STOCK MARKET RETURNS AND GOVERNMENT STRINGENCY INDEX DURING THE MCO: EVIDENCE FROM THE TECHNOLOGY SECTOR IN MALAYSIA

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ABSTRACT

Financial markets are influenced by various external factors, including natural catastrophes and technological advances. The COVID-19 epidemic was an unprecedented occurrence that led to a worldwide lockdown, had a profound effect on business operations, and created a substantial shock to the financial market. The surge in COVID-19 cases has had a significant impact on the Malaysian economy, prompting a closer examination of how this global event has adversely affected the performance of the Malaysian stock market. Furthermore, the imposition of government restrictions on personal mobility and commercial activity might have a substantial effect on an economy that is primarily dependent on services, such as Malaysia. COVID-19 pandemic had a negative impact on the performance of listed companies in the Malaysian stock exchange during Movement Control Order (MCO). Nevertheless, earlier researchers have primarily focused on analysing the impact of various crises on stock market performance, with limited exploration on the factors such as government intervention policy. Henceforth, it is worthwhile for this research to scrutinise the effect of COVID-19 cases, fatalities, and the government stringency index on the stock daily returns in the technology sector. This study employed panel data, referring to an assortment of 88 firms (cross-sectional units) that were observed over a two-year time series (i.e., January 1, 2020, until December 31, 2021). Three static linear panel models (pooled OLS, fixed effect model, and random effect model) were used to validate the hypothesis. It is intriguing to note that the findings suggest a positive relationship between confirmed case rate (CCR) and case fatality rate (CFR) with the daily stock returns of technology firms. This implies that the COVID-19 crisis has accelerated the usage and adoption of digital devices, resulting in increased revenue and improved profitability. In addition, the government stringency index was the most significant predictor, as lockdown measures have a harmful impact on the economic which might be seen unfavourably by investors. This study provides insightful inputs into how investors perceive and manage risk, particularly when investment opportunities in other financial products decline, and makes the stock market an attractive option for investors to allocate their funds.

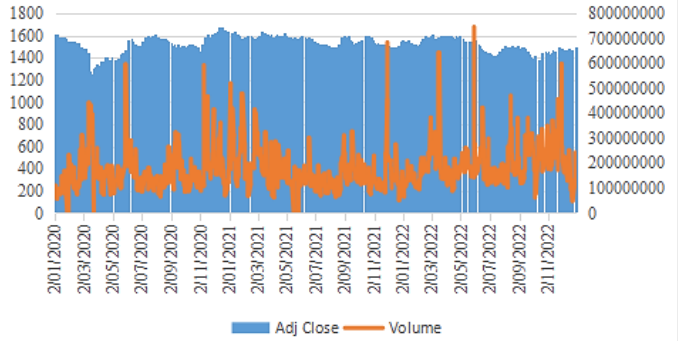
Keywords*:* Stock returns; government stringency; covid-19; technology sector

INTRODUCTION

Throughout history, it has been clear that unexpected events occur from time to time that were not foreseen or predicted by anyone. These are the occurrences that catch everyone by surprise to such an extent that they create chaos in the business environment and disrupt the daily lives of humans. These occurrences are referred to as black swan events (Taleb, 2007). This event has triggered profound disruption in labour markets, universal supply chains, consumer behaviour, and particularly capital markets in emerging nations who have fewer resources to mitigate unforeseen shocks (Ellahi, Rehman, Sulehri, Ahmad, & Qureshi, 2021). When reviewing the earliest literature about how stock price reaction to the neglected risk, i.e., outbreak of COVID-19, the literatures have identified the factors that influenced the risk-adjusted rate of returns such as international business activities and corporate liquidity position. Investors were rapidly incorporated such information with the outspreading of novel coronavirus (COVID-19), considering that the pandemic might provoke adverse upshot on global macroeconomic growth (Ramelli & Wagner, 2020) wherein COVID-19 has been listed as top ten risk factor in the World Economic Forum report in 2020.

On 25 January 2020, Malaysia reported its initial COVID-19 case involving a Chinese national who had travelled to Malaysia from Singapore (See et al, 2020). During the transformative constitutional phase, there was a significant increase in cases resulting from a large Islamic missionary gathering in Sri Petaling on 27 February 2020. This gathering was reported as having the highest number of coronavirus cases in Southeast Asia on 15 March 2020 (Mat et al., 2020). As a result, the Malaysian government implemented the Movement Control Order (MCO) on 18 March 2020, which was later replaced by the Conditional MCO (CMCO) on 4 May 2020. The Recovery MCO (RMCO) was in effect from 10 June 2020 to 31 March 2021. On January 12, 2021, the monarch of Malaysia made the decision to declare a state of emergency. This action was taken in response to the significant number of deaths, which had surpassed 138,000, and the strain that the healthcare system was experiencing as it approached its maximum capacity. Between 5 July 2021 and 3rd January 2022, Malaysia successfully moved into phases two and three of the national recovery plan.

Figure 1: Share Price Movement (1-1-2020 ~ 31-12-2022)



Analysing the adverse effects of the COVID-19 crisis on the Malaysian stock market is crucial because of its repercussions on the Malaysian economy. Throughout history, it is evident that unforeseen occurrences sometimes take place. The unforeseen uncertainties that lay ahead could be abruptly transforming the way individuals living their life which including the manifestation of fear emotions amongst investors that is linked with the heightening selling pressure in the financial markets. Howbeit, certain researchers have pointed the sharp decline of share prices is merely lasted for short period due to the market labour surplus supply, which subsequently follows by price rebounding (Toda, 2020). In the Malaysian context, FTSE Bursa Malaysia KLCI Index (KLCI) dipped to the lowest point of 1207.80 on 19 March 2020, subsequent to the overreaction of investors towards national lockdown as well as the uncertainties laid ahead. Most economic operations in Malaysia have stopped as a result of the coronavirus's exponential spread, which has had a negative impact on stock market performance. The KLCI fell to its lowest level of 1,219.71 on the second day of first MCO announced. After that, KLCI progressively climbed back up to the 1,400-point mark (Lee et al. 2020). According to Lee et al. (2020), the high number of confirmed COVID-19 cases had a negative impact on the performance of the Kuala Lumpur Composite Index (KLCI). As there were delays in production and delivery, several companies, particularly those with large debt, appeared to be having financial issues. The situation undermines investors' trust, which prompts them to retaliate by selling their shares. In fact, Bursa Malaysia reported an RM5.9 billion net foreign outflow. Net foreign outflow reached a record high of RM24bil in 2020. As a result, the market for corporate bonds and stock decline. Kenny Yee, head of research at Rakuten Trade, claimed that constant selling by foreign investors has lowered the values of nearly all of the top 10 companies that make up the FBM KLCI. These companies' price-to-earnings (PE) ratio is lower than it has historically been as a result. During pandemic time, apart from the technology and transport indices, all the other are trading below their average PE for the period from 2015 to 2019.

Mehmood, Mohd-Rashid, Aman-Ullah, Shafique, and Tajuddin (2022) indicate that the COVID-19 pandemic had a negative impact on the performance of listed companies in the Malaysian stock exchange during Movement Control Order (MCO). The authors elaborate on how different sectors were impacted to varying degrees. Sectors such as energy, property, and finance sectors were particularly susceptible to negative effects from the movement restrictions. In addition, the results indicate how the pandemic has altered the way people interact, leading to a positive impact on technology sector's performance. There is a growing demand for IT services such as cloud infrastructure, communication equipment, and network equipment to accommodate remote work as well as online classes. Furthermore, as reported by Aman (2021), the technology sector is set to benefit significantly from the 12th Malaysia Plan (12MP), with the government planning to allocate approximately RM28 billion to upgrade existing network equipment for faster and real-time communications.

The objective of this research is to analyse the effect of COVID-19 cases, deaths, and the government stringency index on the Malaysian capital market. Mishra et al. (2022) have noted that previous studies have primarily focused on examining the impact of various crises on stock market performance, with limited exploration on the factors such as government intervention policy and vaccinations. The primary aim of this research is to examine the influence of the COVID-19 epidemic on the daily returns of technology listed companies. The specific objective of the study is to examine the effect of daily growth in confirmed cases, daily growth of death case, and the government stringency index on technology firms' returns.

This research makes a substantial contribution to the current body of literature in two distinct manners. Initially, the researcher evaluate the ability of technology firms to withstand and remain unaffected by the financial challenges brought about by the COVID-19. This research seeks to provide guidance to Ministry of Health in developing a more efficient regulatory framework to prevent the outspread of the coronavirus while also ensuring economic sustainability. Moreover, analysing the association between the number of COVID-19 cases and share price movement would aid the government in promoting economic recovery and formulating a robust strategy to enhance trust among enterprises and consumers. Furthermore, it plays a crucial role in the corporate setting by facilitating the creation of effective business strategies and enhancing grasp of sector-specific dynamics within the Malaysian context.

LITERATURE REVIEWS

EFFICIENT MARKET HYPOTHESIS (EMH)

The efficient market hypothesis (EMH), as established by Fama in his survey article "Efficient Capital Markets" has gained widespread acceptance among economists and academia (Fama 1970). This theory articulates that capital markets are efficient in incorporation of news and information related to specific stocks or the entire market. The EMH is usually categorised into three main forms: weak, semi-strong, and strong. Even though the EMH controversy has persisted for a considerable duration, research

suggests that the semi-strong form is more likely to dominate, particularly in cases when markets are efficient and valuation models accurately assess the worth of stocks (Ying et al., 2019).

In addition, Fama (1965) provided an explanation that when information is freely accessible, investors may interpret it distinct ways, leading to random movements in market prices (also known as the random walk theory). In a study conducted by Fama (1998), it was discovered that any anomalies in stock returns tend to diminish over time, especially when there are changes or shifts in the market. Furthermore, it is usual for investors to overreact or underreact to new relevant information regarding securities. In his work, Malkiel (2003) highlighted that the rationality or irrationality of investors does not have the power to generate abnormal returns from a portfolio of securities. As Malkiel (2003) explains, the capital market mechanism promptly adjusts asset prices when new pertinent information emerges.

The efficiency of the stock market is often influenced by various events, each affecting it to varying extents (Okzan, 2021). Machmuddah et al. (2020) discovered that various corporate activities like stock splits, right issues, and warrants have a gradual but noticeable impact on the stock market efficiency. On the other hand, unforeseen events like economic sanctions, strikes, terrorism, and pandemics can have a significant and immediate effect on stock markets. When a pandemic starts, retail investors may experience distress about their investments. This phenomenon is known as the "leverage effect", indicating that negative news triggers a greater potential for loss compared to good news. This might be attributable to the fact that investors have been advised to be more vigilant about negative news in the market owing to the fluctuating relationship between return shocks and volatility adjustments, leading to increased uncertainty (Mishra et al., 2022).

DAILY STOCK PRICE RETURNS (DR)

The COVID-19 outbreak had a significant impact, starting as a health crisis and rapidly escalating into an economic calamity. The economic crisis eventually shaped investors' negative perception of stock investing. They expressed scepticism about the potential of their investments to deliver their expected returns (Zulfikar, 2022). The COVID-19 pandemic was the first to have a substantial influence on the stock market (Baker et al., 2020). In a study by Machmuddah et al (2020), it was found that investors use different methods to assess the fair value of financial securities. These methods are called as fundamental analysis, which involves investigating how a firm's potential earnings are affected by antecedents such as COVID-19 and general macroeconomic conditions. On the other hand, technical analysis focuses on chart patterns, market psychology, and price movement. The impact of the COVID-19 outbreak on stock market returns is more pronounced in Asian countries, which react swiftly to government announcements and also recover more rapidly compared to other regions (Liu, Manzoor, Wang, Zhang, & Manzoor, 2020). Confirmed cases of COVID-19 have had notable impact on indices performance, with abnormal returns declining to a greater extent in Asian indices.

DAILY CONFIRMED COVID-19 CASES GROWTH RATE (CCR)

In a study conducted by Bai et. al. (2020), it was suggested that the outbreak of infectious Coronavirus has a positive significant impact on the volatility of international stock markets. In addition, Tahat and Ahmad (2020) attempted to investigate the influence of the epidemic on the liquidity and stock market returns in the United Kingdom. The investigation revealed a link between the outbreak and stock market performance, along with more severe consequences on all sectoral market returns, except the healthcare and basic material industries. On top of that, Kotishwar (2020) investigated the impact of the COVID 19 outbreak on the stock markets of six countries that were positively affected by the pandemic, including the United States, China, Italy, Spain, France, and India. The study found evidence of a long-run and negative relationship between the outbreak and the stock market performance. Erdem (2020) examined if there was a link between how stock market indices responded to Covid-19 news in different regimes, such as free and less free nations, and discovered that the pandemic had a large negative influence on stock market returns in less free countries, with dropping returns and considerable volatility. Ashraf (2020) studied the impact of the pandemic on stock market performance in 64 countries and discovered that the number of confirmed cases and stock market returns are inversely related. Therefore, the following hypothesis is formulated based on the aforesaid justification:

H1: The growth rate of daily confirmed COVID-19 cases has negative effect on daily share price returns among technology firms.

DAILY CONFIRMED FATALITY RATE (CFR)

In their study, Albuquerque et al. (2020) explore the impact of official COVID-19 releases and fatality ratios on financial market volatility, asserting that the prolonged duration of coronavirus pandemic is a major factor contributing to financial instability. In addition, Topcu and Gulal (2020) found that the coronavirus has a negative and statistically significant effect on developing capital markets, particularly in Asia. The impact on European markets, while still notable, was comparatively less severe. In other respect, the stock market performance of all Chinese firms is significantly impacted by the daily growth in confirmed cases and deaths caused by COVID-19 (Al-Awadhi et al, 2020). In a study conducted by Yilmazkuday (2020), the impact of coronavirus disease 2019 cases on the S&P 500 index was examined. The findings revealed that a global COVID-19 death rate exceeding 1% would lead to a 0.02 percent decline in the Standard & Poor's 500 within a day, followed by a 0.06 percent decrease after a week, and a 0.08 percent drop after a month. The researchers formulate the following hypothesis based on the aforementioned study and literature.

H2: The growth rate of daily death COVID-19 cases has significant effect on daily share price returns among technology firms.

GOVERNMENT STRINGENCY (GS)

Many countries have implemented stringent measures, including temporary or permanent lockdowns, in response to rising cases nationwide. The COVID-19 crisis had created an unprecedented healthcare emergency on a global scale which might trigger prolonged recession if prompt and decisive policy responses are not implemented (Baldwin & Weder, 2020). Tan et al (2022) has pointed out that the timing, urgency, and effectiveness of the preventive measures enforced by governments have played a vital role in influencing stock market returns. Higher stringency could hinder corporate operations and economic growth. Such restrictions affect the market because prudent investors demand a higher market risk premium during a crisis (Aggarwal et al., 2021). On the contrary, favourable economic signals might stimulate foreign investment, which could enhance per capita income (Sharma & Kautish, 2021). In other respect, vaccination clinical studies deliver encouraging market news (Chan et al., 2021). Rational investors think the market responds adversely to rising cases, fatalities, and strictness, but positively to vaccination programmes.

H3: The government stringency index has significant effect on daily share price returns among technology firms.

METHODOLOGY

The researcher intends to test the hypothesis on the effect of COVID-19 and government stringency index on share price movement in the technology sector. Panel data which is defined as the pooling of observations on a cross-section of studies objects e.g. firms, countries etc. over throughout several time periods (Hill, 2007). Panel data denotes data sets consisting of multiple observations on each sampling unit (Baltagi, 2008). This study applied the panel data regression method to estimate the model due to rationale that it provides double dimensionality of data observation to capture the effect of COVID-19 i.e. on cross-sections of units (i.e., public listed companies in technology sector) and correspondingly time-wise observation of data i.e. termed as longitudinal data (Alshaikhmubarek et al, 2024).

This study is based on secondary sources of data. Data on daily closing prices of Malaysian stock exchange (i.e., Bursa Malaysia) have been gathered from Yahoo Finance official website. In total, there is 43,208 observations with total 88 number of technology firms and 491 days of observations starting from 1/1/2020 until 31/12/2021, excluding weekend and public holidays. Daily stock price returns (DR) is measured by subtracting the closing pricing of a particular trading day from the closing pricing for previous trading day and divided by closing pricing for the previous trading day. This research used the confirmed case rate (CCR) and case fatality rate (CFR) to assess the daily confirmed and mortality cases of COVID-19 respectively. The rates is calculated by dividing the difference of total number of case from the disease in two days consecutively by the overall number of diagnosed cases. In addition, the government stringency index is obtained from Our World in Data (http://ourworldindata.org/coronavirus), along with other COVID-19 data (Ritchie et al., 2022). The index is a comprehensive gauge that takes into account nine response indications, namely school closures, workplace closures, and travel prohibitions. It is scored on a scale of 0 to 100, with higher numbers indicating more stringent measures (Caporale et al., 2022).

In order to confirm an association between estimators, the Ordinary Least Square (OLS) technique is usually used through extensive disciplines such as pure science, engineering, economics, international trade and employment (Ha & Tran, 2017) and etc. OLS technique permits the measurement of estimators using linear regression with both continuous as well as categorical variables, for example gender, ethnic profile, occupation, marital status and others (Midi & Talib, 2008).

In addition, this study used fixed-effects model which accounts for all time-invariant difference between cross-sectional units (i.e., firms), ensuring that the estimated coefficients are not biased and unaffected by the omission of time invariant characteristics such as culture, socioeconomic status, and etc. According to Stock and Watson (2018), it was noted that if the unobserved variable remain constant over time, then any variations in the dependent variable ought to be attributed to factors other than the fixed characteristics. A crucial assumption of fixed effect is that time-invariant characteristics are specific to each unit of analysis and should not be correlated with other individual characteristics.

Besides, the study also performed random effect model which assumes that the variation across entities is a random variable that is not correlated with the predictor variables. Greene (2008) points out that the key difference between fixed effect and random effect lies in whether the unobserved individual effect is related to the variables in the model, regardless of whether these effects are stochastic or not. One benefit of using random effects is the ability to include time-invariant factors such as gender. This is in contrast to fixed effects models, where the intercept accounts for all time-invariant variables. In this case, the error term of the unit of analysis does not correlated with the explanatory variables, enabling time-invariant variables to serve as explanatory factors. Further, this research applied multiple tests to identify the right static panel regression technique which are (a) partial F test for fixed effect test to compare the pooled ordinary least squares (OLS) and fixed-effect models (FEM); (b) Breusch and Pagan (1980) Lagrange multiplier test to compare the pooled OLS and random-effect models (REM); and finally, (c) Hausman (1978) test to compare fixed-effect and random-effect models. These tests establish a common procedure to select the best-fitting model (Baltagi, 2008).

RESULTS & DISCUSSION

Table 1 demonstrates that the stock daily return has a large dispersion, as shown by the standard deviation (i.e., 0.499164). The average returns is 5.514 percent, with a minimum return of -100 percent and maximum return of 5500 percent. In brief, the findings suggest an increasing in the unpredictability changes in share prices, which is influenced by the level of confidence that investors have in the firm's capacity to capitalise on their competitive advantage to generate higher profits. Likewise, the government stringency index also demonstrates a significant shift, starting with a no stringency (0.00) and increasing to a level beyond (91.67) during the total lockdown period in June 2021.

Table 1: Descriptive Analysis

Variable	Mean	Std. Dev.	Min	Max	VIF
DR	0.0551443	0.499164	-1	55	
CCR	0.0303993	0.2686293	-0.0230528	1.94591	2.02
CFR	0.0127311	0.0350222	-0.041566	0.50000	2.01
GS	64.51719	18.08831	0	91.67	1.41

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author (2024)

Supplementary to the summary of variables, Table 2 shows the correlation analysis. The result indicates that stock returns are positively correlated with the growth rates of confirmed cases and death cases. This findings suggest that when the number of infected and deceased patients rises, the government is inclined to enforce more stringent restrictions, such as the Movement Control Order (MCO), to curb the spread of illness (Caselli & Fracasso, 2021). As a result of restriction involving home office isolation, technology firms has developed extensive applications for various purposes of remote working, virtual offices, teaching, medical care, and etc., and hence enhancing their revenue and boosting the profitability (Wang, 2022). This is supported by the increase in the gross value added of the ICT manufacturing sector from 11 percent in 2021 to 21.3 percent in 2022 (Department of Statistics Malaysia, 2023). In other respects, this relationship is further supported by the results, as shown by the positive association between the government stringency index and the increasing rate of confirmed cases (coefficient: 0.3727; p-value: 0.000) as well as death cases (coefficient: 0.4797; p-value: 0.000).

Table 2: Spearman Ranking Test

	lnDR	lnDCCG	lnDDG	lnGS
lnDR	1.0000			
lnCCR	0.0381***	1.0000		
lnCFR	0.0779***	0.6554***	1.0000	
lnGS	-0.0385***	0.3727***	0.4797***	1.000

Source: Author (2024)

Added to that, Table 2 underlines that the coefficient for the growth rate of death cases is greater than the coefficient for the growth rate of confirmed cases. This discovery contradicts with the prior investigation conducted by Ben-Ahmed, Ayadi, and Hamad (2022), examined 90 digital firms across 24 countries. The authors postulate that the number of fatalities is determined by the number of active cases, which diminishes the significance of the indicator. However, in the context of Malaysia, the increasing number of fatalities poses a significant risk to the general public due to the highly infectious nature of the coronavirus. Consequently, people may overreact to enforced restrictions such as social distancing, and increase their purchases of digital devices to accommodate for the lockdowns. This, in turn, will subsequently enhance the sales and profitability of technology firms.

Table 3: Static Linear Panel Models

VARIABLES	(1) Pooled OLS	(3) FEM	(4) REM
lnCCR	0.0730***	0.0914***	0.0913***
	(0.0204)	(0.0105)	(0.0105)
lnCFR	0.0865***	0.0846***	0.0845***
	(0.0194)	(0.0100)	(0.0100)
lnGS	-0.3368**	-0.3745***	-0.3750***
	(0.1584)	(0.0817)	(0.0817)
Constant	-1.1662	-0.9292**	-0.7629*
	(0.7250)	(0.3737)	(0.3924)
Observations	10,856	10,856	10,856
R-squared	0.0081	0.0358	0.0326
Number of Firm	88	87	87

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Author (2024)

As demonstrated in Table 3, the results indicate that all variables tested are having significant relationship with stock returns. Remarkably, the finding reveals a positive association between confirmed case rate and case fatality rate with daily returns on stock. This result contradicts the majority of previous studies stated there is a negative relationship between the growth rate of daily new confirmed cases and the fatality cases (Chia et al., 2020; Liu et al., 2020; Kotishwar, 2020; Tahat & Ahmad, 2020). These studies showed that there were negative stock returns, primarily attributed to the fear and anxiety among investors following the shocks of receiving unexpected new information, which aligns with the EMH theory (Caporale et al., 2019). Nevertheless, in light of the COVID-19 crisis, various activities involving human have transition to the digital technology through platforms such as Skype, Zoom, and Loop Up. The growing reliance on digital devices and communication methods has not only made a significant contribution to managing the COVID-19 crisis, but has also provided technology firms with ample opportunity to leverage their edges and increase profitability (Ben-Ahmed, Ayadi, & Hamad, 2022).

In addition, the results indicate a negative and significant relationship between government stringency index and stock daily returns. Surprisingly, it is the most significant explanatory factors which may suggest that the timing and efficiency of government-imposed preventive measures were not effective in generating the desired market sentiments that may stimulate the stock market (Hersh et al, 2023; Tan et al, 2022). Given the stock market's inclination to rapidly respond to negative news rather than positive news, the enforcement of lockdown measures to control the outbreak of the coronavirus might have a detrimental effect on both production and consumption. This could result in significant economic losses, which may viewed unfavourably by investors. As a result, the investors are more likely to seek higher market risk premiums to protect their investments from the market volatility (Aggarwal et al., 2021).

Table 4: Selection of estimation model

Estimation	Comparison of static linear panel models	F value / chibar2 (01)	P-value	Conclusions
Partial F test for fixed effect	Pooled OLS vs. FEM	351.90	0.0000	Fixed-effect model
Breush Pagan LM test on REM	Pooled OLS vs. REM	1.7e+06	0.0000	Random-effect model
Hausman Test	FEM vs. REM	4.33	0.2280	Random-effect model

Source: Author (2024)

Various estimating approaches have been used to choose suitable panel data models to validate hypotheses. The results of the partial F test for fixed effect show that the null hypothesis was rejected, suggesting a significant fixed effect model. In other words, the fixed effect model superiors the pooled OLS model. The Breusch and Pagan LM test is used to examine the suitability of two techniques, namely pooled OLS and REM. The discovery indicates that the null hypothesis has been rejected and the alternative hypothesis is accepted when the Langrage Multiplier exceeds the value χ^2 with one degree of freedom. Put simply, the outcome suggests that there is variation among individuals and indicates that the random effects model is suitable. Finally, the Hausman test is used to examine the distinction between fixed effects and random effects models. The discovery suggests that the null hypothesis is upheld, so indicating that the random effect model is an accurate specification. It suggests that the disparity between the estimates of two models is insignificantly minor. Ultimately, this research will use the measurement of REM as the conclusive sign to validate the model.

CONCLUSION

Across the course of human history, numerous contagious illnesses have caused turmoil and devastation within both regional and international communities. The present study provides valuable insights into how investors think and handle their risk. Amidst the pandemic, when investment opportunities were dwindling in other sectors, the stock market emerged as a more promising avenue for investors to allocate their funds. Furthermore, the results serve to fill up the gaps to the current body of literature, providing important insights that may help technology firms to develop versatile risk management strategies to minimise any unexpected disruptions. Remarkably, the findings revealed that the rise in infection and fatality rates had a positive impact on daily share price daily returns. This suggest that technology played a crucial role in facilitating work, teaching, communication and other activities throughout the lockdowns. Apart from this, the government stringency index has a negative impact on daily stock returns. Therefore, this is crucial for the government to exercise caution when implementing movement controls, as they can have a significant effect the productivity and financial burden of businesses. Nevertheless, this research has some limitations. In particular, it does not perform each market's regression analysis due to the smaller sample size of listed ACE technology firms subsequent unsuccessful to fulfil criteria during the filtration procedure. Another limitation of this research is the lack of availability of the unconsolidated financial data of the PLCs. Thus, the researcher has to rely on consolidated financial information in which the data might not be able to capture all-embracing sectorial effect as most of PLCs are relatively diversified in their business activities, and not wholly involving in one sector alone.

Acknowledgement

This research was funded by an internal grant from the University of Technology Sarawak (UTS/RESEARCH/3/2022/09).

Reference

Aggarwal, S., Nawn, S., & Dugar, A. (2021). What caused global stock market meltdown during the COVID pandemic – lockdown stringency or investor panic? *Finance Research Letters*, 38, 101827. doi.org/10.1016/j.frl.2020.101827.

Albuquerque, R., Koskinen, Y., Yang, S., & Zhang, C. (2020). Resiliency of environmental and social stocks: An analysis of the exogenous COVID-19 crash. *The Review of Corporate Finance Studies*, *9*(3), 593-621. https://doi.org/10.1093/rcfs/cfaa011.

Alshaikhmubarek,A., Kulendran, N., Seelanatha, L. (2024). The impact of COVID-19 on stock returns and firm characteristics in the Saudi Stock Market. *Cogent Economics & Finance*, *12*(1), 1-19. DOI: 10.1080/23322039.2023.2295754.

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*(2020), 100326. https://doi.org/10.1016/j.jbef.2020.100326.

Aman, A.S. (2021). *Tech Sector Seen as Biggest Winner*. New Straits Times, Malaysia. Retrieved on March 29, 2022 from https://www.nst.com.my/business/2021/09/731821/tech-sector-seen-biggest-winner.

Ashraf, B.N. (2020). Economic impact of government interventions during the Covid-19 pandemic: International evidence from financial markets. *Journal of Behavioural and Experimental Finance,* 27, 100371. https://doi.org/10.1016/j.jbef.2020.100371.

Bai, L., Wei, Y., Wei, G., Li, X., & Zhang, S. (2021). Infections disease pandemic and permanent volatility of international stock markets: A long-term perspective. *Finance Research Letters*, *40*(2021), 1-10.

Baker, S.R., Bloom, N., Davis, S.J., Kost, K., Sammon, M., & Viratyosin, T. (2020). The unprecedented stock market reaction to COVID-19. *The Review of Asset Pricing Studies*, *10*(4), 742-758. doi:10.1093/rapstu/raaa008.

Baldwin, R. & Mauro, B.W.D. (eds.) (2020). *Mitigating the COVID Economic Crisis: Act Fast and Do Whatever It Takes*. CEPR Press, Paris & London.

Baltagi, B.H. (2008). *Econometric Analysis of Panel Data*. John Wiley & Sons Ltd., Chichester.

Ben-Ahmed, K., Ayadi, I., & Hamad, S.B. (2022). COVID-19 impact on digital companies; stock return: a dynamic data analysis. *Finance Research Letters*, *46*(A), 102340, 1-6. https://doi.org/10.1016/j.frl.2021.102340.

Breusch, T.S. & Pagan, A.R. (1980). The Lagrange multiplier test and its applications to model specification in econometrics. *The review of Economic Studies*, *47*(1), 239-253. https://doi.org/10.2307/2297111.

Caselli, M. & Fracasso, A. (2021). Covid-19 and technology. GLO Discussion Paper, No. 1001, Global Labour Organization (GLO), Essen.

Caporale, G.M., Plastun, A., & Makarenko, I. (2019). Force majeure events and stock market reactions in Ukraine. *Investment Management and Financial Innovations*, *11*(1), 334-345.

Chan, K. F., Chen, Z., Wen, Y., & Xu, T. (2022). COVID-19 vaccines and global stock markets. *Finance Research Letters*, *47*, 102774. https://doi.org/10.1016/j.frl.2022.102774.

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.

Department of Statistics, Malaysia (2023). Malaysia Digital Economy 2023. https://www.dosm.gov.my/portal-main/release-content/malaysia-digital-economy-.

Erdem, O. (2020). Freedom and stock market performance during Covid-19 outbreak. *Finance Research letters*, *36*, 101671. https://doi.org/10.1016/j.frl.2020.101671.

Ellahi, N., Rehman, J.U., Sulehri, N.A., Ahmad, M.A., & Qureshi, T. (2021). Investigating the impact of COVID 19 outbreak on stock market returns: Evidence from Pakistan. *International Journal of Innovation, Creativity and Change*, *15*(5), 1-9.

Fama, E.F. (1965). Random walks in stock market prices. *Financial Analysis Journal*, *21*(5), 55-59.

Fama, E.F. (1970). Efficient capital markets: a review of theory and empirical work. *The Journal of Finance*, *25*(2), 383-417.

Fama, E.F. (1998). Market efficiency, long-term returns, and behavioural finance. *Journal of Financial Economics*, *49*(3), 283-306. DOI: 10.1016/S0304-405X(98)00026-9.

Greene, W.H. (2008). Econometric Analysis. Prentice Hall, 100-210.

Ha, H.V. & Tran, T.Q. (2017). International trade and employment: a quantile regression approach. *Journal of Economic Integration*, 32(3), 31-557. doi.org/10.11130/jei.2017.32.3.531.

Hausman, J.A. (1978). Specification tests in econometrics. *Econometrica: Journal of Econometric Society*, *46*(6), 1251-1271. https://doi.org/10.2307/1913827.

Hersh, N.F., Masron, T.A., Pitchay, A.A., Malim, N.A.K.M., & Mazlan, P.N.B.M. (2023). Does government stringency policy reduce the adverse effects of COVID-19 on Islamic stock? *Asian Academy of Management Journal*, *28*(2), 449-479.

Hill, R.C., Griffiths, W.E., & Lim, G.C. (2007). Principles of Econometrics, John Wiley & Sons Inc. New Jersey, 382-404.

Kotishwar, A. (2020). Impact of Covid-19 on stock market with reference to selected countries. *Academy of Accounting and Financial Studies Journal*, *24*(4), 1-9.

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.

Liu, H.Y., Manzoor, A., Wang, C.Y., Zhang, L., & Manzoor, Z. (2020). The COVID-19 outbreak and affected countries stock market response. *International Journal of Environmental Research and Public Health*, *17*, 1-19.

Machmuddah, Z., Utomo, S.D., Suhartono, E., Ali, W., Ghulam, W.A. (2020). Stock market reaction to COVID-19: Evidence in customer goods sector with the implication for open innovation. *Journal of Open Innovation: Technology, Market and Complexity*, *6*(99), 1 – 13.

Malkiel, B.G. (2003). The efficient market hypothesis and its critics. *Journal of Economic Perspectives*, *17*(1), 59-82. DOI: 10.1257/089533003321164958.

Mat, N.F.C., Edinur, H.A., Razab, M.K.A.A., & Safuan, S. (2020). A single mass gathering resulted in massive transmission of COVID-19 infections in Malaysia with further international spread. *Journal of Travel Medicine*, *27*(3), 1-4. doi: 10.1093/jtm/taaa059.

Mehmood, W., Mohd-Rashid, R., Aman-Ullah, A., Shafique, O., & Tajuddin, A.H. (2022). The reaction of the Malaysian stock market to the COVID-19 pandemic. *Journal of Contemporary Eastern Asia*, *20*(2), 63-84.

Midi, H. & Talib, B. (2008). The performance of robust estimator on linear regression model having both continiuos and categorical variables with heteroscedastic errors. *Malaysian Journal of Mathematical Sciences*, *2*, 25-48.

Mishra, R., Sharma, R., Karedla, Y., & Patel, N. (2022). Impact of COVID-19 cases, deaths, stringency and vaccinations on the US stock market. *Vision. https://doi.org/10.1177/09722629221074901.*

Ozkan, O. (2021). Impact of COVID-19 on stock market efficiency: evidence from developed countries. *Research in International Business and Finance, 58,* 101445. https://doi.org/10.1016%2Fj.ribaf.2021.101445.

Ramelli, S. & Wagner, A. (2020). What the stock market tells us about the consequences of COVID-19. *Mitigating the COVID Economic Crisis: Act Fast and Do Whatever It Takes*, 63-70. UK, CEPR Press.

Ritchie, H., Mathieu, E., Rodes-Guirao, L., Appel, C., Giattino, C., Ortiz-Ospina, E., Hasell, J., Macdonald, B., Dattani, S., & Roser, M. (2022). Malaysia: Coronavirus Pandemic Country Profile. Our World in Data, England & Wales.

See, K.C., Liew, S.M., Ng, D.C., Chew, E.L., Khoo, E.M., Sam, C.H., Sheena, D., Filzah, M.Z., Chin, S.Y., Lee, P.Y., & Tan, L.P. (2020). COVID-19: four paediatric cases in Malaysia. *International Journal of Infectious Diseases*, *94*(2020), 125–127. 10.1016/j.ijid.2020.03.049.

Sharma, R. & Kautish, P. (2021). Aid-growth association and role of economic policies: new evidence from South and Southeast Asian countries. *Global Business Review*, *22*(3), 735-752.

Stock, J.H. & Watson, M.W. (2018). Introduction to Econometrics. London: Pearson.

Tahat, T. & Ahmed, A.H. (2020). Stock market returns, liquidity and Covid-19 outbreak: Evidence from the U.K. Retrieved from https://www.researchgate.net/profile/Ahmed-Ahmed-64/publication/340926380_Stock_Market_Returns_and_COVID-19_Outbreak_Evidence_from_the_UK/links/5f00ed4692851c52d6180558/Stock-Market-Returns-and-COVID-19-Outbreak-Evidence-from-the-UK.pdf.

Taleb, N.N. (2007). The Black Swan: the impact of the highly improbable. Random House, New York.

Tan, X., Ma, S., Wang, X., Zhao, Y., Wang, Z., & Xiang, L. (2022). The dynamic impact of COVID-19 pandemic on stock returns: a TVP-VAR-SV estimation for G7 countries. *Frontier in Public Health*, *10*(2022), 859647. doi:10.3389/fpubh.2022.859647.

Toda, A.A. (2020). Susceptible-infected-recovered (sir) dynamics of COVID-19 and economic impact. *ArXiv*. /abs/2003.11221

Topcu, M. & Gulal, O. S. (2020). The impact of Covid-19 on emerging stock markets. *Finance Research letters*, 36, 101691. https://doi.org/10.1016/j.frl.2020.101691.

Wang, H.Y. (2022). The impact of epidemic on technology companies. *Advances in Economics, Business, and Management Research*, 211, 1766-1769.

Yilmazkuday, H. (2020). Effects on the S&P 500 index. *Applied Economics Letters.* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3555433.

Ying, Q., Yousaf, T., Ain, Q.U., Akhtar, Y., & Rasheed, M.S. (2019). Stock investment and excess returns: a critical review in light of the efficient market hypothesis. *Journal of Risk and Financial Management*, *12*(2), 97.

Zulfikar, Z. (2022). Bibliometric analysis of stock market performance throughout the COVID-19 outbreak. *Investment Management and Financial Innovations*, *19*(2), 14-23.

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