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The Influence of the COVID-19 Pandemic on Stock Market Returns in Indonesia Stock Exchange

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Abstract

This research aims to confirm if the COVID-19 pandemic has had an impact on existing sectors, and how that affects the Indonesian Stock Exchange (IDX) market returns. The research method used is an event study employing market models in nine sectors of the Exchange with purposive sampling technique, and supported by Ordinary Least Square (OLS) regression. Based on the calculation of abnormal returns in the period of 30 days before up to 30 days after, the financial property, real estate, and construction sector results show a decreased abnormal return value. The infrastructure, utilities, and transportation sectors also show an abnormal return value that tends to be constant, while the abnormal return value increases in other sectors. Judging from the cumulative value of abnormal returns, the most affected sector is financials, followed by the trade, service, and investment sectors. The consumer goods and mining industry sectors are still optimistic, while other sectors show temporary negative sentiment. Overall, the stocks on the Indonesia Stock Exchange (IDX) were affected by the COVID-19 pandemic with a cumulative negative value of the average abnormal return sample. The results using OLS regression also strengthen the relationships between the COVID-19 pandemic, and negative and significant market returns.

Keywords: COVID-19, Stock Market Return, Event Studies, Market Model

JEL Classification Code: G10, G14, M21

1. Introduction

In 2020, all countries in the world are facing a new pandemic. Covid-19, also known as Coronavirus, is one of the severe acute respiratory syndrome family of viruses. It was identified for the first time in December 2019 in Wuhan, China (UNICEF, 2020; Camba & Camba Jr., 2020). The spread of COVID-19 has been very fast. It is easily transmitted through saliva exchange from someone who has been infected. It can then attack the respiratory system with symptoms ranging from mild to severe and develop into a disease that is quite serious for the elderly or those with chronic medical problems such as diabetes, cardiovascular disease, cancer, and chronic respiratory problems (WHO, 2020a). Until now, COVID-19 has been considered a relatively serious disease due to its sudden appearance and lack of a cure or vaccine to prevent and control its spread.

Based on data from April 24, 2020, the end-date of the study, 2,631,839 cases were confirmed globally, with the number of deaths reaching 182,100 (WHO, 2020b). The spread was very rapid, to more than 180 countries, including Indonesia. In Indonesia alone, as of April 24, 2020, the number of positive confirmed cases was 8,211 with 1,002 cured and 689 deceased (Badan Penanggulangan Bencana, 2020).

A simple look at the stock market will tell you that coronavirus has led to a volatile economy. This event has greatly impacted the global, as well as the Indonesian economy, including the stock market. That is because

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investor behavior changes based on the information they receive. Returns on the stock market respond to major events (Al-Awadhi et al., 2020). Market psychology is the prevailing sentiment of financial market buyers and sellers at any point in time Greed, fear, expectations, and circumstances are all factors that contribute to markets' overall market psychology. The ability of these states of mind to trigger periodic "risk-on" and risk-off," in other words boom and bust cycles in financial markets, is well documented (Samsul, 2006). External events can have a negative effect on the economy, and affect investor sentiment (Liu et al., 2020; Khanthavit, 2020).

Economic turmoil associated with the COVID-19 pandemic has had wide-ranging and severe impacts upon financial markets, including stock, bond, and commodity (including crude oil and gold) markets (Hongsakulvasu & Liammukda, 2020; Alam et al., 2020). Referring to Goodell (2020), these impacts occur due to additional costs related to the pandemic, ranging from healthcare to pandemic controls, to issues of work productivity, economic activity, foreign investment, and tourism. Moreover, Goodell (2020) states that the banking sector would be vulnerable if an economic crisis occurred, with foreclosures, bad credit, and other banking issues. Moreover, market reactions will deeply impact several industries.

The spread of this infectious disease not only affects the health and life of the community but also the health of the economy (Liu et al., 2020). The results of this research show that stock markets across the globe have experienced a rapid weakening, and the occurrence of negative abnormal returns, confirming pessimistic investor sentiment. This is aligned with Al-Awadhi et al. (2020), who pointed to the significant negative influence of COVID-19 on stock returns. Compared to the industrial sector, the COVID-19 pandemic has had a relatively positive impact on the health and telecommunications industries, but a negative impact on energy and transportation which has caused those stock prices to plummet (Ramelli & Wagner, 2020).

This COVID-19 pandemic is a new issue that has increased risk and uncertainty for investors. Ichev and Marinč (2018) described it in their 2018 study on the Ebola outbreak. Information in the form of media coverage affected people's feelings, causing anxiety and fear that affected investor decisions, risk-averse behavior, and pessimism. The emergence of COVID-19 can cause behavioral fever for investors due to their uncertainty and anxiety, which leads to new risks, although stock price movements based on expectations for the economy are reasonable (Wagner, 2020).

Therefore, the movement of stock prices on the Indonesia Stock Exchange is something that is important to note from before the COVID-19 outbreak until after the pandemic ends. The following is share price on the Indonesia Stock Exchange starting from March 2, 2020, until April 24, 2020, which is illustrated as follows.

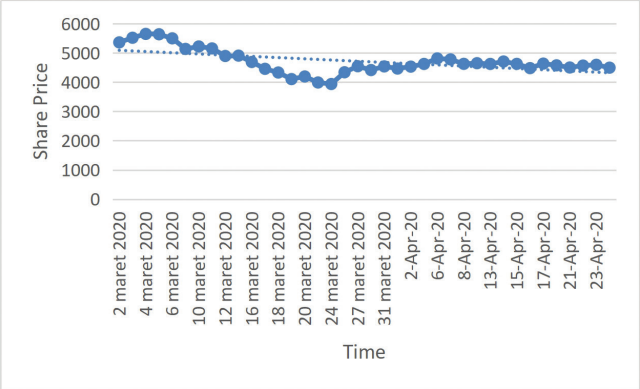

Figure 1: IDX Stock Price Movements

Source: Yahoo Finance (2020) Data Processed by the Author.

Based on Figure 1, stock prices on the IDX experienced a downward, but not too significant, decline. Therefore, in this case, the author will confirm the impact of the pandemic on existing sectors and how it will affect the market return. Research methodology, data, along with empirical tests, analysis, and conclusions will be presented in the next section.

2. Methods

To answer the stated research objectives, the event study is used to determine the market return before and after the COVID-19 outbreak. An event study is an empirical analysis that examines the impact of a significant catalyst occurrence or contingent event on the value of a security, such as company stock. Event studies can reveal important information about how a stock is likely to react to a given event. This study is used because the method is able to analyze market reactions to certain events by observing changes in stock price through the measurement of abnormal returns and the volume of stock trading activity (Suganda, 2018). The stages of its use are as follows: 1) determine the sample of companies that have received the announcement; 2) determine Zero Day as the day of the announcement; 3) determine the time period to be examined; 4) calculation of return is performed each day; 5) the calculation of abnormal returns is also done each day; 6) calculate the average abnormal return in all samples; 7) add the abnormal returns of each company to the calculation of abnormal returns that have been accumulated since the initial period; 8) examine and discuss the results (Elton et al., 2007).

3. Data and Empirical Test

The time period that will be used in this research is 30 days, which is designed to be 30 days before the event and up to 30 days after the event, with March 2, 2020, as

the day of the event. The population in the study is nine business sectors listed on the IDX, with nine more to be added later in the study. The purposive sampling technique was also taken based on the following criteria: the companies were listed on the Indonesia Stock Exchange (IDX) during the research period of September 10, 2019, to April 15, 2020, not classified as suspension shares, and fulfilling the necessary data requirements so that the number of shares counted was 572 shares in the nine existing sectors. The research time used is divided into two, periods, - from January 20, 2020, to February 28, 2020 (as Panel A) and March 3, 2020, to April 15, 2020 (as Panel B), excepting Saturdays, Sundays, and national holidays within the 90-day estimation period.

The study of events in this research uses the market model. According to Zoogah (2014), in determining stock returns when events do not or have not occurred, the market model considers changes in the market and stock returns as an adjustment to risk. Based on the statement by Panayides and Gong (2002), the estimated value of the beta and the realization of market returns obtained within the window period, and the expected level of stock returns can be calculated as follows:

$$\overline{E}_{it} = \hat{\alpha}_i + \hat{\beta}_i R_{mt}$$

with $\overline{E}_{it}$ as the expectation of stock returns at the time t, $\hat{\alpha}_i$. and $\hat{\beta}_i$ as market models during the estimation period, and R_{mt} as a market return at time t so that the value of abnormal returns can be calculated as the difference in actual and expected returns.

$$\mathrm{AR}_{it} = R_{it} - \overline{E}_{it}$$

The cumulative value of the abnormal return from the time of the event (p) to a certain time (q) can be calculated as follows:

$$\mathrm{CAR}_i(p,q) = \sum_{t=p}^{q} \mathrm{AR}_{it}$$

After the three calculations above, based on Panayides and Gong (2002), next is the calculation of the average abnormal return of the sample with an arithmetic average of n shares and the cumulative value of the average abnormal return of the sample, as follows:

$$\overline{\mathrm{AR}}_t = \frac{1}{n}\sum_{i=1}^{n} \mathrm{AR}_{it}$$

$$\mathrm{CAR}(p,q) = \sum_{t=p}^{q} \overline{\mathrm{AR}}_t$$

In calculating CAR, both cumulative abnormal return and cumulative abnormal return from the sample, the research time will be divided from (0.6), (7.14), (15.22), (23.30 to be able to see the impact of the COVID-19-related information per 7–8 days.

In this study, the error tolerance level used (α) was 5%. Ordinary least square (OLS) is a type of linear least-squares method for estimating the unknown parameters in a linear regression model. OLS chooses the parameters of a linear function of a set of explanatory variables by the principle of least squares: minimizing the sum of the squares of the differences between the observed dependent variable (values of the variable being observed) in the given dataset and those predicted by the linear function. In confirming the impact of COVID-19 on market returns with abnormal returns, in this study Ordinary Least Square (OLS) will be used with the following equation, referring to the adjusted research of Liu et al. (2020).

$$\mathrm{AR}_{it} = \beta_1 + \beta_2 \mathrm{Return}_{it} + \beta_3 \mathrm{Return} M_{it} + \mu$$

with AR_{it} being abnormal return, β the constant of stock returns and market returns. The hypothesis that will be tested in this study consists of:

Ho: *$b = 0$, with no variable X_n effect to the abnormal return.*

Ha: *$b \neq 0$, with an influence of the variable X_n on abnormal return.*

4. Further Analysis

Before starting the analysis of event studies using the market model, a calculation of the average stock returns of the nine sectors both before (Panel A) and after the event (Panel B) can be seen in the following table:

Based on the table above, the highest stock return value in Panel A is on the 18th day before the event, with a total return of 0.0098. The lowest value, −0.0193, occurs on the first day before the event, and the average on Panel A is −0.0038. The highest stock return value on Panel B, 0.0520, appears on the 17th day after the event. The lowest value, −0.0514, occurs on the fifth day after the event, and the average on Panel B is −0.0038. The average stock returns on panels A and B have similar values, and the maximum value on Panel B is greater than Panel A. To confirm this, further analysis is needed by calculating the abnormal return value of the shares.

Table 1: Average Stock Return of IDX Before and After the Event

Information	Day	Stock Return	Information	Day	Stock Return
Panel A (Events Before)	−30	−0.0086	Panel B (Events After)	1	0.0176
	−29	−0.0065		2	0.0102
	−28	−0.0012		3	−0.0008
	−27	0.0047		4	−0.0120
	−26	−0.0023		5	−0.0514
	−25	−0.0157		6	0.0052
	−24	−0.0074		7	−0.0185
	−23	−0.0035		8	−0.0399
	−22	−0.0049		9	−0.0028
	−21	−0.0078		10	−0.0272
	−20	−0.0133		11	−0.0372
	−19	−0.0010		12	−0.0201
	−18	0.0098		13	−0.0272
	−17	0.0027		14	0.0172
	−16	0.0003		15	−0.0321
	−15	−0.0075		16	0.0019
	−14	−0.0006		17	0.0520
	−13	−0.0091		18	0.0259
	−12	−0.0083		19	−0.0216
	−11	0.0044		20	0.0173
	−10	0.0021		21	−0.0108
	−9	0.0090		22	0.0078
	−8	0.0082		23	0.0148
	−7	0.0006		24	0.0286
	−6	−0.0075		25	0.0005
	−5	−0.0093		26	−0.0163
	−4	0.0032		27	0.0000
	−3	−0.0091		28	−0.0020
	−2	−0.0154		29	0.0108
	−1	−0.0193		30	−0.0045
Day of the Event	0	−0.0134	Event		−0.0040

Table 2: Abnormal Return on and After the Event

Sector	The Day	1 Day After the Event	2 Days After the Event	3 Days After the Event
Agriculture	0.0005	−0.0058	−0.0130	0.0112
Basic & Chemicals Industries	0.0080	−0.0037	0.0153	−0.0034
Consumer Goods Industry	−0.0015	−0.0004	−0.0196	0.0018
Financial	−0.0108	−0.0049	0.0000	0.0029
Infrastructure, Utilities & Transportation	−0.0313	0.0191	−0.0029	−0.0025
Mining	−0.0013	0.0002	−0.0028	0.0006
Miscellaneous Industries	−0.0072	0.0026	0.0011	−0.0011
Property, Real Estate & Construction	0.0155	−0.0119	−0.0059	0.0071
Trade, Services & Investment	0.0085	0.0069	−0.0068	−0.0060

In this study, the value of abnormal stock returns in the nine sectors will be displayed three days after the event to determine investor response to this COVID-19 pandemic information.

Based on the values of the abnormal returns, it can be seen that the industrial sectors of consumer goods, finance, infrastructure, utilities & transportation, mining, and various types of industries on the day of the event show abnormal negative returns while other sectors are positive. This shows that there was a negative sentiment from investors in those sectors over the announcement of the outbreak in Indonesia. This caused investors to worry about the effects of the COVID-19 pandemic. Unlike the first day after the event, when the consumer goods and financial industry sectors continued to show negative sentiment from investors, followed by other industries (except the mining industry), various industries, trade, services, and investments showed positive abnormal return values.

On the second day following the event, the agriculture sector, the consumer goods industry, and property, real estate & construction industry still had negative sentiment followed by the infrastructure, utilities & transportation, mining, and trade, services, and investment sectors. On the third day after the event, only three sectors had negative sentiments (basic industries and chemicals; infrastructure, utilities & transportation; miscellaneous industries, and trade, services, and investment) while other sectors showed positive sentiment. Based on the data from three days after the event, there is still a fluctuation of sentiment from investors concerned with the information obtained.

Figure 2 shows the number of abnormal returns in each sector for 30 days before the event up to 30 days after the event. From the graph, it can be seen that the financial, property, real estate, and construction sectors have abnormal return values with a negative tendency, indicating a negative sentiment in these sectors, stemming from information about the outbreak for up to 30 days after the event. Conversely, the infrastructure, utilities, and transportation sectors show an abnormal return value, with a tendency to be constant. This sector is not affected by the information of a COVID-19 outbreak in Indonesia. The other six sectors experienced a tendency toward abnormal returns revealing that despite the information about the COVID-19 pandemic, investors still had positive sentiment regarding the shares owned. Furthermore, the CAR (Cumulative Abnormal Return) calculation is performed with the following calculation results:

In Table 3, the financial sector was most affected when compared to other sectors, including the trade, service & investment sectors, even up to 30 days after the announcement. The decline was due to the impact of the Indonesian economy, both domestically and abroad (exports), on production and other economic activities. This is consistent with the statement from Bank Indonesia Bank Sentral Republik Indonesia (2020), where the widespread COVID-19 pandemic had an impact on macro-financial stability, both globally and domestically, with the impact on tourism, investment, trade (exports) and was a detriment to economic activity and production. According to the statement, the increase in uncertainty that occurred caused investors to make portfolio adjustments so that the outflow of funds and the exchange rate become depressed. Based on a study by Bank Indonesia, if the spread of the pandemic continues, corporate and household performance will decline more deeply due to the spread that occurs in various sectors, leaving the financial service industry with the potential to decline in its performance, especially for banks.

The agriculture, infrastructure, utilities, and transportation sectors, as well as various industries, responded immediately upon the announcement of the pandemic with increased investor pessimism, even though it appeared to be only temporary. Likewise, the basic industrial sector & chemicals showed a pessimism, even though it did not directly respond to the announcement information. The property, real estate, and construction sectors had a cumulative value of negative abnormal returns on the last day of the window period, namely April 15th to the 30th. This is possible because an economic downturn reduces buying interest, and creates difficulties in paying for installments. Those difficulties can cause pessimism, unlike the consumer goods and mining industry sectors, which still exhibited optimism amid the uncertainty.

To clarify the impact of the COVID-19 pandemic, a cumulative calculation of the average abnormal return of the sample is carried out with the following results:

In Table 4. The average cumulative value in the sample starting from Day Zero until the 22nd day, shows a mildly significant negative value, whereas from the 23rd to the 30th day, the cumulative value of the average abnormal return of the sample shows a positive value, though, it is not very significant. In Graph 3, the average value of abnormal return samples tends to increase, though the increase is not large, unlike the sample's cumulative abnormal return, which shows a downward trend throughout, from day −30 to +30.

A calculation of OLS regression, from the day of the event up to 30 days after, is used to determine the impact—or not—of the COVID-19 pandemic on market returns. Before the calculation, the classic assumption test is performed for normality, multicollinearity, heteroscedasticity, and autocorrelation. The results of the normality test show that the data used is distributed normally (the statistical value of JB chi-square distribution is smaller than the critical chi-square value of 43.77297 and the probability value is greater than 0.05). In the next step, multicollinearity testing is done using the Correlation Matrix. According to the rules, correlation coefficient values greater than 0.80 or 0.90 indicate the presence of multicollinearity (Lee et al., 2019). Based on the current test results, there is multicollinearity in the relationship between market return and stock returns, while the other variables are free from multicollinearity.

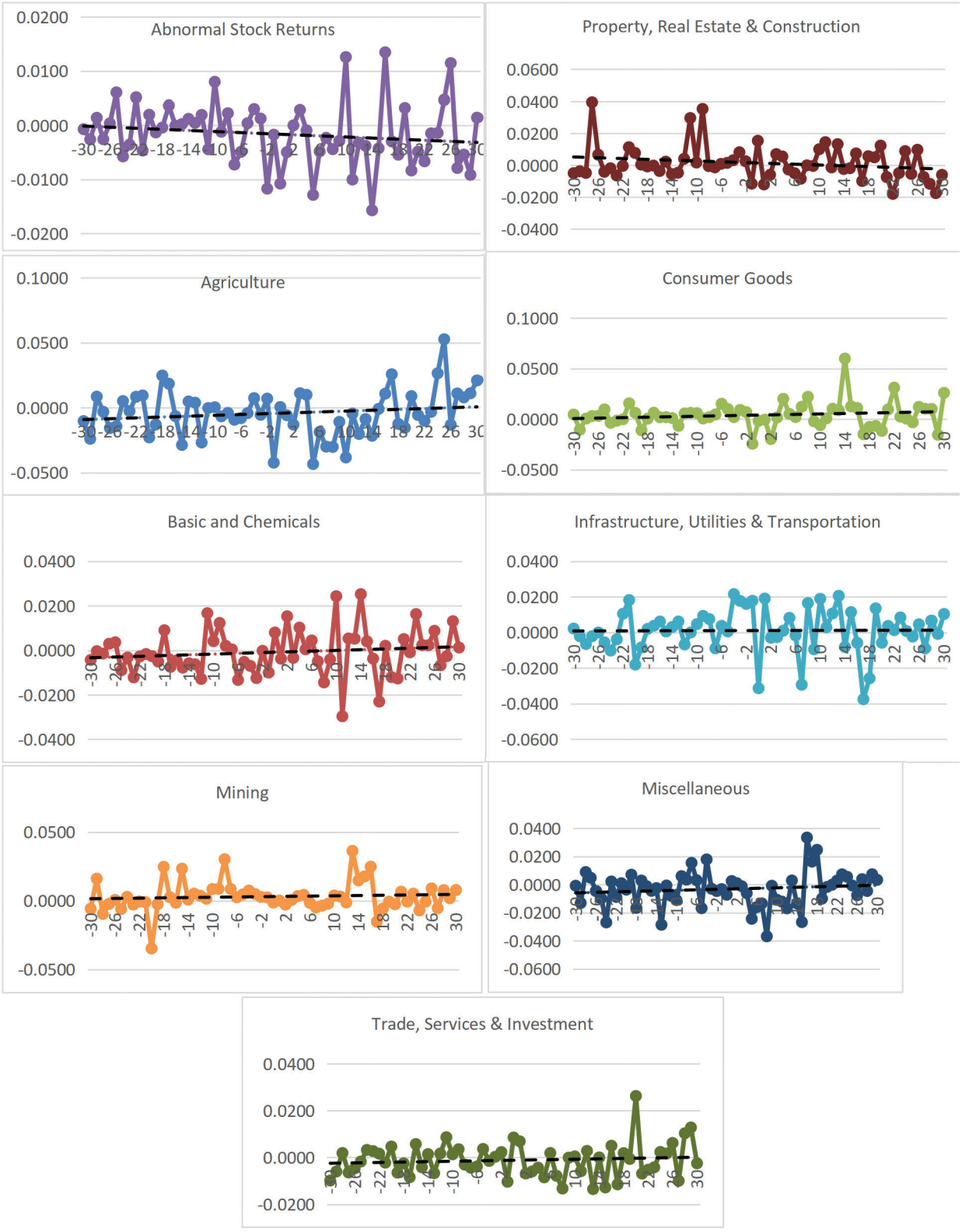

Figure 2: Abnormal Return on Every Sector

Table 3: Cumulative Abnormal Return

Sector	CAR (0, 6)	*T*-stat	CAR (7, 14)	*T*-stat	CAR (15, 22)	*T*-stat	CAR (23,30)	*T*-stat
Agriculture	−0.0592	−0.2125	−0.1642	−0.5513	0.0011	0.0036	0.1140	0.3826
Basic & Chemicals Industry	0.0315	0.1280	0.0073	0.0276	−0.0410	−0.1561	0.0349	0.1328
Consumer Goods Industry	0.0079	0.0308	0.1072	0.3903	0.0243	0.0885	0.0437	0.1591
Finance	−0.0313	−0.1495	−0.0296	−0.1321	−0.0157	−0.0700	−0.0076	−0.0339
Infrastructure, Utilities & Transportation	−0.0098	−0.0402	0.0233	0.0893	−0.0444	−0.1703	0.0193	0.0740
Mining	0.0031	0.0112	0.0465	0.1546	0.0248	0.0824	0.0189	0.0628
Miscellaneous Industries	−0.0507	−0.1693	−0.1005	−0.3137	0.0397	0.1240	0.0154	0.0482
Property, Real Estate & Construction	0.0030	0.0086	0.0260	0.0696	−0.0058	−0.0156	−0.0333	−0.0890
Trade, Services & Investment	−0.0082	−0.0399	−0.0370	−0.1692	−0.0037	−0.0170	0.0169	0.0770

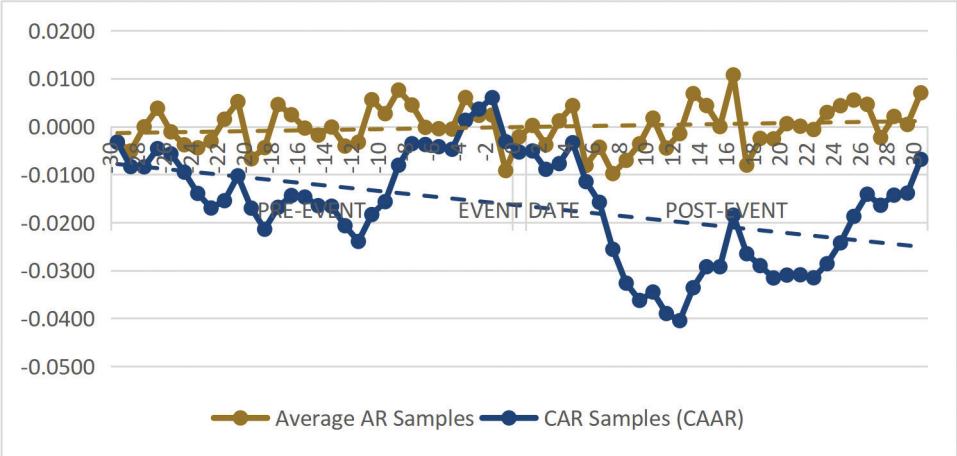

Figure 3: Comparison of Average Abnormal Return Samples and Cumulative Abnormal Return Samples

Table 4: Cumulative Average Abnormal Return Sample

Period	CAR Sample	*t*-stat
0,6	−0.0126	−0.0763
7,14	−0.0134	−0.0759
15,22	−0.0023	−0.0130
23,30	0.0247	0.1394

Although multicollinearity is found, it can still be continued with OLS regression calculations because it meets the assumptions of the BLUE (Best Linear Unlock Estimator). The occurrence of multicollinearity does not mean violating one of the assumptions in OLS regression because the estimated OLS regression parameters are still in the BLUE (Best Linear Unlimited Estimator) state (Das & Chatterjee, 2012; Chen et al., 1986).

Multicollinearity occurs in the market returns variable because stock prices are very closely related to the CSPI. The stock price forms the CSPI (Market). Therefore, this research is still being carried out using previously planned variables. From the heteroscedasticity and autocorrelation tests that it can be said that there is no heteroscedasticity or autocorrelation.

Therefore, the data that will be used in calculating OLS regression is already fulfilling. In the next step, the OLS regression calculation is performed with the following results:

Based on the results of Table 5, the stock return variable has a probability value of 0.0000, which is less than 0.05, indicating that there is a significant and positive influence of the stock return variable on abnormal returns, as indicated by the positive coefficient. Return M variable also has a probability value of 0.0000, which is less than 0.05, indicating that there is a significant negative influence of the market return variable on abnormal returns, which is indicated by the negative coefficient value.

Table 5 demonstrates that the probability value of 0.000000, which is smaller than 0.05, indicates the significant simultaneous influence of the stock return and market return variables on the abnormal return. Furthermore, the test shows the adjusted *R*-squared value of 0.999913 indicated that the abnormal return variable can be explained by the stock return and market return variables (99.9913%), while the rest is explained by other variables not included in the study (Table 5).

The OLS regression test results regarding the relationship between the COVID-19 pandemic and the market return, previously described, demonstrates a negative and significant influence on abnormal returns following the news announcement. The results of the study are consistent with the research by Liu et al. (2020), Al-Awadhi et al. (2020), and Ramelli and Wagner (2020). This test also confirms the findings from the previous event studies. This is because perceived investor uncertainty results in negative sentiments that impact the overall market return.

5. Conclusions

The COVID-19 outbreak in Indonesia turned out to have an impact on several sectors in the Indonesia Stock Exchange (IDX). The impact is shown by the emergence of negative sentiment from the sectors that existed during the day of events up to the first three days following the event. The financial property, real estate, and construction sectors have shown to have abnormal returns that decreases during the 30-day period before and after. The infrastructure, utilities, & transportation sectors are not affected by this pandemic because abnormal returns tend to be constant. Conversely, other sectors show increased abnormal return values.

When the abnormal return value is accumulated, the financial sector is most affected during the event period up to 30 days after the event, which is then followed by the trade, service, & investment sectors. The impact was due to the decline in exports, production, and economic activities, and the consequent uncertainty felt by investors, resulting in an outflow of funds and depressed exchange rates. As it continues, the performance of various sectors will be further affected. Conversely, the consumer goods and mining industry sectors were still optimistic amid the uncertainties, while the other sectors show temporary negative sentiments, both directly and indirectly. To determine the overall impact, a cumulative calculation of the average abnormal return of the sample was performed, which showed that the COVID-19 pandemic has had an impact on stocks on the Indonesia Stock Exchange, with a decline as well as negative values occurring during the day of the event until the twenty-second day after the event. The results of this event study, then, were confirmed by further testing, which strengthened the relationship between the COVID-19 pandemic and the significantly negative market returns indicated by the abnormal returns following the event.

Table 5: Ordinary Least Square (OLS) Regression

Variable	Coefficient	Std. Error	*t*-statistic	Prob.
C	0.000729	8.93E-06	81.64311	0.0000
Return	1.001602	0.001753	571.4321	0.0000
Return M	−0.673230	0.001148	−586.2607	0.0000
R-squared	0.999919	Mean dependent var		0.000774
Adjusted *R*-squared	0.999913	S.D. dependent var		0.005259
S.E. of regression	4.91E-05	Akaike info criterion		−16.91255
Sum squared resid	6.76E-08	Schwarz criterion		−16.77378
Log likelihood	265.1446	Hannan–Quinn criter		−16.86732
F-statistic	171854.1	Durbin–Watson stat		1.702546
Prob(*F*-statistic)	0.000000			

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