



EVENT STUDY ANALYSIS OF THE COVID-19 OUTBREAK ON STOCK PRICES LISTED ON THE INDONESIA STOCK EXCHANGE

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Abstrak

Penelitian ini bertujuan untuk menguji kandungan informasi yang terdapat pada peristiwa pertama penyebaran COVID-19 di Indonesia pada 2 Maret 2020 yang dilakukan dengan cara menganalisis return taknormal serta aktivitas volume perdagangan saham pada sektor pariwisata, transportasi, tekstil, alat kesehatan, farmasi, makanan dan minuman disekitaran terjadinya peristiwa. Digunakan penelitian kuantitatif dengan pendekatan studi peristiwa dan trading volume activity dengan menggunakan purposive sampling sebagai teknik pengambilan sampel Pengujian dilakukan menggunakan indikator abnormal return dengan cara melakukan uji statistic dari average abnormal return untuk setiap peristiwa. Adapun Uji hipotesis pada indikator trading volume activity dilakukan dengan cara uji beda Paired Samples T-test yang dilakukan dengan cara membandingkan nilai statistik -t dengan nilai t-tabel pada rerata aktivitas volume perdagangan sebelum dan sesudah dengan nilai t-tabel. Temuan menunjukkan bahwa Ketika terjadi peristiwa penyebaran COVID-19 pertama di Indonesia, terdapat reaksi pasar pada sektor pariwisata, transportasi, tekstil, alat kesehatan, farmasi, makanan dan minuman. Hasil penelitian penting untuk melihat pengujian uji beda dua rata-rata aktivitas volume perdagangan pada peristiwa penyebaran COVID-19 pertama di Indonesia menunjukkan bahwa terdapat aktivitas volume perdagangan yang signifikan terjadi pada alat kesehatan dan farmasi.

Kata kunci: Event Study, COVID-19, Abnormal Return, Trading Volume Activity

Abstract

This study aimed to examine the information content contained in the first event of the COVID-19 outbreak in Indonesia on March 2, 2020, by analysing abnormal return and stock trading volume activity in the tourism, transportation, textile, medical device, pharmaceutical and food and beverage sectors around the event. This study used quantitative research with an event study approach. The samples were selected with purposive sampling as a sampling technique. The hypothesis test using the abnormal return indicators was carried out by conducting a statistical test of the average abnormal return for each event, while the hypothesis test using the trading volume activity indicators was carried out by conducting a paired-difference samples t-test by comparing the t-statistic value with the t-table value on the average trading volume activity before and after with the t-table value. The findings showed that when the first event of the COVID-19 outbreak occurred in Indonesia, there was a market reaction in the tourism, transportation, textile, medical device, pharmaceutical and food and beverage sectors. The test result is important to show the difference test results of the two average trading volume activities during the



first event of the COVID-19 outbreak in Indonesia showed that there was significant trading volume activity in the medical device and pharmaceutical sectors.

Keywords: *Event Study, COVID-19, Abnormal Return, Trading Volume Activity*

I. Introduction

The capital market is one of the economic instruments that cannot be separated from the influence of surrounding economic events, such as micro-economic events like announcements of dividend distribution (Puspaningtyas, 2019), announcements of corporate alliances (Burton, 2005) and announcements of corporate earnings (Choi, 2019) as well as macroeconomic events like the growth of Gross Domestic Product in a country and monetary policies (Chen et al., 2005; Hussain et al., 2018). The existence of information related to public events that can cause market reactions certainly has a very important role for investors. This is because investors use this public information in their decision making (Fama 1970; Jogiyanto 2017). At the end of December 2019, it was announced that in Wuhan, Hubei, China there was a Novel Coronavirus Disease (COVID-19). The disease is thought to have originated from seafood and wild animals traded in the Huanan market of Wuhan. Then, on January 22, 2020, the WHO declared this outbreak an international health emergency. The impact of the COVID-19 pandemic not only gives anxiety about the spread of the virus but also provides a blow to the global economy. This event is an unexpected event—and some parties have considered it to be an event that will affect the future of the world economy. The COVID-19 outbreak also has an impact on world capital markets, as it undermines investor sentiment and lowers stock prices in major capital markets (CNBC, 2020).

On March 2, 2020, the President of the Republic of Indonesia with the Minister of Health announced the first 2 cases of COVID-19 that occurred in Indonesia (Kompas, 2020). The announcement of the first 2 cases of COVID-19 caused the IDX Composite (or, Jakarta Composite Index (JSX)) to react. On March 4, 2020, the Ministry of Tourism and Creative Economy postponed promotions and incentive plans to attract foreign tourists to countries affected by the COVID-19 pandemic. Then on March 5, in a day, the JSX decreased by 0.21% and on March 6, it decreased again by 1.11% (CNBC, 2020). The decline in the tourism sector in Indonesia also have a negative impact in terms of restrictions on public transportation, restrictions on work activities outside the house and the purchase of food and beverages at cafes and restaurants may only be taken home. An event study for non-economic events, in this case is the COVID-19 outbreak, needs to be done to see how the Indonesian capital market reacts when a pandemic event occurs. Besides, it is hoped that an event study on the COVID-19 outbreak can be used to see if the outbreak resulted in a significant change in companies' value, so that later companies can take more appropriate policies when a similar event occurs.

Based on this background, the research questions are as follows:

1. Did the announcement of confirmed COVID-19 patients in Indonesia—before, the day of the event, and after it—react to the capital market, especially in the tourism,

- transportation, textile, medical device, pharmaceutical and food and beverage sectors sectors?
2. Does the announcement of confirmed COVID-19 patients in Indonesia—before, the day of the event, and after it—react to stock trading volume activity in the tourism, transportation, textile, medical device, pharmaceutical and food and beverage sectors sectors?
expected to be used by investors in making decisions. The relationship between security prices and (1979) states that the market efficiency hypotheses are divided into three types of information, namely weak form, semi-strong form and strong form of market efficiency.
 - a. Weak form of market efficie

Weak form of market efficiency states that capital market conditions are efficient when security prices fully reflect the information contained in the past. Bodie, et al (2014) explain that past information has conveyed signals that investors rely on for future performance, which causes investors to learn to take advantage of these signals.

- b. Semi-strong form of market efficiency.
The semi-strong form of market efficiency states that market conditions are efficient when security prices are formed against published information. Fundamental data on company lines, quality of management in the company, estimated company earnings and accounting practices are the

II. Theoretical Framework

1. Fama's Efficient Market Theory (1979)

It is stated that the efficient market theory is an efficient condition that is formed when all stock prices are formed because they reflect all the relevant information content that is available quickly and accurately. The existence of relevant information is information is the main key used in measuring efficient markets (Hartono, 2010). Fama

scope of information used (Bodie et al, 2014).

- c. Strong form market efficiency.

Strong form of market efficiency states that market conditions are efficient when both published information and the presence of private information formed the security prices.

2. Market Reaction

It is an event that contains information that is surprising or is not expected to cause a reaction to the capital market. Market reaction can be proxied by the presence of abnormal return. The existence of a market reaction can change the company value because of the information that has economic value. An event is considered as good news if the event contains economic value that can increase the company value and vice versa (Hartono, 2018). Therefore, investors use information relevant to market conditions as an effort to make decisions (Suryawijaya & Setiawan, 1998).

3. Event Study

It is a methodology that is generally used in financial, economics, accounting, marketing, politics,

information systems and other social studies (Hartono, 2010). To test the reaction of the capital market, the event study method is used to the events that contain information on the Indonesian stock exchange.

4. Trading Volume Activity

It is a variation of the event study which is measured by comparing the number of company shares traded with the total number of outstanding shares in the same time period (Suryawijaya and Setiawan, 1998). To measure market reaction, trading volume activity is another indicator used in addition to abnormal return. Trading volume can experience a sharp increase when unexpected events occur regardless of whether they are good or bad news. The existence of information gaps can also result in a change in Trading Volume Activity in unexpected events but this does not apply to scheduled events.

III. Research Method

1. Population and Sample

The population used in this study were all companies listed on the Indonesia Stock Exchange during the first event of the COVID-19 outbreak in Indonesia, with a total of 699 companies. This study used purposive sampling as a sampling technique. This study used a sample of 118 companies in the tourism, transportation, textile, food and beverage industries as well as the pharmaceutical and medical device industries listed on the Indonesia Stock Exchange. The company sample data collected were closing price data during the estimation period and window period. Based on these data, the calculation of the average stock return, average market return average

abnormal return are calculated throughout the estimation period from December 24, 2019 to February 14, 2020 (100 days) and the window period from February 17, 2020 to March 16, 2020 (21 days) with the detail periods of $t-10$ (10 days before the event), t_0 (1 day of the event), and $t+10$ (10 days after the event).

2. Data Collection and Data Analysis Techniques

This study used secondary data from the Indonesia Stock Exchange. In data collection, the method used was the documentation method. The observation period in this study was 121 days consisting of:

- a. The estimation period. It is a time span that can be used to calculate the expected return of stock prices. The range of the estimation period used in this study was 100 trading days, namely t_{11} to t_{110} .
- b. The window period. It is the time span of the event occurred and its effect. It is called a window because there are events that occur and their effects are assumed to be observable through the existing window. The length of the window period used in this study was 21 days, namely 10 days before the event, 1 day of the event, and 10 days after the event.

Data analysis techniques used in this study include:

1. Calculating the return of realized stock during the study estimation period, which was 100 days and the event period (window period), which was 21 days.

2. Calculating the stock market index return during the estimation period and the event period
3. Calculating the expected return of the market model.

This study used risk adjusted models, namely the market model. Using a model based on risk adjusted will give better results because economically risk plays a role in determining return. Calculations can be done by forming an expectation model using realization data during the estimation period then this expectation model can be used to estimate the expected return in the window period.

4. Calculating the abnormal return.
5. Calculating the average abnormal return, every day during the event period.
6. Calculating the accumulation of abnormal return from the event period from the minimaxing of security.
7. Calculating the standard error of the estimate based on the average return during the estimation period.
8. Conducting a t-test by dividing the abnormal return value with the standard error of the estimate value.
9. Conducting a t-test of portfolio returns (average return of all k-security) on day -t in the event period.

Trading Volume Activity

It can be done with the following details:

1. Calculating the trading volume activity during the stock trading studied during the event period can be done with the following formula:

$$TVA_{i,t} = \frac{\sum \text{Shares of company } i \text{ traded}}{\sum \text{Company } i \text{'s outstanding shares}}$$

2. Calculating the abnormal trading volume activity for all stocks studied during the event period can be done with the following formula:

$$ATVA = \frac{\sum_{t=-10}^{t=+10} TVA_t - TVA_{t-1}}{t-1}$$

$$TVA_{t-1}$$

IV. Discussion

Hypothesis test

The hypothesis test using the abnormal return indicators was carried out by conducting a statistical test of the average abnormal return of the stock, on each day of the event period. Meanwhile, the hypothesis test using the trading volume activity indicators was carried out by conducting a paired-difference samples t-test by comparing the t-statistic value with the t-table value on the average trading volume activity before/after with the t-table value.

Table 1. Results of Abnormal Return Test of All Sectors during the Event Period

Windows period	DAY -t	RRTN					
		Tourism	Transportation	Textile	Medical Device	Pharmaceutical	Food & Beverages
2/17/2020	-10	-1.742**	1.107	1.784**	0.196	-1.351***	1.554***
2/18/2020	-9	-2.404**	1.909**	3.761***	-1.950**	-0.139	0.820
2/19/2020	-8	-1.067	0.320	0.575	-0.633	2.528**	2.318**
2/20/2020	-7	0.492	0.323	0.709	-0.392	-0.022	0.887
2/21/2020	-6	-0.005	-0.242	1.790**	0.834	-0.590	-0.561
2/24/2020	-5	-0.977	-3.000*	-0.733	-0.941	0.720	-0.342
2/25/2020	-4	-2.227**	-1.139	-1.645***	-0.327	-1.897**	-0.801
2/26/2020	-3	0.233	-0.437	1.758	-1.600*	-1.432***	-1.313
2/27/2020	-2	-1.467***	0.019	-0.923	1.139	-1.042	-5.898*
2/28/2020	-1	-1.466***	-3.509*	-5.380*	-4.042**	-3.596*	-2.170**
3/2/2020	0	-0.558	0.167	6.739*	-0.387	2.138**	-3.706*
3/3/2020	1	0.415	-0.575	0.583	-0.877	1.677***	7.771*
3/4/2020	2	-0.073	-0.427	0.665	1.712***	1.245	-0.188
3/5/2020	3	-0.429	1.137	-0.040	-1.103	4.868*	2.847*
3/6/2020	4	-0.497	-0.112	1.883**	1.566***	-1.059	-0.040
3/9/2020	5	-0.656	-1.435**	-0.650	-5.245*	-3.773*	-4.121*
3/10/2020	6	4.291*	-0.545	-1.842**	-1.838**	3.240*	1.486***
3/11/2020	7	-3.459*	-3.300*	0.224	-0.705	-4.645*	-0.615
3/12/2020	8	-1.585***	-2.713*	-2.570*	-2.603*	0.384	-4.096*
3/13/2020	9	-2.326***	-2.742*	4.641*	-1.332	-1.556**	-2.923*
3/16/2020	10	0.945	-0.965	-0.607	-1.215	1.060	-0.099

Explanation : * : Significance in the level of 10% (t>1.325)
 ** : Significance in the level of 5% (t>1.725)

This study aimed to find out how the information contained in the first event of the COVID-19 outbreak in Indonesia on March 2, 2020, affected companies in the

tourism, transportation, textile, medical device, pharmaceutical and food and beverage sectors. To see how the market reacts to these events, an event study was conducted.

The first event of the COVID-19 outbreak in Indonesia was bad news for the tourism, transportation and health sectors. There was a decrease in the number of foreign tourists coming to Indonesia. Also, there were government policies related to the implementation of social distancing and reducing crowd rules to prevent the spread of COVID-19. COVID-19 is still relatively new and when it first outbreaked in Indonesia, people did not really understand this virus. The government's incentive, at that time, only focussed on how to recover the tourism and aviation sector by selling airplane ticket at low prices and there weren't an incentives for medical devices when this virus it first outbreaked in Indonesia.

The first event of the COVID-19 outbreak in Indonesia was good news for the textile, pharmaceutical and food and beverage sectors. When the event of the COVID-19 outbreak occurred in Indonesia, the government required the public to use mask as a mandatory health protocol. This course causes the textile industry to increase production, especially in personal protective equipment like masks. So, investors perceived COVID-19 as good news for textile sector companies. The existence of government policies related to the implementation of social distancing and reducing crowd rules has led to an increase in people's consumption of medicines such as multivitamins—also, food and beverages. Even, there was hoarding and stockpiling by the public which has caused a shortage of multivitamins and masks. Therefore, the first event of the COVID-19 outbreak was considered good news for the textile, pharmaceutical and food and beverage

sectors. This was reflected in the presence of positive abnormal returns around the event. The statistical test of the abnormal return value on the trading volume activity value before and after the event was intended to determine whether the COVID-19 outbreak in Indonesia has a significant impact on stock trading volume in the tourism sector. The results of the statistical test on trading volume activity are shown in the following table.

Table 2. Difference Test Results in Average Trading Volume Activity Before and After the Event

	Tourism		Transportation		Textile	
	Before	After	Before	After	Before	After
	0.001670	0.001940	0.000670	0.004410	0.000140	0.000080
	0.000770	0.002770	0.003560	0.005270	0.000190	0.000100
	0.001380	0.001290	0.002460	0.003010	0.000110	0.000070
	0.000810	0.001780	0.002650	0.002360	0.000380	0.000050
	0.001650	0.001180	0.004230	0.002420	0.000640	0.000140
	0.001850	0.002010	0.004550	0.002350	0.001000	0.000460
	0.001420	0.001410	0.004110	0.003460	0.000390	0.000620
	0.001070	0.001050	0.004030	0.000560	0.000220	0.000300
	0.001790	0.001110	0.005390	0.000410	0.000130	0.000720
	0.001590	0.000360	0.002520	0.000440	0.000400	0.000350
Average	0.00140	0.00149	0.11960	0.08646	0.00647	0.00523
st.dev	0.00039	0.00066	0.04752	0.05820	0.00501	0.00439
t-count	-0.3202		1.1800		0.6500	
Significance	0.05					

Based on the difference test results of the two average trading volume activities during the first event of the COVID-19 outbreak in Indonesia, it was found that the tourism, transportation, textile and food and beverage sectors had no significant trading volume activity. Although there was an increase and decrease in trading volume activity in the five sectors, it was temporary and not prolonged.

Table 3. Difference Test Results of Two Averages TVA during the First COVID-19 Outbreak in Indonesia

	Medical Device		Pharmaceutical		Food & Beverages	
	Before	After	Before	After	Before	After
	0.000100	0.000094	0.000152	0.001191	0.000970	0.000580
	0.000060	0.000117	0.000269	0.001011	0.000810	0.000700
	0.000050	0.000049	0.000572	0.002423	0.001510	0.000820
	0.000070	0.000086	0.000294	0.001307	0.000770	0.000800
	0.000050	0.000141	0.000224	0.000692	0.000560	0.000580
	0.000050	0.000123	0.000211	0.000864	0.000510	0.000890
	0.000040	0.000207	0.000194	0.000610	0.000960	0.000520
	0.000070	0.000300	0.000295	0.000440	0.000530	0.000990
	0.000070	0.000213	0.000376	0.000413	0.000660	0.001370
	0.000090	0.000019	0.000495	0.000527	0.000400	0.000940
Average	0.00046	0.00094	0.00277	0.00853	0.01615	0.01722
st.dev	0.00013	0.00059	0.01122	0.00543	0.00680	0.00529
t-count	-2.3970		-3.6060		-0.3450	
Significance	0.05					

The results of the difference test results of the two average trading volume activities during the first event of the COVID-19 outbreak in Indonesia showed that there was significant trading volume activity in medical device and pharmaceutical sectors. The significant difference in average trading volume activity in the medical device sector was probably due to investors selling their stocks in this sector. In addition, investors were also likely to respond negatively to this event, thereby deciding to sell their stocks in the medical device sector. Meanwhile in the pharmaceutical sector, the significant difference in average trading activity was probably due investors buying the stock in this sector. Furthermore, the obligation to wear masks will certainly increase revenue from textile sector companies, which will make investors respond positively to this news so they decide to buy the stock in this sector.

V. Conclusion

Based on the results of hypotheses testing and the description that have been presented in previous chapters, the conclusions that can be drawn in this study are as follows.

1. H1 states that the first event of the COVID-19 outbreak in Indonesia

reacts to stock in the tourism, transportation, textile, medical device, pharmaceutical and food and beverage sectors.

The H1 test results showed that there was market reaction around the COVID-19 announcement in Indonesia, thus H1 is supported. The first event of the COVID-19 outbreak in Indonesia was an event that contained information that could trigger a market reaction. After the announcement of the first confirmed COVID-19 patients in Indonesia, companies in the tourism, transportation and health sectors received negative market reactions, while companies in the textile, pharmaceutical and food and beverage sectors, received positive market reactions.

2. H2 states that the first event of the COVID-19 outbreak in Indonesia reacts to stock trading volume activity.

The H2 test results showed that there were differences in trading volume activity in the period before and after the first event of COVID-19 outbreak in Indonesia in certain sectors. H2 is supported in the medical device and pharmaceutical sectors but it is not supported in the tourism, transportation, textile and food and beverage sectors.



VI. REFERENCES

- Burton, Dawn.” Marketing Theory Matters”. British Journal of Management Volume 16, Issue 1.2005
- Chen, Ming Hsiang, et al. “The Impact of the SARS Outbreak on Taiwanese Hotel Stock Performance: An Event-Study Approach.” International Journal of Hospitality Management, vol. 26, no. 1, 2007, pp. 200–12, doi:10.1016/j.ijhm.2005.11.004.
- Choi, Hae Mi. “Market Uncertainty and Trading Volume around Earnings Announcements.” Finance Research Letters, vol. 30, no. June 2018, Elsevier, 2019, pp. 14–22, doi:10.1016/j.frl.2019.03.002.
- Hartono. Teori Portofolio Dan Analisis Investasi Title. BPFE Yogyakarta, 2017.
- Hartono, Jogyanto “Teori portofolio dan analisis investasi edisi ke-11” BPFE Yogyakarta, Yogyakarta, 2017
- Hussain, Chaudhery Mustansar. 2018. Handbook of Nanomaterials for Industrial Applications. Amsterdam: Elsevier
- Bodie, Zane, et al. Essentials of Investments. 2004.
- Fama, Eugene F. “American Finance Association Efficient Capital Markets : A Review of Theory and Empirical Work Author (s): Eugene F . Fama Source : The Journal of Finance , Vol . 25 , No . 2 , Papers and Proceedings of the Twenty- Eighth Annual Meeting of the American.” The Journal of Finance, vol. 25, no. 2, 1970, pp. 383–417.
- Fama, Eugene F. “Market Efficiency, LongTerm Returns, and Behavioral Finance.” Journal of Financial Economics, vol. 49, no. 3, 1998, pp. 283–306, doi:10.2469/dig.v30.n1.624.
- Puspitaningtyas, Zarah.”Pengaruh profitabilitas terhadap kebijakan dividen dengan likuiditas sebagai pemoderasi” Jurnal Administrasi Bisnis (JAB), pp. 1-17.2019
- Suryawijaya, Marwan A dan Faizal Arief Setiawan. 1998. Reaksi Pasar Modal di Indonesia Terhadap Peristiwa Politik Dalam Negeri (event study pada peristiwa 27 Juli 1996). KELOLA. No. 18/VII : 137-153.