Economic Consequence of COVID-19 in ASEAN-5: Investigating the Impact of the First COVID-19 Case and Lockdown Announcement on the Stock Prices of Publicly Listed Companies

Arnel Onesimo O. Uy*, Diane Danielle P. Ang, Alvaro Joaquin K. Aranton, Matthew Marcus P. Lim, and Albright Leben S. Tee

De La Salle University
*Corresponding Author: arnel.uy@dlsu.edu.ph

Abstract: From the first reported COVID-19 case in December 2019 and even after the declaration of the World Health Organization (WHO) that COVID-19 is a global pandemic in March 2020, governments have implemented various measures to contain its exponential spread, including declaring lockdowns. Using an event study, we provided evidence that two key events of the pandemic – the first COVID-19 case and the lockdown declaration – have significant impacts on the cumulative abnormal returns of publicly listed companies in the ASEAN-5 countries. Furthermore, we confirm that while country was a significant contributing factor in both events, industry was only a significant contributing factor in the lockdown declaration.

Key Words: COVID-19 pandemic; economic impact; cumulative abnormal returns; ASEAN-5; event study

1. INTRODUCTION

The exponential spread of the virus referred to as SARS-CoV-2 which causes a disease which is officially called COVID-19 from its first reported case in December 30, 2019 resulted in the declaration of a global pandemic by the Director General of the World Health Organization (WHO) less than three months after. Between December 30, 2019 and March 11, 2020, cases were reported in 114 countries with more than 118,000 cases and 4,291 people have lost their lives. Thereafter, countries started to implement measures to address the spread of this virus. Government declared curfews, quarantines and even lockdowns. By April 2020, about half of the world's population was under lockdown (Sanford, 2020). Schools and businesses were closed and people were asked to stay home. Curfews were also introduced to limit the movement of people.

The pandemic has not only locked down cities but also crippled businesses. A quick search in the EBSCO journal articles published since 2020 shows more than 2,500 papers were published in academic journals. While most of these studies the economic effect of COVID-19 on a particular context or situation, there were 25 studies which covered its impact on stock prices or markets, but none investigated the economic consequence of the pandemic to a group of countries such as ASEAN.

1.1 Problem Statement

In this study, we investigated the economic consequences of the COVID-19 by examining market reactions to the first reported COVID-19 case and the implementation of a government lockdown in five ASEAN countries - Indonesia, Malaysia, Philippines, Singapore and Thailand, or collected referred to as ASEAN-5. By analyzing the movements of stock prices prior to and after the first COVID-19 case and the implementation of lockdowns, we sought to determine whether the COVID-19 impacts the overall ASEAN-5

and whether countries and industries are significant factors.

1.2 Theory, Framework and Hypotheses

The COVID-19 pandemic can be considered a black swan event. The Black Swan theory proposed by Nassim Nicholas Taleb suggests that black swans events are rare and unpredictable events that are capable of causing severe negative impacts (Chappelow, 2020). The inability to predict the outcomes of events like such are related to the lack of awareness on the subject matter. According to Taleb (2007), there is a need to adjust to their existence instead of trying to predict its impact and effect on its environment.

The Efficient Market Hypothesis, on the other hand, attempts to explain the reasoning on why the prices of stocks traded in the stock market change. This theory states that an efficient capital market is a market whose prices of stock fully reflect all known information which allows uninformed investors who buy a diversified portfolio at the tableau of prices given by the market to obtain a rate of return as generous as that achieved by experts (Malkier, 2003). This theory can be used to explain why most, if not all, stocks in the stock market have fallen in price during COVID-19 epidemic. The prices traded in the stock market reflect the current information gathered from the events of the COVID-19 epidemic.

Therefore, while the black swan theory proposes that the impact and effect of COVID-19 pandemic (black swan event) is not predictable, we can still use the reaction of investors as they use whatever information they have regarding COVID-19 to assess and reflect its impact to businesses in the valuation of stock prices. Hence, by using the cumulative abnormal returns (CARs) of stock prices, an approached pioneered by Ball and Brown (1968), we can determine the economic consequence of COVID-19 in ASEAN-5. Figure 1 shows the operational framework we used in this study for the two COVID-19 events.
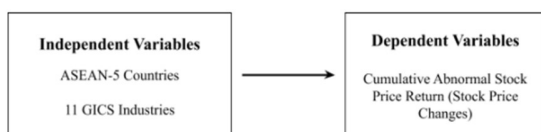

Figure 1. Operational Framework

The unpredictability and potential severe consequences that the event may bring allows the classification of the confirmation of the first confirmed COVID-19 case as a black swan event. These types of events may be a concern and cause panic to many international investors and result in a sharp panic selling response (He et al., 2020). With the panic selling response and the possible operational disruption of firms, this may cause a negative impact on the performance of a stock. However, this event represents an early stage of the spread of the virus. The social awareness of the population and the severity level of the virus may not be considered critical to merit a significant negative market reaction. This leads us to our first hypothesis.

H_1: The first confirmed COVID-19 case has a significant effect on cumulative abnormal stock price return of ASEAN-5 listed companies.

To counteract the spread of the virus, governments around the world have started to conduct measures, such as lockdowns and quarantines. The enactment of lockdown and quarantine procedures has heavily restricted the movement of people and the flow of producing and selling goods and services. These restrictions have severely affected economies that are reliant on their neighboring countries for imports, exports or both (Fernandes, 2020). Due to the interconnectedness and integrated nature of the economies in ASEAN as well as the shocks in the economies of the main ASEAN trading partners such as the US, China and EU, the direct disruptions caused by travel and mobility restrictions, and the interruptions in normal business operations have severely decreased trade which has caused the depreciation of the economy and the exchange rates across the southeast Asian region (ASEAN, 2020). This leads us to hypothesize that:

H_2: The first day of lockdown implementation has a significant effect on cumulative abnormal stock price return of ASEAN-5 listed companies.

Studies have observed that pandemics cause negative reactions from stock markets; in fact, some markets have shown a more significant reaction compared to others. (Zhang et al., 2020). The market reaction of the ASEAN-5 stock exchange may vary due to various factors. One of the factors include the economic development and economic condition of a country. Using the World Bank (2020) categorization of all member-countries based on their income level, specifically, GNI per capita, we confirm that the

ASEAN-5 countries used in this study belongs to different economic categories. Singapore is classified as a high-income economy. Indonesia, Malaysia, and Thailand belong to the upper-middle-income economies. The Philippines is categorized as part of low-middle-income economies. Moreover, Patra and Poshakwale (2006) adds that economic conditions affected by inflation, trading volume and money supply have a relationship with the movement of stock prices. Thus, the difference in the economic condition or classification of these countries may be a contributing factor to how stock prices of listed companies will react to the implications of the COVID-19 events. This leads us to formulate hypothesis 3 and 4 as follows:

H_3: The cumulative abnormal return of firms during the first confirmed COVID-19 case are significantly different among countries.

H_4: The cumulative abnormal return of firms during the lockdown implementation are significantly different among countries.

Another factor that affects variation in market reaction to a pandemic is the impact on various industries as directly affected by the changing needs and demands of people. According to del Rio-Chanona (2020), these industries may be affected through a demand shock or a supply shock. To test this, we hypothesized that:

H_5: The cumulative abnormal return of firms during the first confirmed COVID-19 case in various industries significantly differ.

H_6: The cumulative abnormal return of firms during the lockdown implementation in various industries significantly differ.

2. METHODOLOGY

2.1 Research design

Our study used an event study methodology to analyze the impact of COVID-19 on stock prices of publicly listed companies in ASEAN-5. We used a 150-day estimation period (Armitage, 1995) and combination of a 31-day (15-pre-event days, the event day, and 15-post-event days) as well as a 16-day (event day and 15 post-event days. Table 1 indicates the event dates for each country which we consider as Day 0 for the two events we are studying.

Table 1. Event Dates (Day 0)

Country	Event 1: First Confirmed COVID-19 Case	Event 2: First Day of Lockdown Implementation
Indonesia	2-Mar-20	10-Apr-20
Malaysia	24-Jan-20	18-Mar-20
Philippines	30-Jan-20	15-Mar-20
Singapore	23-Jan-20	7-Apr-20
Thailand	13-Jan-20	26-Mar-20

The study computed cumulative abnormal returns (CAR) around the event dates to measure the impact of such events. This was first used by Ball and Brown (1968).

To facilitate a comparative analysis of the impact of COVID events on countries and industries, a two-way analysis of variance (ANOVA) was conducted on the hypothesis that cumulative abnormal returns have generally been the same for firms across all countries and all industries. A two-way ANOVA is a statistical test that determines the effect of two nominal predictor variables on a continuous outcome variable. Individual effects of Country and Industry were considered in the two-way model. At the same time, the moderation effect of a country on an industry was considered, as a Country may indirectly influence which industry is affected and in what particular intensity and direction (gain or loss). This is only reflective of the potentially different strengths and weaknesses each industry may have in each country's specific market contexts and may also reflect administrative decisions across countries that may affect the running stability of different industries in various ways.

2.2 Population

Covering all ASEAN-5 publicly listed companies with available stock prices in COMPUSTAT, our study used 3,206 companies. The breakdown of these companies by country and industry classification using the Global Industry Classification Standard (GICS) is presented in Table 2.

Table 2. No. of Publicly Listed Companies

Industry Classification	Philippines	Indonesia	Thailand	Malaysia	Singapore	Total
Energy (10)	14	52	35	31	44	176
Materials (15)	38	71	111	105	38	363
Industrials (20)	33	110	168	200	200	712
Consumer Discretionary (25)	28	88	113	110	84	423
Consumer Staples (30)	24	72	81	88	33	298
Health Care (35)	1	18	34	15	30	98
Financials (40)	33	97	87	33	25	275
Information Technology (45)	13	12	42	49	56	172
Telecommunication Services (50)	9	34	60	17	17	137
Utilities (55)	13	6	38	14	10	82
Real Estate (60)	54	68	142	106	102	472
Total	260	628	911	768	639	3206

3. RESULTS AND DISCUSSION

3.1 Overall Impact

In order to determine whether or not the COVID-19 events had a significant effect on the cumulative abnormal stock return, one-sample t-test was used. As shown in Table 3, the results of our t-tests show that both events - the first confirmed COVID-19 case and the first day of lockdown implementation – during the 16-day and 31-day event windows have a significant effect on the cumulative abnormal stock price returns of the public listed companies in ASEAN-5. Hence, we accept our H_1 and H_2 that the two COVID-19 events have significant impact on the stock prices of publicly listed ASEAN-5 countries.

Table 3. T-Test Results

Event 1: First COVID-19 Case				
Window	CAR	T-Test	P-Value	
16 days	-0.0252	-4.9806	0.000	***
31 days	-0.0352	-5.5835	0.000	***
Event 2: Lockdown Implementation				
Country	CAR	T-Test	P-Value	
16 days	0.1259	21.5430	0.000	***
31 days	0.0869	8.3117	0.000	***

While both COVID-19 events significantly affected the overall stock prices of ASEAN-5 listed companies, it is interesting to note that CAR is negative in the First Case event implying losses while it is positive in the First Lockdown event implying gains. The significance of a negative CAR in the first COVID-19 case confirms the assertion of He et al (2020) that the pandemic is a concern and cause panic to many international investors and result in a sharp panic selling response. On the other hand, the positive CAR in the first lockdown implementation may indicate optimism of the investors when lockdowns were implemented as a way to contain the spread of the coronavirus. According to the Dyson (2020), a number of investors chose to capitalize on the falling prices to acquire stocks at a price lower than pre-pandemic levels. Thus, shifting the investor's outlook during the lockdown from negative to positive as compared to the initial impact of the first reported case.

Moreover, the timing of the first case and the lockdown implementations across the five (5) ASEAN countries may have affected the behavior of CARs during these two events. Investors may have already consider the impact of COVID in their value judgement of the stocks when the first COVID case was reported in each country. This may explain the negative CARs in the first case. When the lockdowns were implemented which happened 39 days (Indonesia) to 75 days (Singapore) later, investors viewed this as a way to mitigate the effects of COVID thus adjusted their value judgement upward.

3.2 Impact of Event 1: First Case Reported

When considering the impact of the first confirmed COVID-19 case on the economic activity in ASEAN-5 countries, the two-way ANOVA results show that the CARs of the ASEAN-5 countries were found to be significantly different while the CARs of the industries were not significantly different during the 16-day and 31-day windows (Table 4). Thus, accepting our hypothesis, H_3. This implies that the markets of the ASEAN-5 countries react differently to the first event. One of the main factors that may have caused the differences in the CARs of the ASEAN-5 countries are their respective economic conditions. These results are similar with the study of Liu et al (2020) where they found that stock markets of Asian

countries react more quickly to the COVID-19 outbreak with some countries recovering slightly better in the later stage of the pandemic than other countries. Thereby supporting that each country has its own market behavior which may reflect in the industry within each country.

Table 4. Two-way ANOVA Results

Factor	Df	Sum Sq	Mean Sq	F Value	P Value
Event 1: First COVID-19 Case					
Event Window: 16-day					
Country	4	4.577	1.144	15.285	$p < 0.001$***
Industry	10	0.827	0.083	1.105	0.354
Country x Industry	40	4.965	0.124	1.658	0.006***
Residuals	2944	220.377	0.075		
Event Window: 31-day					
Country	4	10.554	2.638	22.924	$p < 0.001$***
Industry	10	1.542	0.154	1.340	0.203
Country x Industry	40	6.594	0.165	1.432	0.039**
Residuals	2944	338.842	0.115		
Event 2: Lockdown Implementation					
Event Window: 16-day					
Country	4	25.488	6.372	69.997	$p < 0.001$***
Industry	10	3.436	0.344	3.775	$p < 0.001$***
Country x Industry	40	10.348	0.259	2.842	$p < 0.001$***
Residuals	2944	268.000	0.091		
Event Window: 31-day					
Country	4	276.511	69.128	305.886	$p < 0.001$***
Industry	10	12.607	1.261	5.579	$p < 0.001$***
Country x Industry	40	28.070	0.702	3.105	$p < 0.001$***
Residuals	2944	665.320	0.226		

*** Significant at alpha = 0.01 ** Significant at alpha = 0.05

Industry, on the other hand, is not significant which implies that the impact of the first confirmed COVID-19 case on the CAR of the different industries are relatively similar. Thereby, we reject our H_5 hypothesis.

3.2 Impact of Event 2: Lockdowns

The two-way ANOVA results for the second event (Table 4) show that on the impact of the first lockdown implementation among the ASEAN-5 countries found that the CARs of each country and industry were significantly different during the 16-day and 31-day event windows. Thus, we accept H_4 and H_6.

This implies that countries and industry classifications have significant impact on the CARs of listed firms during the first lockdown implementation. This could be due to varying degrees of economic resiliency among ASEAN-5 countries. The same is true for the industries where some industries were affected greatly (positively and negatively) by the pandemic while others were not.

4. CONCLUSIONS

Using an event study analysis, we were able to provide empirical evidence that there stock markets were significantly affected by COVID-19 before and after the first confirmed COVID-19 case and the news of the lockdown implementation.

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The first confirmed COVID-19 case had resulted in negative cumulative abnormal returns. This is reminiscent of the Spanish Flu in 1918 which resulted in negative implications on the market and the economy. Whereas the first lockdown implementation resulted in positive cumulative abnormal returns which happened much later than the first reported case. This may reflect investors' optimism when lockdowns were implemented as a way to contain the spread of the coronavirus.

The results of the two-way ANOVA presented a significant difference between the cumulative abnormal returns of firms in the ASEAN-5 countries for both COVID-19 events. Meanwhile, the impact of both events on the stock returns of the industries have varied accordingly. For the first confirmed COVID-19 case, the industries showed no significant difference between the CAR of the industries in each country suggesting that all industries were affected by the pandemic. On the contrary, the industries showed a significant difference between the CAR of the industries in each country during the first lockdown implementation. This implies that investors' reaction to the industry classifications of firms was common when the first case was announced but their reaction varied significantly during the lockdown implementation.

5. REFERENCES (use APA style for citations)

Armitage, S. (1995). Event study methods and
    evidence on their performance. Journal of

Economic Surveys, 9(1), 25–52.
https://doi.org/10.1111/j.1467-6419.1995.tb00109.x.

ASEAN (2020, April 10). ASEAN policy brief. https://asean.org/storage/2020/04/ASEAN-Policy-Brief-April-2020_FINAL.pdf

Ball, R, Brown, P (1968) An empirical evaluation of accounting income numbers. Journal of Accounting Research 6(2): 159–178.

Chappelow, J. (2020). Black Swan. https://www.investopedia.com/terms/b/blackswan.asp

del Rio-Chanona, R. M., Mealy, P., Pichler, A., Lafond, F., & Farmer, D. (2020). Supply and demand shocks in the COVID-19 pandemic: An industry and occupation perspective. arXiv preprint arXiv:2004.06759.

Dyson, R. (2020, August 4). Market shock: how did investors react to the impact of Covid-19? https://www.schroders.com/en/insights/global-investor-study/market-shock-how-did-investors-react-to-the-impact-of-covid-19/

Fernandes, N. (2020). Economic effects of coronavirus outbreak (COVID-19) on the world economy. *Available at SSRN 3557504.*

He, P., Sun, Y., Zhang, Y., & Li, T. (2020). COVID–19's impact on stock prices across different sectors—An event study based on the Chinese stock market. Emerging Markets Finance and Trade, 56(10), 2198-2212.

Liu, H., Manzoor, A., Wang, C., Zhang, L., & Manzoor, Z. (2020). The COVID-19 outbreak and affected countries stock markets response. *International Journal of Environmental Research and Public Health, 17(8)*, 2800.

Malkiel, B. (2003). The efficient market hypothesis and its critics. *Working Papers 111, Princeton*

University, Department of Economics, Center for Economic Policy Studies.

Patra, T., & Poshakwale, S. (2006). Economic variables and stock market returns: evidence from the Athens stock exchange. Applied financial economics, 16(13), 993-1005.

Sandford, A. (2020, April 3). Coronavirus: Half of humanity now on lockdown as 90 countries call for confinement. *www.euronews.com.* Retrieved from https://www.euronews.com/2020/04/02/coronavirus-in-europe-spain-s-death-toll-hits-10-000-after-record-950-new-deaths-in-24-hou

Taleb, N.N. (2007). The black swan: The impact of the highly improbable. Random: New York, NY, USA.

World Bank. (2020). World Bank Country and Lending Groups. https://datahelpdesk.worldbank.org/knowledgebase/articles/906519

Zhang, D., Hu, M., & Ji, Q. (2020). Financial markets under the global pandemic of COVID-19. *Finance Research Letters*, 101528.