Assessing the Impact of COVID-19 Cases Towards Stock Return: Evidence from Tourism, Hotel, and Restaurant Industries in Indonesia

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ABSTRACT

COVID-19 has negatively impacted the world since its inception in Wuhan, China. Specifically in Indonesia, the first case of COVID-19 was announced by the President, Jokowi, on March 2, 2020. This pandemic has had a massive impact on many industries, and the hospitality industry is included in it. The effect of the pandemic on the hospitality industry is because of the implementation of regulations such as regional lockdowns. Stock return is a factor that motivates investors to invest and also a reward for investors' willingness to take risks with their investments. This study aims to investigate the causality between COVID-19 and stock returns. This study uses weekly stock returns with a sample period from March 2020 to February 2021 with a sample of 6 active hotel, restaurant, and tourism companies listed on the Indonesia Stock Exchange (IDX). By using Granger causality, this study finds that there is a relationship between COVID-19 and P.T. Fast Food Indonesia's stock returns, but there is no relationship between COVID-19 and stock returns for the other companies. Furthermore, we also used Vector Autoregression (VAR) and Impulse Response Function (IRF) to support the Granger causality test results.

Keywords: Stock return; Covid-19; Granger causality; Indonesia.

1. INTRODUCTION

In 2019, the world abruptly hit the world with a new health issue named Coronavirus disease, or COVID-19, that was initially found in Wuhan, China. As the virus spreads extremely rapidly and widely, WHO declared COVID-19 to be a global pandemic on March 11, 2020 (WHO, 2020). Indonesia is not an exception to the COVID-19-affected countries. President of Indonesia, Jokowi, declared the first confirmed case on March 2, 2020. It is indisputable that COVID-19 has had a negative impact on the Indonesian economy. According to *Badan Pusat Statistik (BPS),* Indonesia's economic growth slowed to 2,97 percent (Year on Year/YoY) in Quarter I-2020 (BPS, 2021).

Furthermore, COVID-19 has an impact on the Indonesian financial market as well. For instance, The Jakarta Composite Index (JCI) fell 33% from January 2020 to 3,918 on March 16, 2020, the lowest level in eight years (Habir and Wardana, 2020). The hospitality industry contributes a lot to the economic development of Indonesia. The tourism industry contributed USD12.23 billion, or Rp169 trillion, to the Indonesian economy in 2015, ranking fourth behind oil and gas, palm oil, and coal according to a pocketbook by the Ministry of Tourism 2019. Due to COVID-19, the government decided to impose some regulations in order to prevent the virus from spreading further, such as regional lockdowns, and this regulation certainly impacts the hospitality industry.   As a result, the uncertainty caused by this pandemic led to the fall of the stock market. In terms of stock return, if the corporation issues the shares performs well, the stock price tends to rise, and the higher the stock price, the greater the return acceptability (Sudarsono, 2014). Given the fact that information is critical in the stock market. Because it was not foreseen earlier, this outbreak became one of the most startling types of information. As a result, the uncertainty caused by this pandemic led to the fall of the stock market worldwide. This study aims to examine the causal relationships between COVID-19 and stock returns. This study examined weekly stock returns for a sample of six active hotels, restaurants, and tourism enterprises listed on the Indonesia Stock Exchange (IDX) from March 2020 to February 2021. Using the Granger causality test, we find no significant relationship between COVID-19 and stock returns. Additionally, we employed Vector Autoregression (VAR) and Impulse Response Function (IRF) analysis to verify the Granger causality test result.

2.   LITERATURE REVIEW

As COVID-19 has become a frightening event that no one anticipated, research on the extent of its impacts is progressively rising. Numerous research has been conducted to evaluate the effect of COVID-19 on global financial markets. For instance, Baker *et al.* (2020) stated that there had been no prior infectious disease outbreak, including the Spanish Flu, that significantly impacted the stock market as the COVID-19 outbreak. In terms of country-specific research, Xu (2021) analyzed the stock return response to unanticipated changes in the COVID-19 outbreak and the pandemic-related uncertainties in the US and Canada, which found that the increasing of COVID-19 cases has a severe impact on the stock market overall. In contrast, (Bahrini and Filfilan, 2020) examined the stock market response in GCC countries and found that the GCC countries' stock markets reacted unfavorably to new and total COVID-19 confirmed deaths, but not to the number of COVID-19 confirmed cases. In Indonesia, Rahmayani and Oktavilia (2020) found that COVID-19's total cumulative cases in Indonesia have

no significant short-term impact on Indonesia's stock market. More specifically, in terms of the hospitality industry, Song, Yeon, and Lee (2021) found that restaurant firms with prior characteristics of larger size, more leverage, more cash flows, less ROA and more internationalization are more resilient to COVID-19 stock declines than other similar firms. Furthermore, (Chen *et al.*, 2020) analyzed the impact of COVID-19 on US travel and leisure companies and found that growth in confirmed COVID-19 cases has not affect stock returns of US travel and leisure firms. Several of the studies cited above show that covid-19 affects stock returns, while others suggest that it has no effect. This study focuses on analyzing the impact of covid-19 on the stock return of selected hospitality companies, including travel, restaurant, and hotel companies in Indonesia.

3.   EMPIRICAL FRAMEWORK

3.1 Sample and variables

This research examines chosen hospitality companies in Indonesia, including tourists, restaurants, and hotels. The firms were chosen based on their market capitalization as provided by Yahoo Finance. The selection of the companies within the sub-sector is based on each company's market capital by choosing the company with the biggest and smallest market capitalization to see the differences in the impact of the growth of COVID-19 confirmed cases on each company. Studies on the effects of the COVID-19 on financial markets are typically observed to have an impact on firm size. The size of the company is one of the components to assess the impact of COVID-19 on the economy. The impact of COVID-19 can be different between the different sizes of the company. For instance, the study by (Al-Awadhi *et al.*, 2020) evaluated the impact of the COVID-19 virus on Chinese stock market returns of large and small market capitalization stocks. By using the panel data test, the study found that stocks with a large market capitalization have a much larger negative effect on returns than equities with a smaller market capitalization. Moreover, the study by (Song, Yeon, and Lee, 2021) found that companies with bigger sizes are more resilient to stock market falls in response to COVID-19. Given the findings of the previous literature, this study wants to know whether the growth of COVID-19 confirmed cases gives different impacts on the largest and the smallest company based on their market capitalization as additional information for this study.

Weekly stock returns were used as a dependent variable in this study, which was obtained from yahoo finance data, while the growth of COVID-19 confirmed cases was used as an independent variable, based on data from the covid19.go.id, website of

COVID-19 Handling Task Force of Indonesia *(Satuan Tugas Penanganan COVID-19 Indonesia)*. The study's sample period is March 2020 to February 2021. Although COVID-19 was found in 2019, it was initially publicized in early March 2020.

3.1.1 Stock return measures

In order to calculate the stock returns, we estimated weekly stock returns after collecting stock price data for tourism, restaurant, and hotel companies in Indonesia from Yahoo Finance (in percentage). We collected dividend-adjusted closing prices for each firm on the last trading day of a week from March 6th, 2020 to February 26th, 2021. To calculate weekly stock returns, the difference between the closing price on week t and week t-1 was divided by the closing price on week t-1 (Ramelli and Wagner, 2020).

3.1.2 COVID-19 cases measures

The covid19.go.id website of the Indonesian COVID-19 Handling Task Force (Satuan Tugas Penanganan COVID-19 Indonesia) provides daily COVID-19 confirmed cases, recoveries, and deaths. We calculated COVID-19 growth rates by focusing on weekly cumulative confirmed cases in Indonesia over the sample period. Additionally, to align COVID-19 weekly growth rates with the weekly stock returns of sampled tourism, restaurant, and hotel enterprises, we established a week from Saturday to Friday, corresponding with stock market trading days, given that Friday is typically the last trading day of the week (Ding et al., 2020). The following equation is used to determine the weekly growth rate of COVID-19 cases:

COVID-19 = log (1+#confirmed cases in week$_t$) − log (1+#confirmed cases in week$_{t−1}$).

<div align="center">Table 1. Variables Description</div>

No.	Variable	Measurement	Data
Dependent Variable			
1	Stock Return	Weekly stock return.	Yahoo Finance
Independent Variable			
2	Growth of COVID-19 confirmed cases.	Weekly cumulative confirmed cases.	COVID-19 Information Website by COVID-19 Handling Task Force of Indonesia (covid19.go.id)

3.2 Quantitative methods

Several tests were conducted to determine the influence of the Covid-19 virus's growth on stock returns. Before processing the data using the VAR method, first, the stationarity test of the Covid-19 effect on stock returns was carried out using the ADF method, then continued with the determination of lag length. Lastly, examine the causality with the Granger causality method. Eviews 10 software is used to conduct testing on each technique.

3.2.1 Stationery Test

The stationarity test of the Covid-19 effect on stock returns uses the Unit Root Augmented Dickey-Fuller (ADF) method, which compares the statistical ADF value with the Mackinnon critical value 1%, 5%, and 10%, where the test is carried out with the following equation:

$$Yt = \rho\ Yt\text{-}1 + \varepsilon t$$

If $\rho = 1$, the variable contains a unit root and is not stationary. If the test results are obtained at the temporary data level, a first-order test (first difference) is performed to obtain stationary data using the following equation:

$$Yt \text{ - } Yt\text{-}1 = \rho\ Yt\text{-}1 \text{ - } Yt\text{-}1 + \varepsilon t$$
$$\Delta Yt = (\rho\text{-}1)\ Yt\text{-}1 + \varepsilon t$$

The unit root test results were obtained by comparing the t-count value with the Dickey-Fuller value, the significance level being 95% or 5%. The data is considered stationary if the statistical ADF value > critical Mackinnon value ($\alpha = 5\%$) and is considered non-stationary if the stationary ADF value is < critical Mackinnon value ($\alpha = 5\%$). The data can also be considered stationary if the probability value of each variable is less than 0.05.

3.2.2 Lag Order Selection

After doing the stationarity test, the research continued with the lag test to determine the optimal lag length for the VAR model. Determination of the optimal number or length of lag uses several information criteria such as Schwarz Criteria (SC), Likelihood Ratio Test (LR), Hannan-Quinn Information Criteria (HQ), Final Prediction Error (FPE), and Akaike Information Criteria (AIC).

3.2.3 Granger Causality Test

Before carrying out the VAR method, to see the relationship between variables, a Granger causality test was carried out with the following equation:

$$Yt = \alpha + \Phi\ Yt\text{-}1 + \beta\ 1Xt\text{-}1 + \varepsilon t$$

If β 1 = 0, then X t-1 is not Granger to Yt or a variable does not affect other variables, and if β 1 > 0, then there is a Granger X t-1 relationship to Yt, it can be interpreted that a variable affects other variables.

3.2.4 Vector Autoregression (VAR)

After testing the stationarity of the data and Granger causality, the study continued with the VAR method to see the significant effect between the variables tested using the following equation model:

$$SRt = β0 + α1iΣrCOVIDt$$

After the Granger and VAR causality tests have been carried out, the Impulse Response Function (IRF) test is also employed in this research to support the existing results.

4. RESULT

4.1 Stationary test analysis

The stationarity test is used to determine whether or not the data set has a unit root. In maintaining the stability of the data, the test is carried out based on the logarithm of the research data. The hypothesis of this test is as follows:

Ho: data is not stationary

Ha: data is stationary

If the value of Prob.* is less than the significance level (α=0.05), then Ha is accepted. The result of the stationery test is shown below.

Table 2. Augmented Dicky-Fuller test Result

The outcomes of the augmented Dickey-Fuller test						
Variable	**Level**			**1st Difference**		
	Adj. T-Stat	**Prob.***	**Description**	**Adj. T-Stat**	**Prob.***	**Description**
C-19	-10.00032	0.0000	Stationer	-15.86306	0.0000	Stationer
Stock_BAYU	-6.612414	0.0000	Stationer	-5.785321	0.0000	Stationer
Stock_FAST	-6.632594	0.0000	Stationer	-6.724555	0.0000	Stationer
Stock_KPIG	-4.28234	0.0019	Stationer	-6.257402	0.0000	Stationer
Stock_PANR	-4.115373	0.0030	Stationer	-9.134924	0.0000	Stationer
Stock_PGLI	-8.178788	0.0000	Stationer	-5.335443	0.0002	Stationer

Stock_PTSP	-3.6849	0.0091	Stationer	-5.966318	0.0000	Stationer

Source: Author's own calculation with Eviews (2021)

The test results at the level and 1st difference with the ADF method show that all Prob.* values are smaller than the significance level (α=0.05). Hence, it can be concluded that Ho is rejected, so all variables are stationary.

4.2 Lag Order Selection

In order to conduct the Granger causality and VAR tests, it is required first to determine the optimal lag length, as the causality and VAR tests are quite sensitive to the number of lags. In this study, the lag order is determined using a variety of approaches, including Likelihood Ratio (LR) and Akaike Information Criterion (AIC). The following table summarizes the outcomes of the VAR Lag Order Selection method.

Table 3. Lag Order Selection Result

Lag	LogL	LR	AIC
0	3.091.624	NA	-1.888.515
1	3.493.788	6.032.464	-1.833.618
2	4.122.069	66.75478*	-19.20043*

Source: Author's own calculation with Eviews (2021)

The Eviews program marked the lag set as lag optimal with an asterisk. Based on the table above, according to the criteria, LR and AIC with the smallest value and the asterisk (*), the optimum lag for this research is lag 2.

4.3 Granger causality test

After finding the optimum lag, the next step is to find the causal relationship between the variables tested through the Granger causality test. The Granger causality test is presented in the following table.

Table 4. Granger causality test result

Hypothesis	F-Stat	Prob.	Result	Description
STOCK_BAYU does not Granger Cause COVID_19	0.16703	0.84700	H0 Accepted	No Causal Relationship
COVID_19 does not Granger Cause STOCK_BAYU	3.10889	0.0609	H0 Accepted	

STOCK_FAST does not Granger Cause COVID_19	0.50857	0.607	H0 Accepted	No Causal Relationship
COVID_19 does not Granger Cause STOCK_FAST	3.5644	0.0423	H0 Rejected	Unidirectional causality
STOCK_KPIG does not Granger Cause COVID_19	0.24446	0.7848	H0 Accepted	No Causal Relationship
COVID_19 does not Granger Cause STOCK_KPIG	0.22898	0.7969	H0 Accepted	
STOCK_PANR does not Granger Cause COVID_19	1.10789	0.3448	H0 Accepted	No Causal Relationship
COVID_19 does not Granger Cause STOCK_PANR	0.4354	0.6515	H0 Accepted	
STOCK_PGLI does not Granger Cause COVID_19	1.03539	0.3688	H0 Accepted	No Causal Relationship
COVID_19 does not Granger Cause STOCK_PGLI	0.14413	0.8664	H0 Accepted	
STOCK_PTSP does not Granger Cause COVID_19	1.47382	0.2469	H0 Accepted	No Causal Relationship
COVID_19 does not Granger Cause STOCK_PTSP	0.5613	0.577	H0 Accepted	

Source: Author's calculation with Eviews (2021)

From the results above, this study found a unidirectional causality between the COVID-19 and the stock return of P.T. Fast Food Indonesia Tbk. It is shown from the probability value of COVID-19 affect the stock return is smaller than the significant level (0.05), which means that the growth of COVID-19 confirmed cases affect the stock return of P.T. Fast Food Indonesia Tbk. However, this study found no causal relationship between the growth of COVID-19 confirmed cases and the stock return on P.T. Bayu Buana Tbk (BAYU), P.T. MNC Land Tbk (KPIG), P.T. Panorama Sentrawisata Tbk (PANR), P.T. Pembangunan Graha Lestari Indah Tbk (PGLI), and P.T. Pioneerindo Gourmet International Tbk (PTSP).

4.4 Vector Autoregression (VAR)

A VAR estimation was carried out in supporting the Granger causality test results by comparing the t-statistical value with the t-table. The calculation of the t-table is n-k,

where n is the number of observations and k is the number of variables, so n-k = 50-2=48. Based on these results, the value of df 48 with a significant level of 0.05, then the t-table is 2.01063.

If the t-statistic value is greater than the t-table value, the Covid-19 variable significantly affects the stock return variable. On the contrary, if the t-statistic value is smaller than the t-table value, it can be concluded that the COVID-19 variable does not significantly affect the stock return variable. The following is the result of the VAR estimation:
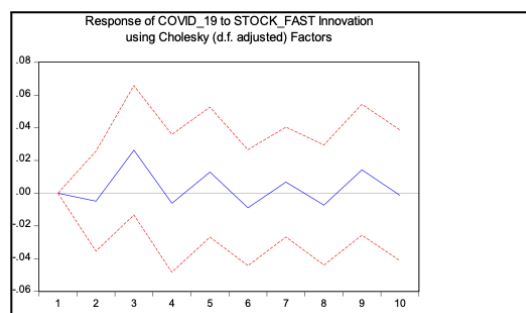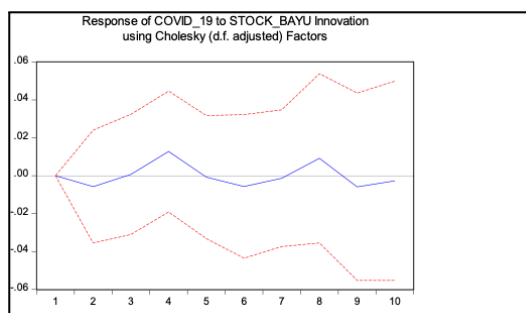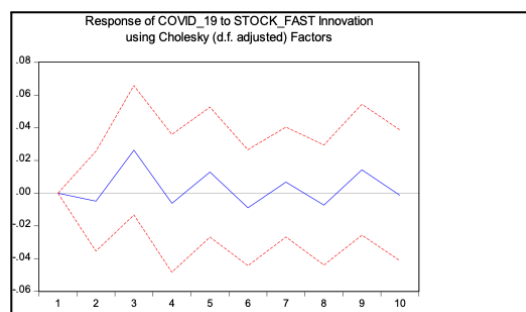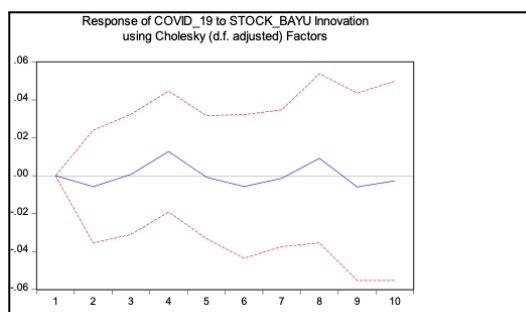
Table 5. VAR Estimation

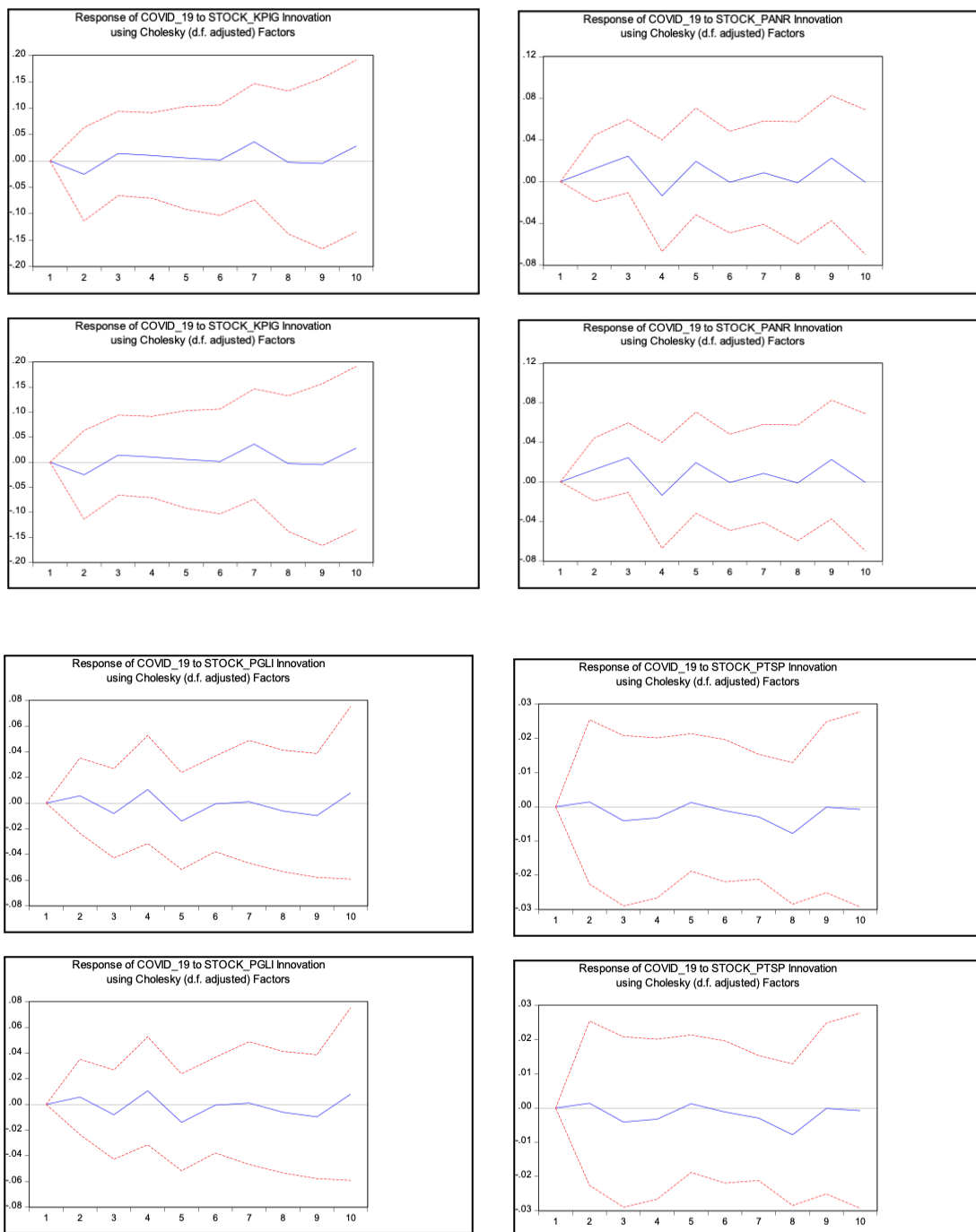|	COVID_19	STOCK_ BAYU	STOCK_ FAST	STOCK_ KPIG	STOCK_ PANR	STOCK_ PGLI	STOCK_ PTSP
	-0.386489	-0.159917	-0.015304	0.024864	0.049995	0.645413	-0.585003
COVID_19(-1)	-0.34019	-0.19825	-0.11053	-0.13528	-0.56607	-0.59698	-0.37348
	[-1.13608]	[-0.80663]	[-0.13847]	[0.18380]	[0.08832]	[1.08112]	[-1.56634]
	-0.346497	0.031071	0.36308	-0.210472	0.430529	-1.032416	-0.614857
COVID_19(-2)	-0.41559	-0.24219	-0.13502	-0.16526	-0.69153	-0.7293	-0.45626
	[-0.83374]	[0.12829]	**[2.68903]***	[-1.27356]	[0.62257]	[-1.41563]	[-1.34759]

Source: Author's own calculation with Eviews (2021)

Based on the table above, the VAR estimation shows that the t-statistic of the P.T. Fast Food Indonesia Tbk is bigger than the t-table which indicates that the growth of COVID-19 confirmed cases affect the stock return of P.T. Fast Food Indonesia Tbk. However, it also can be seen that the VAR estimation regarding COVID-19 on the stock return of the remaining company shows a t-statistic value that is smaller than the t-table (2.01063). Hence, the results show no significant effect between Covid-19 on stock returns of the other five selected tourism, restaurant, and hotel firms listed on the Stock Exchange (IDX) which are P.T. Bayu Buana Tbk (BAYU), P.T. MNC Land Tbk (KPIG), P.T. Panorama Sentrawisata Tbk (PANR), P.T. Pembangunan Graha Lestari Indah Tbk (PGLI), and P.T. Pioneerindo Gourmet International Tbk (PTSP). The VAR estimation results show the consistent result with the Granger causality test that has been done previously.

4.5 *Impulse Response Function* (IRF) Test

The impulse response function (IRF) test shows the stock returns a response to the growth of COVID-19 confirmed cases. In order to interpret the IRF result, the blue line of the graph indicates the stock return reaction, meanwhile, the red line is the shock of the growth of COVID- 19 confirmed cases. The X-axis for the graph indicates the weekly period according to this study, each period including 5 weeks of the stock return reaction, 1_{st} period started in the March $6_{th,}$ 2020- April $10_{th,}$ 2020, and the last period started from January $22_{nd,}$ 2021 – February $26_{th,}$ 2021. Meanwhile, the Y-axis indicates the standard deviation of the shock. The result of the Impulse Response Function for each company is described below.

Response of COVID_19 to STOCK_KPIG Innovation using Cholesky (d.f. adjusted) Factors

Response of COVID_19 to STOCK_PANR Innovation using Cholesky (d.f. adjusted) Factors

Response of COVID_19 to STOCK_PGLI Innovation using Cholesky (d.f. adjusted) Factors

Response of COVID_19 to STOCK_PTSP Innovation using Cholesky (d.f. adjusted) Factors

According to the graph, the stock return of PT. Bayu Buana Tbk fell in March 2020 due to the Covid-19 pandemic in Indonesia. Stock return fluctuations can be observed in the graph above, which shows significant fluctuations during the study period until the end of the research period, specifically in February 2021 PT. Bayu Buana Tbk had a significant increase in stock returns.

The chart shows that PT. Fast Food Indonesia Tbk's stock returns fluctuated significantly during the study period. Furthermore, during the first period, the stock

return response negatively to the shock of the growth of COVID-19 confirmed cases. It also can be seen that in the second period, the stock return of P.T. Fast Food Indonesia Tbk sharply increase, and followed by a sharp decrease in the third period of the study. The response of the stock return of P.T. Fast Food Indonesia Tbk continuously fluctuating during the period.

The IRF graph of P.T. MNC Land Tbk stock return response towards the growth of COVID- 19 confirmed cases. It can be seen that in the first period of the research study, the stock return response negatively to the shock of the growth of COVID-19 confirmed cases. However, after the second period, the response of P.T. MNC Land Tbk stock return was continuously positive.

Regarding the IRF result of the stock return of PT. Panorama Sentrawisata Tbk (PANR), it can be seen that initially, the response of the stock return towards the shock of the growth of COVID-19 confirmed cases are positive. Still, however, after the third period, the response sharply decreases, and shows fluctuate responses afterward but there is no negative response during the period.

According to the graph from the Impulse Response Function (IRF) of PT. Pembangunan Graha Lestari Tbk, it can be shown that the stock return response positively in the first period of this study towards the shock of the growth of COVID-19 confirmed cases. However, after the sharp decrease in the fifth period, the response of the stock return towards the shock of growth of COVID-19 confirmed cases continuously stable and increase after the ninth period.

Based on the graph above, the Impulse Response Function (IRF) results of P.T. Pioneerindo Gourmet International Tbk initially responded positively to the one standard deviation of the shock of the growth COVID-19 confirmed cases. In the eighth period, the stock return shows a negative response. However, after that, the response of the stock return of P.T. Pioneerindo Gourmet International Tbk sharply increase then the shock got stabilized after the ninth period.

5. CONCLUSION

This paper has objectives to analyze the causal relationship between the growth of COVID-19 confirmed cases and the stock return also examine whether the growth of COVID-19 confirmed cases impacts the stock return of 6 (six) selected tourism, hotel, and restaurant companies listed on the Indonesia Stock Exchange (IDX) between March 2020 and February 2021. This study employs two methodologies in order to assess the relationship and the impact of COVID-19 towards the stock return of the

selected companies, which are the Granger causality test and the Vector Autoregression (VAR) estimation.

This study found:

- By using the Granger causality test results indicate unidirectional causal between the growth of COVID-19 confirmed cases to the stock return of P.T. Fast Food Indonesia Tbk which unidirectional causal indicates that the growing number of COVID-19 confirmed cases affects the stock return of PT. Fast Food Indonesia. Meanwhile, the result also shows no causal relationship between COVID-19 and the stock return of the other 5 (five) selected tourism, hotel, and restaurant companies listed on the Indonesia Stock Exchange (IDX) during the period study.

- From the VAR estimation, it is concluded that the growth of COVID-19 confirmed cases affect the stock return of P.T. Fast Food Indonesia Tbk. However, there is no significant effect on the stock return of the remaining selected tourism, hotel, and restaurant companies listed on the Indonesia Stock Exchange (IDX) during the period study.

The findings of this study indicate that PT. Fast Food Indonesia's performance, both financially and in terms of investor sentiment, are factors that contribute to the growth of confirmed COVID-19 cases having a significant effect on the stock return of PT. Indonesian Fast Food. The increase in confirmed COVID-19 cases resulted in the establishment of the lockdown regulation, which has an effect on PT. Fast Food Indonesia's business processes, which are sensitive information for PT. Fast Food Indonesia investors. This resulted in stock price volatility throughout the study period, with the increase of COVID-19 confirmed cases resulting in lower stock prices and lower investor returns. Furthermore, this study also suggests that the investors of the remaining selected companies such as PT. Pioneerindo Gourmet International Tbk, PT. Bayu Buana Tbk, PT. Panorama Sentrawisata Tbk, PT. MNC Land Tbk, and PT. Pembangunan Graha Lestari Indah Tbk, are not too sensitive to the growth of the COVID-19 confirmed cases. Moreover, those remaining selected companies have several businesses lines and also innovations in terms of business processes to optimize the companies' performance during the study period. Another reason is the Indonesian government loosened lockdown restrictions and implemented the new normal concept during the study period which enables the hospitality business to gain and optimize their profitability during the pandemic. In addition, this finding is consistent with the previous literature (Rahmayani and Oktavilia, 2020) that states there is no short-term impact of the increasing number of COVID-19 confirmed cases on the stock return. The findings of this study also consistent with the previous literature by Indrastuti (2021) that indicates that the number of COVID-19 confirmed cases does not have significant effect on the stock exchange.

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