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Insights on Investment Psychology of Individual Investors at Dhaka Stock Exchange (DSE) During The Covid-19 Pandemic

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ABSTRACT

Almost all calamities make a footmark on the financial sector, and COVID-19 is no different. On this ground, stock market investors' attitudes, thinking, and everything receives severe attention as investors' psychology is a common determinant of the trading activity and investment decisions which ultimately drive the market. Investors in developing countries like Bangladesh need a more rigorous analysis of their behavior as they are now more concerned and worried about their investments than before. They must be more vigilant in terms of preparation to eliminate the impacts of COVID-19. This paper aims at focusing on understanding how the spread of the pandemic is reshaping the psychological aspect of investors with a focus on four selected factors, risk perception, market psychology, media effect, and loss aversion. Three hundred eighty-five responses were collected through a questionnaire during the COVID-19 pandemic, where data was tested using Smart PLS 3.0 in conjunction with IBM SPSS 25. With the help of the measurement model and structural model of partial least square, the suggested framework in this paper has been studied to identify some aspects of investors' psychology that could potentially have insights and information on how countries should place themselves to respond to future epidemics. The effect size and individual t-test of the factors explain the affected state of thinking of retail investors, where loss aversion and risk perception affect investors the most. In contrast, media effects have a moderate influence, and market psychology has the least. The findings are expected to help investors and policymakers understand the behavior of the market and prepare accordingly for challenging the upcoming economic crisis in the corona war.

1. Introduction

The world economy has observed a great shock in revenue due to the spread of COVID-19, leading to a pandemic (Baldwin et al., 2020). This is one consequence of the first wave of COVID-19 that originated in Wuhan of, China, in December 2019. The sudden outbreak of COVID-19 has significantly increased economic uncertainty (Baker et al., 2020a). People and businesses have observed the devastating outcome of this pandemic and have been anticipating the costs of a second wave. They have started taking probable precautions to lower the loss amidst governments' restrictions to control the outbreak. Investors are suffering considerably due to this pandemic affecting them financially and psychologically. Considerable financial loss due to low revenue, loss of jobs, and restrictions on movements and traveling have slowed down the economy of most countries, which can be argued to affect investors' psychology further.

Investors' psychology profoundly influences investment decisions in the stock market (Nofsinger, 2010). So, investors in a developing country, such as Bangladesh, need to count on their behavior as they are now more concerned and anxious about their investments than before. They are required to be more watchful to get rid of or minimize the financial effects of COVID-19 consequences. It is, therefore, a time to understand the dynamics of the investment psychology of investors so that watchdogs can take the necessary measures. Against this backdrop, our main objectives are to explore the profile of the psychology of the retail investors at DSE under COVID-19 in terms of selected factors and drivers of the investment decisions and to identify comparative influences of behavioral aspects of individual investors in their investment decision-making. This research aims at contributing to knowledge on how investors in a developing country respond to the pandemic and at unfolding different aspects of investors' psychology that might offer insights for investment planners, financial advisers, and individual investors, which they might find useful in improving their portfolio configurations and in foreseeing how they should strategize to respond to future unprecedented disasters.

Numerous papers investigated and found the economic impacts of specific events, including nuclear wars and climate change, on the financial market. Gangopadhyay et al. (2010) inspected the impact of Hurricane Katrina on share price performance in 2005, whereas (Becchetti & Ciciretti, 2011) explored the effect of the global financial crisis of 2007–2009. Likewise, after the sudden outbreak of unprecedented COVID-19, much literature has appeared till now to inspect the impact of Covid-19 on the stock market (Akhtaruzzaman et al., 2020; Ashraf, 2020; Baker et al., 2020a; Goodell, 2020; Wagner, 2020; Zhang et al., 2020). Some of these have revealed stock market volatility due to COVID-19 (Baker et al., 2020; Wagner, 2020), and some have explored links between COVID impact and stock market returns (Al-Awadhi et al., 2020; Ali et al., 2020). Existing studies by Baker et al. (2020b); Wagner, 2020) have shown that the stock market volatility in the United States has reached its highest point in history, whereas Ali et al. (2020) have found a negative and significant relationship between returns of most of the financial securities and the COVID-19 deaths. Huo and Qiu (2020) have explored the reaction to the announcement of the COVID-19 pandemic lockdown. They observed the reversals both at the industry and firm levels due to investors' overreactions. In their literature, they found retail investors reacting more strongly to COVID-19. Phan and Narayan (2020) have unknotted new insights and found possible overreaction and market correction. In their paper, they studied government responses to COVID-19 for the top 25 countries by using daily time-series data on those countries' stock returns keeping in mind that governments' reactions are transmitted to the market through stock price correction. The effect of news related to infectious diseases on public sentiments can be found in various studies (Blendon et al., 2004; Haroon & Rizvi, 2020; Mairal, 2011; Tetlock, 2007; Young et al., 2013). It is clear from those studied that public sentiment has played a role in the previously unseen volatility in the equity markets which is evident in the US market and

similarly world markets experiencing a decline of nearly 30% within the first quarter of 2020. The study also discovered this same finding (Albulescu, 2020).

However, some firms react differently to the COVID-19 revenue shock. Mazur et al. (2020) have found that natural gas, food, healthcare, and software stocks earn high positive returns with a sharp fall in the US market's petroleum, real estate, entertainment, and hospitality sectors. They have also found loser stocks, which have an inverse correlation with stock returns, to exhibit extreme asymmetric volatility. The above studies confirm that the outbreak of COVID-19 has spread fear into the public, making them more concerned about their portfolios and plan. This fear has affected them not only financially but also psychologically. Therefore, people are acting irrationally. So, it has become necessary to measure the status of the investment psychology of those people while trading in the stock market. The present study is thus to explore the effect of COVID-19 on the investment psychology of individual investors in the Bangladeshi stock exchange, where individual investors often make behaviourally biased investment decisions (Hossain & Siddiqua, 2022). One recent study tested four behavioral biases on Dhaka Stock Exchange and found behavioral biases in their decision-making (ibid).

Moreover, various factors i.e., advice of brokers, friends, and family, past performance, news of media, representativeness, overconfidence, anchoring, gambler's fallacy, loss aversion, regret aversion, and mental accounting, are found to affect investment decisions on DSE (Sochi, 2018; Akhter & Ahmed, 2013). So, there might be a possibility to have psychological biases in the investment decision-making of individual investors in the Dhaka Stock Exchange due to the fear of COVID-19 relating to their portfolios and plan, which needs to be studied. The study can be useful in making a well-stock investment strategy during the upcoming second wave of Novel Coronavirus. Till now, no paper has been found to expose how and to what extent the behavioral traits of individual investors of the Bangladeshi stock market are affected due to the Novel Coronavirus.

Motivated by these observations, this study suggests testing the following hypothesis to examine the role of COVID-19 developments on investors' decision-making.

(H_1): There is an effect of COVID-19 on the investment behavior of investors at DSE.

The hypothesis has been tested for two steps ((H_1)$_1$ to (H_1)$_4$ and (H_1)$_5$) to assess the mastery of COVID-19 on investors' investment decision-making at the Dhaka Stock Exchange and portray the psychological profile with the relative importance of the chosen factors (risk perception, market phycology, loss aversion, and media effect). The central hypothesis is partitioned into the subsequent sub-hypotheses:

(H_1)$_1$: There is an effect of loss aversion on the investment behavior of investors at DSE.

(H_1)$_2$: There is an effect of risk perception on the investment behavior of investors at DSE.

(H_1)$_3$: There is an effect of media effect on the investment behavior of investors at DSE.

(H_1)$_4$: There is an effect of market psychology on the investment behavior of investors at DSE.

To test the presence of the effect of COVID-19, we have assessed the responses of investors against four behavioral factors (risk perception, media effect, market psychology, and loss aversion) and to determine the most contributing factors in investment decisions during the pandemic, the following hypothesis is taken further:

(H_1)$_5$**:** There is a significant difference in the effect among the four behavioral traits due to COVID-19 on the investment behavior of investors at DSE.

The proposed conceptual framework based on the hypothesis is depicted in Figure 1.
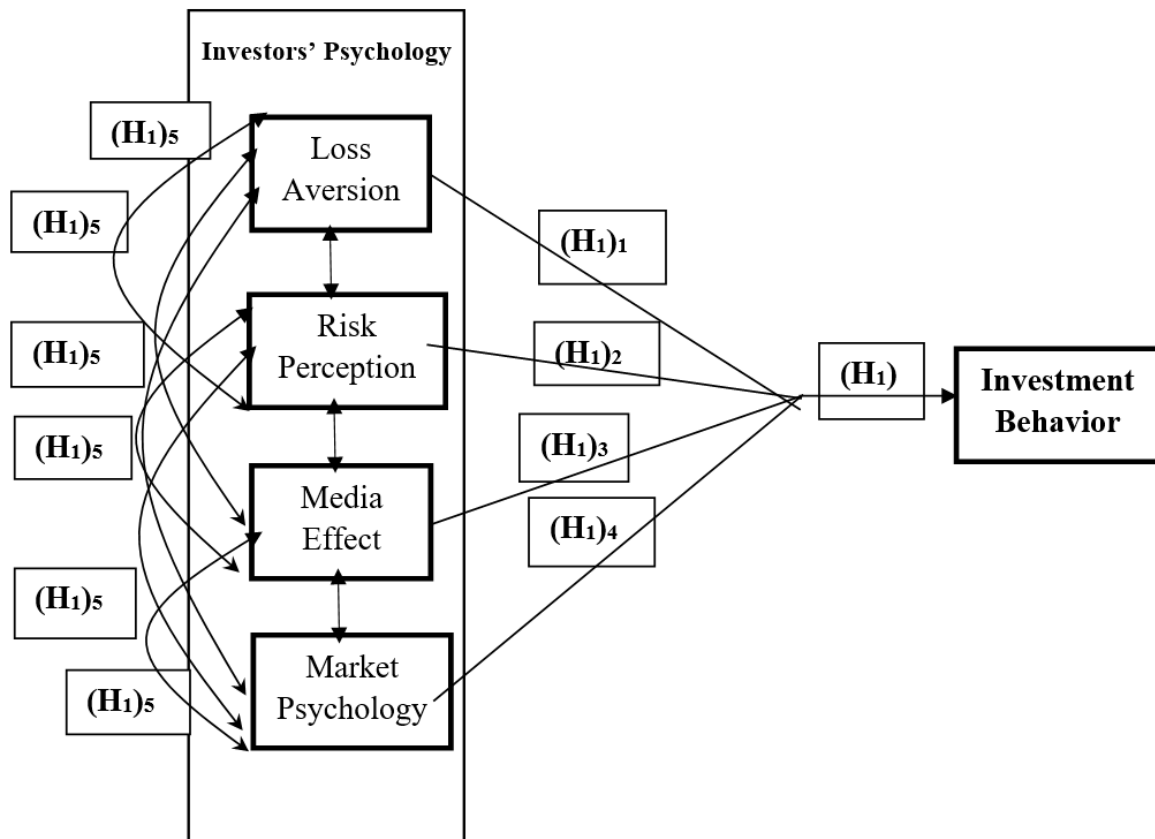
Figure 1 Conceptual framework and hypothesis development

2. Methods

The research utilizes both primary and secondary data. Primary data is collected through a structured questionnaire with closed-ended questions using a 5-point Likert scale. Secondary data are collected from books, research articles published in renowned journals, and research reports. Repositories such as SSRN and Scopus databases identify related scholarly works. At a 95% confidence level with a 5% margin of error and 50% response distribution, a sample of 385 respondents is surveyed out of the population of 23,52,645 (CDBL, 2019). The following equations are used to calculate the sample size. Here, n = sample size, N = population size, r = fraction of responses, Z(c/100) = critical value for confidence level c, E= margin of error.

$$X = Z (c /100)2 r (100 - r) \ldots\ldots\ldots\ldots(i)$$

$$n = N x / ((N-1)E2 + x)\ldots\ldots\ldots\ldots(ii)$$

$$E = Sqrt[(N - n)x / n(N-1)]\ldots\ldots\ldots(iii)$$

This study's respondents are individual investors holding investment portfolios at DSE during the pandemic. The survey collected some demographic information about the investors and their responses to several investment psychology-related statements related to lose aversion, risk perception, media effects, and market psychology. A 5-point Likert Scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) against 16 statements has been used in the survey. The statements for each factor in the questionnaire are depicted in Table 1.

Table 1 Factor-wise statements in the questionnaire

Variables
Risk Perception

1	I will not fear investing in shares of companies that manufacture products that are necessary for the pandemic, (i.e., healthcare and food industries)
2	I will behave conservatively about the shares that show unexpected fluctuations in price or transaction in this pandemic.
3	I will behave differently as an investor in this pandemic and be more sensitive to market risks.

Market Psychology

4	I will make investment decisions based on the volume of shares traded in the market during the pandemic.
5	I will invest with confidence even in this pandemic because China has bought a considerable percentage of DSE.
6	I will respond fast to the changes in other investors' choices during the pandemic.

Media Effect

7	I will be more sensitive to media news on shares in this pandemic than in normal times.
8	News related to COVID-19 in different media will change my usual investment pattern.
9	I will become more concerned about getting my investment back based on the news I receive from different media during the pandemic.

Loss Aversion

10	Incurring loss will be more serious to me than getting a substantial gain during the pandemic.
11	Considerable price drops in share prices during the pandemic have made me nervous. This will affect my investment decision negatively.
12	I will not consider trading in the stock market lucrative during the pandemic.

Decision Making

13	I will avoid increasing my investment in this pandemic situation.
14	I will make investment decisions following the choices of other investors during the pandemic.
15	I will make buy decisions when I watch positive news in the media about this pandemic, such as the disease recovery rate increasing and working on the development of a vaccine becoming successful.
16	I will not sell shares that have observed a decline in value but will try to sell shares that have experienced a rise during the pandemic.

Source: Authors' construct

Assessing the effect of the COVID-19 pandemic on these four psychological factors of individual investors' investment decision at the Dhaka Stock Exchange and their relative impact, an analysis of respondents' responses based on the measurement model and structural model has been led. Measurement to test the model and structural model, this study has used Smart PLS 3.0 along with IBM SPSS 25 because of its ability to use formative indicators and handle problematic modeling issues such as nonnormal data distribution and small sample size (Hair et al., 2014).

3. Results And Discussion

3.1. Result

The following measurement model and structural model have been developed to test whether COVID-19 significantly impacts the investors' psychological traits in investment decision-making at DSE.

3.1.1. Measurement Model

This study used partial least squares to examine the suggested framework where data was tested using Smart PLS 3.0 software. Apart from this, Harman single factor test has been executed using IBM SPSS 25 where a single component is found to explain 22.51% of the variation, which is less than 50%.

This study has used composite reliability (CR) and average variance extracted (AVE) to assess the internal consistency and convergent validity. Hair et al. (2014) stated that to attain acceptance, the value of CR needs to be greater than 0.7, whereas AVE needs to be more than 0.5. In our case, CR and AVE are satisfied for all the constructs as they are more significant than that threshold level which is depicted in Table 2. So, the proposed model holds an acceptable quantity of internal consistency and convergent validity.

Table 2 Composite reliability and average variance extracted

Constructs	Abbreviation	Composite Reliability	Average Variance Extracted
Decision Making	DM	0.901	0.752
Loss Aversion	LA	0.948	0.859
Risk Perception	RP	0.877	0.705
Media Effect	MedEff	0.850	0.654
Market Psychology	MktPsy	0.822	0.607

Source: Authors' construct

The study used the Fornell-Larcker criterion for assessing the discriminant validity. Hair et al. (2014) state that each variable's AVE must be higher than any other variable's maximum squared correlation. Table 3 depicts that the square root of AVE, which is set diagonally, appears to be greater than the inside values in the corresponding rows and columns. As a result, the Fornell and Larker condition is verified, which leads to the conclusion that all the constructs are discriminant.

Table 3 Discriminant validity

Constructs	DM	LA	RP	MedEff	MktPsy
DM	0.667				
LA	0.365	0.927			
RP	0.257	-0.225	0.840		
MedEff	0.262	0.051	0.064	0.809	
MktPsy	0.263	0.195	0.085	0.285	0.779

Source: Authors' construct

The model comprising the four variables, risk perception, market phycology, media effect, and loss aversion, explains 30.30% of the decision-making variable. According to (Hair et al., 2013), R^2 values of 0.75, 0.50, and 0.25 for the endogenous latent variable (Table 4) represent substantial, moderate, and weak effects, respectively. Accordingly, in this

research work, the four factors as a group have come with a moderate effect on investors' decision-making issues specifically during the first wave of COVID-19.

Table 4 Values of R^2 adjusted

Construct	R Square Adjusted
DM	0.303

Source: Authors' construct

3.1.2. Structural Model

The four sub-hypotheses ($(H_1)_1$, $(H_1)_2$, $(H_1)_3$, $(H_1)_4$) under the main hypothesis (H_1) are tested using Smart PLS 3.0 and found significant, whose results are depicted in Table 5. The results of the structural model accept the four sub-hypotheses and, thereby, the main hypothesis that there is an effect of COVID-19 on the investment psychology of individual investors at DSE.

Table 5 Hypotheses results

Hypothesis	Relationships	β values	T values	P-values	Remarks
$(H_1)_1$	LA -> DM	0.409	10.045	0.000	Supported
$(H_1)_2$	RP -> DM	0.328	8.173	0.000	Supported
$(H_1)_3$	MedEff -> DM	0.191	4.447	0.000	Supported
$(H_1)_4$	MktPsy -> DM	0.101	2.432	0.015	Supported

Source: Authors' construct

Since the study has been found to have a significant effect of COVID-19 on investment decision-making, it now further requires testing the following hypothesis $(H_1)_5$, i.e., there is a significant difference in the effect among the four behavioral traits due to the COVID-19 on investment behavior of investors at DSE. The effect size is used to measure the strength of the traits' relationships. According to Hair et al. (2014), the effect size needs to be more than 0.02, 0.15, and 0.35 to have a weak, moderate, and large effect respectively. The Decision-making variable is found to be affected significantly from moderate to weak (Table 6) with the four factors of the model during the first wave of COVID-19, which confirms the existence of noteworthy differences in the effect among the four behavioral traits due to the COVID-19 on investment decision making of investors.

Table 6 Effect size

Hypothesis	Relationships	f^2 values	Remarks
$(H_1)_1$	LA -> DM	0.22	Moderate effect
$(H_1)_2$	RP -> DM	0.15	Moderate effect
$(H_1)_3$	MedEff -> DM	0.05	Weak effect
$(H_1)_4$	MktPsy -> DM	0.01	Weak effect

Source: Authors' construct

3.2. Discussions

Covid-19 was first reported in Bangladesh on March 08, 2020, with three infected persons. Before this, on January 22, 2021, the authority of Bangladesh Airport imposed an alert message, and on February 01, 2021, Bangladesh evacuated 312 citizens from Wuhan (COVID-19 Pandemic in Bangladesh, n.d.). During this pandemic, DSE made the transaction

hour to 3 hours, and a circuit breaker was introduced to boost the capital market (Financial Express, 2020).

Investors in the stock market were on the verge of uncertainty with the sudden worldwide crisis, the black swan event, where physical and mental health was questioned in terms of behavior and, thereby, decision-making. The economy was to be shaken, and so was expecting the stock market. Investors' behavior plays a significant role in decision-making for the stock market, which can be assessed regarding different behavioral factors. In the later part of the first wave, three hundred eighty-five respondents were surveyed with a closed-end 5-point Likert scale questionnaire comprising four exogenous and one endogenous factor. The following hypotheses have been constructed and tested for statistical significance based on the survey data for assessing the consequences of four psychological factors.

(H_1): There is an effect of COVID-19 on the investment behavior of investors of DSE.

Health crises and psychological disorders among the general public affect individual and global investors' economic conditions and financial positions (Naseem et al., 2021). COVID-19 is one such health crisis at the same time a black swan event for the financial sector that is creating a multi-dimensional impact on general investors' psychological, physical, social, and financial aspects. In this study, the psychological factors during COVID-19 have been assessed regarding the behavior of stock market investors.

In this paper, investors' decisions are moderately affected by the selected factors; risk perception, media effect, market phycology, and loss aversion. With R^2 = 30.30%, more factors will be better able to explain the overall decision-making profile as time passes with the spread of the contagious disease, COVID-19. In addition, four more hypotheses have been tested and investigated to assess the effect of psychological traits separately.

(H_1)$_1$: There is an effect of loss aversion on stock investment behavior at DSE.

Rational investors are loss averse, and the study also underpins the significant (β values=.409, t-stat =10.045, P-values = .000) impact of loss aversion on investors' decision-making at $^{the\ first}$ wave of the pandemic period with moderate effect size (f^2 =0.22) concerning other exogenous variables in the research model.

(H_1)$_2$: There is an effect of risk perception on stock investment behavior at DSE.

Risk perception is a cognitive process that defines investors' view of financial risk. With the exposure to the black swan event risk perception of investors carries a role in outlining the investment decision. Unlike the classical finance theory, individual investors do not always make rational investment decisions, as found in the Indian context (Bairagi & Chakraborty, 2018). In this backdrop, the present study tested this bias and found it to significantly affect risk perception on the decision-making variable (β values=.328, t_{stat} =8.173, P-values = .000) where the effect size is moderate (f^2 =0.15).

(H_1)$_3$: There is an effect of media effect on stock investment behavior at DSE.

Media moves the market and investors to close contact and in any black swan, event media is thought to have a prime role in shaping the investors' decision. The financial news, media, and amplifiers have worked as fear spreaders about COVID-19. Investors' investment decision is found to have a weak media effect (f^2 =0.15). However, it is statistically significant (β values=.191, t_{stat} =4.447, P-values = .000). Similar result was found in a study by (Spelta et al., 2021) where the stock market underreacted to the announcement of SARS-CoV-2.

(H_1)$_4$: There is an effect of market psychology on stock investment behavior at DSE.

Investors unintentionally work as a group, i.e., one follows others. Behavioral finance suggests that investors mimic others' actions due to a lack of confidence, especially during turbulent periods of fear, uncertainty, and panic (Dhall & Singh, 2020). In this study, during the pandemic period, DSE individual investors have significantly impacted market psychology (β values=.101, $t_{=stat}$ =2.432, P-values = .015). However, it is weak regarding effect size (f^2 =0.01).

(H_1)$_5$: There is a significant difference in the effect among the four behavioral traits due to COVID-19 on the investment behavior of investors at DSE.

Each behavioral trait differs significantly in affecting investors' investment decisions. By calculating effect size, the relative importance of each trait is explored. To identify the most contributing factor(s) to respondents' investment decision-making, comparisons among all psychological factors are imperative. Therefore, the structural model is developed to analyze primary data to find the comparative importance of the stated four psychological factors of the respondent investors by their effect size in shaping their investment behaviors in the lived realities of the COVID-19 pandemic. Table 5 shows that after the first wave of COVID-19, loss aversion has become the most affecting psychological factor influencing respondents' investment behavior at DSE. In contrast, market psychology has the most negligible impact.

In the study, loss aversion affects more than any other biases among the four chosen behavioral biases. Avoiding loss is inevitable, but it becomes more dominant during the first wave of COVID-19 to DSE investors. Loss aversion has played a significant role in formulating the decision-making of the portfolio. Investors became more conservative and made an investment decision to minimize loss centering on the development of COVID. The study shows that individual investors have become more reactive to incurring losses than gains during the pandemic. A considerable drop in stock prices has made them feel vulnerable, affecting their investment decisions negatively, as evident from the survey questionnaire responses. They consider it risky to invest in this pandemic even though stock price declines, which reveals their loss aversion attitude. Similar findings are also synthesized from the current stock market volatility and the reactions to the declaration of COVID-19 lockdown in other contexts (Baker et al., 2020a; Huo, X., Qiu, 2020; Wagner, 2020).

However, respondents behave differently towards different stocks. They feel safe investing in companies that sell products in high demand during this pandemic, such as the healthcare and food industries, consistent with the findings (Mazur et al., 2020). Respondents are more sensitive to market risks and do not consider stock trading lucrative during the pandemic. Several studies by C. Albulescu (2020); Haroon and Rizvi (2020) conducted on COVID-19 realities came with a strong association between the overwhelming panic stemming from the news outlets with the increasing volatility in the equity markets. The investor sentiment theory also confirmed the consistent relationship between media content and individual investor behavior with disproportionately small stocks. However, in our study, DSE investors' investment decision is found to have a weak media effect. The reason behind this may be that in Bangladesh. However, COVID-19 was first diagnosed in March 2020, many countries have already observed it, and the people of Bangladesh are aware of the devastating nature of COVID-19 through different media around the world. So, the investors of Bangladesh were observing rather than getting panicked and contemplating applying their other behavioral traits to decide about the stock market position.

The study shows that in Bangladesh, respondents are less affected by the lack of confidence. However, they have been experiencing pandemics for the first time, contrasting what is realized in the US market (Baker et al., 2020b; Mazur et al., 2020; Onali, 2020). Individual investors are least affected by market psychology as they depend more on their skills, knowledge of the stock market, and anticipation of market returns. So, it is expected that investors with high experience, maturity, and expertise can make effective investment decisions amidst pandemic-led challenging market psychology.

4. Conclusions

Bangladesh is no exception to suffering from Covid-19 led challenges. Many business entities were inactive for several months, causing a strident drop in consumption and economic output. This resulted in a lower stream of expected future cash flows leading to investors' vulnerable confidence. Investors have become more risk-averse, and their observations regarding risks have become unorthodox as COVID-19 has affected different sectors differently. Several studies conclude that this pandemic can lead to a global financial disaster. The psychological health of the investors and the impact on the financial market should be assessed more deeply to figure out the investors' movement during this turbulent period. All the factors selected for this paper were in driving mode to map the investors' decision whether to invest more and sell for exploiting profit or for waiting for goods. Apart from the combined effect, each factor has been researched for a rank-based conclusion. DSE investors ponder the stock market to be riskier with the spread of the pandemic, thereby opting to be conservative but also care for others' footsteps though not strongly. Investors need to be found to move more with the media broadcast about covid- 19 and financial news. Instead, they are more comfortable observing and applying their risk perception to avoid portfolio loss. In the first wave, DSE investors were more stable in applying their judgment, but uncertainty grew with the advancement and endurance of Covid-19. The sluggish development of covid-19 put the investors in the observer position, and it may go up in the next wave. The study's findings would assist individual investors and policymakers in understanding the dynamics of investment psychology in unprecedented pandemic realities, where the latter would be able to formulate effective policies to encounter the shocks of the future waves of a pandemic.

Further research is suggested with alteration of the period and date with extension. An extended period study can be conducted with more data samples. Last but not least, more factors can be included with the different combinations like time and sample size for understanding the black swan event effect on investors' psychology.

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