Received 30 August 2020
Revised 16 February 2021
1 August 2021
26 January 2022
Accepted 18 May 2022

Stock market reactions of Malaysian firms and industries towards events surrounding COVID-19 announcements and number of confirmed cases

Redhwan Aldhamari and Ku Nor Izah Ku Ismail
Tunku Puteri Intan Safinaz School of Accountancy, Universiti Utara Malaysia (UUM) Sintok, Sintok, Malaysia, and

Haithm Mohammed Hamood Al-Sabri and
Mousa Sharaf Adin Hezam Saleh
Department of Finance and Banking Science, Ibb University, Ibb, Yemen

Abstract

Purpose – This paper aims to examine the stock market reactions of firms and industries in Malaysia to the government's COVID-19 movement control order (MCO) announcement. As China is Malaysia's leading trading partner, the authors also observe if the Chinese Government's confirmation of human-to-human coronavirus transmission affects firms' stock market reactions. In addition, this study examines whether the Malaysian Government's ease of restrictions on economic activities affects firms' stock market reactions. Finally, this study analyses the effect of COVID-19 number of confirmed cases on firms' abnormal returns.

Design/methodology/approach – This study uses an event study methodology to determine the abnormal returns between day −30 to day 30 of the announcements. In addition, this study uses the regression estimation to determine whether the COVID-19 number of confirmed cases explain the abnormal returns.

Findings – This study finds that investors react negatively to the announcement of the MCO and confirmation of the human-to-human transmission of coronavirus over the event windows. However, the cumulative average abnormal returns (CAARs) started to recover when stimulus packages were introduced, and the lockdown measures were eased, allowing businesses to reopen. This study also finds that only firms in the health-care sector reported significant positive CAARs. Stock returns of the utilities and telecommunication firms showed no changes, while eight other sectors fell remarkably. The results also show that the COVID-19 number of confirmed cases adversely affects firms' abnormal returns.

Practical implications – This study suggests that stock prices incorporate bad and good news surrounding the announcements of major international and local events related to the COVID-19 pandemic. Thus, investors should consider such factors in making investment decisions.

Originality/value – To the best of the authors' knowledge, this paper is one of the early research works investigating the stock market reactions to the COVID-19 major announcements (MCO, human-to-human transmission and ease of restrictions on economic activities) using an event study methodology in an

JEL classification – G11, G14

The authors gratefully acknowledged the constructive comments and suggestions of anonymous reviewers that improve the quality of the paper from its earlier version. All usual disclaimers apply.

Funding: The authors received no financial support for conducting this research work.

Disclosure statement: On behalf of all authors, the corresponding author states that there is no conflict of interest with respect to the research, authorship and/or publication of the paper.

Pacific Accounting Review
Vol. 35 No. 3, 2023
pp. 390-411

0114-0582
DOI 10.1108/PAR-08-2020-0125

emerging market, namely, Malaysia. This study is timely in light of the recently increasing calls for researchers to analyse the potential economic impacts of COVID-19 on global capital markets, especially in emerging markets whose evidence is scarce.

Keywords Malaysia, Event study, COVID-19, Cumulative average abnormal returns, Industry stock performance

Paper type Research paper

1. Introduction

In recent years, the world has witnessed an increasing number of contagious diseases that threaten human health and lives, including the N1H1, SARS, MERS, Ebola and Zika virus. In addition to having a social influence, such fatal infectious diseases have caused a tremendous negative impact on the economy worldwide. Neglecting them has led to heavy financial losses in some countries (Chen *et al.*, 2007; Zhang *et al.*, 2009; Wang *et al.*, 2013). One dreaded disease that shocked the world in 2020 is the coronavirus, widely known as COVID-19 [1].

The first case of COVID-19 was reported in Wuhan, China, on 31 December 2019, by the World Health Organization (WHO) (available at: www.who.int/emergencies/diseases/novel-coronavirus-2019). The news of the new contagious disease began to spread when on 20 January 2020, the National Health and Fitness Commission of People's Republic of China high-level expert group leader, Zhong Nanshan, suggested that the virus could be transmitted among people. Ten days later, the WHO issued a global alert about COVID-19 due to the virus' rapid spread. As a result, on 11 March 2020, the WHO declared COVID-19 a pandemic. In Malaysia, the first case of COVID-19 was reported on 25 January 2020 after three Chinese nationals entered the country through Singapore. They were in close contact with an infected person in Singapore.

COVID-19 is not only a public health crisis that results in a dramatic loss of lives. It is also a tragedy that leads to severe economic misfortune worldwide. The rapid spread of coronavirus inside and outside China has increased the number of infected people by the virus. For instance, on 26 June 2020, the total number of COVID-19 confirmed cases was 2,367,064 in the USA; 1,188,631 in Brazil; 307,984 in the UK; 239,709 in Italy; and 85,148 in China (available at: www.who.int/emergencies/diseases/novel-coronavirus-2019). Liu *et al.* (2020) argue that although the fatality rate of COVID-19 is considered low compared to similar types of viruses, its infection rate is relatively high. With respect to economic implications, person-to-person transmissions and perceived risk of COVID-19 outbreak are significant factors that shape investors' sentiments towards the virus, which eventually lead to a substantial impact on stock markets (Mishra and Mishra, 2021). Bad news coupled with anxiety and uncertainty emanated from the COVID-19 outbreak affect investors' sentiment against risk-taking. The situation temporarily increases investors' fear of trading as they will be more pessimistic regarding future returns. The ambiguity and fear of death may lead to short-term investors' overreactions. Sharif *et al.* (2020) suggest that investors' perception of coronavirus risk is an irresistible driver of US economic anxiety, economic policy uncertainty and stock market behaviour.

Some researchers and experts compare the Global Financial Crisis (GFC) of 2007–2008 and the crisis of other infectious diseases with the COVID-19 crisis and conclude that the COVID-19 shock is severe. It has more financial and economic implications. For example, Harvey (2020) differentiates between the GFC and COVID-19 crisis and points out to COVID-19 pandemic as the "Great Compression". Sansa (2020) argues that, unlike the GFC, the COVID-19 crisis affects the whole world as the virus has led to complete closures of many countries around the globe.

Baker *et al.* (2020) report that coronavirus has resulted in the highest stock market volatility in the USA among all recent infectious diseases. According to World Bank Group President David Malpass:

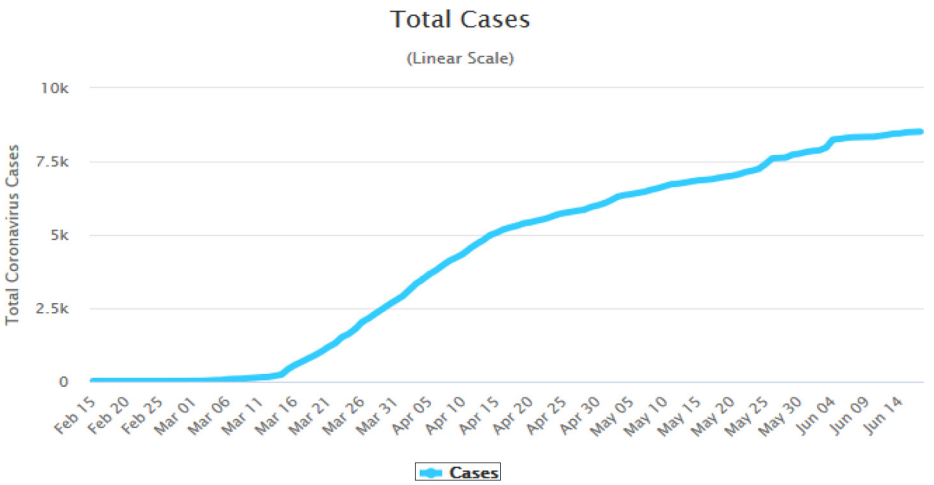
> [. . .] the scope and speed with which the COVID-19 pandemic and economic shutdown have devastated the poor around the world are unprecedented in modern times. Current estimates show that 60 million people could be pushed into extreme poverty in 2020. These estimates are likely to rise further, with the reopening of advanced economies the primary determinant [2].

In attempts to contain the spread of the virus, countries worldwide, including Malaysia, have implemented several containment measures, such as social distancing, mobile software applications for digital contract tracing (MySejahtera in Malaysia), lockdowns (known as MCO in Malaysia) and travel bans. The main objective of this study is to examine how stocks of Malaysian firms react to the government's announcement of the COVID-19 first movement control order (MCO), both at the firm and industry levels. While on the one hand, the MCO was an effective measure to curb the spread of COVID-19, on the other hand, it affected the economy severely. During the MCO, businesses deemed non-essentials had to be closed, impacting not only the small- and medium-sized enterprises (SMEs) but also large and listed firms.

In April 2020, Malaysia suffered a trade deficit of RM (Ringgit Malaysia) 3.5bn, and during the MCO, incurred a loss of RM2.4bn a day. Thus, it is interesting to examine the effect of the MCO on firms' abnormal returns. We also examine the abnormal returns at the industry level since the pandemic badly hit some industries while others remained healthy. For example, the country's tourism industry suffered a loss of RM45mn in tourist expenditure during the MCO.

Next, since China is the origin of COVID-19 and is Malaysia's leading business partner, we observe the Malaysian stock market reactions towards the Chinese government's declaration of the human-to-human transmission of the virus. In addition, we observe firms' stock market reactions to the Malaysian Government's announcements of the lifting of restrictions on economic activities. Finally, this research determines whether the COVID-19 number of confirmed cases influences firms' abnormal returns.

Our study focuses on the Malaysian stock market for several reasons. First, although only a few cases were discovered in mid-March 2020, the number started to grow remarkably by the end of March (see Figure 1). According to the Ministry of Health Malaysia (MoH), the number of confirmed cases rose to 8,616 by 28 June 2020. This is an alarming figure considering the country's population is only about 32 million, and the number of cases is expected to grow. Second, the Malaysian economy is highly subjected to Chinese demand and supply. China is Malaysia's number one trading partner, a significant source of foreign investments and a key source of tourists (Cheng, 2020). It will be even more damaging for Malaysia as the country is not simply a small, open economy with a heavy reliance on trade, but much of the trade is also tightly linked to global supply chains. In Malaysia, over 82% of large companies and over half of all small- and medium-sized businesses are involved in global value chains that are China-centric. As a result, China's supply chain disruptions will severely impact Malaysian exports (Cheng, 2019). Besides, the tourism industry was the first to be impacted; during the first three quarters of 2019, over 10 million visitors from China and Singapore visited Malaysia. In early 2020, over 170,000 hotel room bookings worth RM68m were cancelled, most of which were from China (Lee *et al.*, 2020). Therefore, the strong mutual trade dependence between Malaysia and China and the tourism industry reliance on China visitors may have a severe impact on the Malaysian economy and the stock market. It has been argued that financial markets become more



Source: Available at: www.worldometers.info/coronavirus/country/malaysia

Figure 1.
Total confirmed coronavirus cases in Malaysia

closely linked during the financial crisis (In *et al.*, 2002; Naeem *et al.*, 2021), and such linkages may influence global investors' decisions on asset allocation and economies of different countries (Kumari and Bharti, 2021; Siddiqui, 2009).

Third, the effect on Malaysia's economy is expected to be tremendous due to COVID-19's adverse impact on foreign direct investment (FDI), commodities and tourism, as well as domestic shocks stemming from travel bans and lockdown procedures enforced by the Malaysian government. According to the Department of Statistics Malaysia, the impact of COVID-19 on sectors such as tourism, FDI and supply chains and commodities, which include palm oil and oil and gas, could cost the country's economy RM5.9bn in 2020. Furthermore, Malaysia's gross domestic product is estimated to dwindle by 4.6% in 2020 (available at: www.dosm.gov.my/v1/index).

Fourth, governments of most countries around the globe have implemented several policies (e.g. lockdowns, strict quarantine policies, travel bans and social distancing practices) to cushion the ramifications of the pandemic. Travel bans and lockdowns are two main government containment policies to combat COVID-19 (Phan and Narayan, 2020). Malaysia was among the first countries to impose travel bans and lockdowns to contain the pandemic and deaths due to COVID-19.

Fifth, governments and central banks of many countries have come forward with their stimulus packages to restore investors' confidence in the financial markets. For instance, on 15 March 2020, the US Federal Reserve announced a US$700bn easing programme, and on 22 March 2020, the Australian Prime Minister announced a US$43bn coronavirus stimulus package (Rahman *et al.*, 2020). Similarly, in March and April 2020, the Malaysian Government has introduced an RM50bn fund for working capital loan guarantees to all COVID-19 affected businesses and RM10bn grants for the SMEs to combat the economic consequences [3]. Such an intervention to uphold the country's economy is likely to be positively perceived by investors who may be encouraged to make investments in the financial markets. Therefore, it would be interesting to see how the Malaysian stock market responds to and around a specific event such as COVID-19 MCO.

Even though numerous studies have examined the overall social, well-being and economic impact of COVID-19, to our best knowledge, studies investigating stock market

reactions to the pandemic are relatively scarce. Using an event study methodology, we contribute to this important research area by providing insights into how investors respond to dramatic news of the fatal disease, COVID-19. Furthermore, we contribute to market efficiency theory by providing empirical evidence of stock market reactions to COVID-19. Our paper also adds to the growing literature examining determinants of stock market reactions (see, for example, Narayan *et al.*, 2020; Vidya and Prabheesh, 2020; Orhun, 2020) by introducing COVID-19 number of confirmed cases as one factor that affects investors' investment decisions and abnormal returns in Malaysia.

Our study is closely related to Liu *et al.* (2020), who analyse the short-term influence of the COVID-19 outbreak on 21 leading stock market indices of major affected countries. However, we entirely focus on Malaysia to evaluate investors' reactions to such specific events as Malaysia is highly dependent on China for trading and tourism. Given that China market is one of the primary sources of a spillover effect to other markets and regions, we believe that the strong mutual trade dependence between Malaysia and China can heighten economic uncertainties, which eventually will weaken the stock market in Malaysia. Moreover, our paper is different from Liu *et al.* (2020); we use different event days and windows, which allow us to analyse whether market players would react differently during different time horizons concerning their investment decisions. Although Liu *et al.* (2020) examine country-level data to compute abnormal returns, our paper uses firm-level data to calculate the returns. Finally, unlike Liu *et al.*, we shed new light on the possible differential impact of COVID-19 MCO on the stock performance of different industries.

Another study that is closely linked to our research work is Lee *et al.* (2020), who performed regression analyses to test the impact of COVID-19 related variables (number of confirmed cases and number of deaths) on the stock performance of all stock market sectors in Malaysia. However, we differ from their study in that our paper uses an event study methodology to evaluate how investors behave towards major COVID-19 announcements. The event study methodology, introduced by Ball and Brown (1968), is one of the most popular and suitable methods to investigate the effect of a specific event on stock returns over an event period and has been used by numerous stock market studies worldwide. The method is based on the premise that a stock price incorporates all available information and future expectations. Therefore, the theory implies that the influence of a firm's event can be assessed by observing the impact on the firm's stock.

The recent emphasis on the potential economic impacts of COVID-19 and the increasing trend of countries upholding affected businesses to protect their economies make our paper worthwhile and timely. Our paper will be interesting for a vast range of market traders as their perceptions of COVID-19 risk will most probably impact stock market behaviour. Furthermore, this study is expected to shed light on the influence of COVID-19 on the stock performance of all listed companies, preparing policymakers and businesses for similar pandemics.

The rest of this paper is organised as follows. Section 2 reviews previous literature. Section 3 describes the data source and methodology used in this paper. Next, Section 4 discusses the empirical results of the main and additional analyses. Finally, Section 5 concludes the study.

2. Literature review

A relatively large stream of studies investigates the influence of the pandemic of infectious diseases on stock markets. A majority of the studies use market efficiency theory to analyse stock market reactions to specific events. Such events include the outbreak of SARS (Chen *et al.*, 2007; Nippani and Washer, 2004), Ebola (Del Giudice and Paltrinieri, 2017; Ichev and Marinč, 2018),

Zika (Macciocchi *et al.*, 2016) and recently COVID-19 (see among others, Al-Awadhi *et al.*, 2020; Alfaro *et al.*, 2020; Ding *et al.*, 2020; He *et al.*, 2020; Lee *et al.*, 2020; Xiong *et al.*, 2020).

Generally, previous studies show that disease outbreaks impact stock market reactions. Zhang *et al.* (2020) suggest that the coronavirus outbreak dramatically affects financial markets worldwide. It creates uncertainty and an unmatched level of risk, causing investors to suffer significant losses in a very short period. Corbet *et al.* (2020) study the effect of coronavirus on the return and volatility behaviour of stocks during the outbreak of COVID-19 and find that companies exhibit negative hourly returns after the announcement of the COVID-19 pandemic. Sharif *et al.* (2020) provide evidence of the significant short-term impact of COVID-19 on the US stock markets. In addition, previous studies have shown that the extent and direction of the effects can be influenced by factors such as industries, jurisdictions, number of confirmed cases and deaths, media coverage, and government policies such as stimulus packages, lockdowns and travel bans.

Pre-COVID-19 studies that concentrated on industries found that the hotel industry in Taiwan (Chen *et al.*, 2007) and mutual funds in Africa (Del Giudice and Paltrinieri, 2017) were badly affected by the outbreak of SARS and Ebola, respectively. During the pandemic, people were reluctant to travel due to infection, and a travel warning was issued in Taiwan and some countries, causing the hotel industry to suffer. Furthermore, as in the case of mutual funds in Africa, the huge media coverage of the Ebola outbreak impacted investors' behaviour, causing them to withdraw their savings from the mutual funds, which eventually reduced the equity capital injection into African stock markets. On the other hand, Wang *et al.* (2013) provide evidence that pre-COVID-19 infectious disease outbreaks positively impact biotechnology stock performance in Taiwan. The reason is that biotechnology helps protect an economy and its residents' health against any possible impact of a disease.

As far as the COVID-19 pandemic and industries are concerned, Al-Awadhi *et al.* (2020) reveal that information technology and medicine manufacturing sectors experienced higher returns than others during COVID-19 outbreak. In addition, He *et al.* (2020) provide evidence that the outbreak of COVID-19 hurts the transportation, mining, electricity, heating and environment sectors. On the other hand, the manufacturing, information technology, education and health-care sectors react positively to the pandemic. Similarly, Mazur *et al.* (2020) document that during the March 2020 stock market crash, stocks of firms in the health care, food, natural gas and software sectors experienced high positive returns. In contrast, firms operating in crude petroleum, real estate, entertainment and hospitality industries tumbled down considerably, losing more than 70% of their market capitalisation.

Ichev and Marinč (2018) evaluate whether the geographical proximity of information disseminated by the 2014–2016 Ebola outbreak and the widespread media coverage affect US stock prices. The findings show that the Ebola outbreak has a significant negative impact on firms' stock prices whose operations are exposed to the West African Countries (WAC) and the USA for events located in the WAC and the USA. The study also reports that the effect of Ebola is more substantial for stocks exposed to intense media coverage and more pronounced for smaller, liquid and more volatile stocks and less stable industries.

Some studies investigate the effect of infectious diseases on various stock markets and find that some are severely affected, while some are not. For example, Nippani and Washer (2004) investigate the effect of SARS on stock markets of Canada, China, Hong Kong, Indonesia, China, Singapore, the Philippines, Vietnam and Thailand. The study concludes that SARS only negatively impacted the stock market performance of China and Vietnam. Next, Macciocchi *et al.* (2016) analyse the impact of the outbreak of the Zika virus epidemic on the short-term economy of Brazil, Argentina and Mexico. They conclude that, except for Brazil, the other two Latin American and Caribbean countries' market indices did not record

negative returns the day after each shock. Subsequently, Topcu and Gulal (2020) empirically analyse the impact of COVID-19 on emerging stock markets. The results reveal that the adverse impact of coronavirus is the highest in Asian emerging markets, whereas it is the lowest in the European emerging markets.

Studies have also shown that government policies such as stimulus packages, travel bans and lockdowns would mitigate the effect of COVID-19 on market performance. For instance, Topcu and Gulal (2020) find that the impact of the pandemic is relatively smaller on all stock markets examined where stimulus packages are implemented instantly. Likewise, Phan and Narayan (2020) provide evidence that stock prices in the vast majority of 25 countries covered under their study dropped considerably during the early stages of the COVID-19 pandemic. Subsequently, the adverse market effects were mitigated when governments imposed travel bans and lockdowns to contain the spread of the disease and death and implemented stimulus packages to relieve the slowdown in economic activities.

As far as media coverage is concerned, Ambros *et al.* (2020) evaluate the effect of changes in the amount of COVID-19 news on stock markets in the USA, Asia and Europe during the initial two months of the pandemic. They find that changes in COVID-19 news do not affect stock markets return but significantly impact the volatility in both European and US markets during the first two months of the outbreak.

Rather than observing the impact of infectious diseases on stock returns during disease outbreaks, several studies examine market reactions towards the number of confirmed cases and deaths (Al-Awadhi *et al.*, 2020; Ashraf, 2020; Erdem, 2020; Lee *et al.*, 2020). Ashraf (2020) investigates the stock markets' reactions to the growth in COVID-19 confirmed cases and death in the international context. The study reports that stock market returns declined significantly as the number of confirmed cases increased, albeit responses to growth in deaths were not statistically significant. Erdem (2020) provides international evidence that the adverse effects of COVID-19 number of confirmed cases and deaths on stock market returns and volatilities are lower for freer countries than for less-free countries [4]. Al-Awadhi *et al.* (2020) report that both the total confirmed cases and total death cases caused by the pandemic adversely affect stock returns across all companies in China. Meanwhile, Lee *et al.* (2020) show that the number of confirmed cases adversely affected the performance of all industries in Malaysia, except the plantation and real estate investment sectors.

The shortcoming of the above literature is that the studies have paid less attention to the importance of the event study approach, which can be used to analyse how stock prices change during different pandemic window periods. Liu *et al.* (2020) use an event study methodology to examine the short-term economic consequences of the COVID-19 outbreak on 21 leading stock market indices in major affected countries worldwide. The study shows that the virus outbreak has a significant adverse influence on the stock market returns of all affected countries. Although some of them recover slightly in the later pandemic stage, countries in Asia report more negative abnormal returns than other countries during the outbreak of COVID-19. In the same vein, Huo and Qiu (2020) evaluate how China's stock market responded to the announcement of the pandemic lockdown. The authors observe, among other things, stock market reversals for industries with positive and negative CAARs in both the event and post-event windows. The reversals are stronger for stocks with lower institutional ownership. Rahman *et al.* (2020) find an average CAR of −4.39% in the event window (−5,5), resulting from the declaration of COVID-19 as a global pandemic. The market, however, reacts positively with an average CAR of 2.73% in response to the announcement of the Australian JobKeeper package.

As it is clear from the above discussion, there is limited research using event study methodology to investigate the effect of COVID-19 on stock prices in the existing literature,

and most of the studies have been conducted in developed markets (see, for example, Yong and Laing, 2020). In filling the literature gap, our study empirically explores the impact of COVID-19 on the stock performance of both companies and industries in Malaysia using event study methodology and regression analysis. Our study is one of the first research works that uses the event study methodology to analyse firm market performance and industry response to COVID-19 in an emerging market. A very limited number of studies consider Malaysian data to investigate stock market reactions to the outbreak of COVID-19 (Lee *et al.*, 2020; Liu *et al.*, 2020; Mishra and Mishra, 2021). However, none of these studies explores the responses of Malaysian firms from different industries to the coronavirus by using an event study approach.

3. Methodology

3.1 Data and sample of study

The starting point of the current study sample encompasses all publicly listed Malaysian firms whose data are available in the DataStream database in May 2020. Then, we remove firms for which the data required to compute abnormal returns are missing and companies delisted after the year 2019. We ended up with a final sample of 924 Malaysian listed firms. We obtain stock price and market return data from the DataStream database.

3.2 Event study setup

The event study methodology is widely applied to explain how stock markets react to information disclosure or specific events. For instance, Ismail and Manaf (2016), Campbell and Vera (2010); and Ding and Charoenwong (2013) investigate stock market reactions towards the appointment of women to corporate boards in Malaysia, Spain, and Singapore, respectively. Abdul Latif *et al.* (2014) study how the Malaysian stock market reacts to the announcements of actual share repurchases. Gaver *et al.* (1992) analyse market reactions to the adoption of top executive long-term compensation strategies. Furthermore, studies that examine the impact of the outbreaks of infectious diseases on the stock market performance include Liu *et al.* (2020), Wang *et al.* (2013); Alber (2020); and Huo and Qiu (2020). While Liu *et al.* (2020) and Alber (2020) focused on the impact of COVID-19 on developed markets and Huo and Qiu (2020) on the Chinese market, Wang *et al.* (2013) observed the effect of infectious diseases before COVID-19 in Taiwan. Following the literature, an event study methodology is used to analyse the stock performance of firms in Malaysia. According to the coronavirus news source in Malaysia, on 16 March 2020, the Prime Minister officially promulgated the MCO under the Prevention and Control of Infectious Diseases Act 1998 and Police Act 1967. Later, on 18 March 2020, the Malaysian government started to implement the MCO. Therefore, 16 March 2020, when the declaration of the MCO may cause markets shock, is chosen as the event day in this study. We use the market model to derive expected returns and evaluate the abnormal returns on the declaration of the MCO. The following market model associates the return of firm stocks to the return of the market portfolio:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

R_{it} is a stock return of firm i on day t, R_{mt} is the market return on day t, which is represented by the return on Kuala Lumpur Composite Index (KLCI), and ε_{it} is the error term. An estimated period covering 240 trading days prior to the event day are used to estimate the expected returns. An abnormal return is a difference between the actual return and the estimated expected return. The abnormal returns are analysed in the 61-day event window from day −30 to day 30. The declaration of the MCO is set to day 0 (see Figure 2). The abnormal return is computed as follows:

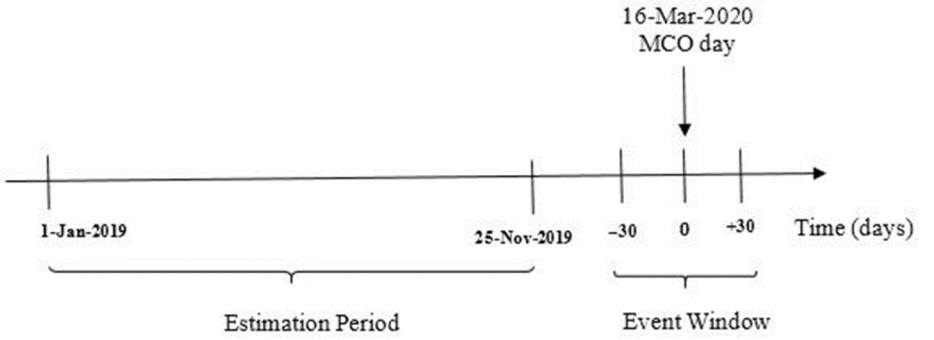


Figure 2.
Event study timeline

Source: The authors

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \tag{2}$$

where AR_{it} is the abnormal return of stock i on day t, and $\hat{\alpha}_i$ and $\hat{\beta}_i$ are the estimates of α and β generated from ordinary least square regressions. Average abnormal returns (AARs) of t days are calculated as:

$$AARt = \frac{\sum_{i=1}^{t} ARit}{N} \tag{3}$$

where $t = -30, -29, -28, \ldots\ldots\ldots, 0, \ldots\ldots, 28, 29, 30$, and N is total observations. Average abnormal return can be accumulated as follows:

$$CAAR(t0, t1) = \sum_{t=t0}^{t1} AARt \tag{4}$$

CAAR is the cumulative average abnormal return of all firms. Then, the conventional t-test is applied to analyse if the abnormal returns are statistically significant.

4. Empirical results

4.1 Announcement of movement control order – firm-level analysis

The AARs and CAARs for the event period from day −30 to day 30 of the MCO are presented in Table 1. Figure 3 displays the chart for CAARs for the same event period. Generally, significant negative abnormal returns are observed since day −30 of the MCO. The CAARs then stabilised for a few days and started to fall sharply on day −15 until day 5. Then, the CAARs generally increased until day 30; however, the loss is not fully recovered.

The results suggest that investors anticipate the potential impact of the coronavirus pandemic one month before the announcement of the MCO and react negatively. The reaction could be due to the pandemic's news that began to appear in the international media in January, which may cause investors in Malaysia to react negatively to such news very much earlier before the event day. Table 1 shows that the stock market reacts remarkably on the event day with an average abnormal return of −7.44%, compared to −1.68% on the previous day. The t-values show that the negative abnormal return is statistically significant at 0.01. In the following five days, the stock market experiences a more

Day	AAR	*t*-stat	CAAR
−30 (3 February 2020)	−0.0081	−4.7859***	−0.0081
−29	−0.0008	−0.4801	−0.0089
−28	0.0057	3.9333***	−0.0032
−27	0.0039	3.0238***	0.0007
−26	0.0027	1.5825	0.0034
−25	−0.0027	−1.6916*	0.0007
−20	0.0035	2.0945*	0.0100
−19	−0.0084	−5.6177***	0.0016
−18	0.0026	1.7796*	0.0042
−17	0.0018	1.0757	0.0060
−16	0.0002	0.1367	0.0062
−15	−0.0125	−9.0967***	−0.0063
−14	0.0011	0.7664	−0.0052
−13	−0.0013	−0.7486	−0.0065
−12 (27 February, SP 1)	−0.0135	−8.9611***	−0.0200
−11	−0.0285	−15.107***	−0.0485
−10	−0.0034	−1.7268*	−0.0519
−9	−0.0028	−1.8844*	−0.0547
−8	−0.0068	−3.8728***	−0.0615
−7	0.0052	3.0310***	−0.0563
−6	−0.0101	−6.2111***	−0.0664
−5	−0.0618	−18.3067***	−0.1282
−4	0.0022	1.1328	−0.1260
−3	−0.0067	−3.6085***	−0.1327
−2	−0.0305	−13.817***	−0.1632
−1	−0.0168	−5.815***	−0.1800
0 (16 March)	**−0.0744**	**−21.7034*** **	**−0.2544**
1	−0.0220	−6.4596***	−0.2764
2	−0.0392	−12.2606***	−0.3156
3	−0.0583	−17.0571***	−0.3739
4	0.0389	12.1484***	−0.3350
5	−0.0300	−10.8773***	−0.3650
6	0.0248	8.7032***	−0.3402
7	0.0035	1.2720	0.3367
8	0.0098	4.9323***	−0.3269
9 (27 March, SP 2)	0.0122	5.4507***	−0.3147
10	−0.0046	−1.8085*	−0.3193
11	0.0210	9.0123***	−0.2983
12	0.0076	3.653***	−0.2907
13	0.0228	8.4582***	−0.2679
14	−0.0024	−1.2129	−0.2703
15 (6 April, SP 3)	0.0274	11.1685***	−0.2429
16	0.0325	13.8928***	−0.2104
17	−0.0080	−3.8002***	−0.2184
18	0.0127	6.2975***	−0.2057
19	−0.0117	−6.1577***	−0.2174
20	−0.0079	−3.7884***	−0.2253
25	0.0025	1.0792	−0.1811
26	−0.0140	−8.0091***	−0.1951
27	0.0049	2.4846**	−0.1902
28	0.0088	4.7909***	−0.1814
29	0.0149	7.6825***	−0.1665
30 (27 April)	0.0085	3.4109***	−0.1580

Notes: *Significant at 0.1; **significant at 0.05; ***significant at 0.01. SP = Stimulus Package

Table 1.
AARs and CAARs of the MCO announcement event window (−30,30)

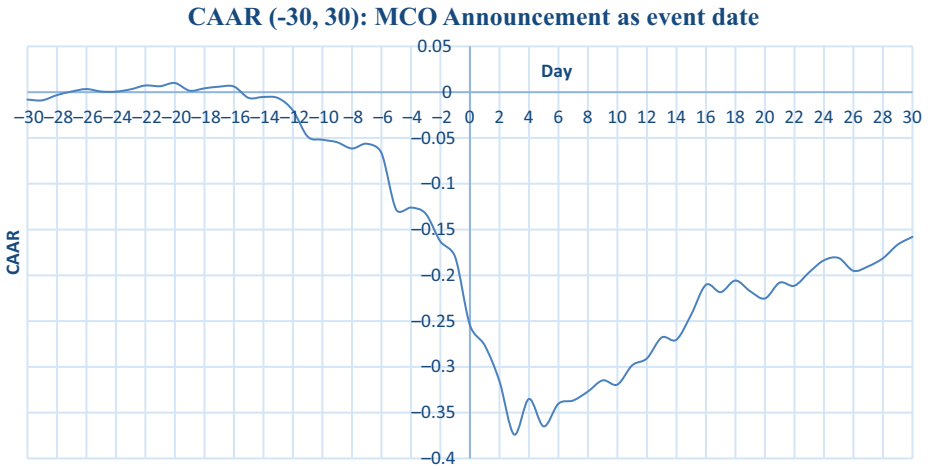


Figure 3.
Cumulative average abnormal returns (CAARs) from day −30 to 30 of the MCO

significant reduction in CAARs. The results imply that the outbreak of COVID-19 reduces the CAARs and shows a tremendous impact on the stock market in Malaysia. However, after day 5, albeit with some fluctuations, the AARs are generally positive, thus increasing the CAARs.

The possible explanation behind the positive market reaction five days after the MCO could be due to the containment measures to contain the spread of the virus and the implementation of the stimulus packages to relieve the slowdown in economic activities. Statistics issued by the Malaysian MoH showed that 63.2% of the cumulative number of patients has recovered as of 23 April 2020. Moreover, on 27 March and 6 April 2020, the Malaysian Government announced the second and third stimulus packages, worth RM250bn and RM10bn, respectively, to ease the financial burden of businesses and individuals (Ministry of Finance, 2020). The findings are consistent with Liu *et al.* (2020), who unravel that stock markets of some Asian countries recovered slightly in later stages of the COVID-19 pandemic, and Singh *et al.* (2020), who report a recovery of stock markets from the negative effect of COVID-19 in the G-20 countries. Our findings are also in tandem with scholars who contend that implementing stimulus packages would positively impact stock markets (Phan and Narayan, 2020; Rahman *et al.*, 2020; Topcu and Gulal, 2020).

Table 2 presents CAARs of different windows: (−30,30), (−15,15), (−10,10), (−5,5), (0,1) and (0,5). Results of the *t*-test show that the CAARs are significantly negative at the 0.01 significance level in all windows. The result suggests that investors believe that COVID-19 would hurt firm performance, thus reacting negatively. In other words, the share price incorporates the bad news earlier than the announcement date. This finding is in tandem with Liu *et al.* (2020) and Topcu and Gulal (2020), who conclude that COVID-19 has a greater influence on the stock market of Asian countries.

4.2 Announcement of movement control order – industry-level analysis

Table 3 shows the CAARs by industry or business sector over the 61-day event window from day −30 to day 30. The Industry Classification Benchmark classifies firms into 11 sectors. Figure 4 displays the plots of CAARs by sector. The *t*-values in Table 3 reveal that, except for health care, utilities and telecommunication, all other sectors experience significant negative CAARs over the event window, indicating the wide-reaching impact of

the coronavirus outbreak on the sectors. Energy, consumer discretionary, industrial and real estate are the sectors that suffered the most during the period. The energy sector involves oil and gas firms (e.g. Petronas). The lesser demand for capital goods and the sharp decline in oil prices create difficulties for companies operating in capital goods and oil and gas industries during the COVID-19 crisis. The consumer discretionary sector comprises businesses that sell non-essential products and services that consumers may avoid without major consequences to their well-being. The demand for consumer discretionary products like automobiles, hotels, restaurants and leisure products has dropped due to the lockdown. As a result, these products show higher susceptibility to the effects of a recession. The industrial sector involves companies that manufacture and distribute capital goods such as aerospace, weapons/defence, commercial vehicles, construction materials, industrial machinery and equipment manufacturers.

Meanwhile, basic materials, technology, financial and consumer staples are less impacted by the crisis. Companies operating in the health-care industry are likely to have benefited from the sharp increase in demand for medicines, vaccines and related medical products. As a result, health care is the only sector with significant positive CAARs. This result is in line with Mazur *et al.* (2020), He *et al.* (2020); and Al-Awadhi *et al.* (2020), who found that stocks of companies operating in the healthcare sector experience high positive returns during the COVID-19 outbreak. However, two other sectors, the telecommunication and utility sectors, are not affected by the lockdown. Although most businesses are closed

Interval	CAAR	*t*-stat
(−5,5)	−0.2986	−33.5031***
(−10,10)	−0.2706	−31.8801***
(−15,15)	−0.2488	−32.0903***
(−30,30)	−0.1579	−17.5049***
(0,1)	−0.0220	−6.4701***
(0,5)	−0.1849	−28.7375***

Notes: *Significant at 0.1; **significant at 0.05; ***significant at 0.01

Table 2. Cumulative average abnormal returns (CAARs) of the MCO for different windows ($N = 924$)

	CAAR	*t*-stat
All firms	−0.1578	−17.5049***
Technology	−0.1266	−3.8301***
Telecommunication	0.0026	0.0378
Health care	0.1146	2.0320**
Financial	−0.1291	−4.7042***
Real estate	−0.1333	−7.3412***
Consumer discretionary	−0.1960	−7.3412***
Consumer staples	−0.1184	−5.6506***
Industrial	−0.1801	−13.2034***
Basic materials	−0.1185	−3.4852***
Energy	−0.5943	−7.3842***
Utilities	−0.0579	−1.5610

Notes: *Significant at 0.1; **significant at 0.05; ***significant at 0.01

Table 3. Cumulative average abnormal returns (CAARs) of the MCO for all firms and sectors from day −30 to day 30

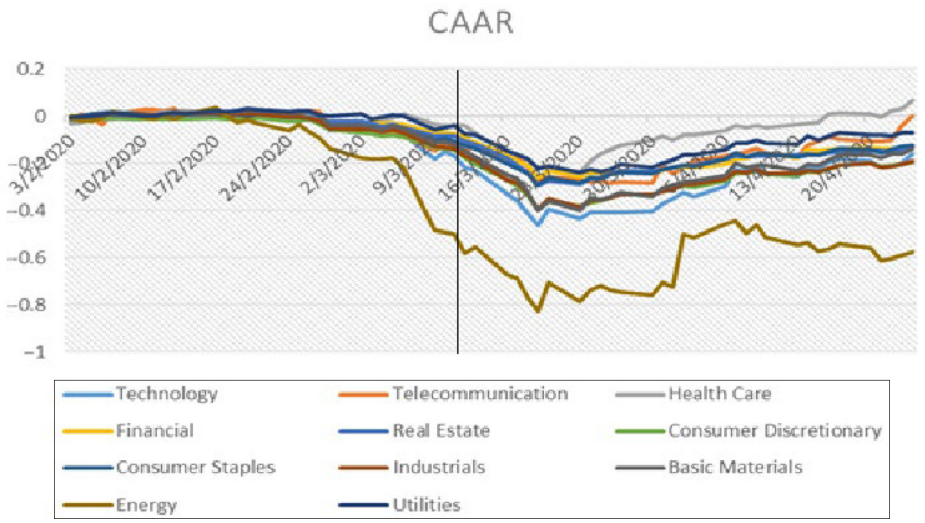


Figure 4.
Cumulative average abnormal returns (CAARs) by industry from day −30 to 30 of the MCO

and the demand for utilities and communication falls, these two sectors are stable. As the entire population remains at home during the lockdown, communications and connectivity are highly demanded, and digital infrastructure has become increasingly important for people to interact (Loozen, 2020). Similarly, home electricity and water usage are high during the lockdown. As a result, abnormal returns are not observed in these sectors.

We also conducted more in-depth industry-level analyses as robustness tests. Table 4 presents the impact of the COVID-19 crisis on the performance of the 11 sectors in Malaysia using various event windows [(0, +1), (0, +5), (−5, +5), (−10, +10) and (−15, +15)]. Even though the health-care industry was significantly hit in the earlier days of the MCO announcement, the stock return quickly rebounded, as observed in the longer event window. The health-care industry benefits from the sharp increase in demand for medical products, thus showing normal returns in windows (−10, +10) and (−15, +15) and positive abnormal returns in window (−30, +30).

4.3 Additional observations – other events

The first case of COVID-19 was identified in Wuhan, China, on the last day of December 2019. Following that, on 20 January 2020, the Chinese health authorities confirmed the human-to-human transformation of the coronavirus (Liu *et al.*, 2020). Therefore, as additional analysis and following prior studies (Liu *et al.*, 2020), we use 20 January 2020, when the virus attracts the public's attention worldwide, as an event day. We then analyse CAARs over a 61-day event window from −30 to 30, whose results of various windows are presented in Panel A of Table 5. The CAARs are negative, and the *t*-test results show that the CAARs are statistically significant over almost all event windows. Thus, the results are in line with our main analysis, where we found that investors reacted negatively to the news of the COVID-19 outbreak very much earlier before the event date (i.e. 16 March 2020). The finding suggests that the stock price already incorporates the bad news before the event.

Statistics show that most infected people recovered, and the number of COVID-19 new cases started to decline in May 2020. Although the rules and standard operating procedures during the MCO continue to be enforced until 9 June, most of the restrictions spelt out in the MCO were eased

Table 4.
Cumulative average abnormal returns (CAARs) of the MCO for all industries for different windows

Event window	(0, +1)	(0, +5)	(−5, +5)	(−10, +10)	(−15, +15)	(−30, +30)
All	−0.0963*** (−22.47)	−0.1849*** (−28.74)	−0.2985*** (−33.50)	−0.2706*** (−31.88)	−0.2488*** (−32.09)	−0.1579*** (−17.50)
Technology	−0.1295*** (−8.99)	−0.2052*** (−8.04)	−0.3594*** (−12.87)	−0.3480*** (−12.07)	−0.3078*** (−10.86)	−0.1266*** (−3.83)
Telecommunication	−0.0530* (−1.96)	−0.1468*** (−2.77)	−0.1868*** (−3.14)	−0.2385*** (−3.52)	−0.1720*** (−2.88)	0.0026 (0.04)
Healthcare	−0.0840*** (−3.90)	−0.1661*** (−3.85)	−0.2482*** (−3.14)	−0.0565 (−0.91)	−0.0542 (−0.9181)	0.1146** (2.03)
Financial	−0.0803*** (−5.29)	−0.1469*** (−3.80)	−0.2198*** (−7.17)	−0.2178*** (−7.39)	−0.1969*** (−6.63)	−0.1291*** (−4.70)
Real estate	−0.0916*** (−9.61)	−0.1694*** (−11.58)	−0.2403*** (−10.32)	−0.2127*** (−11.13)	−0.1826*** (−10.59)	−0.1330*** (−7.34)
Consumer discretionary	−0.0955*** (−8.73)	−0.1797*** (−10.83)	−0.2965*** (−12.11)	−0.2778*** (−11.54)	−0.2677*** (−11.39)	−0.1960*** (−7.34)
Consumer staples	−0.0826*** (−5.60)	−0.1454*** (−7.96)	−0.2269*** (−8.78)	−0.1946*** (−8.80)	−0.1912*** (−9.43)	−0.1184*** (−5.65)
Industrial	−0.0989*** (−11.66)	−0.1977*** (−17.78)	−0.3159*** (−21.38)	−0.2808*** (−20.81)	−0.2773*** (−22.28)	−0.1801*** (−13.20)
Basic materials	−0.0927*** (−6.48)	−0.2249*** (−7.52)	−0.3479*** (−10.31)	−0.3024*** (−11.10)	−0.2768*** (−10.85)	−0.1185*** (−3.49)
Energy	−0.1334*** (−6.23)	−0.2345*** (−7.41)	−0.5725*** (−10.04)	−0.6235*** (−8.95)	−0.4243*** (−7.95)	−0.5943*** (−7.38)
Utilities	−0.0845*** (−4.01)	−0.1499*** (−4.58)	−0.2418*** (−5.11)	−0.2202*** (−5.12)	−0.1662*** (−4.03)	−0.0579 (−1.56)

Notes: *Significant at 0.1; **significant at 0.05; ***significant at 0.01. *t*-statistics are presented in parentheses

Table 5.
Cumulative average abnormal returns (CAARs) for different windows ($N = 924$)

Interval	CAAR	*t*-stat
Panel A: Confirmation of human-to-human transmission (20 January 2020) as event date		
(−10,10)	−0.0437	−9.3695***
(−15,15)	−0.0164	−3.0752***
(−30,30)	−0.0746	−10.3619***
(0,1)	−0.0024	−1.7950*
Panel B: Announcement of ease of restrictions on economic activities (4 May 2020) as event date		
(−5,5)	0.0512	12.0377***
(−10,10)	0.0954	15.2114***
(−15,15)	0.1065	14.2320***
(−30,30)	0.2134	18.3570***
(0,1)	0.0166	9.3847***

Notes: *Significant at 0.1; **significant at 0.05; ***significant at 0.01

on 4 May 2020, when the government announced that almost all economic sectors were allowed to operate. Thus, we consider the date as an event day. Panel B of Table 5 provides the *t*-stat of the CAARs surrounding the event day using the same window period from day −30 to day 30. Positive and significant CAARs are observed in all windows. The results are in tandem with the investor overreaction hypothesis, which indicates the departure of stock prices from the fundamental value emanated from investors' overreaction to a specific event. In this research, investors may correct their prior expectations about stock prices, causing a recovery in the Malaysian stock market from the negative impact of COVID-19, particularly after lockdown measures are eased.

4.3.1 COVID-19 confirmed cases and abnormal returns. Baltagi (2008) points out that panel data regression mitigates estimation bias, controls for individual heterogeneity and identifies the time-varying relationship between dependent and independent variables. However, we conducted a regression analysis to investigate how the stock market in Malaysia reacts to the announcement of the number of COVID-19 confirmed cases after the announcement of the MCO (i.e. 16 March 2020) [5]. In other words, we find out whether the number of COVID-19 confirmed cases is considered one of the factors affecting investors' investment decisions and, consequently, the stock market performance. Our study covers 59 trading days, beginning 17 March to 4 June 2020. We stopped on 4 June because, during data collection, that was the most recent data regarding COVID-19 number of confirmed cases. Therefore, the panel data should comprise 54,516 observations, given that there is a cross-section dimension of 924 sample firms and a time dimension of 59 days. However, due to missing values of the control variables, the final sample consists of 52,805 observations. Panel A of Table 6 shows the sample selection procedure.

To analyse how the confirmed cases of COVID-19 influence the stock performance of sample companies, we use the following regression model:

$$AR = \beta_0 + \beta_1 NC + \beta_2 RETURN + \beta_3 INR + \beta_4 MR + \beta_5 MC + \beta_6 ROA + \beta_7 MTB + \beta_8 DEBT + \beta_9 CASH + \varepsilon \quad (5)$$

AR is daily abnormal returns of a company; NC is the natural log of the number of COVID-19 confirmed cases; RETURN is daily stock actual returns; INR is the average of daily stock returns; MR is market returns; MC is the natural log of daily market capitalisation; ROA is firm profitability; MTB is firm growth; DEBT is firm debt; CASH is firm cash holding; ε is the error

Panel A: Sample selection procedure

	Firm-days
Companies listed on Bursa Malaysia during 2020 with available data to compute abnormal returns (924 firms × 59 trading days)	54,516
Less: Missing information	1,711
Final sample	52,805

Panel B: Summary statistics

Variable	Obs	Mean	Std	Min	Max
AR	52,805	0.0010	0.0670	−1.3125	0.9945
NC *(LOG)*	52,805	4.3428	0.7436	2.3026	5.6240
NC	52,805	97.6102	62.5763	10	277
RETURN	52,805	0.0045	0.0668	−1.3157	0.9904
INR	52,805	0.0044	0.0246	−0.1132	0.2285
MR	52,805	0.0033	0.0146	−0.0339	0.0663
MC *(LOG)*	52,805	12.3503	1.7496	8.7180	18.3915
ROA *(%)*	52,805	2.4165	9.9380	−34.3600	42.0800
MTB	52,805	1.2723	1.8455	−0.3900	14.7000
DEBT (%)	52,805	19.5679	17.5560	0.0000	72.1100
CASH (%)	52,805	12.3503	14.6202	0.1706	67.4327

Panel C: Newey–West regression results on COVID-19 confirmed cases and abnormal returns

Variables	Newey–West	
	1	2
NC		−0.00068* (0.00026)
RETURN	−0.19749*** (0.01294)	−0.19748*** (0.02398)
INR	0.33714*** (0.02372)	0.34029*** (0.02398)
MR	−0.40930*** (0.03307)	−0.41361*** (0.03329)
MC	−0.00066*** (0.00016)	−0.00066*** (0.00017)
ROA	−0.00004 (0.000035)	−0.00004 (0.00005)
MTB	0.00025** (0.00012)	0.00025*** (0.00012)
DEBT	−0.00002 (0.00001)	−0.00002 (0.00002)
CASH	0.00001 (0.00002)	0.00001 (0.00002)
Obe	52805	52805
F	56.07	50.06
P-value	0.000	0.000

Notes: *Significant at 0.1; **significant at 0.05; ***significant at 0.01. Standard errors corrected for clustering at firm level are presented in parentheses

Table 6.
Descriptive statistics and regression results

term. Appendix presents the detailed descriptions and the source of variables used in the above regression model.

Our variable of interest is NC, the natural log of the number of COVID-19 confirmed cases. Data on COVID-19 confirmed cases are extracted from the Worldometer Data Trucker (available at: www.worldometers.info/coronavirus/country/malaysia). We expect the coefficient on this variable to be negative and significant. We control for RETURN, INR, MR, MC, ROA, MTB, DEBT and CASH as the variables are found to have a significant effect on abnormal returns in prior studies (Al-Awadhi *et al.*, 2020; Huo and Qiu, 2020; Liu *et al.*, 2020; Rahman *et al.*, 2020; Ramelli and Wagner, 2020; Singh *et al.*, 2020) and to test the pure impact of NC on abnormal returns. Data on the control variables are extracted from the DataStream database. To control for heteroskedasticity and autocorrelation problems, we use Newey–West regressions with robust standard errors.

Panel B in Table 6 provides the descriptive statistics for the variables used in the regression analysis. The regression results of the impact of COVID-19 confirmed cases on

the stock performance of sampled firms are reported in Panel C of Table 6. As expected, the regression results for Newey–West estimation show that the coefficients for NC are negative and statistically significant. The results suggest that the stock market reacts negatively to news of COVID-19 number of confirmed cases. The findings also indicate that the negative CAARs, resulted from, among others, an increased number of COVID-19 in Malaysia.

5. Conclusion

This study evaluates the stock reactions of Malaysian firms and industries to the COVID-19 pandemic. Specifically, we examine the abnormal returns at the firm and industry levels surrounding the announcement of the MCO using event study methodology. In addition, the effect of the announcements of human-to-human transmission and lifting of economic activity restrictions on firm abnormal returns are also examined. Conventional *t*-test results show that investors reacted negatively to the proclamation of the MCO, as evidenced by significant negative CAARs before and after the announcement. Indeed, we find that the abnormal returns started even before the proclamation that COVID-19 is a human-to-human transmission disease. However, the abnormal returns recovered when most lockdown measures were eased, and nearly all sectors were allowed to operate. Our investigation at the industry level reveals that stock returns of companies in eight out of eleven industries (technology, financial, real estate, consumer discretionary, consumer staples, industrials, basic materials and energy) fell remarkably. On the other hand, stocks of companies operating in the healthcare industry experienced high positive CAARs. Meanwhile, the telecommunication and utility firms experienced non-significant changes in stock returns.

We further analyse the effect of COVID-19 number of confirmed cases on firm abnormal returns. The information was found to negatively impact firm abnormal returns, implying that investors perceive information on the number of COVID-19 confirmed cases negatively. Our findings support the view that bad news coupled with anxiety and uncertainty emanated from the COVID-19 outbreak contributed to the global economic downturn. Moreover, fears of death, lockdown measures to control the virus transmission and the increased number of COVID-19 confirmed cases had placed investors in a panic mood, causing them to be more concerned about future returns. As a result, investors would sell their shares before the situation becomes worse.

This study contributes significantly to the literature on event studies and COVID-19 in an emerging country, namely Malaysia. China, the coronavirus origin, is Malaysia's number one trading partner and a significant foreign investments and tourists source. Besides, a majority of Malaysian companies are involved in global value chains that are China-centric. Thus, the impact of China shocks resulting from the COVID-19 on the Malaysian economy and the stock market is expected to be critical. Investors will benefit from this paper as this study suggests stock prices incorporate bad and good news surrounding the announcement of major international and local events, such as those related to the COVID-19 pandemic. The effects of the announcements are observed long before the announcements are made. It is too late to react to the announcement date because the information is already impounded in the share price. Thus, investors should consider such factors in making their investment decisions. Given that our results show a stock market recovery from the setback of the COVID-19 outbreak after allowing the economic activities to continue, our paper encourages investors to foster long-term investment strategies and buy shares in such a weakened market situation. Furthermore, businesses and policymakers can learn some lessons from the COVID-19 outbreak and be prepared to tackle similar challenges in the future. The government's initiatives, such as the economic stimulus programmes to help affected

individuals and businesses and the ease of restrictions on economic activities during the pandemic, help restore market confidence.

However, our paper carries some inevitable limitations. First, we only observe the short-term effect of the coronavirus pandemic using a window period of 61 days; thus, we do not observe the long-term effect of the events related to the pandemic. Second, given the short window of our study, we do not examine firm characteristics or any other major events that may influence firms' stock returns. Whether firm characteristics and events would affect investors' investment decisions and, eventually, the long-term performance of the stocks is left for future research. As of the date of writing, major events have taken place since the first lockdown. For example, a series of lockdowns and economic stimulus packages to assist businesses and individuals affected by the pandemic were announced. Future research may examine how the stock market reacts to these announcements. Future research also can explore other predictors of stock market response (e.g. the proportion of Chinese tourists, foreign direct investment and health system preparedness) in Malaysia.

Notes

1. Coronavirus and COVID-19 are used interchangeably in the study as both have the same meaning.
2. The World Bank "Countries Can Take Steps Now to Rebuild from COVID-19" (2 June 2020), available at: www.worldbank.org/en/news/press-release
3. International Monetary Fund "Policy Responses to COVID-19", (2020), available at: www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19
4. Based on the freedom index, countries are classified into more and lesser freedom countries. Specifically, countries with an above-median freedom score are less free countries, whereas those with below-median freedom scores are more free countries.
5. We only considered the number of confirmed cases as the number of deaths caused by the virus was very minimal at the time of this study. Moreover, (Lee *et al.* 2020) report that the number of fatalities has no significant impact on the stock performance of all industries in Malaysia.

References

Abdul Latif, R., Taufil Mohd, K.N., Wan Hussin, W.N. and Ku Ismail, K.N.I. (2014), "The wealth effects of share repurchases in Malaysia", *International Journal of Management Studies (IJMS)*, Vol. 20 No. 2, pp. 105-127.

Al-Awadhi, A., Alsaifi, K., Al-Awadhi, A. and Alhammadi, S. (2020), "Death and contagious infectious disease: impact of the COVID-19 virus on stock market returns", *Journal of Behavioral and Experimental Finance*, Vol. 27, p. 100326, doi: 10.1016/j.jbef.2020.100326.

Alber, N. (2020), "The effect of coronavirus spread on stock markets: the case of the worst 6 countries", Available at: SSRN 3578080.

Alfaro, L. Chari, A. Greenland, A.N. and Schott, P.K. (2020), "Aggregate and firm-level stock returns during pandemics, in real time", NBER Working Paper No. 26950, available at: www.nber.org/papers/w26950.

Ambros, M., Frenkel, M., Huynh, T.L.D. and Kilinc, M. (2020), "COVID-19 pandemic news and stock market reaction during the onset of the crisis: evidence from high-frequency data", *Applied Economic Letters*, doi: 10.1080/13504851.2020.1851643.

Ashraf, B.N. (2020), "Stock markets' reaction to COVID-19: cases or fatalities?", *Research in International Business and Finance*, Vol. 54, doi: 10.1016/j.ribaf.2020.101249.

Baker, S.R., Bloom, N., Davis, S.J., Kost, K., Sammon, M. and Viratyosin, T. (2020), "The unprecedented stock market reaction to COVID-19", *The Review of Asset Pricing Studies*, Vol. 10 No. 4, pp. 742-758.

Ball, R. and Brown, P. (1968), "An empirical evaluation of accounting income numbers", *Journal of Accounting Research*, Vol. 6 No. 2, pp. 159-178.

Baltagi, B. (2008), *Econometric Analysis of Panel Data*, John Wiley and Sons.

Campbell, K. and Vera, A.M. (2010), "Female board appointments and firm valuation: short and long-term effects", *Journal of Management and Governance*, Vol. 14 No. 1, pp. 37-59.

Chen, M.-H., Jang, S.S. and Kim, W.G. (2007), "The impact of the SARS outbreak on Taiwanese hotel stock performance: an event-study approach", *International Journal of Hospitality Management*, Vol. 26 No. 1, pp. 200-212.

Cheng, C. (2019), "Is Malaysia benefitting from the US-China trade war?", East Asia Forum, available at: www.eastasiaforum.org/2019/08/05/is-malaysia-benefitting-from-the-us-china-trade-war/

Cheng, C. (2020), "COVID-19 in Malaysia: Economic impacts and fiscal responses", Institute of Strategic and International Studies (ISIS) Malaysia, available at: www.isis.org.my/wp-content/uploads/2020/06/POLICY-BRIEF_COVID-19-in-Malaysia.pdf

Corbet, S., Hou, Y., Hu, Y., Lucey, B. and Oxley, L. (2020), "Aye corona: the contagion effects of being named corona during the COVID-19 pandemic", *Finance Research Letters*, Vol. 38, doi: 10.1016/j.frl.2020.101591.

Del Giudice, A. and Paltrinieri, A. (2017), "The impact of the Arab spring and the ebola outbreak on African equity mutual fund investor decisions", *Research in International Business and Finance*, Vol. 41, pp. 600-612.

Ding, D.K. and Charoenwong, C. (2013), "Stock market reaction when listed companies in Singapore appoint female directors", *International Journal of Management*, Vol. 30 No. 1, pp. 285-300.

Ding, W., Levine, R., Lin, C. and Xie, W. (2020), "Corporate immunity to the COVID-19 pandemic", NBER Working Paper No. 27055, available at: www.nber.org/papers/w27055.

Erdem, O. (2020), "Freedom and stock market performance during COVID-19 outbreak", *Finance Research Letters*, Vol. 36, pp. 1-6, doi: 10.1016/j.frl.2020.101671.

Gaver, J.J., Gaver, K.M. and Battistel, G.P. (1992), "The stock market reaction to performance plan adoptions", *Accounting Review*, Vol. 67 No. 1, pp. 172-182.

Harvey, C.R. (2020), "The economic and financial implications of COVID-19", *The Mayo Center for Asset Management at the University of VT Darden School of Business and the Financial Management Association International Virtual Seminars Series*.

He, P., Sun, Y., Zhang, Y. and Li, T. (2020), "COVID-19's impact on stock prices across different sectors – an event study based on the Chinese stock market", *Emerging Markets Finance and Trade*, Vol. 56 No. 10, pp. 2198-2212, doi: 10.1080/1540496X.2020.1785865.

Huo, X. and Qiu, Z. (2020), "How does China's stock market react to the announcement of the COVID-19 pandemic lockdown?", *Economic and Political Studies*, Vol. 8 No. 4, pp. 436-461, doi: 10.1080/20954816.2020.1780695.

Ichev, R. and Marinč, M. (2018), "Stock prices and geographic proximity of information: evidence from the ebola outbreak", *International Review of Financial Analysis*, Vol. 56, pp. 153-166.

In, F., Kim, S. and Yoon, J.H. (2002), "International stock market linkages: evidence from the Asian financial crisis", *Journal of Emerging Market Finance*, Vol. 1 No. 1, pp. 1-29.

Ismail, K.N.I.K. and Manaf, K.B.A. (2016), "Market reactions to the appointment of women to the boards of Malaysian firms", *Journal of Multinational Financial Management*, Vol. 36, pp. 75-88.

Kumari, M. and Bharti, N. (2021), "Estimating the impact of COVID-19 on South Asia's exports: does trade facilitation matter now more than ever?", *Transnational Corporation Review*, doi: 10.1080/19186444.2021.1911280.

Lee, K.Y.-M., Jais, M. and Chan, C.-W. (2020), "Impact of COVID-19: evidence from Malaysian stock market", *International Journal of Business and Society*, Vol. 21 No. 2, pp. 607-628.

Liu, H., Manzoor, A., Wang, C., Zhang, L. and Manzoor, Z. (2020), "The COVID-19 outbreak and affected countries stock markets response", *International Journal of Environmental Research and Public Health*, Vol. 17 No. 8, pp. 1-19.

Loozen, T. (2020), "COVID-19: how the telecoms industry is pursuing a renewed purpose", Ernst and Young, available at: www.ey.com/en_my/tmt/covid-19-how-the-telecoms-industry-is-pursuing-a-renewed-purpose

Macciocchi, D., Lanini, S., Vairo, F., Zumla, A., Moraes Figueiredo, L.T., Lauria, F.N., Strada, G., Brouqui, P., Puro, V. and Krishna, S. (2016), "Short-term economic impact of the zika virus outbreak", *New Microbiologica*, Vol. 39 No. 4, pp. 287-289.

Mazur, M., Dang, M. and Vega, M. (2020), "COVID-19 and the March 2020 stock market crash: evidence from S&P 1500", *Finance Research Letters*, doi: 10.1016/j.frl.2020.101690.

Ministry of Finance (2020), "Economic outlook 2021", Percetakan Nasional Malaysia, Kuala Lumpur, available at: https://belanjawan2021.treasury.gov.my/pdf/economy/2021/economic-outlook-2021.pdf

Mishra, P.K. and Mishra, S.K. (2021), "COVID-19 pandemic and stock market reaction: empirical insights from 15 Asian countries", *Transnational Corporations Review*, Vol. 13 No. 2, pp. 139-155, doi: 10.1080/19186444.2021.1924536.

Naeem, M.A., Sehrish, S. and Costa, M.D. (2021), "COVID-19 pandemic and connectedness across financial markets", *Pacific Accounting Review*, Vol. 33 No. 2, doi: 10.1108/PAR-08-2020-0114.

Narayan, P.K., Phan, D.H.B. and Liu, G. (2020), "COVID-19 lockdowns, stimulus packages, travel banks, and stock returns", *Finance Research Letters*, Vol. 38, doi: 10.1016/j.frl.2020.101732.

Nippani, S. and Washer, K.M. (2004), "SARS: a non-event for affected countries' stock markets?", *Applied Financial Economics*, Vol. 14 No. 15, pp. 1105-1110.

Orhun, E. (2020), "The impact of COVID-19 global health crisis on stock markets and understanding the cross-country effects", *Pacific Accounting Review*, doi: 10.1108/PAR-07-2020-0096.

Phan, D.H.B. and Narayan, P.K. (2020), "Country responses and the reaction of the stock market to COVID-19-a preliminary exposition", *Emerging Markets Finance and Trade*, Vol. 56 No. 10, pp. 2138-2150, doi: 10.1080/1540496X.2020.1784719.

Rahman, M.L., Amin, A. and Al Mamun, M.A. (2020), "The COVID-19 outbreak and stock market reactions: evidence from Australia", *Finance Research Letters*, Vol. 38, doi: 10.1016/j.frl.2020.101832.

Ramelli, S. and Wagner, A.F. (2020), "Feverish stock price reactions to COVID-19", *The Review of Corporate Finance Studies*, Vol. 9 No. 3, pp. 622-655, doi: 10.1093/rcfs/cfaa012.

Sansa, N.A. (2020), "Effects of COVID-19 pandemic on the world population: lessons to adopt from past years global pandemics", available at: https://ssrn.com/abstract=3565645 or doi: 10.2139/ssrn.3565645.

Sharif, A., Aloui, C. and Yarovaya, L. (2020), "COVID-19 pandemic, oil prices, stock market, geopolitical risk and policy uncertainty nexus in the US economy: fresh evidence from the wavelet-based approach", *International Review of Financial Analysis*, Vol. 70, doi: 10.1016/j.irfa.2020.101496.

Siddiqui, S. (2009), "Stock markets integration: examining linkages between selected world markets", *Vision: The Journal of Business Perspective*, Vol. 13 No. 1, pp. 19-30.

Singh, D., Dhall, R., Narang, S. and Rawat, S. (2020), "The outbreak of COVID-19 and stock market responses: an event study and panel data analysis for G-20 countries", *Global Business Review*, doi: 10.1177/0972150920957274.

Topcu, M. and Gulal, O.S. (2020), "The impact of COVID-19 on emerging stock markets", *Finance Research Letters*, Vol. 36, doi: 10.1016/j.frl.2020.101691.

Vidya, C.T. and Prabheesh, K.P. (2020), "Implications of COVID-19 pandemic on the global trade network", *Emerging Markets Finance and Trade*, Vol. 56 No. 10, pp. 2408-2421.

Wang, Y.-H., Yang, F.-J. and Chen, L.-J. (2013), "An investor's perspective on infectious diseases and their influence on market behavior", *Journal of Business Economics and Management*, Vol. 14 No. 1, pp. 112-127.

Xiong, H., Wu, Z., Hou, F. and Zhang, J. (2020), "Which firm-specific characteristics affect the market reaction of Chinese listed companies to the COVID-19 pandemic?", *Emerging Markets Finance and Trade*, Vol. 56 No. 10, pp. 2231-2242, doi: 10.1080/1540496X.2020.1787151.

Yong, H.H.A. and Laing, E. (2020), "Stock market reaction to COVID-19: evidence from US firms' international exposure", *International Review of Financial Analysis*, Vol. 76, doi: 10.1016/j.irfa.2020.101656.

Zhang, D., Hu, M. and Ji, Q. (2020), "Financial markets under the global pandemic of COVID-19", *Finance Research Letters*, Vol. 36, doi: 10.1016/j.frl.2020.101528.

Zhang, Y., Dang, Y., Chen, H., Thurmond, M. and Larson, C. (2009), "Automatic online news monitoring and classification for syndromic surveillance", *Decision Support Systems*, Vol. 47 No. 4, pp. 508-517.

Appendix

Variables	Notation	Description	Data source
Abnormal stock firm return	AR	Daily abnormal returns of company *i* at day *t*	Authors' Estimation
COVID-19 confirmed cases	NC	Natural log of the number of COVID-19 confirmed cases at day *t*	Compiled from the web database of Worldometer Data Trucker
Actual stock firm return	RETURN	Daily stock actual returns of company *i* at day *t*	Compiled from DataStream Database
Actual stock industry return	INR	Average daily stock returns of a company within an industry at day *t*	DataStream Database and authors' calculation
Actual stock market return	MR	Market returns measured by the daily return of KLCI index at day *t*	Compiled from DataStream Database
Firm market capitalisation	MC	Natural log of daily market capitalisation for company *i* at day *t*	Compiled from DataStream Database
Firm profitability	ROA	Daily operating income over total assets of company *i* at day *t*	Compiled from DataStream Database
Firm growth	MTB	Daily market-to-book ratio of company *i* at day *t*	Compiled from DataStream Database
Firm leverage	DEBT	Daily total debt over total assets of company *i* at day *t*	Compiled from DataStream Database
Cash holdings	CASH	Daily cash and cash equivalent to total assets of company *i* at day *t*	Compiled from DataStream Database

Notes: The data on MC, ROA, MTB, DEBT and CASH are not available on a daily basis. Therefore, we collected information on these variables using data from the last date available for each variable and assumed that the same figure is applicable for each day of that date

Table A1.
Variables source and definitions

Corresponding author
Redhwan Aldhamari can be contacted at: redhwan@uum.edu.my