Assessing the Capital Market Reactions of COVID-19 Announcement: Evidence from Bangladesh

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Abstract:

This research assessed the reactions of the COVID-19 epidemic announcement and the firm-level causative factors of abnormal return in the context of the Bangladesh capital market. 349 companies from the Dhaka Stock Exchange (DSE), which is considered as frontier market, have been selected for this analysis. We got that the announcement of the COVID-19 epidemic caused a substantial positive reaction, quite a contradictory finding than other Aksian countries due to the lower infection rate and death rate in Bangladesh, on cumulative average abnormal returns range from 1.13% to 2.51% having a 5-day event window period, with some deviations. The cross-sectional outcomes support the notion that the smaller, more profitable and lesser liquid portfolios reacted more throughout the course of this epidemic. To conclude, abnormal returns were responded mostly by size and liquidity and these findings are fundamental grasp for a series of robustness tests.

Keywords: Corona-virus, Bangladesh capital market, CAAR, Abnormal returns.

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1.0 Introduction

Starting as a local crisis in China's Hubei Province and converting into a global epidemic, the novel Coronavirus (Covid-19) causes 2,907,944 deaths including 134,308,070 confirmed cases of COVID-19 (WHO,10 April 2021). Apart from this record of adverse impact on human lives, this pandemic caused and still causing equities to be plunged and market volatility to be flown upwards around the world. Economic activities are facing worse experiences day by day, which are yet to be measured, because of long-drawn-out lockdowns, severe quarantine policies, and maintenance of social distancing. But global financial markets have demonstrated an asymmetrical but unique response to this pandemic. In this situation, governments and central banks of many countries have instantaneously appeared with different stimulus packages and policy instruments to maintain the stability of the capital markets and ensure investors' confidence, and fight back against this challenge.

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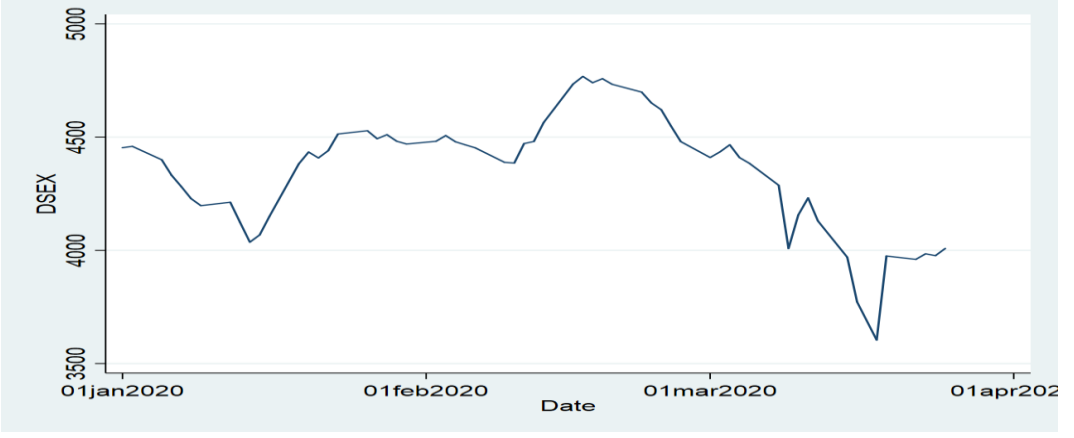
There is a negative response from stock markets, in common, to COVID-19 which to some extent recovered with the declaration of different relief plans by the government and central banks. However, the precise direction and degree of stock markets' reactions to these events (declaration of COVID-19 epidemic) are investigated for the developed capital markets such as the US, Australia, China, Japan etc. (Rahman et al., 2021; Ramelli & Wagner, 2020; Rahman & Al Mamun, 2021) This has not been yet investigated in the context of a frontier market like Bangladesh. We aim to fill this gap by exploring this response in frontier markets like Bangladesh where the market should be resilient to the pandemic so that small investors can survive.

The main focus of this study is to assess the reactions of Bangladeshi stock returns to the declaration of COVID-19 as a pandemic. We also tried to identify firm-specific causative factors of realized abnormal returns during the course of this pandemic phase. Lots of empirical analysis has been done on geo-political events, or administrative changes, which are mostly endogenous to distinctive corporate choices and have a noteworthy likelihood of iterating (like political actions), and are difficult to uncover frequently (Ramelli & Wagner, 2020). Here we focused on investigating how firm value changes in reaction to COVID-19, an exogenous crisis and suggest causative firm-specific factors for those reactions.

A few reasons motivated us for choosing Bangladesh. To begin with, in spite of the fact that Bangladesh was not among the notably influenced nations with regards to human costs (such as mental trauma, subsequent health issues, and death) of the pandemic, Figure-1 shows that there are many ups and downs in the stock market as presented by DSEX index on the first quarter of 2020. The DSEX index variability over the first quarter of 2020 motivated us to choose Bangladesh as an interesting context to study market response related to the COVID-19 pandemic announcement. The yield of all shares decreased to 3.01 at the end of January 2021 which was 3.16 at the end of December 2020 and 4.99 at the end of January 2020 in the Dhaka Stock Exchange (DSE) (Bangladesh Bank, January 2021). Second, the eventual feedback of the Bangladesh capital market to the COVID-19 pandemic is still unknown. Third, as a frontier market, most of the studies do not cover Bangladesh and thus it creates a gap in the literature and it is really very important to examine the effect of this pandemic situation in the Bangladeshi stock market as a parameter to measure the strength of this market to face challenges. With this background, it would be noteworthy to investigate how the Bangladesh capital market represented by DSE reacted to a particular event encompassing the COVID-19 pandemic announcement.

Figure-1 : DSEX Index in the First Quarter of 2020



Source: DSE data library

The framework of corporate finance theories has been used in the multivariate setting, considering financial condition variables before COVID-19 firm-particular causative factors to justify cross-sectional cumulative abnormal returns. The cumulative abnormal returns (CAR) related to the announcements is the dependent variable here and the independent variables are firm characters. The firm-specific factors such as size, profitability, leverage and liquidity capture the firms' fundamental traits. We found a cumulative positive abnormal return of 1.13% as the reaction to the 1st event that is the announcement of COVID-19 as a public health emergency on January 30th, 2020 and of 2.51% as the reaction to the 2nd declaration of COVID-19 as a global epidemic on March 11, 2020, considering a [− 5,5] event window. The smallest, most profitable firms reacted more negatively during the course of this pandemic. Finally, abnormal returns were responded mostly by size and liquidity.

These findings have vital policy inferences and we, hence, make a significant contribution to the literature by evaluating the reaction to the COVID-19 epidemic announcement in the frontier market like the Bangladeshi stock market.

2.0 Literature Review

Over time, scholars have led several studies and researches for establishing diverse theories, for example, the efficient market hypothesis (EMH), to explain the financial markets environment bearing in mind investors as rational. However, it fails to explain some occurrences that have an impact on investor's stock preferences. Behavioural finance asserts that individuals may not constantly be coherent rather they are humans who discover the irrationality of investors which often leads them to make unreasonable investment choices. Several empirical studies on many financial markets proved investment choices are not always taken on the customary finance theories, they also depend on financial behavioural factors (e.g., Baker & Wurgler,

2006; Baker & Wurgler, 2007; Caparrelli, D'Arcangelis & Cassuto, 2004; Chandra, 2008; Chaudhary, 2013; Fama, 1965; Fogel & Berry, 2006; Jokar & Daneshi, 2018; Shleifer, 2000; Waweru & Munyoki, E; Uliana, 2008).

Therefore, it is quite challenging, specifically ex-ante, to assess the market response towards the COVID-19 related announcements and has made it an empirical question to find out whether it is consistent with the EMH. The study used event study methodology to investigate the reaction of two negative announcements on the DSE stock returns. But when we tried to capture the effect of positive events, we failed to do that as DSE remained closed most of the time during that period because of strict lockdown. Next, we examine firm-level causative factors of abnormal return in response to these events using both univariate and multivariate analysis. In the univariate case, based on the premise that firms' ability to withstand a disastrous event may vary based on firms' size (Lanfear et al., 2019), profitability (Kaplanski and Levy, 2010), liquidity, and leverage, we explore the effect on different characteristic-sorted portfolios.

Since early 2020, researchers are increasingly exploring the effects of the coronavirus as it became a global health concern at that time but before the COVID-19 outburst, there was very little literature on the effect of a pandemic which includes the study of Ichev & Marinč (2018) or effect of a disastrous event on stock prices like Kaplanski & Levy (2010), Lanfear et al. (2019). However, a number of researchers (Albulescu, 2020; Baek et al., 2020; Corbet et al., 2020; Haroon et al., 2020; Zhang et al., 2020) conclude that across the markets there was a rise in total and idiosyncratic volatility and risk spill-over due to the COVID-19 pandemic. COVID-19 has had a noteworthy negative impact (Goodell & Huynh, 2020; Heyden & Heyden, 2020) on stock prices. Nature of stock price drop has been asymmetric throughout pandemic because of various factors like lower level of capital concentration and leverage (Alfaro et al., 2020), flexibility in terms of enabling remote working (Davison, 2020), degree of employee satisfaction (Shan & Tang, 2020), global exposure of the firm (Ramelli & Wagner, 2020), environmental and social rating (Albuquerque et al., 2020), financial flexibility to support cash flow shortfall (Fahlenbrach et al., 2020), among others.

The aviation, tourism, wholesale, and retail sectors reacted negatively towards the Severe Acute Respiratory Syndrome outbreak (Chen et al., 2009; Loh, 2006). Similarly, other studies showed a strong negative outcome of COVID-19 in the stock market performance and a substantial rise in the global financial market risk (Baker et al., 2020; Zhang et al., 2020). However, none of them identified the reaction of those specific two events adjacent to the epidemic on stock yields in the context of Bangladesh.

In several studies that analysed the reaction of stock prices to specific news or events, some mention worthy studies include Albulescu (2020) who analysed the response of stock prices to the new cases of contaminations and death ratio. Similarly, Heyden & Heyden (2020) researched the first death in a given country, Alfaro et al. (2020) and Ding et al. (2020) cited the effect of a cumulative number of stated cases/infections, and first definite case (Bretscher et al., 2020) on the stock price. But the reaction of pronouncements related to the COVID-19 outbreak on the stock price and the association between distinctive firm features has not been analysed with respect to the frontier market and it gave us an opportunity to analyse the reaction of Bangladeshi stock market as a frontier market and find to what extent it is resilient to responding to such global announcements.

Another rationale for this study is that prior studies largely emphasise the US and other developed financial markets only. Alfaro et al., (2020), Albuquerque et al. (2020), Albulescu, (2020), Baek et al., (2020), and Baker et al. (2020) selected the US for exploring the effect of COVID-19 on stock market returns as the USA had highest number of infections and deaths among other countries. On the other hand, Rahman et al. (2021), Rahman & Al Mamun (2021), Hassan et al. (2020), Ding et al. (2020), and Heyden and Heyden (2020), among others, analysed the European, Australian and Asia Pacific country stock prices and found a significant negative reaction to the announcement related to COVID-19 on the stock returns. Therefore, the reaction to the COVID-19 announcement on the frontier capital markets, more specifically Bangladesh capital market is still unknown and we expect this study will contribute to blocking this gap.

3.0 Data and Methodology

3.1 Data

Considering market capitalization as a base, 349 companies listed in the Dhaka Stock Exchange (DSE) have been used as samples for this event-analysis framework where we focus on two negative events dated: January 30, 2020 (declaration of COVID-19 as a public health emergency) and March 11, 2020 (declaration of COVID-19 as pandemic). These two announcements were made by the World Health Organization (WHO) in Geneva, Switzerland. Due to time zone differences, we consider the event date the immediate next trading day. We started with price data to calculate the abnormal return of available stocks in DSE. However, while matching with firm fundamental characteristics, we have 154 observations available.

3.2 Abnormal Returns

Using the standard market model, we estimate the abnormal returns following the event study literature (Lanfear, Lioui, & Siebert, 2019; Krüger, 2015) such as:

$$R_{i,t} = \alpha_i - \beta_i R_{M,t} \quad (1)$$

Then we calculated abnormal returns as follows:

$$AR_{i,t} = R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{M,t} \quad (2)$$

where $AR_{i,t}$ is the individual stock abnormal return, $R_{i,t}$ and $R_{M,t}$ are additional returns of individual stock and market index respectively, $\hat{\alpha}_i$ and $\hat{\beta}_i$ are calculated parameters from the standard market model. This approach helps to eliminate the correlation of specific stock returns with the market and thus splits the reaction of a specific stock to an event from that of its reaction to the market (Rahman & Al Mamun, 2021). The market model estimation period is 250 trading days, ending 50 days prior to the first event date. The three-month Treasury bill rate of the country is taken as the risk-free rate.

A point to be noted at this stage is that probable information drip before an event can lead to a price impact even before an event. Moreover, investors might underreact to that event due to their lack of reasoning aptitude which may lead to a deferred reaction of stock price to an event. To capture these, CAR (cumulative abnormal return) is estimated by combining abnormal returns around the event dates (if an event date is defined as t = 0, CAR for a 3-day window is the sum of abnormal returns from t = -3,…..,0,….,3) has been used in this study. To reduce the confounding effect of the other event (although the literature often calculates CAR up to 30 trading days), we restrict the estimation up to 7 trading days before and after an event date. Afterward, for a particular sample, the cumulative average abnormal return (CAAR) is estimated to identify the potential impact of an event on stock prices. The statistical significance of CAAR for each event and each window period (for example, -3 to +3) is tested using the cross-sectional t-test. For robustness, we have also estimated the abnormal returns based on the Fama-French multifactor model.

Table-1 : Event Particulars

Event dates	Event description
30/01/2020	COVID-19 is declared a public health emergency.
11/03/2020	COVID-19 is declared a pandemic

Source: World Health Organization (WHO) COVID-19 timeline (see, https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline).

To categorize the causative factors of the realized CARs, we estimate the following regression model following Rahman and Al Mamun (2021):

$CAR_i = \gamma_0 + \gamma_1 SIZE + \gamma_2 LEVERAGE + \gamma_3 LIQUIDITY + \gamma_4 PROFITABILITY + \varepsilon_i$ (2)

Where CAR_i is the cumulative abnormal returns for different window periods. The independent variables are idiosyncratic firm characteristics that are chosen from the literature (Kolaric and Schiereck, 2016; Krüger, 2015) and as used by Rahman and Al Mamun (2021). See notes to Table-4 for further details. Here SIZE is the log of total assets, LEVERAGE is total debt as a percentage of total assets, LIQUDITY is cash and short-term investment scaled by total assets, and PROFITABILITY is net income as a percentage of total assets.

To explore the determinants of abnormal returns, we first observe whether there is any variation in the firms' stock return response to a global pandemic based on different firm-specific causative factors such as size, profitability, liquidity, and leverage. Small-cap firms are typically marginal firms that exhibit poor performance, high financial leverage, cash flow difficulties, operating inefficiencies and low market value (Chan & Chen, 1991). Therefore, small-cap firms may find it more difficult to survive a hostile event than large-capitalization firms, hence, the response of small-size firms may be more concentrated compared to that of a large-size firm. In line with this argument, Lanfear et al. (2019) show that although both small and big firms suffer the effects of hurricanes in the US, microcap firms suffer noticeably from extreme weather events. Kaplanski and Levy (2010) report that the effect of an aviation disaster in small and riskier stocks and firms that belong to more volatile industries is higher compared to that in large and less risky stocks.

The stock return responses to the COVID-19 related announcements can also be shaped by firms' profitability. A larger pre-crisis profit makes a firm more resilient to the pandemic's potential impact on sales, cost, financing and liquidity constraints. Based on this argument, we hypothesize that stocks of less profitable firms show a greater price decline in reaction to the pandemic. Ding et al. (2020) report that firms with larger profits showed better stock price responses to COVID-19 compared to the firms that are otherwise similar.

At this point, based on previous empirical literature and corporate finance theories, the causative firm-level variables are identified. For example, cash flow difficulties and operating inefficiency may cause small firms to respond more intensely to a disastrous event compared to that of big firms (Lanfear et al., 2019; Albuquerque et al., 2019). It is also found by Alfaro et al. (2020), Ding et al. (2020), and Bretscher et al. (2020) that a firm with higher profit, higher cash holding, and low leverage may show more resilience to the pandemic as there is probability that pandemic will increase cost, reduce corporate sales, and impose financing and liquidity constraints. Further, a firm with a good liquidity position is well-placed to deal with any potential negative cash flow implications associated with the COVID-19 crisis. Therefore, a more liquid firm may exhibit higher stock market returns compared to less liquid firms (Ramelli & Wagner, 2020).

4.0 Empirical Results

We have presented our empirical results in two parts. First, the cumulative average abnormal returns (CAAR) surrounding the pandemic announcements are presented in the first part. The second part shows empirical findings and discussion on the cross-sectional causative factors of the abnormal returns.

4.1 Cumulative Average Abnormal Returns (CAAR)

The CAAR of DSE for different event windows related to the WHO announcement of COVID-19 as a public health emergency and pandemic are presented in Table-2. Markel model based and multi-factor model based CARRs respectively are presented in panel A and panel B of Table-2. The result in panel A shows that the announcement of Covid-19 as a public health emergency on 30th January 2020 had a substantial positive impact on the stock returns of Bangladesh. This is interesting as most of the Asia-Pacific countries has a significant decline during this announcement period. It indicates that the Bangladesh capital market does not go with the flow of negative impact of the health emergency announcement as other countries follow. This is not unusual as the infections and deaths related to Covid-19 are not pronounced in Bangladesh during the first wave of its effect in comparison to other developed and Asia-pacific countries in the world. Since the average market capitalization is BDT 3,408 billion, average market capitalization is increased during the health emergency announcement is BDT 85 billion (considering [-5,5] event window).

The announcement of Covid-19 as an epidemic on 11 March 2020 has also a positive impact on stock returns only in the [-5, 5] and [-7, 7] event window. It shows that there is no significance in the [-1, 1] and [-3, 3] event window. This mixed evidence is not surprising, as Covid-19 infections are increasing during that time period. However, the investor reactions related to the announcement may not be as influential as other developed markets, due to the information processing delay. Investors in the Bangladeshi capital market are more focused on national announcements rather than international announcements. Except for the textile industries, most of the industries are operating on the basis of domestic demands. As companies are relying less on the international market, the impact of the pandemic announcement will not be as substantial as it is for developed markets in the world. The same outcomes have been observed during the global financial crisis period.

Table-2 : Event window cumulative average abnormal return (%) during the announcement

	CAAR[-1,1]	CAAR[-3,3]	CAAR[-5,5]	CAAR[-7,7]
Panel A: Market Model				
30.01.2020	0.8699%***	1.4162%***	2.5134%***	2.1082%***
	(0.0005)	(0.0002)	(0.0001)	(0.0002)
11.03.2020	-0.19%	0.27%	1.1320%**	1.7678%***
	(-0.4406)	(0.5324)	(0.0236)	(0.0021)
Panel B: Multi-Factor model				
30.01.2020	0.79%***	1.39%***	2.61%***	1.99%***
	(0.0012)	(0.0002)	(0.0000)	(0.0003)
11.03.2020	-0.7441%***	1.4706%***	0.65%	1.4377%***
	(-0.0019)	(0.0001)	(0.1554)	(0.0074)
Note[3]				

Our finding shows a diverse reaction to the COVID-19 announcements on stock returns in diverse event windows. The EMH depicts that first-hand information should be instantaneously reflected in share price. Thus prices of firm should not change intentionally in the post-announcement period. We, still, note a statistically insignificant effect of pandemic announcements on the [-1, 1] and [-3, 3] event window and the CAARs in the following event windows are also stereotypically statistically significant which might be the results of under-reaction to the announcements from investors' point of view.

In Panel B, we have tested the impact of two announcements of WHO using the Fama-French multi-factor model. The results are qualitatively similar to the results in panel A. It indicates that our results are robust to the use of different model specifications for calculating CAARs. Overall, the results imply that the DSE stock markets reacted more to the country-specific events rather than the global outbreak announcements.

4.2 Determinants of Abnormal Returns-Univariate Analysis

In this section, we present results relating to the univariate analysis of the determinants of abnormal returns. More specifically, based on different firm

[3] This table presents the CAAR for [-1, 1] to [-7, 7] event windows. Details of events are presented in Table-1. Cross-sectional t-test is used to test the statistical significance of CAAR. *, **, *** denote statistical significance at the 10%, 5% and 1% level, respectively.

characteristics such as size (market capitalization), profitability (Return on assets), leverage (Debt to equity ratio), and liquidity (Cash to total assets), we examine whether firms' stock price response to a global pandemic varies. Table-3 and Table-4 respectively present CAARs for the characteristic-sorted portfolios for the 1st and 2nd Covid-19 WHO announcements. Although we calculate CAARs for five quintile portfolios for each portfolio characteristic, we only report CAARs for the highest and lowest quintiles to conserve space.

We first concentrate on Table-3. As we focus on the size-sorted portfolios, we observe that the 1st announcement had a statistically significant positive impact on the stock return of the smallest quintile portfolio in the 5-day and 7-day window period. However, the large stock portfolio appears to be more negatively impacted by this announcement. For example, the CAARs range between -1.37% to -1.78% respectively for 3-day and 5-day event windows for the large stock portfolio which are all statistically significant. However, the CAARs are much higher (-2.99% to -3.07%) for the smallest portfolio and they are statistically significant at the conventional level. Overall, the greater decline in prices of large stocks (represented by a larger negative CAAR) compared to that of small stocks is consistent with our frontier market expectation. However, this result may not be in line with Lanfear et al. (2019), Kaplanski and Levy (2010), and Albuquerque et al. (2020), among others, who show that small stocks are more vulnerable to a crisis/disaster.

As we focus on the profitability-sorted portfolios, we find results consistent with our prior theoretical expectations. Most profitable stocks appear to be less vulnerable to the negative news relating to the first announcement. For instance, the CAAR is positive and statistically significant for the high-ROA portfolio (most profitable) while the CAAR is insignificant for the low-ROA portfolio (least profitable). This result holds for 5-day and 7-day event windows. However, the CAARs for the low-ROA portfolios are not statistically significant.

Overall, our result of an increase in stock prices (positive CAAR) for more profitable stocks compared to that of less profitable stocks supports the theoretical argument that profitable firms are more resilient to a pandemic due to their greater ability to withstand a decline in sales, increase in cost and liquidity constraints induced by the pandemic. Therefore, profitable firms show smaller increases in stock prices. Our result is consistent with Ding et al. (2020).

With regard to leverage, we do not find any statistical significance based on high and low debt-to-equity ratios. Although firms with high leverage are more constrained to raise funds during the pandemic situation, this argument may not be suitable for the starting period of the pandemic. During the beginning of the pandemic, firms may not realize the requirements of funding for the upcoming situation.

Finally, about the liquidity sorted portfolios, we find significant positive CAAR for the low-liquid firms. It indicates that at the beginning of the pandemic, the low-liquid firms outperformed in the stock returns.

Table-3 : CAARs of characteristic-sorted portfolios based on the pandemic announcement on 30.01.2020

	CAAR(-1,1)	CAAR(-3,3)	CAAR(-5,5)	CAAR(-7,7)
Size				
Large	-0.0036	-0.0137**	-0.0122	-0.0178**
	(-0.4008)	(-0.0224)	(-0.1480)	(-0.0452)
Small	0.0025	0.0069	0.0299**	0.0307**
	(0.7385)	(0.4771)	(0.0425)	(0.0478)
Profitability				
Most	-0.0010	0.0029	0.0260*	0.0343**
	(-0.8481)	(0.7647)	(0.0792)	(0.0178)
Least	0.0040	0.0084	0.0087	-0.0001
	(0.5747)	(0.2583)	(0.3900)	(-0.9905)
Leverage				
High	0.0034	-0.0054	-0.0012	-0.0061
	(0.5155)	(-0.4271)	(0.9137)	(0.6160)
Low	0.0037	0.0054	0.0155	0.0206
	(0.4362)	(0.5917)	(0.2796)	(0.1402)
Liquidity				
High	0.0088*	-0.0087	0.0141	0.0114
	(0.0563)	(-0.1822)	(0.1786)	(0.2713)
Low	0.0128	0.0217**	0.0267**	0.0081
	(0.1117)	(0.0221)	(0.0411)	(0.5445)
Note[4]				

We now focus on the second event CAARs of different characteristic-sorted portfolios for four different event windows (Table-4). As we look at the CAARs of size-sorted portfolios, we find statistically insignificant CAARs indicating that prices

[4] This table presents CAAR for different event windows and for different characteristic-sorted portfolios. Size, profitability, leverage, and liquidity are considered as the characteristics. Quintile portfolios are constructed based on these characteristics and respective CAARs are calculated. The event date is 30th January, 2020. Cross-sectional t-test is used to test the statistical significance of CAAR. *, **, *** denote statistical significance at the 10%, 5% and 1% level, respectively.

of the stocks in the largest and smallest quintiles were invariant to the announcements of the WHO pandemic announcement. With regard to the profitability-sorted portfolios, CAARs are statistically significant and negative for the most profitable stocks. Most profitable stocks appear to be vulnerable to the negative news relating to the pandemic announcement. For instance, the CAAR is negative and statistically significant for the high-ROA portfolio (most profitable) while the CAAR is insignificant for the low-ROA portfolio (least profitable). Similar to the first negative event announcement, we do not find any significance for leverage-sorted portfolios. However, we do find similar evidence for liquidity-sorted portfolios related to the pandemic announcement by WHO.

Table-4 : CAARs of characteristic-sorted portfolios based on the pandemic announcement on 11.03.2020

	CAAR(-1,1)	CAAR(-3,3)	CAAR(-5,5)	CAAR(-7,7)
Size				
Large	-0.0091	0.0007	0.0035	0.0177
	(-0.1156)	(0.9530)	(0.7289)	(0.1810)
Small	0.0044	0.0159	0.0447*	0.0344
	(0.6019)	(0.4115)	(0.0531)	(0.1447)
Profitability				
Most	-0.0068	-0.0324**	-0.0236*	-0.0304**
	(-0.4408)	(-0.0169)	(-0.0602)	(0.0143)
Least	-0.0014	0.0167	0.0295	0.0370**
	(-0.8228)	(0.4991)	(0.1306)	(0.0353)
Leverage				
High	-0.0012	-0.0012	0.0102	0.0316
	(-0.8851)	(-0.9364)	(0.5656)	(0.1174)
Low	-0.0054	-0.0061	-0.0153	-0.0056
	(-0.5009)	(-0.7022)	(-0.2510)	(-0.6832)
Liquidity				
High	0.0016	-0.0162	-0.0174	-0.0149
	(-0.8400)	(-0.5387)	(-0.4371)	(-0.4856)
Low	-0.0070	0.0334*	0.0372*	0.0416**
	(-0.3170)	(0.0940)	(0.0681)	(0.0499)
Note[5]				

[5] This table presents CAAR for different event windows and for different characteristic-sorted portfolios. Size, profitability, leverage, and liquidity are considered as the characteristics. Quintile portfolios are constructed based on these characteristics and respective CAARs are calculated. The event date is 11th March, 2020. Cross-sectional t-test is used to test the statistical significance of CAAR. *, **, *** denote statistical significance at the 10%, 5% and 1% level, respectively.

To summarize, the first announcement negatively affected the largest quintile portfolio in a statistically significant manner and they either came out to be vulnerable to the pandemic or slowly absorbed higher stock price drops. However, lower liquid firms generated positive CAARs during the WHO announcement event window indicating that the WHO announcements failed to affect the investors' confidence in the Bangladesh capital market.

4.3 Determinants of Abnormal Returns-Multivariate Analysis

Through the univariate analysis, we get some evidence of what factors may drive the CAAR. However, to get a clear picture, in this section, we perform a cross-sectional regression analysis to find out the firm-level drivers of CAAR. We first regress the CAAR of [-5, 5] window period on the firm-level characteristics variable. The results are presented in Table-5 from Model-1 to Model-5.

Table-5 : Firm-level operating variables and abnormal returns on 30th January 2020

	Dependent variable: Cumulative abnormal returns				
VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
Size	-0.00561***				-0.00514**
	(-0.00210)				(-0.0023)
Liquidity		-0.0176			-0.0389
		(-0.0438)			(-0.0453)
Leverage			-0.027		-0.024
			(-0.0175)		(-0.0191)
ROA				-0.00223	-0.000105
				(-0.0294)	(-0.0307)
Constant	0.144***	0.0210***	0.0307***	0.0190***	0.148***
	(-0.0482)	(-0.0072)	(-0.0107)	(-0.0064)	(-0.0508)
Observations	154	151	148	154	145
R-squared	0.043	0.001	0.016	0.024	0.054
Note[6]					

[6] This table presents results of a regression model of this form $CAR_{i,[\tau_1,\tau_1]} = \gamma_0 + \mu_i X_i + \delta_i + +\varepsilon_i$ where $CAR_{i,[\tau_1,\tau_1]}$ is for the [-5,5] day window period. X_i includes firm specific operating variables. Industry fixed effects is presented by δ_i. *, **, *** denote statistical significance at the 10%, 5% and 1% level, respectively. Robust standard error of estimates are shown in the parentheses.

The result in Table-5 shows that there is a statistically significant negative association between size and CAARs with regard to WHO health emergency announcement. The expected positive relationship between size and profitability with the abnormal returns turns out to be rejected as the negative coefficient of size depicts that shareholders may have treated bigger firms as less flexible and overstrained with productive aptitude and reprimanded more during the COVID-19 crisis situation.

Table-6 : Firm-level operating variables and abnormal returns on 11th March 2020

	Dependent variable: Cumulative abnormal returns				
VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
Size	-0.000142				-0.000218
	(-0.00355)				(-0.00304)
Liquidity		-0.251***			-0.261***
		(-0.0577)			(-0.0603)
Leverage			0.00868		-0.0366
			(-0.0283)		(-0.0254)
ROA				-0.0382	-0.00993
				(-0.0474)	(-0.0409)
Constant	0.016	0.0293***	0.00902	0.0155	0.0538
	(-0.0796)	(-0.00958)	(-0.0173)	(-0.0103)	(-0.0676)
Observations	154	151	148	154	145
R-squared	0.043	0.113	0.001	0.004	0.122
Note[7]					

Table-6 shows the results correspond to the cross-sectional regressions based on the WHO pandemic announcement event. Here, we find that the liquidity of the firm is negatively associated with CAARs during the pandemic announcement event window and thus does not support the results of Ramelli and Wagner (2020), and Albuquerque et al. (2020) (among others of the developed countries) that cash-cow firms are more resilient to pandemic-related stock price decline, though we do not prove the same justification in case of the WHO announcements window.

[7] This table displays results of following regression model $CAR_{i,[\tau_1,\tau_1]} = \gamma_0 + \mu_i X_i + \delta_i + +\varepsilon_i$ where $CAR_{i,[\tau_1,\tau_1]}$ is the cumulative abnormal returns for the [-5,5] day window period. X_i includes firm specific operating variables. Industry fixed effects is presented by δ_i. *, **, *** denote statistical significance at the 10%, 5% and 1% level, respectively. Robust standard error of estimates are shown in the parentheses.

Table-7 : Firm-level operating variables and quarterly abnormal returns

	Dependent variable: 1st quarter cumulative abnormal returns				
VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
Size	-0.00324				-0.00225
	(-0.0066)				(-0.00635)
Liquidity		-0.486***			-0.467***
		(-0.126)			(-0.126)
Leverage			0.00769		-0.0443
			(-0.0499)		(-0.0531)
ROA				-0.0599	-0.0143
				(-0.0883)	(-0.0854)
Constant	0.126	0.0973***	0.0437	0.0581***	0.161
	(-0.148)	(-0.0209)	(-0.0305)	(-0.0192)	(-0.141)
Observations	154	151	148	154	145
R-squared	0.002	0.091	0.032	0.003	0.092

Note[8]

As robustness, we have also run the cross-sectional regressions for the CAARs of the first quarter of 2020. The results are presented in Table-7. The results of Table-7 are qualitatively similar to the results of Table-6. It indicates the higher liquid firms performed negatively during the first quarter of 2020 when the WHO pandemic announcements were declared. Large size may have a negative relation with CAAR as shareholders may have treated bigger firms as less flexible and overstrained with the productive aptitude and reprimanded more during the COVID-19 crisis. However, this relationship only existed on January 30, 2020. For the whole quarter, this relationship does not exist. This indicates that investors may overreact to the January 30 news where else they corrected during the quarter.

The first quarter of 2020 was marked by significant global economic challenges primarily due to the outbreak of the COVID-19 pandemic. The pandemic led to widespread uncertainty, disruptions in supply chains, business closures, and a sharp decline in consumer demand. The adverse effects of the pandemic on financial markets and businesses were widespread, influencing both liquid and illiquid firms.

[8] This table shows results of a regression model $CAR_{i,[\tau_1,\tau_1]} = \gamma_0 + \mu_i X_i + \delta_i + +\varepsilon_i$ where $CAR_{i,[\tau_1,\tau_1]}$ is the cumulative abnormal returns for the 1st quarter. X_i includes firm specific operating variables. Industry fixed effects is presented by δ_i. *, **, *** denote statistical significance at the 10%, 5% and 1% level, respectively. Robust standard error of estimates are shown in the parentheses.

However, there are a few reasons why higher liquid firms, or those with more easily tradable assets, might have faced negative performance during this period:

In times of crisis, investors often engage in panic selling, leading to a sharp decline in asset prices. This can result in a liquidity crunch, even for liquid assets, as the selling pressure overwhelms the market's ability to absorb the transactions.

The COVID-19 pandemic presented a significant systematic risk as it affected various sectors globally. Liquid assets are not immune to systematic risks, and broad market movements can affect their prices.

It is important to note that while liquidity can provide some degree of flexibility, it does not make assets immune to market downturns or economic crises. The severity of the market impact during the first quarter of 2020 was largely driven by the unprecedented nature of the global pandemic and the resulting economic challenges.

5.0 Conclusion

This paper investigates the effect of COVID-19 pandemic announcements and their firm-level determinants on the Bangladeshi capital markets. These investigations are valuable as the COVID-19 pandemic, a natural exogenous shock, offers a true platform to explore the determinants of firm value subject to a severe contagious outbreak around the globe. Examining this research objective in the context of Bangladesh capital markets can be motivating as Bangladesh was not among the most affected nations in terms of social costs (for instance, number of deaths, number of infections, social unrest) of the pandemic in comparison to China, India, USA and European countries. Further, Bangladesh is within close proximity to the primary epicentre of the pandemic (Wuhan, China) which can affect its stock prices' reaction to the pandemic.

Using an event-study methodology, at first, we tried to find out the reaction to the international health emergency and global pandemic announcements of COVID-19 and then we considered univariate and multivariate cross-sectional analysis using pre-COVID firm-specific characteristics to explain cross-sectional abnormal returns generated by the companies in response to the events. The announcement of Covid-19 as a public health emergency on 30th January 2020 has a significant positive impact on the stock returns of Bangladesh. This is interesting as most of the Asia-Pacific countries has a significant decline during this announcement period (Rahman & Al Mamun, 2021). The announcement of Covid-19 as a pandemic on 11 March 2020 has also positive impact on stock returns only in the [-5, 5] and [-7, 7] event window. It also shows that there is no significance in the [-1, 1] and [-3, 3] event window. It implies that the Bangladesh capital market does not go with the flow of negative impact of the health emergency announcement as other countries follow. This is not rare as the infections and deaths related to Covid-19 are not pronounced in Bangladesh during the first wave of its effect in comparison to other developed and

Asia-pacific countries in the world. The investor reactions related to the announcement may not be as influential as other developed markets, due to the information processing delay. In a nutshell, the results imply that the country-specific events affected DSE stocks more rather than the global outbreak announcements. Analysing the characteristics-sorted portfolios during these two announcements, we find evidence that most profitable and less liquid stocks appear to be less vulnerable to the negative news relating to the pandemic. Finally, our cross-sectional regression analysis depicts that higher liquid firms performed negatively during the first quarter of 2020 when the WHO pandemic announcements were declared.

The outcome of this paper has significant policy implications in relation to investors' portfolio choices, management corporate decisions, and the government's strategic role in stabilizing unexpected vulnerability in the capital market during a global pandemic. The usage of the Book-to-Market (BM) ratio as a determinant of cross-sectional stock return created a scope for future research.

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