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COVID-19 AND GOVERNMENT RESPONSES: HAS THE PANDEMIC AFFECTED THE KUALA LUMPUR COMPOSITE INDEX?

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ABSTRACT

This study aims to determine the impact of the COVID-19 pandemic and government responses on the Malaysian stock market. Using the Kuala Lumpur Composite Index (KLCI) from 1st March 2020 to 31st December 2020, the study discovered several findings. First, the number of daily new COVID-19 cases affected the index. Nevertheless, the new cases turned out to be positive at a later stage. This finding inferred that investors grew apathetic towards COVID-19 over the long run. Second, daily new COVID-19 deaths negatively impacted the stock index. Third, the Movement Control Order (MCO) harmfully influenced the index. Fourth, the Recovery Movement Control Order RMCO and most government stimulus packages positively impacted the index. In conclusion, the government's responses to COVID-19 have managed to mitigate several negative impacts of the pandemic on the stock market. The stimulus packages provided the much-needed impetus for market recovery during the pandemic.

Keywords: COVID-19, stock market, government responses, loan moratorium.

JEL Classification: G12, G18, G28.

INTRODUCTION

The Coronavirus (COVID-19) outbreak that originated in Wuhan, China caused significant concerns about public health due to its rapid spread across the globe. Economic consequences are also brought to the forefront as more countries are switching to a work-from-home mandate to slow the spread of the virus, restrict travel and shut down schools (Toda, 2020). According to the Organisation for Economic Co-operation and Development (OECD), the new COVID-19 pandemic has severe economic consequences. It may be the biggest threat to the world economy (Siddiquei & Khan, 2020). While studies have been conducted on the economic effects of the pandemic, most papers focused on the economic effects caused by pandemic-related deaths (Meltzer et al., 1999; Smith et al., 2009; Smith et al., 2011; Siu & Wong, 2004; Chen et al., 2018; Ali et al., 2010). For example, when examining the severe acute respiratory syndrome (SARS) pandemic, Chou et al. (2003) researched the pandemic's health cost effects on China, Hong Kong and Taiwan.

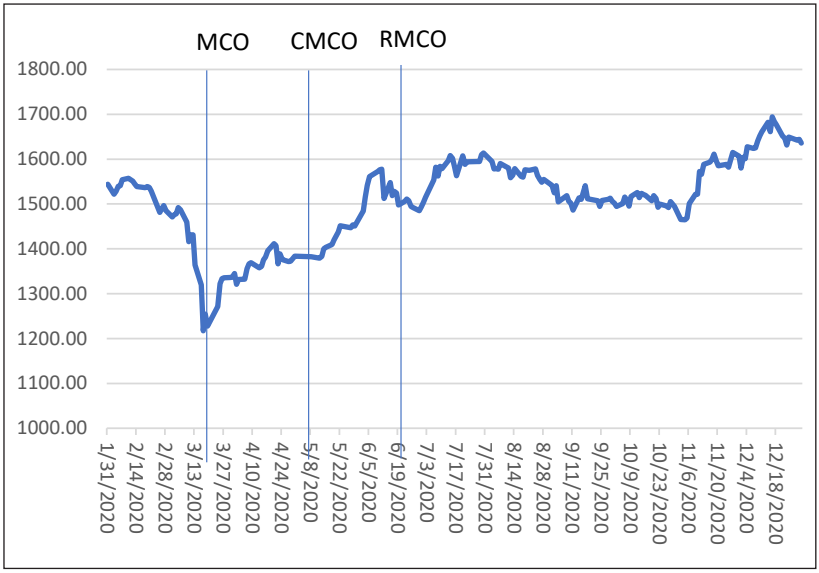
Figure 1 shows the Kuala Lumpur Composite Index (KLCI) against time in 2020. Based on the chart, the KLCI was experiencing a downtrend and hit its lowest point of 1,207.80 on 19th March 2020, one day after the Movement Control Order (MCO) was first implemented. As a result of the outbreak, the government announced the implementation of the MCO, an initiative designed to restrict economic activity and public movement, which was executed from 18th March 2020 to 3rd May 2020. It should be noted that the MCO was extended over this period as it was initially planned to take place over just two weeks, from 18th March 2020 until 31st March 2020.

After the end of the MCO, the government relaxed restrictions and implemented the Conditional Movement Control Order (CMCO) from 4th May 2020 to 9th June 2020 to replace it. After the end of the CMCO, the Recovery Movement Control Order (RMCO) took its place from 10th June 2020 onwards, with further relaxed restrictions

and, most importantly, allowed non-essential economic activity to restart. In Malaysia, COVID-19 was first recorded on 25th January 2020. The number of cases reported daily is shown in Figure 2 below. As observed, many new COVID-19 cases occurred from October 2020 to the end of December 2020. The significant spikes in cases were speculated due to the after-effects of a state by-election on 26th September 2020. A month later, new COVID-19 cases started spiking upwards, reaching four-digit cases by 26th October 2020.

Figure 1

The Movement of KLCI from 31st January 2020 to 31st December 2020



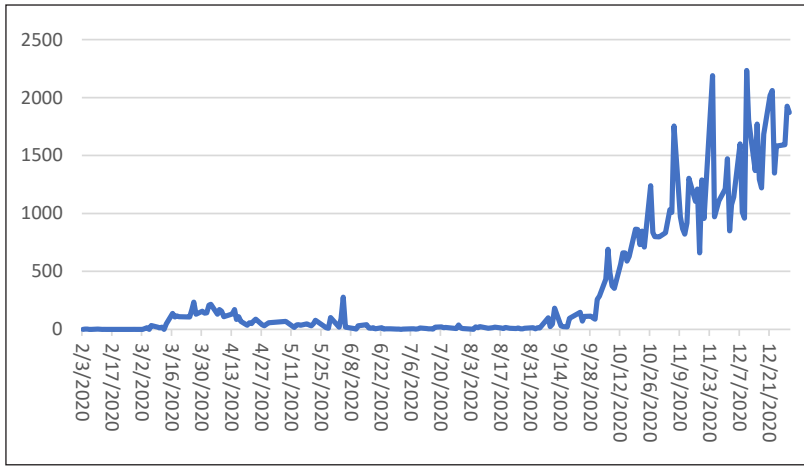
Notes: Author's sketch. Pre-MCO: 31/01/2020 – 17/03/2020. MCO: 18/03/2020 – 03/05/2020. CMCO: 04/05/2020 – 09/06/2020. RMCO: 10/06/2020 onwards. KLCI denotes the Kuala Lumpur Composite Index. Source of KLCI: Bursa Malaysia Official Website at https://www.bursamalaysia.com/, accessed on 7th May 2021.

As the number of COVID-19 cases increased in Malaysia, the Malaysian government began imposing movement restrictions to contain the spread of the virus. These actions resulted in an economic lockdown, whereby economic activity was halted. Subsequently, the lockdown led to less consumer demand, which affected consumption and caused a drop in sales. As sales suffered, the profit of listed

companies dropped due to low cash flow. The drop in profits would then affect their stock price. Therefore, it is believed that there is a need to determine the impact of COVID-19 and the subsequent government responses on the Malaysian stock market.

Figure 2

Daily Number of New COVID-19 Cases in 2020



Notes: Author's sketch. Data sourced from the World Health Organisation's (WHO) official COVID-19 website at https://covid19.who.int/region/wpro/country/my, accessed on 10th May 2021.

Government Responses to COVID-19

In light of the economic and health crisis, the government executed several responses, including the MCO, stimulus packages and other initiatives, such as allowing Employees Provident Fund (EPF) withdrawals and a moratorium on loan repayment. Besides the movement restrictions, various stimulus packages were announced throughout the year, such as the 2020 Economic Stimulus Package, Bantuan Prihatin Nasional, PRIHATIN SME Economic Stimulus Package, PENJANA Economic Stimulus Package and the KITA PRIHATIN Economic Stimulus Package with a cumulative worth of RM305 billion. Table 1 summarises the Malaysian government's responses to COVID-19 throughout 2020. The primary goal of this study is to investigate how the COVID-19 outbreak and the government policies related to it affected the Malaysian stock market

at the early stage of the pandemic in 2020. The research questions are as follows: First, has the COVID-19 pandemic affected the KLCI of Bursa Malaysia? Second, have the government's responses alleviated the negative impact of COVID-19 on the stock market?

Table 1

Malaysian Government's Responses to COVID-19 in 2020

	Government Policies	Date	Amount
1	Movement Control Order (MCO)	18/03/20 – 03/05/20	-
2	Conditional Movement Control Order (CMCO)	04/05/20 – 09/06/20	-
3	Recovery Movement Control Order (RMCO)	10/06/20 – 31/03/21	-
4	Second Conditional Movement Control Order in certain states (CMCO2)	14/10/20 – 12/01/20	-
5	Moratorium on Loan Repayment	01/04/20 – 30/09/20	RM100 bil.
6	Announcement of 2020 Economic Stimulus Package	27/02/20 onwards	RM20 bil.
7	Announcement of Bantuan Prihatin Nasional	27/03/20 onwards	RM230 bil.
8	Announcement of an additional PRIHATIN SME Economic Stimulus Package	06/04/20 onwards	RM10 bil.
9	Announcement of PENJANA Economic Stimulus Package	05/06/20 onwards	RM35 bil.
10	Announcement of KITA PRIHATIN Economic Stimulus Package	23/09/20 onwards	RM10 bil.
11	Announcement of i-Sinar EPF Withdrawal	21/12/20 onwards	-

Source: https://en.wikipedia.org/wiki/COVID-19 _pandemic_in_Malaysia

Given the importance of the government in managing the macroeconomic repercussions of a health crisis, the government's role in crisis policymaking must be investigated to examine the effects that it would have on the stock market. The significance of this study is in providing firms, investors and the general public with an understanding of how the COVID-19 pandemic and government responses can affect the stock market. This paper is organised as follows. Section Two reviews the literature, followed by data and

methodology in Section Three. Section Four reports the findings, while the last section concludes the study.

LITERATURE REVIEW

Economic Effects of the Pandemic

Economic research specific to the spread of a pandemic is relatively recent compared to other fields in economic research. Among the research papers notable are Meltzer et al. (1999). Their paper focused on the impact of an influenza pandemic in the United States (US). They utilised a mathematical model to determine the cost impact of a pandemic on the economy, focusing on the impact of vaccinations. They discovered that economic costs are high whenever death is involved. Therefore, a policy that prevents death would be better for the economy in the long run, such as vaccinations.

Likewise, Smith et al. (2009) corroborated Meltzer et al. (1999) with their research in the United Kingdom. Their research also uncovered that the economic costs for illnesses would inadvertently increase as the fatality rate increases. Nevertheless, they added to the discussion by indicating that closing schools will increase economic impact.

Some studies have shown that obtaining enough vaccines is more critical to determining the economic impact of the pandemic than the actual pandemic itself. These scholars discovered that essential sectors like food production were less affected by a pandemic while less essential sectors, such as luxury goods, were the most affected (Smith et al., 2011). The research in Turkey by Yoldascan et al. (2010) also confirmed the results of the previous two papers in the United States and the United Kingdom.

On the other hand, Chen et al. (2018) decided to use weekly aggregate stock price indices from 1998 to 2008 to determine the impact of the SARS epidemic on stock market integration. They utilised the extreme value theory and separated the sample countries into three categories, namely the source country (China), highly infected countries (Hong Kong, Taiwan and Singapore) and a minorly infected country (Japan). Their results indicated that the SARS epidemic affected the long-run cointegration of the Chinese market with the other markets. The findings implied that the SARS epidemic weakened market

cointegration, and thus, arbitrage profits could be generated via portfolio diversification in the event of severe epidemics. In Malaysia, Ali et al. (2010) provided evidence to indicate that investors had over-responded to the SARS epidemic. Their results showed a tendency for investors in the Malaysian stock market to overreact whenever an economic crisis or extraordinary political event occurs.

COVID-19 Pandemic, Public Health and the Economy

Carlsson-Szlezak et al. (2020) attempted to explain the theoretical effects that COVID-19 could have on the economy. They believed that the pandemic would affect the economy through three primary channels. The first of these effects was wealth effects, in which the increase in household savings rates was due to falling wealth, i.e., job losses. This outcome directly affects consumption and market demand. Second is the direct hit to consumer confidence. As consumers shift towards a more pessimistic view of spending, this affects demand negatively and keeps consumers spending frugally. Lastly, supply-side shocks are caused by disruptions in the supply chain.

Several studies have also attempted to explain the effects of the COVID-19 pandemic on the economy. Zaremba et al. (2020) wrote a paper investigating the impact of non-pharmaceutical policy responses to the pandemic on stock market volatility. The findings suggested that government responses significantly impact stock market volatility. Al-Awadhi et al. (2020) also provided findings suggesting that the continuous increase in daily cases and deaths negatively affected stock market returns. Dietrich et al. (2020) surveyed US households to gauge their expectations about the impact of COVID-19. Their study hypothesised that the short-term economic effect of the pandemic would be governed by public expectation. The findings illustrated a high standard deviation in the received responses, implying that public perception of the pandemic's economic impact was uncertain. They further argued that utilising monetary policy to revitalise the economy would work in the short run but not in the medium run.

Subsequently, Barro et al. (2020) used country-level regression models to compare the current COVID-19 pandemic with the Spanish flu of the early 1900s. Their estimations identified that the economic decline in gross domestic product (GDP) caused by the Spanish flu showed a similar pattern to the COVID-19 pandemic. Compared to the Spanish flu, the COVID-19 pandemic had a more significant percentage decline, albeit with a notably less mortality shock.

In Egypt, Elgin et al. (2020) attempted to construct an index of the global economic stimulus packages that governments had introduced in response to the COVID-19 pandemic. The paper first quantified the economic policies utilised by national governments throughout the COVID-19 pandemic, then used the Principal Component Analysis (PCA) methodology to construct the index. The construction of this index allowed the paper to aggregate and standardise the governmental responses across countries.

Subsequently, the findings indicated a significant correlation between population characteristics, public health-related variables and economic variables with government-announced economic stimulus packages. For example, it was discovered that countries with a higher median age, a lower number of hospital beds per capita and a higher GDP per capita typically had a higher stimulus package announced by the government. The paper also implied that government responses were motivated to react to the pandemic as a health crisis rather than an economic crisis. Barrot et al. (2020) attempted to determine the sectoral effects of implementing social distancing measures in France. By employing a standard model of production networks, they identified that social distancing measures had resulted in a 5.6 percent drop in the French GDP due to work-from-home enforcement and the shutting down of non-essential economic activity.

In China, it was discovered that COVID-19's impact on the economy was less due to death, sickness or the time sacrificed in taking care of the ill but rather fear, stigma and discrimination (Gong et al., 2020). The paper debated that keeping the economic impact of the pandemic to a minimum is a delicate balancing act between keeping the economy running and preventing a health crisis. It also distinguished the effects of the pandemic by explaining its effects in isolation at the micro, sectoral and macro levels. On the financial issue, a recent research paper in Turkey analysed the stock index changes during the COVID-19 pandemic. Kartal et al. (2020) utilised the XU100 index in Turkey as their dependent variable while employing the MSCI Emerging Market Index, Volatility Index, oil prices, CDS spreads, Treasury Bond Interest Rates, foreign exchange rate, and other variables as the independent variables. They used a dummy variable to account for the presence of COVID-19.

Locally in Malaysia, Chia et al. (2020) measured the impact of the COVID-19 pandemic on the returns on the Kuala Lumpur Composite

Index (KLCI). Using a simple Ordinary Least Squares (OLS) regression model, they discovered the following: Firstly, the daily new cases had a significant but minimal impact on the KLCI. Secondly, the impact of the pandemic on companies was affected by their capital size. Thirdly, Shariah-compliant indices suffered lower losses than their non-Shariah counterparts. It was also identified that the number of daily deaths had the most insignificant impact on the indices. Further research conducted by Ashraf (2020) on the same topic as Chia et al. (2020) attempted to identify the impact at a country level. In contrast to the previously mentioned paper that focused on Malaysia specifically, Ashraf (2020) utilised data from 64 countries instead to identify the impact of the COVID-19 pandemic. He discovered that at a general level, stock markets responded negatively as the number of confirmed COVID-19 cases increased.

Chia et al. (2020) concluded that the response of stock markets towards the number of deaths due to COVID-19 was weak. Furthermore, the results indicated that the impact of the pandemic reduced over time, determining that early stock market reactions during the pandemic had a more robust response to the increasing number of cases, while the reaction became much weaker as time passed. They thus concluded that the market adjusted to the existence of the pandemic at a quick pace. Keh and Tan (2021), Nugroho and Pertiwi (2021) and Tanveer (2021) also corroborated the above studies by identifying that the increase in COVID-19 cases negatively affected the stock market regardless of country. Notably, Keh and Tan (2021) further examined government responses in Malaysia and how they affected the stock market. The paper discovered that different policies positively and negatively affected the economy and stock market. For example, workplace closures adversely influenced the stock market, while stay-at-home requirements, international travel control and income support had positive impacts.

Baharudin et al. (2021) examined the Malaysian government's policies and how they affected consumer confidence. They utilised surveys to determine the general response to the Movement Control Order (MCO) to achieve their goal. Their survey results indicated that most respondents were optimistic about MCO compliance, and most supported its implementation. Furthermore, it was noted that most respondents were optimistic about the financial assistance offered by the government.

Song et al. (2021) used event studies to identify the impact of key events in Malaysia and their effects on the stock market during the pandemic. They found that the market initially reacted negatively during the early stages of the MCO, but the reaction turned positive over time. They hypothesised that the shift of reactions was due to low interest rates, a large number of stimulus packages and the resumption of economic activity after the initial stages of the pandemic. The paper also argued that government stimulus packages lost their effectiveness in rallying the stock market during the later stages of the pandemic.

Another notable research paper is Ishak and Jiun (2021), which reported that cyclical industries were more severely affected by COVID-19. Besides, Mubarok and Al Arif (2021) examined the impact of the COVID-19 pandemic on Islamic stocks and discovered that they were negatively affected by the pandemic but on a lower magnitude than their conventional counterparts. Azman et al. (2021) corroborated their results. Zainuddin et al. (2021) identified that the pandemic negatively affected the Malaysian export sector, while Habibullah et al. (2021) found that the pandemic had a negative effect on the labour sector.

Research Gap

Among the literature concerning the economic effects of the pandemic, most studies focus on the economic impact by analysing the gross domestic product (GDP) as well as viewing the pandemic's effect from a health crisis perspective (Meltzer et al., 1999; Smith et al., 2010; Keogh-Brown et al., 2011; Qiu et al., 2018).

The existing research lacks analysis of the effects of government policies in response to the COVID-19 outbreak. Furthermore, most research had a short period (Lee et al., 2020; Chia et al., 2020), which did not consider the market crashes and rebounds during the entire year in addition to the spike in the number of cases towards the end of 2020. Therefore, this study fills the gap by looking into the changes in factors related to COVID-19, government policies and their impact on the stock index.

Hypothesis Development

Based on an earlier study by Lee et al. (2020) and Chia et al. (2020), they expect an increase in the number of new daily COVID-19 cases

will result in a negative drop in the market index. Financial markets are expected to react negatively to the news of increasing COVID-19 cases. Therefore, hypothesis H_1 is proposed and assumes that the relationship between the daily new cases of COVID-19 and the stock index is negative.

H_1: The daily new COVID-19 cases negatively affect the stock index.

A negative relationship is also expected between the daily new deaths of COVID-19 and the stock index. Financial markets are expected to react negatively to the news of increasing COVID-19 deaths. Therefore, hypothesis H_2 is proposed as follows:

H_2: The daily new deaths of COVID-19 have a negative relationship with the stock index.

The MCO had a direct effect of reducing the level of economic activities by restricting human movement. Therefore, the convention would imply that the MCO would have an adverse impact on the stock index. Nonetheless, Chia et al. (2020) showed that the MCO had an unexpected positive relationship with the stock indices and hypothesised that it was due to favourable market sentiment. It was explained that implementing the MCO was viewed as a positive effort by the government to control the pandemic and resulted in positive market sentiment. However, it is noted that the paper covered a short sample period of only four months and might not have accounted for the MCO's effects in the long run. Therefore, hypothesis H_3 is proposed as below:

H_3: The movement control order negatively affects the stock index.

The CMCO was implemented right after the end of the MCO and marked the start of businesses and economic activity reopening. Nevertheless, a negative sign is expected between the CMCO and the stock indices as economic activity was still restricted during the period. Therefore, hypothesis H_4 is proposed as follows:

H_4: The conditional movement control order negatively affects the stock index.

The RMCO was implemented after the end of the CMCO and further opened the economy. It is believed that the sign of the RMCO with the

KLCI would be positive as economic activity had begun recovering during this period. Therefore, the following hypothesis H_5 is proposed:

H_5: The recovery movement control order positively affects the stock index.

The moratorium on loan repayment is expected to affect the stock indices positively. Hypothesis H_7 is proposed as it is hypothesised that the moratorium's implementation created positive sentiments. It can be viewed as an effort by the government to reduce the adverse effects of COVID-19 on the economy.

H_6: The moratorium on loan repayment positively affects the stock index.

The 2020 Economic Stimulus Package (ESP), Bantuan Prihatin Nasional (BPN), PENJANA Economic Stimulus Package and KITA PRIHATIN Economic Stimulus Package are all expected to influence the stock indices positively. This expectation assumes that a government-mandated stimulus package will create a positive market sentiment, positively affecting the stock indices. Therefore, hypotheses H_7 until H_{10} are proposed as below:

H_7: The economic stimulus package (ESP) positively affects the stock index.
H_8: Bantuan Prihatin Nasional (BPN) positively affects the stock index.
H_9: The PENJANA Economic Stimulus Package positively affects the stock index.
H_{10}: The KITA PRIHATIN Economic Stimulus Package positively affects the stock index.

The PRIHATIN SME Economic Stimulus Package is expected to influence the stock indices positively because it is assumed that positive market sentiment will be created from its announcement. Therefore, hypothesis H_{11} is proposed:

H_{11}: The PRIHATIN SME Economic Stimulus Package positively affects the stock index.

The Malaysian government announced the i-Sinar withdrawal on 21st December 2020, allowing funds to be withdrawn from the Employees

Provident Fund (EPF). The news is expected to influence the stock indices positively due to the assumption that positive market sentiment will be created from its announcement. Therefore, hypothesis H_{12} is proposed as follows:

H_{12}: i-Sinar EPF withdrawal has a positive sign with the stock index.

METHODOLOGY

Daily data from 1st February 2020 to 31st December 2020 had been used for this study. The sample period was further divided into four sub-periods represented by dummy variables in the OLS model. The first sub-period was from 1st February 2020 to 17th March 2020. This period captures the trading period before implementing the first MCO.

The second sub-period was from 18th March 2020 to 4th May 2023, which marked the MCO period. The third sub-period was from 5th May 2020 to 9th June 2020, when the CMCO was implemented. The fourth sub-period was from 10th June 2020 to 31st December 2020, capturing the RMCO period. The second CMCO (CMCO2) implementation is excluded as it was not uniformly implemented nationwide.

The daily new cases of COVID-19 and the daily new deaths of COVID-19 as variables were used to represent the COVID-19 situation in Malaysia. They were chosen because these two values are assumed to affect public perception significantly compared to other metrics. This assumption is made as the information is publicly available and widely emphasised in the news. The Brent crude oil price was chosen as a variable as the KLCI is a price-taking stock market, which significantly affects it. It also functions as a control variable.

The CBOE Volatility Index and the Dow Jones Industrial Average were also selected as the global financial market's volatility. The KLCI's co-dependence on foreign markets is assumed to impact the Malaysian stock market. Various dummy variables were chosen to represent all the primary government responses to the COVID-19 pandemic. The independent variables are tabulated in Table 2, while the specification for the various dummy variables is shown in Table 3 .

Table 2

Independent Variables in OLS Models

Variable	Description	Unit of measurement
NC	Daily new cases of COVID-19	Number of Cases
ND	Daily new deaths of COVID-19	Number of Cases
BRENT	Brent crude oil price	USD per barrel
VIX	CBOE Volatility Index	USD
DJIA	Dow Jones Industrial Average	USD

Notes: All data are on a daily frequency. Sample period: 01/02/2020 – 31/12/2020. NC and ND are sourced from official news releases. BRENT, VIX and DJIA are sourced from Bloomberg.com.

Table 3

Dummy Variable Specification

Dummy Variable	Specification
Movement Control Order (MCO)	Dummy = 1 from 18/03/20 – 04/05/20, 0 otherwise
Conditional Movement Control Order (CMCO)	Dummy = 1 from 05/05/20 – 09/06/20, 0 otherwise
Recovery Movement Control Order (RMCO)	Dummy = 1 from 10/06/20 onwards, 0 otherwise
Moratorium on loan repayment (MORAT)	Dummy = 1 from 01/04/20 – 30/09/20, 0 otherwise
2020 Economic Stimulus Package (ESP)	Dummy = 1 from 27/02/20 onwards, 0 otherwise
Bantuan Prihatin Nasional (BPN)	Dummy = 1 from 27/03/20 onwards, 0 otherwise
PRIHATIN SME Economic Stimulus Package (SME)	Dummy = 1 from 06/04/20 onwards, 0 otherwise
PENJANA Economic Stimulus Package (PENJANA)	Dummy = 1 from 05/06/20 onwards, 0 otherwise
KITA PRIHATIN Economic Stimulus Package (PRIHATIN)	Dummy = 1 from 23/09/20 onwards, 0 otherwise
i-Sinar EPF withdrawal (ISINAR)	Dummy = 1 from 21/12/20 onwards, 0 otherwise

Notes: The MCO, CMCO, RMCO and MORAT periods are selected based on the execution date. The periods for ESP, BPN, SME, PENJANA, PRIHATIN and ISINAR are selected based on the announcement date. All information on dates is sourced from official press releases.

This study utilised the Ordinary Least Squares (OLS) model. Gujarati and Porter (2009) explained that the OLS model estimates the unknown parameters in a linear regression model. The OLS model was conducted by selecting the parameters of a linear function from a set of explanatory variables following the principle of least squares. It then minimises the sum of the squares of the differences between the dependent variable and those predicted by the linear function of the independent variable. Since multiple dummy variables were used, regressions were conducted on a staggered basis.

The equation used in this study is as follows:

$$KLCI_t = \beta_0 + \beta_1 NC_t + \beta_2 ND_t + \beta_3 BRENT_t + \beta_4 VIX_t + \beta_5 DJIA_t + \beta_6 MCO_t + \beta_7 CMCO_t + \beta_8 RMCO_t + \beta_9 MORAT_t + \beta_{10} ESP_t + \beta_{11} BPN_t + \beta_{12} SME_t + \beta_{13} PENJANA_t + \beta_{14} PRIHATIN_t + \beta_{15} ISINAR_t + e_t \quad (1)$$

Where:

$KLCI_t$ = Kuala Lumpur Composite Index at time t; NC_t = Daily new cases of COVID-19 at time t; ND_t = Daily new deaths of COVID-19 at time t; $BRENT_t$ = Brent crude oil price at time t; VIX_t = CBOE Volatility Index at time t; $DJIA_t$ = Dow Jones Industrial Average at time t; MCO_t = Movement Control Order at time t; $CMCO_t$ = Conditional Movement Control Order at time t; $RMCO_t$ = Recovery Movement Control Order at time t; $MORAT_t$ = Moratorium on loan repayment at time t; ESP_t = 2020 Economic Stimulus Package at time t; BPN_t = Bantuan Prihatin Nasional at time t; SME_t = PRIHATIN SME Economic Stimulus Package at time t; $PENJANA_t$ = PENJANA Economic Stimulus Package at time t; $PRIHATIN_t$ = KITA PRIHATIN Economic Stimulus Package at time t; $ISINAR_t$ = i-Sinar EPF withdrawal at time t. This study also utilised three diagnostic checks for the OLS model. The diagnostic checks would test for multicollinearity, autocorrelation and heteroscedasticity. The three diagnostic tests used were: Variance Inflation Factor (VIF) for multicollinearity, Durbin-Watson test for autocorrelation and White's test for heteroscedasticity.

RESULTS

As observed in Table 4, the daily new COVID-19 (NC) cases exhibited a very high standard deviation of 550.11 compared to most

other variables except for the Dow Jones Industrial Average. The high standard deviation was hypothesised to be primarily a result of the significant spike in the number of cases towards the end of 2020 from single-digit numbers before March 2020 to four-digit numbers by December 2020. The highest recorded daily number of new cases in 2020 was 2,234 cases on 10th December 2020.

Table 4

Descriptive Statistics of Variables

Variables	Mean	Min	Max	Median	SD
KLCI	1,509.62	1,217.28	1,694.33	1,516.94	92.97
NC	352.47	0	2,234	48	550.11
ND	1.45	0	11	0	2.18
BRENT	41.55	19	59	43	8.37
VIX	30.87	14.12	82.69	27.76	11.98
DJIA	26,808.52	19,898.92	30,409.56	27,173.96	2,511.90

Notes: All statistics are based on original data values. SD refers to standard deviation.

Tables 5 and 6 show the OLS results using the KLCI as the dependent variable regressed against the independent and dummy variables on a staggered basis. The adjusted R-square measured whether the newly added dummy variable was meaningful to the model. Tables 5 and 6 revealed that the number of new COVID-19 cases had a significant positive relationship with the KLCI. Nevertheless, the impact was minimal, with an increase of only 0.05 at most in the KLCI price with each additional new case.

The results differed from hypothesis $H_{1,}$ whereby the relationship was assumed to be negative. Contrary to hypothesis H_1, the number of new COVID-19 cases did not significantly influence the stock indices of the Malaysian stock market over a more extended period. In other words, investors have grown apathetic to the number of new COVID-19 cases in the long run. The sign between the growing number of COVID-19 cases and the stock market index was positive instead of negative over a more extended period. Nevertheless, the new COVID-19 deaths significantly and negatively impacted the KLCI, as shown in Tables 5 and 6. Therefore, H_2 was supported.

Regarding the dummy variables, the MCO had a significant negative sign with most models, aligning with expectations. The results indicated that the stock price during the MCO was lower than before.

The lower stock prices were due to the negative investor perceptions towards the stock market created by the announcement of the MCO.

Table 5

Results of OLS Regressions (KLCI as the Dependent Variable)

Variable	Dependent Variable: $KLCI_t$				
	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-2,118.28**	-2,341.97**	1,106.60	-2,909.89***	-923.16
	(0.03)	(0.02)	(0.21)	(0.00)	(0.26)
NC_t	0.03***	0.03***	0.03***	0.05***	0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ND_t	-5.07***	-5.99***	-5.32***	-1.59	-4.28***
	(0.00)	(0.00)	(0.00)	(0.33)	(0.00)
$BRENT_t$	1.35*	2.00***	3.52***	3.77***	5.20***
	(0.05)	(0.00)	(0.00)	(0.00)	(0.00)
VIX_t	-1.97***	-2.18***	-2.63***	-0.22	-2.59***
	(0.00)	(0.00)	(0.00)	(0.68)	(0.00)
$Ln(DJIA)_t$	356.49***	376.18***	28.68	414.69***	215.38***
	(0.00)	(0.00)	(0.74)	(0.00)	(0.00)
MCO_t	-39.54***	-	-	-35.30***	-1.23
	(0.00)			(0.00)	(0.92)
$CMCO_t$	-	-15.68	-	-	-
		(0.19)			
$RMCO_t$	-	-	66.16***	-	-
			(0.00)		
$MORAT_t$	-	-	-	60.55***	-
				(0.00)	
ESP_t	-	-	-	-	109.68***
					(0.00)
Adjusted R^2	0.8003	0.7919	0.8574	0.8425	0.8513
F-test	137.22***	130.35***	205.49***	156.93***	167.79***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
VIF	9.27	9.27	9.27	9.27	9.27
DW	0.36	0.37	0.46	0.57	0.47
WHITE	51.47***	62.42***	34.16	55.04***	57.96***
	(0.00)	(0.00)	(0.10)	(0.00)	(0.00)

Notes: *, ** and *** denote statistical significance at 10 percent, 5 percent and 1 percent, respectively. Values in parentheses are p-values. F-test represents the F-test of overall significance. VIF represents the highest Variance Inflation Factor found for the independent variables, excluding the dummy variables. DW represents the Durbin-Watson test. WHITE represents White's test.

Table 6

Results of OLS Regressions (KLCI as the Dependent Variable)

Variable	Dependent Variable: $KLCI_t$				
	Model 6	Model 7	Model 8	Model 9	Model 10
Intercept	-1,060.13	-775.73	1,355.88	-3,319.47***	-2,188.70**
	(0.21)	(0.38)	(0.12)	(0.00)	(0.02)
NC_t	0.02***	0.02***	0.03***	0.05***	0.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ND_t	-5.18***	-4.04**	-5.23***	-2.95	-4.65**
	(0.00)	(0.01)	(0.00)	(0.11)	(0.01)
$BRENT_t$	5.53***	5.59***	3.68***	0.60	1.25*
	(0.00)	(0.00)	(0.00)	(0.40)	(0.07)
VIX_t	-0.53	-0.52	-2.67***	-1.64***	-1.97***
	(0.29)	(0.33)	(0.00)	(0.00)	(0.00)
$Ln(DJIA)_t$	225.00***	197.36**	3.36	476.95***	363.86***
	(0.00)	(0.03)	(0.97)	(0.00)	(0.00)
MCO_t	-25.11**	-14.53	1.73	-49.46***	-40.86***
	(0.02)	(0.22)	(0.88)	(0.00)	(0.00)
BPN_t	78.75***	-	-	-	-
	(0.00)				
SME_t	-	70.88***	-	-	-
		(0.00)			
$PENJANA_t$	-	-	69.69***	-	-
			(0.00)		
$PRIHATIN_t$	-	-	-	-43.77***	-
				(0.00)	
$I\text{-}SINAR_t$	-	-	-	-	20.78
					(0.28)
Adjusted R^2	0.8467	0.8353	0.8619	0.8096	0.8004
F-test	161.91***	148.81***	182.85***	124.89***	117.90***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
VIF	9.27	9.27	9.27	9.27	9.27
DW	0.50	0.45	0.47	0.44	0.34
WHITE	63.26***	80.27***	49.23***	61.94***	56.90***
	(0.00)	(0.00)	(0.02)	(0.00)	(0.00)

Notes: *, ** and *** denote statistical significance at 10 percent, 5 percent and 1 percent, respectively. Values in parentheses are p-values. F-test represents the F-test of overall significance. VIF represents the highest Variance Inflation Factor found for the independent variables, excluding the dummy variables. DW represents the Durbin-Watson test. WHITE represents White's test.

The RMCO, moratorium on loan repayment, 2020 Economic Stimulus Package, Bantuan Prihatin Nasional, PRIHATIN SME Economic Stimulus Package and PENJANA Economic Stimulus Package all had significant positive signs with the KLCI, which was also in line with expectations. Nevertheless, the KITA PRIHATIN Economic Stimulus Package had a lower stock price than the negative sign in the above results. It was hypothesised that the lower stock price shown was due to the negative perception that the government had approved too many cash handouts, as the KITA PRIHATIN Economic Stimulus Package was the fifth stimulus package in 2020. The CMCO and i-Sinar EPF withdrawal did not indicate a significant relationship with the KLCI. The Brent crude oil price had a significant positive impact on the KLCI in most models. Similarly, the Dow Jones Industrial Average positively and significantly impacted the KLCI. In contrast, the VIX had a significant negative relationship with the KLCI, indicating that global market volatility adversely affected the KLCI.

In Tables 5 and 6, the F-test of overall significance indicated that all models were significant. Based on auxiliary regressions, the VIF identified was 9.27, indicating no multicollinearity problem. Autocorrelation and heteroscedasticity were present in the above models. This observation was shown by the Durbin-Watson d-statistic of less than 0.50 and significant White's test. This study utilised Heteroskedasticity and Autocorrelation Consistent (HAC) standard errors and covariance to address the problems proposed by Newey and West (1986). The results of the corrected OLS models are presented in Tables 7 and 8.

Based on Tables 7 and 8, the HAC corrected model had similar results to Tables 5 and 6 concerning the sign of coefficients. The HAC corrected model indicated that the p-values for all the independent variables had been slightly adjusted for the model. Nevertheless, the independent variables that affected the KLCI remained significant after the HAC corrections. The number of new daily COVID-19 cases in Malaysia continued to be positively significant with the KLCI in all models. In contrast, the number of deaths remained negatively significant with the KLCI in all models except Model 4a. Therefore, the findings supported H_2 but not H_1.

For the dummy variables in Tables 7 and 8, the MCO showed that the stock price remained low in most models. The RMCO, MORAT, ESP, BPN, SME and PENJANA displayed a positive sign with the KLCI. Therefore, H_2, H_3, H_5, H_6, H_7, H_8, H_9 and H_{10} were supported.

KITA PRIHATIN was significant but negatively related to the KLCI. In short, all government stimulus packages were supported except for the KITA PRIHATIN Economic Stimulus Package, which had a negative sign. The CMCO and i-Sinar EPF withdrawal were not significant. Therefore, H_4, H_{11} and H_{12} were not supported. A summary of the results is shown in Table 9.

Table 7

HAC Corrected OLS Regressions (Dependent Variable: KLCI)

Variable	Dependent Variable: $KLCI_t$				
	Model 1a	Model 2a	Model 3a	Model 4a	Model 5a
Intercept	-2,118.28	-2,341.97	1,106.60	-2,909.89*	-923.16
	(0.14)	(0.11)	(0.40)	(0.06)	(0.49)
NC_t	0.03***	0.03***	0.03***	0.05***	0.02**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.04)
ND_t	-5.07***	-5.99***	-5.32***	-1.59	-4.28***
	(0.00)	(0.00)	(0.00)	(0.24)	(0.00)
$BRENT_t$	1.35	2.00	3.52***	3.77***	5.20***
	(0.30)	(0.12)	(0.00)	(0.00)	(0.00)
VIX_t	-1.97**	-2.18**	-2.63***	-0.22	-2.59***
	(0.03)	(0.02)	(0.00)	(0.82)	(0.00)
$Ln(DJIA)_t$	356.49**	376.18***	28.68	414.69***	215.38
	(0.01)	(0.00)	(0.83)	(0.00)	(0.11)
MCO_t	-39.54*	-	-	-35.30*	-1.23
	(0.06)			(0.08)	(0.95)
$CMCO_t$	-	-15.68	-	-	-
		(0.42)			
$RMCO_t$	-	-	66.16***	-	-
			(0.00)		
$MORAT_t$	-	-	-	60.55***	-
				(0.00)	
ESP_t	-	-	-	-	109.68***
					(0.00)
Adjusted R^2	0.8003	0.7919	0.8574	0.8425	0.8513
F-test	137.22***	130.35***	205.49***	156.93***	167.79***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Notes: *, ** and *** denote statistical significance at 10 percent, 5 percent and 1 percent, respectively. Values in parentheses are p-values. F-test represents the F-test of overall significance. The model is corrected using HAC standard errors and covariance.

Table 8

HAC-Corrected OLS Regressions (Dependent Variable: KLCI)

Variable	Dependent Variable: $KLCI_t$				
	Model 6a	Model 7a	Model 8a	Model 9a	Model 10a
Intercept	-1,060.13 (0.48)	-775.73 (0.59)	1,355.88 (0.30)	-3,319.47** (0.03)	-2,188.70 (0.13)
NC_t	0.02*** (0.00)	0.02*** (0.00)	0.03*** (0.00)	0.05*** (0.00)	0.03** (0.02)
ND_t	-5.18*** (0.00)	-4.04*** (0.00)	-5.23*** (0.00)	-2.95** (0.03)	-4.65*** (0.00)
$BRENT_t$	5.53*** (0.00)	5.59*** (0.00)	3.68*** (0.00)	0.60 (0.65)	1.25 (0.35)
VIX_t	-0.53*** (0.50)	-0.52 (0.56)	-2.67*** (0.00)	-1.64* (0.09)	-1.97** (0.04)
$Ln(DJIA)_t$	225.00 (0.13)	197.36 (0.18)	3.36 (0.98)	476.95*** (0.00)	363.86** (0.01)
MCO_t	-25.11 (0.25)	-14.53 (0.56)	1.73 (0.92)	-49.46** (0.02)	-40.86* (0.05)
BPN_t	78.75*** (0.00)	-	-	-	-
SME_t	-	70.88*** (0.00)	-	-	-
$PENJANA_t$	-	-	69.69*** (0.00)	-	-
$PRIHATIN_t$	-	-	-	-43.77*** (0.00)	-
$ISINAR_t$	-	-	-	-	20.78 (0.27)
Adjusted R^2	0.8467	0.8353	0.8619	0.8096	0.8004
F-test	161.91*** (0.00)	148.81*** (0.00)	182.85*** (0.00)	124.89*** (0.00)	117.90*** (0.00)

Notes: *, ** and *** denote statistical significance at 10 percent, 5 percent and 1 percent, respectively. Values in parentheses are p-values. F-test represents the F-test of overall significance. The model is corrected using HAC standard errors and covariance.

Table 9

Summary of Results

Hypotheses	Description	Result
H_1	The daily new COVID-19 (NC) cases negatively affect the stock index	Not supported
H_2	The daily new deaths of COVID-19 (ND) have a negative relationship with the stock index	Supported
H_3	The Movement Control Order (MCO) negatively affects the stock index	Supported
H_4	The Conditional Movement Control Order (CMCO) negatively affects the stock index	Not supported
H_5	The Recovery Movement Control Order (RMCO) has a positive sign with the stock index	Supported
H_6	The moratorium on loan repayment (MORAT) positively affects the stock index	Supported
H_7	The Economic Stimulus Packages (ESP) positively affect the stock index	Supported
H_8	The Bantuan Prihatin Nasional (BPN) positively affects the stock index	Supported
H_9	The PENJANA Economic Stimulus Package positively affects the stock index	Supported
H_{10}	The KITA PRIHATIN Economic Stimulus Package positively affects the stock index	Not Supported
H_{11}	The SME Economic Stimulus Package positively affects the stock index.	Supported
H_{12}		Not Supported

CONCLUSION

This study investigated the impact of the COVID-19 pandemic and government responses on the Malaysian stock market. Using daily data from 1st February 2020 to 31st December 2020, the empirical results indicated that the number of daily new COVID-19 cases positively and negatively impacted the stock index. Nevertheless, most of the relationships were positive. As the number of new cases of COVID-19 increased, investors became more apathetic to the news.

Regarding government responses, the MCO had an overall negative impact on the stock market, while the RMCO had a positive impact. Most government stimulus packages positively impacted the stock index, including the 2020 Economic Stimulus Package, Bantuan Prihatin Nasional, PENJANA Economic Stimulus Package, and PRIHATIN SME Economic Stimulus Package. The only stimulus package with a negative impact was the KITA PRIHATIN Economic Stimulus Package. All other government responses, such as CMCO and i-Sinar EPF withdrawal, had an insignificant impact on the Malaysian stock market. These findings suggest that most government responses have mitigated the negative impact of daily new COVID-19 cases on the stock market returns.

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REFERENCES

Al-Awadhi, A. M., Alsaifi, K., Al-Awadhi, A., & Alhammadi, S. (2020). Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns. *Journal of Behavioral and Experimental Finance*, *27*, 100326.

Ali, N., Md Nassir, A., Hassan, T., & Zainal Abidin, S. (2010). Short-run stock overreaction: Evidence from Bursa Malaysia. *International Journal of Economics and Management*, *4*(2), 319–333.

Ashraf, B. N. (2020). Stock markets' reaction to COVID-19: Cases or fatalities? *Research in International Business and Finance*, *54*, 101249.

Azman, N. H. N., Zabri, M. Z. M., & Kepili, E. I. Z. (2021). Nexus between Islamic microfinancing and financial wellbeing of micro-entrepreneurs during the COVID-19 pandemic in Malaysia. *Jurnal Ekonomi Malaysia*, *55*(1), 135–146.

Baharudin, S., Waked, H. N., & Paimen, M. S. (2021). MCO in Malaysia: Consumer confidence and households' responses. *Jurnal Ekonomi Malaysia*, *55*(1), 99–112.

Barro, R. J., Ursúa, J. F., & Weng, J. (2020). *The coronavirus and the great influenza pandemic: Lessons from the "Spanish flu" for*

the coronavirus's potential effects on mortality and economic activity (No. w26866). National Bureau of Economic Research.

Barrot, J-N., Grassi, B., & Sauvagnat, J. (2020). Sectoral effects of social distancing. *Covid Economics*, *1*(3), 85–2.3.

Carlsson-Szlezak, P., Reeves, M., & Swartz, P. (2020). What coronavirus could mean for the global economy? *Harvard Business Review*, *3*.

Chen, M. P., Lee, C. C., Lin, Y. H., & Chen, W. Y. (2018). Did the SARS epidemic weaken the integration of Asian stock markets? Evidence from smooth time-varying cointegration analysis. *Economic Research-Ekonomska Istraživanja*, *31*(1), 908–926.

Chia, R. C. J., Liew, V. K. S., & Rowland, R. (2020). Daily new COVID-19 cases, the movement control order, and Malaysian stock market returns. *International Journal of Business and Society*, *21*(2), 553–568.

Chou, J., Kuo, N., & Peng, S. (2003, September 11–12). *The potential impacts on the Taiwanese economy of the outbreak of SARS*. Paper presented at 2003 Asian Economic Panel, Keio University, Tokyo.

Dietrich A., Keuster K., Müller G. J., & Schoenle, R. (2020). *News and uncertainty about COVID-19: Survey evidence and short-run economic impact*. Working paper 20(12). Federal Reserve Bank of Cleveland.

Elgin, C., Basbug, G., & Yalaman, A. (2020). Economic policy responses to a pandemic: Developing the COVID-19 economic stimulus index. *Covid Economics*, *1*(3), 40-53.

Gong, B., Zhang, S., Yuan, L., & Chen, K. Z. (2020). A balancing act: Minimising economic loss while controlling novel coronavirus pneumonia. *Journal of Chinese Governance*, 1–20.

Gujarati, D. N., Porter, D. C. (2009). *Basic econometrics* (5th ed.). McGraw-Hill Irwin.

Habibullah, M. S., Saari, M. Y., Din, B. H., Safuan, S., & Utit, C. (2021). Labour market reactions to lockdown measures during the COVID-19 pandemic in Malaysia: An empirical note. *Jurnal Ekonomi Malaysia*, *55*(1), 39–49.

Ishak, N., & Jiun, R. C. C. (2021). Cyclical industries' stock performance reaction during COVID-19: A systematic literature review. *Jurnal Ekonomi Malaysia*, *55*(1), 147–158.

Kartal, M. T., Depren, Ö, & Depren, S. K. (2020). The determinants of main stock exchange index changes in emerging countries: Evidence from Turkey in COVID-19 pandemic age. *Qualitative Finance and Economics*, *4*(4), 526–541.

Keh, C. G., & Tan, Y. T. (2021). COVID-19: The impact of government policy responses on conomic activity and stock market performance in Malaysia. *Jurnal Ekonomi Malaysia*, *55*(1), 121–131.

Lee, K. Y. M., Jais, M., & Chan, C. W. (2020). Impact of COVID-19: Evidence from Malaysian stock market. *International Journal of Business and Society*, *21*(2), 607-628.

Meltzer, M. I., Cox, N. J., & Fukuda, K. (1999). The economic impact of pandemic influenza in the United States: Priorities for intervention. *Emerging Infectious Diseases*, *5*(5), 659–671.

Mubarok, F., & Al Arif, M. N. R. (2021). Pandemic attack and Islamic stocks index: A cross country analysis. *Jurnal Ekonomi Malaysia*, *55*(1), 27–37.

Newey, W. K., & West, K. D. (1986). A simple, positive semi-definite, heteroscedasticity and autocorrelation consistent covariance matrix. *Econometrica*, *55*(3), 703–708.

Nugroho, D. S., & Pertiwi, M. I. (2021). Stock price reaction when COVID-19 exists: Moderating by firm's operating cash flow. *Jurnal Ekonomi Malaysia, 55*(1), 71–85.

Qiu, W., Chu, C., Mao, A., & Wu, J. (2018). The impacts on health, society, and economy of SARS and H7N9 outbreaks in China: A case comparison study. *Journal of Environmental and Public Health, 7*(1), 1-7.

Siddiquei, M. I., & Khan, W. (2020). Economic implications of coronavirus. *Journal of Public Affairs*, *20*(4), e2169.

Siu, A., & Wong, Y. R. (2004). The economic impact of SARS: The case of Hong Kong. *Asian Economic Papers, 3*(1), 62-83.

Smith, R. D., Keogh-Brown, M. R., Barnett, T., & Tait, J. (2009). The economy-wide impact of pandemic influenza on the UK: A computable general equilibrium modelling experiment. *British Medical Journal*, 339, b4571. https://doi.org/10.1136/bmj.b4571

Smith, R. D., Keogh-Brown, M. R., & Barnett, T. (2011). Estimating the economic impact of pandemic influenza: An application of the computable general equilibrium model to the UK. *Social Science & Medicine*, *73*(2), 235–244.

Song, S. I., Yazi, E., Morni, F., & Janang, J. T. (2021). COVID-19 and stock return: Evidence from Malaysia. *International Journal of Banking and Finance*, *16*(2), 111-140. https://doi.org/10.32890/ ijbf2021.16.2.5

Tanveer, Z. (2021). Event analysis of the COVID-19: Evidence from the stock markets of twenty highly infected countries. *Jurnal Ekonomi Malaysia*, *55*(1), 3–25.

Toda, A. A. (2020). *Susceptible-infected-recovered (SIR) dynamics of COVID-19 and economic impact*. Cornell University. https://arxiv.org/pdf/2003.11221.pdf

Yoldascan, E., Kurtaran, B., Koyuncu, M., & Koyuncu, E. (2010). Modeling the economic impact of pandemic influenza: A case study in Turkey. *Journal of Medical Systems*, *34*(2), 139–145.

Zainuddin, M. R. K., Shukor, M. S., Zulkifli, M. S., & Abdullah, A. H. (2021). Dynamics of Malaysia's bilateral export post COVID-19: A gravity model analysis. *Jurnal Ekonomi Malaysia*, *55*(1), 51–69.

Zaremba A., Kizys R., Aharon D. Y., & Schoenle, R. (2020). Infected markets: Novel coronavirus, government interventions, and stock return volatility around the globe. *Finance Research Letters, 35,* 101597.