

Stock Market Reaction: An Investigation of COVID-19 Effects in ASEAN Countries

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Article Information:

Received: November 19, 2024, Accepted: December 03, 2024, Published: December 28, 2024

Abstract

This study examines the effects of the various COVID-19 announcements by the World Health Organization (WHO) on stock returns in ASEAN countries, which is different from previous research in that most of the research only observed the first announcement of COVID-19 when a pandemic was declared. This study uses 6 announcements of COVID-19, starting from the first time COVID-19 was identified until it was declared a variant delta. The results revealed that the market reaction in ASEAN to the first announcement of COVID-19 in China on December 31st, 2019, shows a positive and non-significant abnormal return and cumulative abnormal return. On January 13th, 15th, 21st, and 24th, 2020, the market also reacted negatively but not significantly to the announcement of the first recorded case outside China, which is in Thailand, Japan, the USA, and the European region, and it was an intermittently negative reaction but not significant. On March 7th, 2020, when the confirmed cases surpassed 100,000 globally, and on March 11th, 2020, when WHO officially announced COVID-19 as a global pandemic, the ASEAN market reacted negatively and significantly for abnormal and cumulative abnormal returns, which is inconsistent with Salisu, Sikiru and Vo (2020) and Topcu and Gulal (2020). However, the ASEAN countries reacted positively but not significantly to the second wave announcement on May 31st, 2021.

Keywords: abnormal return, COVID-19 announcements, ASEAN countries.

JEL Codes: G0, G1, G14

How to Cite:

Fauzi, F., Basyith, A., & Periansya. (2024). Stock Market Reaction: An Investigation of COVID-19 Effects in ASEAN Countries. *International Journal of Finance Research*, 5(4). 618 – 641. DOI: <https://doi.org/10.47747/ijfr.v5i4.2527>

Published by:

1. Introduction

The impact of COVID-19 as a global pandemic on human health was so profound that global economic activity suddenly froze in the first six months of 2020 (Gerlagh, Heijmans & Rosendahl, 2020). Businesses and different industry sectors were severely impacted, with their future condition are in jeopardy, while investors suffered the heavy effect of this disaster and left with uncertainty in the market (Laing, 2019; Salisu & Akani, 2020), thus changing the investors' behaviors (So, Chu & Chan, 2021). The consequentially destructed sectors relate to tourism, education, sports events, and public transport services (Donthu & Gustafsson, 2020). Nevertheless, the air industry is one of the crucial financial market sectors that was also heavily damaged due to the closure of international borders.

Furthermore, COVID-19 has not only caused a health crisis (Jacobsen, 2020) but also severely damaged international economic activity and market confidence (El-Erian, 2020), especially the financial market in general and the global stock markets had a record decline since 2008 financial crisis (Song & Zhou, 2020). Developed and developing countries, index funds, conglomerates, and multinationals have received unprecedented damages during COVID-19. This led to a slowdown in economic growth, and the global economy fell into a recession (OECD, 2020), while the financial market ground to a halt and plunged.

2. Literature Review

A signal theory provides an overview or signal related to information with external parties. The signal theory was first introduced by Spence (1973), who explained that events or activities from certain parties provide a signal or signal in the form of information that reflects the state of an entity beneficial to other parties. For investors, the signal or information is a picture of the entity's future development from the signal, which can be used as a basis for consideration when making investment decisions.

These events or activities originate from micro and macroeconomic factors, disasters, and politics. These disasters can be natural disasters, negligence, or disease outbreaks. Different events affect how the stock market reacts (Ramiah, 2013). Stock price changes over time correspond to current circumstances and information. Internal and external causes can also influence changes in stock prices. The core elements of the business, such as its earnings and dividends, are the pertinent internal variables (Al-Tamimi, Alwan, & Rahman, 2011). The information or news investors acquire, which may be favorable or unfavorable (Chan, 2003), is one of several external factors affecting stock values. According to Bae and Karolyi (1994), bad domestic and international news significantly impacts stock prices more than good news.

Natural disasters, negligence, and disease outbreaks will directly or indirectly impact stock prices (Artiani, 2015). Natural disasters include earthquakes, floods, and storms (hurricanes, tornadoes, and typhoons). Negligence can be in the form of work accidents, explosions, poisoning, which earthquakes can accompany, and toxic gas, which is a consequence of improper equipment. Disease outbreaks can be ebola, SARS, and currently, COVID-19.

The following presents cases of natural disasters that impact stock prices. Wulandari & Khairunissa (2015), Yuwono (2013) and, Mulyana and Lukman (2021) examined flooding in the capital, Ferenita (2014) examined the impact of the 2006 Aceh tsunami. The research results show that neither the tsunami nor the flood gave any difference in abnormal returns before or after the event. Only Natasha and Sumami's research (2015) examined flooding in

Jakarta from 2000 to 2013, which showed differences in returns before and after events for 5 sectors: consumer goods, property and real estate, finance, trade, services, and investment.

Yuwono (2013) examined flooding in Jakarta in 2013. This study's results indicated positive abnormal returns on stocks engaged in the consumer goods industry sector and the retail sub-sector on the day of the incident. Positive abnormal returns occur on the first, second, fourth, fifth, eighth, and tenth days. The difference test shows that statistically, there is a difference in the average abnormal return on stocks engaged in the consumer goods industry sector and the retail sub-sector before and after the event. As for the average stock trading volume activity, there is no statistically significant difference. Ferenita (2014) examined the effect of the Aceh tsunami disaster on stock prices. This is shown by no abnormal return during the event period, no difference in average abnormal return before and after the event, and no difference in average trading volume activity before and after Aceh's tsunami natural disaster event.

Natasha and Sumami (2015) examined flooding in Jakarta from 2000 - 2013. The results of this study show the significant effects of floods occurring in Jakarta on the return of sectoral indices, which were 4 of the 10 sectors in 2002, 3 sectors in 2007, and 2 sectors in 2013. The sectors significantly affected are consumer goods, property and real estate, finance, trade, services, and investment. Different results were obtained by Wulandari and Khairunissa (2015), who also examined the impact of flooding in Jakarta on insurance company shares. This study's results indicate no difference in abnormal returns and trading volume activity in insurance company shares before and after the floods in 2007 and 2013.

Mulyana and Lukman (2021) researched floods in early 2020 in Indonesia. The results show no significant difference in the average abnormal return on the stock afoot in the consumer goods sector, general insurance, and pharmaceutical companies before and after the flood disaster in early 2020. This research implies that investors should look at events that can affect stock prices.

The following are some studies on disasters caused by negligence: Capelle-Blancard and Laguna (2010) and Kowalewski and Śpiewanowski (2020) examined the disaster at the Potassium Mine and its impact on the stock market in Poland and Chemical Disasters. The results of their research showed that there was a decline in market value due to the disaster.

Capelle-Blancard and Laguna (2010) conducted a study on chemical disasters. On average, petrochemical firms in our sample experienced a drop in their market value of 1.3% over the two days immediately following the disaster. After that, Kowalewski and Śpiewanowski (2020) examined the catastrophe at the Potassium Mine and its impact on the stock market in Poland. In the first two days following a disaster, the affected mining companies typically see a cumulative decline in their market value of 1.15%. The result also displayed the rivals of the impacted organizations currently in business and those in the future (greenfield). The relative strength of the negative risk effect and the favorable pricing and supply effect determines the direction and size of the impact.

Previous research on the impact of disease outbreaks such as Ebola and SARS was conducted by Nippani and Washer (2014) and Ichev and Marinč (2018). Nippani and Washer (2004) examined whether SARS impacted the stock markets in Canada, China, Hong Kong, Indonesia, and the Philippines. By comparing stock indexes during and before the SARS outbreak, they found that SARS had no negative impacts except in China and Vietnam. Furthermore, Ichev and Marinč (2018) examined the effect of the Ebola outbreak in 2014 – 2016. The results show

that information about Ebola outbreak events is more relevant for companies geographically closer to the two birthplaces of the Ebola outbreak and financial markets. The results also show that the effect is more pronounced for smaller and more volatile stocks, stocks of specific industries, and stocks exposed to intense media coverage. An increased risk perception also accompanies this event effect; implied volatility increases after the Ebola outbreak event. One lousy news item that can affect stock market prices is the breakout of a disease. Previous research has looked into how outbreaks affect stock markets. However, the effect of severe acute respiratory syndrome (SARS) on stock performance has been the subject of numerous studies. In 2003, there was an outbreak of SARS. SARS is a respiratory illness that has spread to some nations, like COVID-19.

The travel and tourism industry was hit severely since people's willingness to travel decreased (Hao, Bai & Sun, 2021). COVID-19 negatively affected international travel demand due to the risk of being infected with the disease's new diagnosis and the government's travel restrictions. Therefore, as travel fell, these sectors' stock prices also decreased severely as the industry stopped or delayed until things got better, leading to high volatility in the equity market. Consumption is vital in GDP as the largest share, which is affected by internal and external factors. In this period, the main factor is COVID-19. Although the consumption of necessities such as accommodation, food, etc., does not change much, consumer discretionary, such as clothing, recreation, etc., reduced significantly due to COVID-19, leading to the fall in the stock price of these firms. In contrast, other entrepreneurs' stocks did not change much, causing high volatility in the stock market.

As most studies found that certain events caused volatility, Black (1976) was the first to illustrate the leverage effect in equity volatility, in which stock volatility is negatively associated with stock returns, implying that as stock prices fall, volatility rises. The significant fluctuation in market fundamentals creates long-term volatility and acts as a risk to investors who invest in marketable securities like common stock for a long time. Schwert (1990) asserted that there are different reasons for long and short-term volatility. For long-term fluctuations, there are three main factors: personal leverage, corporate leverage, and business condition. For short-term volatility trends, day-to-day business, social ceremonies, and politics cause short-term trends.

Moreover, stock returns are very responsive to the political situation in the country, economic crises, natural disasters inflation effects, etc. (Reddy & Narayan, 2016). These variables provoke fluctuation in the stock market. It is found that during a recession, stock market volatility is higher and can occur after a considerable drop in the stock market price (Schwert, 1990). Volatility in the stock market has always been a significant concern for investors and policymakers. Rajput, Kakkar and Batra (2012) defined volatility as a measure of the disparity between an asset's present and previous average values. Two types of volatility exist in the market: high volatility and low. High volatility exists when prices fluctuate widely over short periods, while low volatility exists when prices move slowly (Rajput, Kakkar & Batra, 2012). Investors observe volatility as a risk index and a piece of information (Rakesh, 2007). As a result, it changes their view on the stock market appropriately. The amount of inconsistency in the stock price, which shows the nature of volatility, caused the change in the value of the investor portfolio.

Furthermore, the ability to react and consecutive spread of volatility depends on market flexibility and efficiency. An efficient and flexible stock market will immediately respond to the market and different factors (Rakesh, 2007). Sometimes, unexpected high volatility is likely to be linked to a specific factor in the country, for instance, corporate earnings and political and government decisions (Bailey & Chung, 1995; Aggarwal, Inclan & Leal, 1999). Furthermore, the long volatility trend must be associated with economic growth.

Jones, Kaul, and Lipson (1994) examined how the flow of information could affect stock price behavior and proposed that community information could be the primary element of short-term volatility. Investors responded to immediate information and influenced the market by making the price go up and down, which caused volatility. We can see how information flow plays a vital role in the movement of stock prices, which is related to volatility (Ross, 1989). Moreover, investor sentiments are affected by the information and are significant in the volatility of the financial market. Such an adverse change in the sentiment due to the dangerous coronavirus situation has impacted the investor's trading behavior. Commonly, most individuals tend to have their behavior switched to a state of panic during a crisis, which makes them act irrationally toward the situation. Therefore, the slump in investor sentiment triggered panic selling behavior. The New York Stock Exchange (NYSE), which is the world's largest stock market, had recorded a high frequency of stock selling-off from the market participants, causing the variation of stock prices to move more significantly during the beginning of the COVID-19 (Hong, Bian & Lee, 2021).

3. Method

This study uses event study methodology to examine whether the market reacts unfavorably to a COVID-19 pandemic announcement by the WHO. Typically, the estimation window is about 250 days for daily data; however, there is discretion to determine the estimation window, which may depend on the characteristics and circumstances. Therefore, this study uses a 120-day estimation window, 21 21-day event window, and a 120-day post-estimation window. 21-day event window aims to capture the short-term effect of COVID-19. This paper used various event dates of COVID-19 events recorded by the World Health Organization (WHO) that are (1) 31 December 2019, when it was first identified in China; (2) 13 January 2020, the first recorded case outside China, took place in Thailand; (3) 15 January 2020, the second confirmed case detected outside China that took place in Japan; (4) 21 January 2020, when the United States of America (USA) reported its first confirmed case; (5) 24 January 2020, when France reported its first confirmed case; (6) 31 January 2020, when the United Arab Emirates (UAE) reported its first confirmed case; (7) the number of confirmed COVID-19 cases surpassed 100 000 globally on 7 March 2020; (8) the date when the WHO announced COVID-19 as a pandemic. Figure 1 presents the estimation window. This study used a composite index from 4 ASEAN countries.

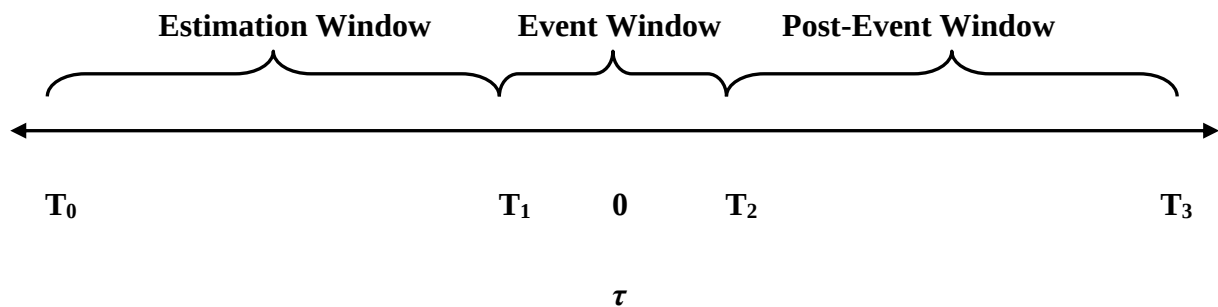


Figure 1: Estimation Window

$\tau = 0$ as the event date

$\tau = T_1 + 1$ to T_2 as the event window

$\tau = T_0 + 1$ to T_1 as the estimation window

$\tau = T_2 + 1$ to T_3 as the post-estimation window

The estimation period is the period over which no event has occurred and is used to establish how the return should behave generally in the absence of the event. There is no set standard for the number of periods to include in the estimation period; one can put a longer estimation window to capture the relationship between the stock and the market, but it should be noted that a longer estimation window may cause a spurious correlation between the stock and the market. The event window is the number of trading days preceding and following the event date that is considered necessary to capture both the leakage and the time needed for the information to be absorbed by the market. The length of the event window is a matter of the researcher's judgment. Having the least number of days possible for the event window is preferable because multiple events within an event window may occur and affect the result's significance. Therefore, the length of the event window depends on the event investigated.

According to Brown and Warner (1980), different abnormal return benchmarks used in the event studies give less benefit and may worsen the result. Moreover, the alternative estimators are the same in their ability to detect abnormal performance without event-time clustering (Peterson, 1989). The mean-adjusted return model is one of the simplest models of abnormal returns that yields similar results to other sophisticated models in the short-term interval, and general market movement is not allowed (Brown & Warner, 1985). The mean adjusted return is formulated as (Peterson, 1989; MacKinlay, 1997; Binder 1998):

$$A_{it} = R_{it} - \bar{R}_i$$

The abnormal returns in the sample are aggregated to draw overall inferences for a specific event. In estimating the performance measure over any multi-period interval (e.g., time 0 through +10), several methods exist for time-series aggregation over the period of interest. The cumulative average residual method (CAR) is used to measure the abnormal performance of the sum of each period's average abnormal performance. The cumulative abnormal return (CAR) is to accommodate a multiple-period event window.

$$AR_t = \frac{1}{N} \sum_{i=1}^N e_{it} \quad (1)$$

$$CAR_i = AR_{i,t1} + \dots + AR_{i,t2} \quad (2)$$

$$CAR_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{i\tau} \quad (3)$$

Under the null hypothesis, H_0 , that the event has no impact on the behaviour of returns (mean or variance) in observation length of the event window (MacKinlay, 1997):

$$AR_{i\tau} \sim N(0, \sigma_i^2(AR_{i\tau})) \quad (4)$$

The variance of CAR_i is:

$$\sigma_i^2(\tau_1, \tau_2) = (\tau_2 - \tau_1 + 1)\sigma_{\varepsilon_i}^2 \quad (5)$$

The distribution of the CAR under H_0 is no abnormal return, then:

$$CAR_i(\tau_1, \tau_2) \sim N(0, \sigma_i^2(\tau_1, \tau_2)) \quad (6)$$

The aggregation is calculated through time and across securities

$$AAR_t = AR_{i,t1} + \dots + AR_{i,t2} \quad (7)$$

$$AAR_t = \frac{1}{N} \sum_{i=1}^N AR_i \quad (8)$$

$$CAAR_t = \sum_{t=t1}^{t2} AAR_t \quad (9)$$

The variance of $CAAR_i$ is:

$$\sigma_i^2(\tau_1, \tau_2) = (\tau_2 - \tau_1 + 1)\sigma_{\varepsilon_i}^2 \quad (10)$$

The distribution of the $CAAR$ under H_0 is no abnormal return, then:

$$CAAR_i(\tau_1, \tau_2) \sim N(0, \sigma_i^2(\tau_1, \tau_2)) \quad (11)$$

A test statistic is typically computed and compared to its assumed distribution under the null hypothesis that mean abnormal performance equals zero. The null hypothesis is rejected if the test statistic exceeds a critical value, typically corresponding to the 5% or 1% tail region (i.e., the test level or size of the test is 0.05 or 0.01). For the CAR shown in equation (2 or 3), a standard test statistic is the CAR divided by an estimate of its standard deviation.⁵ Many alternative ways to estimate this standard deviation have been examined in the literature (MacKinlay, 1997). The test statistic is given by:

$$\frac{CAR(t_1 t_2)}{[\sigma^2(t_1 t_2)]^{1/2}} \quad (12)$$

$$\text{Where, } \sigma^2(t_1 t_2) = L\sigma^2(AR_t) \quad (13)$$

The test statistic in equation 12 provides the variance of one-period mean abnormal return and equation 13 assumes time-series independence of one-period mean abnormal return. $\sigma^2(AR_t)$ is the variance of the one-period mean abnormal return.

4. Findings and Discussions

Vietnam

Though most countries showed negative economic growth in the first quarter of 2020, Vietnam showed a positive growth rate, which indicated that the Vietnamese economy was not severely

affected by the pandemic. However, this does not guarantee that investors still have high confidence in the investment of financial assets, as the cumulative abnormal return has been negative since January 21st, 2020, two days before the first confirmed cases were detected in Vietnam.

The market reaction in Vietnam to the first announcement of COVID-19 in China on December 31st, 2019, shows a negative but non-significant abnormal and a non-significant positive for the cumulative abnormal return. Further, the market reacted negatively on January 13th, 2020, when the first confirmed cases outside China were announced in Thailand. Though the reaction was negative on the announcement date, the cumulative abnormal return was positive and significant. Further, the market reacted positively but not significantly to the announcement on January 15th, 2020, and the cumulative abnormal return was positive until day five after the announcement date. This indicated that the investors still have high confidence in the market. However, the market started to react negatively two days after the announcement on January 21st, 2020, when the first recorded case outside China was in the USA. The first confirmed case in Vietnam was on January 23rd, 2020, and there was a negative and significant reaction to the announcement of the first confirmed case in the European regions on January 24th, 2020. Hence, the stock prices fluctuated significantly, and the cumulative abnormal return ten days after the announcement date was negative and significant. Vietnam's overall economy was also affected by the mixed reaction to the COVID-19 announcement in the first quarter of 2020. Though there was a decline in GDP growth from 2019 to 2020, which was 7.02% and 2.9%, Vietnam's economy has remained resilient compared to other ASEAN countries and other countries as Vietnam is one of the few countries in the world which showed positive economic growth during this period. The positive growth in 2020 during the first outbreak was due to the solid economic fundamentals, decisive containment measures, and well-targeted government support.

On March 7th, 2020, when the number of confirmed COVID-19 cases surpassed 100,000 globally, and on March 11th, 2020, when WHO officially announced COVID-19 as a global pandemic, the market reacted negatively and significantly on the date of the announcements and during the event window of 21 days for both abnormal return and cumulative abnormal return. It can be seen that the stock price declined tremendously during the event window as the negative cumulative abnormal return increased sharply. Though Vietnam was one country that responded well to the pandemic over the following four months after it was first detected in the country and also was one country maintaining positive economic growth, there was an extreme decline in the stock price as the investor lost confidence in their investment. The result is consistent with the findings of Trang Anh and Gan (2020), Dang Ngoc, Vu Thi Thuy, and Le Van (2021), and Nguyen, Hai and Nguyen (2021).

On May 31st, 2021, when the WHO announced the second wave of COVID-19, in which the virus is deadly and more transmissible and called Delta Variant, the market reacted positively but not significantly. Hereafter, it was an intermittently mixed reaction but not significant. However, the cumulative abnormal return was positive and significant, possibly due to the enormous fluctuation of the stock price, which yielded a high abnormal return during the event window. The positive economic growth, which was 2.58% in 2021, might also affect the positive reaction. Further, Vietnam can be considered one of the success stories in dealing with Covid-19. The anti-Covid vaccination campaign is the country's largest-ever immunization campaign. Thus, the second wave of COVID-19 only shocked the economy and the financial

market as over 75% of the population had received one jab, and over 55% had been fully vaccinated (two jabs).

Philippines

The market reaction in the Philippines to the first announcement of COVID-19 in China on December 31st, 2019, shows a negative and non-significant abnormal return and cumulative abnormal return. The negative reaction was intermittent during the event window for abnormal and cumulative abnormal returns, though it was insignificant.

Apart from January 13th, 2020, the announcements on January 15th, 2020, and January 21st, 2020, affected the market's reaction negatively but not significantly to the announcement of the first recorded case outside China, which is in Japan and the USA. Hence, the reaction was negative and varied during the event window. The cumulative abnormal return for these two dates was negative and significant after and before the announcement. Though the first confirmed case was on January 30th, 2020, the market was already alerted by the situation, as shown by a considerable price fluctuation as the government declared a catastrophe in the country on March 17th, 2020, for six months. The government imposed travel restrictions and a stringent social distancing measure. Hence, the market started to slump, as indicated by high volatility. During the event window, most cumulative abnormal returns were negative and significant.

In conclusion, the market reacted positively to the COVID-19 outbreak in the USA; meanwhile, the market reacted negatively to the COVID-19 outbreak in Japan. However, the cumulative abnormal return was negative and significant for both announcements of the COVID-19 outbreak. The Philippines economy was deeply affected by COVID-19 in 2020 as the Philippines suffered a deep recession due to the impact of the COVID-19 pandemic, with GDP contracting by 9.6% compared to 2019. Sales declines caused negative economic growth, and most businesses reported severe liquidity problems as they had insufficient cash to cover daily operational costs and liabilities. Moreover, the government failed to boost the economy by enticing foreign investors to invest in the Philippines using a corporate tax cut policy.

On March 7th, 2020, when the number of confirmed COVID-19 cases surpassed 100,000 globally, and on March 11th, 2020, when WHO officially announced COVID-19 as a global pandemic, the market reacted negatively and significantly on the date of the announcements and during the event window of 21 days for both abnormal return and cumulative abnormal return. It can be seen that the stock price declined tremendously during the event window as the negative cumulative abnormal return increased sharply. The Philippines was the first country to shut financial markets in response to the spread of COVID-19 on March 17th, 2020, in which the stock, bond, and currency trading were halted until further notice. The Philippines benchmark index fell to 20 percent for March 2020, worse than the 2008 global financial crisis. The result is consistent with Camba and Camba Jr (2020) and Le and Tran (2021) findings.

On May 31st, 2021, when the WHO announced the second wave of COVID-19, in which the virus is deadly and more transmissible and called Delta Variant, the market reacted negatively but not significantly. Hereafter, it was an intermittently negative reaction but not significant. Though the cumulative abnormal return was positive and significant, the Philippines remained in a protracted recession during early 2021, with the first quarter of 2021 GDP growth rate at -4.2%, suffering its fifth consecutive economic contraction. Further, the economic recovery has been delayed by the latest COVID-19 wave that hit the Philippines during the first half of 2021,

with the highest number of coronavirus infections and COVID-19 deaths in Southeast Asia after Indonesia. Moreover, the slow economic recovery due to business insolvencies, weaker household balance sheets, and high unemployment also affected investors' confidence.

Laos

The market reaction in Laos to the first announcement of COVID-19 in China on December 31st, 2019, shows a negative but non-significant abnormal and a significant positive for the cumulative abnormal return. The market reacts negatively to COVID-19 only after two days, but it is insignificant. The abnormal return during the event window varied.

The announcement of the first confirmed case outside China, which was in Thailand on January 13th, 2020, did affect the market negatively but was not significant. The stock price fluctuated during the event window, which resulted in abnormal return variation. However, the cumulative abnormal return was negative and significant on the interval of 2 days before the announcement and all significant for 10 days after the announcement date.

The announcement of the first confirmed case outside China, which was in Japan on January 21st, 2020, did affect the market positively but was not significant. The market reacted negatively only three days after the announcement, although it was insignificant. However, the cumulative abnormal return was mainly negative and significant during the event window, as the first confirmed case in Laos was on March 24th, 2020. Though the announcement on January 24th, 2020, was positive and non-significant, the cumulative abnormal return during the event window varied. This indicated price volatility as the market was concerned about the situation.

Further, the first confirmed case in the country was announced on March 24th, 2020, and Laos had the lowest GDP growth rate in 30 years due to COVID-19. Tourism, handicrafts, and manufacturing are the dominant sectors in Laos. In the first six months of 2020, tourist arrivals declined by 60%, and the manufacturing industry had a growth decline from 6.7 percent in 2019 to 5.8 percent in 2020. Tourism-related sectors such as travel agencies, accommodation services, restaurants and entertainment services, passenger transportation, and retail trade have been hit hard. Moreover, investment has been slow or postponed as the government tightens labor and equipment movement difficulty as the borders are closed (source: <https://www.worldbank.org/en/country/lao/publication/covid-19-to-impact-lao-pdr-growth-debt-in-2020-new-world-bank-report>).

On March 7th, 2020, when the number of confirmed COVID-19 cases surpassed 100,000 globally, the market reacted negatively and significantly on the date of the announcements and during the event window of 21 days for both abnormal and cumulative abnormal returns. It can be seen that the stock price declined tremendously during the event window as the negative cumulative abnormal return increased sharply. However, when WHO officially announced COVID-19 as a global pandemic on March 11th, 2020, the market did respond positively but not significantly. However, most cumulative abnormal returns during the event window were negative and significant for March 7th and 11th, 2020. The result is consistent with Ibrahim, Kamaludin, and Sundarasan (2020) findings.

On May 31st, 2021, when the WHO announced the second wave of COVID-19, in which the virus is deadly and more transmissible and called Delta Variant, the market reacted negatively but not significantly. Hereafter, it was an intermittently negative reaction but not significant. However, the cumulative abnormal return was positive and significant, possibly due to the

enormous fluctuation of the stock price, which yielded a high abnormal return during the event window.

Table 1. Abnormal Return and Cumulative Abnormal Return for Vietnam Stock Exchange

Date	31-Dec-19		13-Jan-20		15-Jan-20		21-Jan-20		24-Jan-20		7-Mar-20		11-Mar-20		31-May-21	
	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR
-10	-0.7768	-0.7768	0.5119	0.5119	-0.4195	-0.4195	0.3228	0.3228	1.1701*	1.1701*	-3.2402*	-3.2402*	-1.5174*	-1.5174*	-0.6067	-0.6067
-9	-0.3044	-1.0812*	0.1576	0.6696	0.5893	0.1698	-1.0378*	-0.7151	0.8700*	2.0402*	0.6983	-2.5419*	0.2753	-1.2422	-0.4794	-1.0861
-8	0.1187	-0.9625*	-0.4195	0.2501	-0.1584	0.0114	1.1701*	0.4551	-0.2792	1.7610*	-1.5174*	-4.0594*	-1.8252*	-3.0674*	0.7801	-0.3061
-7	0.4349	-0.5277	0.5893	0.8394	-0.9734*	-0.9620*	0.8700*	1.3251*	0.1200	1.8810*	0.2753	-3.7841*	0.2536	-2.8138*	1.2383	0.9322
-6	0.3153	-0.2124	-0.1584	0.6810	0.3228	-0.6393	-0.2792	1.0459*	0.0579	1.9389*	-1.8252*	-5.6094*	0.6963	-2.1175*	0.4457	1.3779
-5	-0.0573	-0.2697	-0.9735	-0.2925	-1.0378*	-1.6771*	0.1200	1.1660*	0.6952	2.6341*	0.2536	-5.3558*	-0.1393	-2.2568*	1.0884	2.4663
-4	0.2125	-0.0572	0.3228	0.0302	1.1701*	-0.5070	0.0579	1.2239*	0.4761	3.1103*	0.6963	-4.6595*	0.4420	-1.8148*	0.8133	3.2795*
-3	-0.2428	-0.3000	-1.0378*	-1.0075*	0.8700*	0.3631	0.6952	1.9191*	-0.0337	3.0765*	-0.1393	-4.7988*	-0.2096	-2.0243*	0.6186	3.8981*
-2	0.5119	0.2120	1.1701*	0.1626	-0.2792	0.0839	0.4761	2.3952*	0.7878	3.8643*	0.4420	-4.3567*	-6.4819*	-8.5063*	-1.0022	2.8960*
-1	0.1576	0.3696	0.8700*	1.0326*	0.1200	0.2039	-0.0337	2.3615*	0.5147	4.3790*	-0.2096	-4.5663*	0.2403	-8.2660*	1.2874	4.1833*
0	-0.4195	-0.0499	-0.2792	0.7535	0.0579	0.2618	0.7878	3.1493*	-3.2682*	1.1107*	-6.4819*	-11.0483*	-3.1721*	-11.4382*	0.5732	4.7565*
1	0.5893	0.5394	0.1200	0.8735*	0.6952	0.9570*	0.5147	3.6640*	-2.4218*	-1.3110*	0.2403	-10.8080*	-5.3283*	-16.7665*	0.7300	5.4864*
2	-0.1584	0.3810	0.0579	0.9313*	0.4761	1.4331*	-3.2682*	0.3957	-0.9095*	-2.2205*	-3.1721*	-13.9802*	-0.9758	-17.7424*	0.2240	5.7104*
3	-0.9734*	-0.5925	0.6952	1.6266*	-0.0337	1.3994*	-2.4218*	-2.0260*	0.1023	-2.1182*	-5.3283*	-19.3085*	-1.8442*	-19.5866*	1.7375	7.4480*
4	0.3228	-0.2697	0.4761	2.1027*	0.7878	2.1872*	-0.9095*	-2.9355*	-0.3429	-2.4610*	-0.9758	-20.2843*	-0.2785	-19.8651*	0.7136	8.1615*

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5	-1.0378*	-1.3075*	-0.0337	2.0690*	0.5147	2.7019*	0.1023	-2.8332*	1.3548*	-1.1062*	-1.8442*	-22.1285*	0.2518	-19.6133*	-1.1175	7.0440*
6	1.1701*	-0.1374	0.7878	2.8568*	-3.2682*	-0.5664	-0.3429	-3.1761*	0.2352	-0.8710*	-0.2785	-22.4071*	-2.9480*	-22.5614*	-2.9046*	4.1394*
7	0.8700	0.7326	0.5147	3.3715*	-2.4218*	-2.9881*	1.3548*	-1.8212*	-1.0708*	-1.9418*	0.2518	-22.1553*	-2.2582*	-24.8197*	0.9816	5.1210*
8	-0.2792	0.4535	-3.2682*	0.1032	-0.9095*	-3.8976*	0.2352	-1.5860*	0.4224	-1.5194*	-2.9480*	-25.1034*	-6.2709*	-31.0906*	-0.7017	4.4193*
9	0.1200	0.5735	-2.4218*	-2.3185*	0.1023	-3.7953*	-1.0708*	-2.6568*	0.3215	-1.1978*	-2.2582*	-27.3617*	-1.1133*	-32.2039*	2.1052	6.5246*
10	0.0579	0.6314	-0.9095*	-3.2280*	-0.3429	-4.1382*	0.4224	-2.2344*	0.0597	-1.1381*	-6.2709*	-33.6326*	4.6011*	-27.6028*	0.7356	7.2601*

*significant at 5%

Table 2. Abnormal Return and Cumulative Abnormal Return for Philippines Stock Exchange

Date	31-Dec-19		13-Jan-20		15-Jan-20		21-Jan-20		24-Jan-20		7-Mar-20		11-Mar-20		31-May-21	
	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR
-10	-0.5840	-0.5840	1.2717	1.2717	-0.3451	-0.3451	0.5477	0.5477	-0.2680	-0.2680	-0.5847	-0.5847	-3.9388*	-3.9388*	0.5271	0.5271
-9	1.7487*	1.1647	-0.3859	0.8858	-0.9350	-1.2801	-1.3412	-0.7935	0.0000	-0.2680	-2.5052*	-3.0900*	0.8359	-3.1029*	0.2266	0.7537
-8	-2.2598*	-1.0952	-0.3451	0.5407	1.2484	-0.0318	0.7905	-0.0029	0.2117	-0.0563	-3.9388*	-7.0288*	-2.6162*	-5.7191*	-0.6200	0.1336
-7	0.3739	-0.7213	-0.9350	-0.3943	-0.5361	-0.5679	-0.2680	-0.2710	-1.6671*	-1.7234*	0.8359	-6.1929*	-0.5707	-6.2899*	-0.7571	-0.6235
-6	0.0416	-0.6796	1.2484	0.8540	0.5477	-0.0201	0.0000	-0.2710	-0.1465	-1.8699*	-2.6162*	-8.8092*	0.6095	-5.6804*	0.0260	-0.5975
-5	-1.0363	-1.7159*	-0.5361	0.3179	-1.3412	-1.3614	0.2117	-0.0593	0.9027	-0.9673	-0.5707	-9.3799*	1.1235	-4.5569*	-0.5558	-1.1533
-4	1.5451*	-0.1708	0.5477	0.8656	0.7905	-0.5708	-1.6671*	-1.7264*	-2.2256*	-3.1929*	0.6095	-8.7704*	0.2547	-4.3023*	0.5148	-0.6385
-3	1.2717	1.1008	-1.3412	-0.4756	-0.2680	-0.8389	-0.1465	-1.8729*	-1.1445	-4.3374*	1.1235	-7.6470*	-1.6754*	-5.9777*	2.3055*	1.6671
-2	-0.3859	0.7150	0.7905	0.3149	0.0000	-0.8389	0.9027	-0.9702	0.0279	-4.3096*	0.2547	-7.3923*	-7.0007*	-12.9785*	4.9816*	6.6487*
-1	-0.3451	0.3698	-0.2680	0.0469	0.2117	-0.6272	-2.2256*	-3.1958*	1.9572*	-2.3523*	-1.6754*	-9.0678*	0.0914	-12.8872*	0.1405	6.7892*
0	-0.9350	-0.5651	0.0000	0.0469	-1.6671*	-2.2943*	-1.1445	-4.3404*	0.0927	-2.2597*	-7.0007*	-16.0685*	0.5505	-12.3366*	-0.6919	6.0973*
1	1.2484	0.6832	0.2117	0.2586	-0.1465	-2.4408*	0.0279	-4.3125*	-0.4704	-2.7301*	0.0914	-15.9772*	-10.2158*	-22.5525*	-0.0160	6.0814*
2	-0.5361	0.1471	-1.6671*	-1.4085	0.9027	-1.5381*	1.9572*	-2.3553*	-1.5798*	-4.3100*	0.5505	-15.4267*	1.0003	-21.5522*	3.1817*	9.2631*
3	0.5477	0.6948	-0.1465	-1.5550*	-2.2256*	-3.7637*	0.0927	-2.2626*	-0.0856	-4.3956*	-10.2158*	-25.6426*	-8.2454*	-29.7976*	-0.7308	8.5323*
4	-1.3412	-0.6464	0.9027	-0.6523	-1.1445	-4.9083*	-0.4704	-2.7331*	-0.9375	-5.3330*	1.0003*	-24.6422*	0.0000	-29.7976*	0.0658	8.5981*

5	0.7905	0.1441	-2.2256*	-2.8779*	0.0279	-4.8804*	-1.5798*	-4.3129*	-2.6299*	-7.9630*	-8.2454*	-32.8876*	-14.3223*	-44.1200*	-0.4782	8.1199*
6	-0.2680	-0.1239	-1.1445	-4.0225*	1.9572*	-2.9232*	-0.0856	-4.3985*	-0.8894	-8.8524*	0.0000	-32.8876*	3.3046*	-40.8153*	0.6748	8.7947*
7	0.0000	-0.1239	0.0279	-3.9946*	0.0927	-2.8305*	-0.9375	-5.3360*	1.2513	-7.6010*	-14.3223*	-47.2100*	-0.7433	-41.5587*	1.3538	10.1486*
8	0.2117	0.0878	1.9572*	-2.0374*	-0.4704	-3.3010*	-2.6299*	-7.9659*	1.7277*	-5.8733*	3.3046*	-43.9054*	0.6493	-40.9093*	-0.3895	9.7591*
9	-1.6671*	-1.5793*	0.0927	-1.9447*	-1.5798*	-4.8808*	-0.8894	-8.8553*	2.0682*	-3.8050*	-0.7433	-44.6487*	5.1733*	-35.7360*	0.4655	10.2246*
10	-0.1465	-1.7258*	-0.4704	-2.4152*	-0.0856	-4.9664*	1.2513	-7.6040*	0.0092	-3.7958*	0.6493	-43.9994*	7.1716*	-28.5643*	0.1403	10.3649*

*significant at 5%

Table 3. Abnormal Return and Cumulative Abnormal Return for Laos Stock Exchange

Date	31-Dec-19		13-Jan-20		15-Jan-20		21-Jan-20		24-Jan-20		7-Mar-20		11-Mar-20		31-May-21	
	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR	AR	CAR
-10	-0.7117	-0.7117	-0.5042	-0.5042	0.5467	0.5467	-1.6226	-1.6226	-1.0975	-1.0975	-2.3004*	-2.3004*	1.3331	1.3331	-0.2670	-0.2670
-9	1.4242	0.7125	0.0000	-0.5042	-1.7960	-1.2492	-1.0975	-2.7201*	-0.0362	-1.1337	1.3331	-0.9674	0.5703	1.9033	0.5583	0.2914
-8	0.0353	0.7479	0.5467	0.0426	0.0405	-1.2087	-0.0362	-2.7563*	-0.6074	-1.7412	0.5703	-0.3971	-1.5383	0.3651	-0.5150	-0.2236
-7	-0.0619	0.6860	-1.7960	-1.7534	-0.6338	-1.8425	-0.6074	-3.3637*	1.4758	-0.2654	-1.5383	-1.9354	-0.1029	0.2622	0.2326	0.0090
-6	-1.0665	-0.3805	0.0405	-1.7129	0.3538	-1.4886	1.4758	-1.8880	0.1249	-0.1405	-0.1029	-2.0383*	-1.4878	-1.2256	0.2536	0.2627
-5	2.0606	1.6800	-0.6338	-2.3466	-0.5496	-2.0382	0.1249	-1.7631	-0.4284	-0.5689	-1.4878	-3.5260*	-0.2676	-1.4932	1.2285	1.4912
-4	5.9921*	7.6721*	0.3538	-1.9928	-1.6226	-3.6608*	-0.4284	-2.1915	-0.2958	-0.8646	-0.2676	-3.7936*	-1.2972	-2.7904*	-0.6624	0.8288
-3	-0.5042	7.1680*	-0.5496	-2.5424	-1.0975	-4.7583*	-0.2958	-2.4872	-1.6491	-2.5137	-1.2972	-5.0908*	0.3270	-2.4633*	0.9583	1.7870*
-2	0.0000	7.1680*	-1.6226	-4.1649*	-0.0362	-4.7945*	-1.6491	-4.1363*	-0.1573	-2.6710*	0.3270	-4.7638*	0.0000	-2.4633*	0.1750	1.9621*
-1	0.5467	7.7147*	-1.0975	-5.2624*	-0.6074	-5.4019*	-0.1573	-4.2936*	0.5180	-2.1530	0.0000	-4.7638*	-2.6512*	-5.1146*	-0.2901	1.6720*
0	-1.7960	5.9188*	-0.0362	-5.2986*	1.4758	-3.9261*	0.5180	-3.7756*	1.0497	-1.1033	-2.6512*	-7.4151*	0.8470	-4.2676*	-0.1897	1.4823
1	0.0405	5.9593*	-0.6074	-5.9061*	0.1249	-3.8012*	1.0497	-2.7259*	0.2401	-0.8632	0.8470	-6.5681*	-0.4396	-4.7072*	1.3381	2.8203*
2	-0.6338	5.3255*	1.4758	-4.4303*	-0.4284	-4.2296*	0.2401	-2.4858	-0.7352	-1.5984	-0.4396	-7.0077*	0.3611	-4.3462*	0.0595	2.8799*
3	0.3538	5.6794*	0.1249	-4.3054*	-0.2958	-4.5254*	-0.7352	-3.2210*	-0.0815	-1.6800	0.3611	-6.6466*	-0.8166	-5.1627*	-0.2295	2.6503*
4	-0.5496	5.1298*	-0.4284	-4.7338*	-1.6491	-6.1745*	-0.0815	-3.3025*	0.4796	-1.2004	-0.8166	-7.4632*	-0.3874	-5.5502*	-0.1018	2.5485*

5	-1.6226	3.5072*	-0.2958	-5.0295*	-0.1573	-6.3318*	0.4796	-2.8230*	1.5593	0.3589	-0.3874	-7.8506*	0.6650	-4.8852*	-0.4188	2.1297*
6	-1.0975	2.4097*	-1.6491	-6.6787*	0.5180	-5.8138*	1.5593	-1.2637	0.6643	1.0232	0.6650	-7.1856*	0.4280	-4.4571*	0.1374	2.2672*
7	-0.0362	2.3735*	-0.1573	-6.8360*	1.0497	-4.7641*	0.6643	-0.5994	-0.1121	0.9112	0.4280	-6.7576*	-3.6876*	-8.1448*	-0.0458	2.2214*
8	-0.6074	1.7661	0.5180	-6.3180*	0.2401	-4.5239*	-0.1121	-0.7114	-1.3692	-0.4580	-3.6876*	-10.4452*	0.0000	-8.1448*	0.1109	2.3323*
9	1.4758	3.2418*	1.0497	-5.2682*	-0.7352	-5.2592*	-1.3692	-2.0806	-0.9281	-1.3861	0.0000	-10.4452*	-2.6062*	-10.7511*	-0.8164	1.5160
10	0.1249	3.3667*	0.2401	-5.0281*	-0.0815	-5.3407*	-0.9281	-3.0087*	0.8648	-0.5213	-2.6062*	-13.0515*	1.2889	-9.4621*	1.0817	2.5977*

*significant at 5%

5. Conclusion

COVID-19 has impacted and altered various sectors and affected the economy of most countries in ASEAN. Though the market participants, including investors, did not immediately respond to the first announcement of COVID-19 in China, some countries reacted negatively but not significantly. The market participants still believed that the disease would not affect or be transmitted to other countries as ASIAN countries had experienced respiratory diseases such as SARS as there was no certainty about the cause or origin. However, when the disease was detected in other countries such as Thailand, Japan, the USA, and the European region in January 2020, the market started to have a mixed reaction (negative and positive reaction) depending on the country announcing the confirmed case. As the USA and Japan were two dominant trading partners of most countries, other markets, in particular ASEAN countries, started to respond to the COVID-19 announcement in these two countries. As the announcement in these countries affected their stock market, it also affected other stock markets. Furthermore, the stock price in ASEAN countries started to decline sharply as more confirmed cases increased in ASEAN countries and worldwide. The market participants started to panic and sold their stock and related financial instruments, which caused the index to fall significantly; hence some ASEAN countries also halted the stock market trading to prevent a further drop and a market crumble. There is no certainty in the market as most Governments imposed measures such as international travel restrictions, which affected all economic activities, industry sectors and global supply chains. It was also believed that there was international herding behaviour as most stock markets started behaving similarly, resulting in negative abnormal returns and cumulative abnormal returns. Further, the WHO's announcement of COVID-19 as a global pandemic negatively and significantly affected the ASEAN market negatively and significantly. During the first quarter of 2020, the economic growth of most ASEAN countries contracted by 2 to 8 per cent, depending on the economic fundamentals and government measures. However, the second wave of COVID-19 in May 2021 did not affect the ASEAN market severely as in 2020 due to preparedness and the vaccination rate. The market has already adjusted to the pandemic, and the economy has shown a positive increase compared to 2020. Though the outcome is only valid for the study's time period, this can be used as a base for future action and anticipation so that investors can choose which nations to invest in when building foreign stock portfolios by observing how the market responds to differences in the specific event announcements and which countries the market responds more to.

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