, 2 real gains, 1 real loss, 2 paper gains, and 3 paper losses are counted. Realized gains, paper gains, realized losses, and paper losses are summed for each account and across accounts. Thus, PGR = 2/ (2+1) = .67, PLR = 1/ (1+2) = .33 and DE = .34 (Followed by the equation 1, 2 and 3). If the differences between PGR and PLR for all transactions show positive value, it indicates that investors are more reluctant to realize their losses.

IND 1	Stocks	Purchase price	Daily High price	Daily Low price	DAY 1	
Portfolios	A	10	17	13	SOLD	Real Gain
	B	10	16	14	HOLD	Paper Gain
	C	10	7	3	SOLD	Real Loss
	D	10	9	7	HOLD	Paper Loss
	E	10	12	8	HOLD	No count
IND 2					DAY 2	
Portfolios	F	10	18	16	SOLD	Real Gain
	G	10	7	6	HOLD	Paper Loss
	H	10	11	9	HOLD	No count

Table – 8

PGR and PLR for the entire data set

Note: This table compares the aggregate Proportion of Gains Realized (PGR) to the aggregate Proportion of Losses Realized (PLR) where PGR is the number of realized gains divided by the number of realized gains plus the number of paper (unrealized) gains, and PLR is the number of realized losses divided by the number of realized losses plus the number of paper (unrealized) losses, conforming to Odean (1998). Realized gains, paper gains, losses, and paper losses are aggregated over time (2011-2016) and across all accounts (125) in the data set. For the entire year there are 2723 realized gains, 3430 paper gains, 2703 realized losses, and 11029 paper losses. The t-statistics test the null hypotheses that the differences in proportions are equal to zero assuming that all realized gains, paper gains, realized losses, and paper losses result from independent decisions. The t statistic is significant at the 5 percent level.

	Entire Sample
PGR	0.44
PLR	0.20
PGR/PLR	2.2
DE (Difference in proportion)	0.24
t Statistics	35.07

Table – 9
PGR and PLR partitioned by year

Note: This table compares the aggregate Proportion of Gains Realized (PGR) to the aggregate Proportion of Losses Realized (PLR), where PGR is the number of realized gains divided by the number of realized gains plus the number of paper (unrealized) gains, and PLR is the number of realized losses divided by the number of realized losses plus the number of paper (unrealized) losses. The data are partitioned yearly. For 2011 there are 365 realized gains, 597 paper gains, 327 realized losses and 1641 paper losses. For 2012 there are 530 realized gains, 922 paper gains, 565 realized losses, and 3496 paper losses. For 2013 there are 735 realized gains, 751 paper gains, 765 realized losses, and 2658 paper. For 2014 there are 391 realized gains, 427 paper gains, 420 realized losses, and 1418 paper losses. For 2015 there are 457 realized gains, 493 paper gains, 424 realized losses, and 1314 paper. For 2016 there are 244 realized gains, 240 paper gains, 202 realized losses, and 503 paper losses. The t-statistics test the null hypotheses that the differences in proportions are equal to zero assuming that all realized gains, paper gains, realized losses, and paper losses result from independent decisions. The t statistics are significant for groups at the 5 percent levels.

	2011	2012	2013	2014	2015	2016
PGR	0.38	0.37	0.49	0.48	0.48	0.50
PLR	0.17	0.14	0.22	0.23	0.24	0.29
PGR/PLR	2.24	2.64	2.23	2.11	2.00	1.72
DE (Difference in proportion)	0.21	0.23	0.27	0.25	0.24	0.22
t Statistics	12.57	18.78	18.93	12.90	12.70	7.35

Table - 10

PGR and PLR partitioned by sex and trading activity

Note: This table compares the aggregate Proportion of Gains Realized (PGR) to the aggregate Proportion of Losses Realized (PLR), where PGR is the number of realized gains divided by the number of realized gains plus the number of paper (unrealized) gains, and PLR is the number of realized losses divided by the number of realized losses plus the number of paper (unrealized) losses. The data are partitioned on the basis of investor's sex and trading frequency. Here I consider 10 percent of accounts as frequent traders that trade most frequently and 90 percent of accounts as infrequent traders that trade less frequently. For male traders, there are 2415 realized gains, 3098 paper gains, 2328 realized losses and 9722 paper losses. For female traders there are 308 realized gains, 333 paper gains, 376 realized losses, and 1307 paper losses. For frequent traders there are 1218 realized gains, 1821 paper gains, 1114 realized losses, and 4567 paper. For infrequent traders there are 1505 realized gains, 1611 paper gains, 1590 realized losses, and 6462 paper losses. The t-statistics test the null hypotheses that the differences in proportions are equal to zero assuming that all realized gains, paper gains, realized losses, and paper losses result from independent decisions. The t statistics are significant for groups at the 5 percent levels.

	Male Traders	Female Traders	Frequent Traders	Infrequent Traders
PGR	0.43	0.48	0.40	0.48
PLR	0.19	0.22	0.20	0.20
PGR/PLR	2.26	2.18	2.00	2.40
DE(Difference in proportion)	0.24	0.26	0.20	0.29
t Statistics	33.43	12.32	20.05	29.62

Table – 11

Average returns

Note: This table reports the mean return realized on stocks sold for a gain and on stocks sold for a loss. It also reports mean return on stocks that could be realized (but are not sold) on days when other stocks in the same portfolio are sold. These stocks are classified as paper gains and paper losses. For all accounts over the entire year, there are 2723 realized gains, 3430 paper gains, 2703 realized losses, and 11029 paper losses.

	Entire Year
Return on realized gains	0.157703
Return on paper gains	0.587589
Return on realized losses	-0.17433
Return on paper losses	-0.35108

Table – 12

Disposition effect when the entire position in a stock is sold

Note: This table compares the aggregate Proportion of Gains Realized (PGR) to the aggregate Proportion of Losses Realized (PLR), where PGR is the number of realized gains divided by the number of realized gains plus the number of paper gains, and PLR is the number of realized losses divided by the number of realized losses plus the number of paper losses. In this table losses and gains are counted only if a portfolio's total position in a stock was sold that day. Paper gains and losses are counted only if the portfolio's total position in another stock held in the portfolio was sold that day. Realized gains, paper gains, losses, and paper losses are aggregated over time (2011-2016) and across all accounts in the dataset. For the entire year there are 1928 realized gains, 1834 realized losses, 1621 paper gains and 5424 paper losses. The t-statistics test the null hypotheses that the differences in proportions are equal to zero assuming that all realized gains, paper gains, realized losses, and paper losses result from independent decisions. The t statistics is significant for groups at the 5 percent levels.

	Entire Year
PGR	0.543
PLR	0.253
Difference (DE)	0.291
t-statistics	29.72

Table – 13

Disposition effect when no new stock is purchased within three weeks of sale

Note: This table shows the aggregate proportion of realized gains (PGR) and the aggregate proportion of realized losses (PLR) where PGR is the number of realized gains divided by the number of realized gains plus the number of paper gains, and PLR is the number of realized losses divided by the number of realized losses plus the number of paper losses. Realized gains, paper gains, realized losses and paper losses are counted over the period of 2011 – 2016 and across all investors. In this table losses and gains are counted only if a no new purchase was made into a portfolio on the day of the sale or within three weeks following the sale. Paper (unrealized) gains and losses are counted for days on which qualifying sales were made. For the entire year there are 1613 realized gains, 1721 paper gains, 1889 realized losses, and 10,347 paper losses. The *t*-statistics test the null hypotheses that the differences in proportions are equal to zero assuming that all realized gains, paper gains, realized losses, and paper losses result from independent decisions. The t statistics is significant for groups at the 5 percent levels.

	Entire Year
PGR	0.483
PLR	0.154
Difference (DE)	0.328
t-statistics	40.36

Table- 14
Investor characteristics and the disposition effect

Note: This table presents parameter coefficients of the following regression model: PGR (or PLR or PGR-PLR) = α + $\beta1$(Account Age) + $\beta2$(Investor Age)+ $\beta3$ (High Trade Freq Dummy) + $\beta4$(Account Value) + $\beta5$(Dhaka Dummy). Dependent variables (PGR and PLR) report the proportion of gains and losses of individual investors (125) that are realized for stock transactions that took place from 2011-2016. PGR is the number of realized gains divided by the number of realized gains plus the number of paper gains, and PLR is the number of realized losses divided by the number of realized losses plus the number of paper losses. Account Age is the number of years the account has been opened. Investor's Age is the number of years on 01.07.2011, Frequent Trading is a dummy variable that indicates when the account was in the top 10% with regards to trading activity, was assumed as 1, if not then 0. Account Value is the equity value of the brokerage account in BDT, and Dhaka is a dummy variable that indicates when the accounts are located in the cosmopolitan city, it values 1, if not then it values 0. The t-statistics are reported in brackets. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels, respectively.

	PGR	PLR	DE (PGR-PLR)
Intercept	.769	.039	.729
	(8.072)***	-.458	(10.113)***
Account Age	-.352	.352	-.662
	(-3.610)***	(3.579)***	(-9.046)***
Investor's Age	-.005	.101	-.095
	(-0.064)	-1.231	(-1.556)*
Trading Activity	.016	.221	-.181
	-.181	(2.548)***	(-2.807)***
Account Value	-.245	-.326	.047

	(-2.885)***	(-3.804)***	(-.738)
Dhaka	.170	.184	.005
	(2.178)**	(2.341)**	(-.077)
Adjusted R²	.278	.263	.593

Table-15

Characteristics of investors showing positive Disposition Effect

Note: This table reports the result of regression analysis by the model: $PGR\text{-}PLR = \alpha + \beta1(\text{Account Age}) + \beta2(\text{Sex}) + \beta3(\text{Investor Age}) + \beta4 \text{ (High Trade Freq Dummy)} + \beta5(\text{Account Value}) + \beta6(\text{Dhaka Dummy})$.

Here the dependent variable is the difference (PGR-PLR) for all (112) individual respondents showing DE less than the median, higher than the median and for the less frequent and more frequent respondents for stock transactions that took place from 2011-2016. The t-statistic indicates the statistical significance. PGR is the number of realized gains divided by the number of realized gains plus the number of paper gains, and PLR is the number of realized losses divided by the number of realized losses plus the number of paper losses. Column 1 presents parameter coefficients of the regression   model. Account Age is the number of years the account has been opened, sex is a dummy variable, indicates that male is assumed as 1, if not then 0. Investor's Age is the number of years on 01.07.2011, Frequent Trading Dummy is a dummy variable that indicates when the account is in the top 10% with regards to trading activity, is assumed as 1, if not then 0. Account Value is the equity value of the brokerage account, and Dhaka is a dummy variable that indicates when the accounts are located in the cosmopolitan city, it values 1, if not then it values 0. The number of investors having DE less than median are 59, investors having DE more than median are 53, number of less frequent (trading number is less than median) investors having DE are 65 and more frequent (trading number

is more than median) 47. The t-statistics are reported in brackets. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels, respectively.

	Less than median DE	Higher than median DE	Less Frequent Traders DE	More Frequent Traders DE
Intercept	.386	1.149	.939	.332
	(6.960)***	(4.284)***	(3.807)***	(1.771)*
Account Age	-.618	-.756	-.779	-.709
	(-5.907)***	(-7.796)***	(-7.167)***	(-4.956)***
Sex	.092	.033	-.224	.604
	(.903)	(.338)	(-2.10)**	(.548)
Investors' Age	.019	.022	.112	.129
	(.185)	(.239)	(1.146)	(1.097)
Trading Activity	-.103	-.099	-.095	-.071
	(-.976)	(-1.067)*	(-.939)	(-.605)
Account Value	-.002	-.071	-.116	.262
	(-.018)	(-.791)	(-1.04)*	(1.835)*
Dhaka	-.251	-.149	-.054	.017
	(-2.385)**	(-1.650)*	(-.525)	(.144)
Adjusted R²	.465	.572	.535	.280

Table-16

Characteristics of investors with or without DE

Note: This table shows income, profession and mean trade for investors who exhibit DE and those who do not. Investors are classified with monthly income lower than 25,000 BDT as "low income" category, between 25,000 and 80,000 BDT as "medium-income"; and above 80,000 BDT as "high-income" category. Individuals are classified as "professional" if they work in "professional/ technical" or "managerial/administrative" positions and individuals are classified as "non professional" if they work in clerical, service, sales, students, house wives, agriculturist, and pensioner. Last column shows the mean number of trades of the investors showing positive disposition effect and the negative disposition effect.

	Observation	Percent of high-income	Percent of professional	Mean trade
Positive DE	112	33.92	30.35	164
Non positive DE	13	46.15	61.53	30.84
Difference (Non pos.- pos.)		12.23	31.18	-119.16

Table-17

DE of different income group

Note: The following table shows the aggregate proportion of gain realized (PGR), loss realized (PLR) and their difference (DE) of different income groups of 112 investors. For high income group the number of investors is 38, for mid income 38 and for low income 36. The t statistic is significant at 5% level. Investors with monthly income lower than 25,000 taka (tk) into the "low income" category; investors with monthly income between 25,000 to 80,000 tk into the "medium-income" category; and investors with monthly income above 80,000 tk into the "high-income" category. For the entire year there are 613 realized gains, 1138 paper gains, 809 realized losses, and 2080 paper losses for high income group, 821 realized gains, 1134 paper gains, 964 realized losses, and 3052 paper losses for mid income group, 1047 realized gains, 1089 paper gains, 839 realized losses, and 3356 paper losses for low income group.

	High	Mid	Low
PGR	0.35	0.42	0.49
PLR	0.28	0.24	0.20
DE	0.07	0.18	0.29
t-statistics	5.01	14.25	23.85

Table-18

DE of different occupation group

Note: The following table shows the aggregate proportion of gain realized (PGR), loss realized (PLR) and their difference (DE) of different occupational groups of 107 investors. For professional group, the number of investors is 42, for non professional group the number of investors is 65. The t statistic is significant at 5% level. Respondents of "professional" occupations are those who working in "professional/ technical" or "managerial/administrative" positions. Respondents of "nonprofessional" occupations are those who working in clerical, service, sales, students, house wives, agriculturist, and pensioner. For the entire year there are 989 realized gains, 950 paper gains, 913 realized losses, and 2130 paper losses for professional group and 1561 realized gains, 1760 paper gains, 1388 realized losses, and 8526 paper losses for non professional group.

	Professional	Non-professional
PGR	0.42	0.47
PLR	0.30	0.14
DE	0.12	0.33
t-statistics	8.67	39.55

Table-19

DE of different income and occupations group

Note: The following table shows the difference (DE) of the mean proportion of gain realized (PGR) and loss realized (PLR) of different occupational and income groups of 107 investors. Total number of investors of high income and professional group is 31, high income and non professional group is 38, mid income and professional group is 8, mid income and non professional group is 30, low income and professional group is 6, low income and non professional group is 32. t-statistics are reported in brackets. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels, respectively.

	Professional Occupation	Non professional Occupation	Prof.-Nonprof.
High-Income	0.04	0.14	-0.09982(-3.58)***
Mid-Income	0.06	0.31	-0.25 (-2.25)*
Low-Income	0.1	0.51	-0.41 (-4.04)***
High-Low	-0.05982(-.59)	-0.37 (-9.88)***	

Table-20

Demographic characteristics and disposition effect

Note: The regression is specified as follows: $DE = \alpha + \beta_1 x1 + \beta_2 x2$. The dependent variable is the difference (DE) between PGR and PLR of (107) individual respondents for stock transactions that took place from 2011-2016. Income and profession categories are the independent dummy variables. Dummy is introduced as x1(income) and x2 (profession). Being a binary categorical variable, the sample respondents are divided into high income and low income category. Respondents with high income are marked as 1 and with low income category are marked as 0. Similarly, for x2, all respondents are either professional (engineer, doctor, manager etc.) are marked as 1 or non professionals (housewives, students, pensioners etc) are marked as 0. Sample characters present parameter coefficients of the regression model. t-statistics are reported in brackets. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels, respectively.

Sample Characters	DE
Intercept	.080
	(1.816)*
High-Income	-.100
	(-1.232)
Low-Income	.349
	(4.66)***
Professional Occupation	-.039
	(-.411)
Nonprofessional Occupation	.397
	(4.28)***
Adjusted R²	.518

FIGURES

Figure 1

Prospect Theory
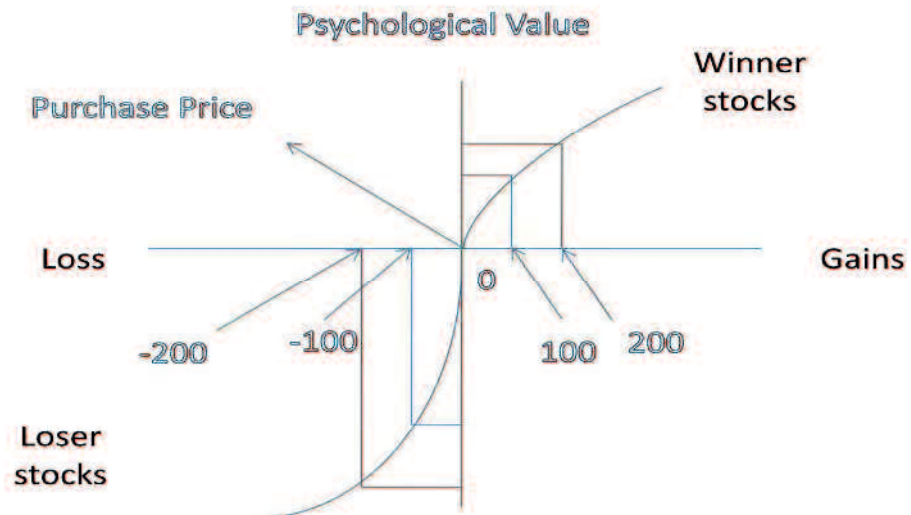
Figure 2
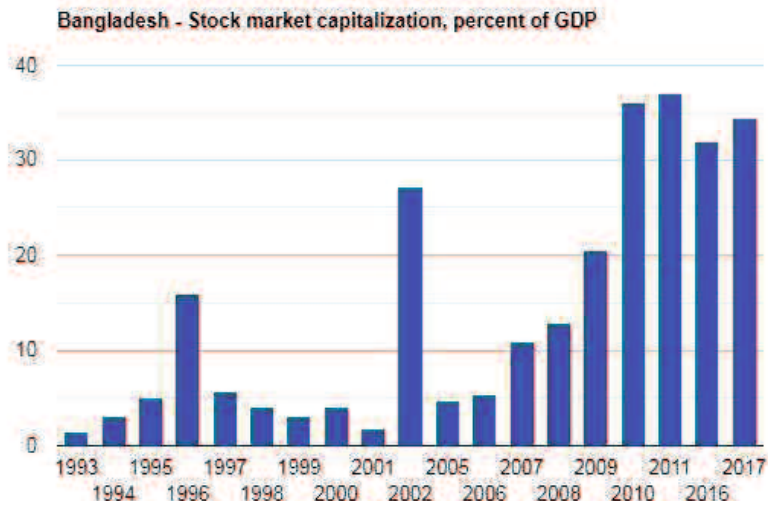
Source: The Global Economy.com, The World Bank
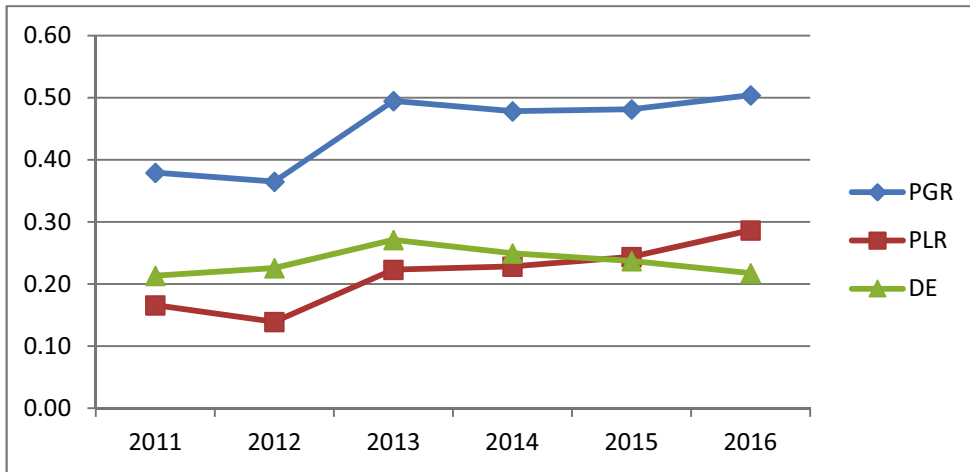
Figure 3

Aggregate level of DE / year of trading

Figure 4

Distribution of Dispositon effect for all investors