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Do Investors Prefer State-Owned over Other Listed Pharmaceutical Companies During COVID-19? Evidence from Indonesian Stock Exchange

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Keywords

*Autoregressive
Conditional
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Model
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Stock Prices
Volatility*

Abstract

This study aims to examine the preference of investors of pharmaceutical companies, including companies that produce herbal medicines, listed in the Indonesian Stock Exchange from 2020 to 2021. By using the descriptive analysis method and reviewing the daily stock prices of Indofarma (INAF), Kimia Farma (KAEF), Kalbe Farma (KLBF), and Sido Muncul (SIDO) in that period, it was found that there were unusual stock prices increases for state-owned pharmaceutical enterprises during those times. However, a similar occurrence did not occur with the other listed pharmaceutical companies, including one herbal medicine manufacturer. In comparing stock price movement trends, the researcher used Microsoft Excel software. The researcher also reviewed the monthly stock closing prices and the news published at that moment. It was found that related events and news existed for every significant increase in stock prices, which might influence investors' perceptions. In addition, the researcher also examined the data to test whether there was a correlation between the number of infected cases and stock prices using the ARCH model estimation. It was found that the relationship between both of them was insignificant. The researcher expects that the findings of this research not only will be a discussion topic in academic groups but also will be a reference for capital market investors and the government as the policyholders and controlling shareholders of these state-owned enterprises. Further studies on listed pharmaceutical companies in the capital markets of other countries are needed to complete the findings in this research, which may find different facts due to different policies in handling the COVID-19 pandemic.

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1. Introduction

Since its first appearance in 2019, COVID-19 has certainly shocked every country. Nowadays, the pandemic may have been much more under control, but for more than two years, the COVID-19 pandemic has persisted. Qiu et al. (2021) stated that the pandemic had been characterized as the most significant health crisis in living memory. As of April 8, 2022, globally confirmed cases are approximately 496 million, with more than 6 million deaths across about 200 countries (Our World in Data, 2022).

Many studies have been conducted regarding the impact of COVID-19 in various fields, not only from health perspectives. The pandemic that occurred for so long obviously impacted many things related to the economy and finance; the capital market sector is no exception. At the beginning of its presence in Indonesia, many suspected that the existence of the pandemic would increase trading volume and raise the share prices of every pharmaceutical company listed on the stock exchange, including the Indonesian capital market. However, the researcher suspected that involving the dominant state-owned enterprises in Indonesia in handling COVID-19 was very likely to cause differences in investor perspectives towards issuers, which would result in differences in price trends between them.

Meanwhile, Indonesia has potential in the herbal medicine market. For instance, Indonesia has 143 million hectares of tropical forests, which are home to 80 percent of the medicinal plants in the world (Heryanto, 2020). Added to this is the tradition of herbal medicine consumption (Ali et al., 2019), which in Indonesian is also known as *Jamu*. Then, to expand the scope of this comparative study, the researcher also decided to review the stock price fluctuations of a herbal medicine company in Indonesia. Therefore, the objects of observation in this research paper are three general pharmaceutical companies, Indofarma (ticker symbol: INAF), Kimia Farma (ticker symbol: KAEF), and Kalbe Farma (ticker symbol: KLBF), as well as a manufacturer of herbal medicine, Sido Muncul (ticker symbol: SIDO).

This research aims to determine what happened to these companies' stock prices during those times, including what factors triggered the price changes. Another purpose is to test whether the daily number of COVID-19 cases is directly related to each company's stock prices. Regarding novelty, no previous studies have directly compared stock price movements between pharmaceutical companies whose major shareholders were state-owned or not state-owned during the COVID-19 pandemic. The existing research studied the impact of COVID-19 on the stock market as a whole observation object. Subsequently, the researcher anticipates

this research will become a valuable reference for academic literature regarding stock prices and returns, government regulations and decision making, and capital market investors.

2. Literature Review

Stickel and Verrechia (1994) stated that an increase in stock prices supported by substantial trading volume tends to make prices rise the next day. On the other hand, if the price increase is not supported by good trading volume, there is the potential for a correction in a price decline on the next trading day. Their research aligned with the conventional wisdom of Wall Street, which states that *“volume is the fuel for stock prices.”* Previously, Cutler et al. (1988) indicated that news does not necessarily influence stock price movements; this is evidenced by the relatively small markets that respond to news related to politics and world events, and that large markets move daily without following such news updates.

Then again, in his study in 1953–1987, Fama (1990), the renowned researcher who introduced standard valuation models, argued that the current stock return has a close relationship with future production growth, showing investors' expectations about future cash flow impounded in stock prices. Another research by Schwert (1990), who extended the observation time from 1988 to 1989, also showed similar results to Fama's findings. In a few words, it can be concluded that when investors expect an event to affect a company's future cash flows, it can affect stock prices. Cochrane (2011) recapitulated the studies over the decades by stating that previous thoughts that returns were unpredictable are not accurate because it seems that all price-dividend variations correspond to discount-rate variations. Besides internal factors, external causes also impact stock prices, one of which is information or news obtained by investors (Chan, 2003), which can be either positive or negative. Prior to these, Bae and Karolyi (1994) found that negative news, domestic and foreign, impacts stock prices more significantly than good news. These factors are indivisible from investors' responses to the collected information. The behaviour of numerous retail investors develops into collective behaviour, including herding behaviour. Shiller (2003) also stated that investors sometimes overreact to news and sometimes barely react (underreact), indicating a stock market investors' behaviour bias. Further, Baker and Wurgler (2006) found that when sentiment is expected to be high, stocks appealing to optimists and speculators are unappealing to arbitrageurs, also known as investors' high sentiment bias. These researches are reinforced by the findings of Chen et al. (2013), who posited that information or news related to cash flow affects stock prices.

Learning from the outbreak of the disease that occurred earlier, SARS was proven to have an impact on stock prices in the capital market. Nippani and Washer (2004) found that SARS negatively impacted China and Vietnam's capital markets. More specifically, Chen et al. (2007) established that hotel stocks experienced substantial price and income declines during the SARS outbreak. Their study also stated that the tourism industry suffered the most significant influence of all sectors, with its stock prices decreasing by roughly 29%. Loh (2006) found that SARS also impacted airline stock prices, not only hotel stock prices. She discovered that airline stocks listed in Canada, China, Hong Kong, Singapore, and Thailand capital markets were more receptive to news about SARS relative to the average non-aviation stocks and that the negative repercussions of SARS on stocks surfaced in the form of increased volatility rather than lower mean returns. In the following years, Chen et al. (2009) conducted another study on the impact of the spread of SARS on Taiwan's capital market. They observed positive shocks to the returns of biotechnology stocks but adverse shocks to the stock returns of the aviation, tourism, and retail companies. While previous research also has documented that stock returns responded to the Ebola Virus Disease (EVD) outbreaks (Ichev & Marinč, 2018), Ma et al. (2020) argued that contagious viruses, including Swine Flu Influenza, MERS, SARS, Ebola, and Zika, had significant economic and financial consequences by impacting the GDP growth rate and stock market returns.

In recent studies regarding the capital market and COVID-19, Albulescu (2020) found that only new cases outside of China impacted the financial market volatility index (VIX). He also affirmed that the death rate due to COVID-19 had a positive and significant impact on the VIX. Other results of his study also showed that the increase in COVID-19 raised financial market volatility. Other studies also showed a vital sign of the effect of the COVID-19 pandemic on stock market volatility (Ali et al., 2020; Zhang et al., 2020; Bai et al., 2020). Baker et al. (2020) applied a text-based method in their investigation. By evaluating the United States stock market movement from 1900 to April 2020, they found that stock market volatility was more significant during the COVID-19 pandemic than during the Spanish flu in 1918–1919 and the Influenza pandemic in 1957–1958 and 1968. Likewise, the stock market in the United States was much more volatile during the emergence of COVID-19 than during the occurrences of other diseases, such as bird flu, SARS, the Middle East respiratory syndrome, and Ebola. Studies have also indicated that the news broadcasting relating to infectious diseases, such as the COVID-19 pandemic, causes anxiety and pessimism among investors, leading them to make decisions based on their perceptions (Donadelli, et al., 2017; Sun, et al., 2021).

Zeren and Hizarci (2020) also assessed the impact of COVID-19 on China, South Korea, Italy, and Germany's stock market. Applying a cointegration test and data from January 23 to March 13, 2020, they found a long-term correlation between the number of deaths attributable to COVID-19 and the stock markets in those observed countries. They also found long-term relationships between some COVID-19 cases and most of the stock markets in their test. Another research by Liu et al. (2020) stated that COVID-19 has negative and significant impacts on returns for the stock. However, these researchers studied only the short-term impact on capital markets in 21 countries, including Japan, Korea, Singapore, the United States, Germany, Italy, and the United Kingdom. Their data spanned from February 21, 2019, to March 18, 2020. In addition, they also found that Asian stock markets reacted more quickly to COVID-19 and that some of those countries are regaining rapidly as well. Investors' concern has proven to be an intermediary and transmission channel for COVID-19's impacts on the stock market.

Furthermore, Kusumahadi and Permana (2021) stated that the rise of this coronavirus variance affected stock return volatility in the United States, Italy, Spain, Germany, China, France, Canada, South Korea, Brazil, Australia, Indonesia, South Africa, Singapore, and Morocco. They also found that the existence of COVID-19 in a country positively affects return volatility, even though its effect is relatively small. Purnomo (2021) found that pharmaceutical company stocks on the Indonesian Stock Exchange did not follow the random walk hypothesis during the COVID-19 pandemic. This research contrasts with the efficient capital market theory proposed by Fama (1970), which states that stock price movements are difficult to predict based on past information because stock returns move randomly. Mishra and Mishra (2021) observed the effect of the pandemic on stock markets in 15 countries in Asia. While investigating the changes in the number of COVID-19 confirmed cases, reported death cases, stock index returns, market volatility, oil prices, inflation rate, and interest rates in the Asian markets, they found that the global statement of the deadly spread of the pandemic exerted adverse effects on stock market returns. Using daily stock index returns, COVID-19 new cases, and new deaths, Gherghina and Simionescu (2021) found that most stock market returns are in phase (cyclical effects) with pandemic variables, although a couple of stock index returns exhibit an out-of-phase behaviour (anti-cyclical effects).

Research in an emerging market conducted by Nguyen et al. (2021) found long-term relationships between foreign investors' trading behaviours and stock market returns. Still, the COVID-19 pandemic is distinguishable from preceding

financial crises regarding its impacts on foreign investors' trading behaviours. Responding to the shocks of the COVID-19 outbreaks, foreign investors have shifted their trading behaviours significantly and missed their position as a trend leader to domestic retail investors in Vietnam's capital market. However, a negative impact also occurred in the developed country. Apergis et al. (2021) confirmed that the COVID-19 pandemic exerts a substantial negative impact on the mean of Canadian stock returns and a positive impact on their volatility. The results also provided evidence that the vaccination program in Canada caused a rise in mean stock returns and a fall in the associated volatility, therefore leading to stability in the capital market. In a broader study scope, Erdem (2020) found the same results, namely that the number of cases and deaths led to a negative impact on stock market returns and a positive impact on market volatility across 75 countries.

Another interesting comparative finding is from China; Feng and Li (2021) stated that SARS triggered an average negative impact of 5.4% on stock prices. In comparison, COVID-19 had a negative impact of 5.3%. Likewise, considering China's rising worldwide influence, this study cautiously reselects the covariates and finds that the negative impact of COVID-19 on stock prices has conservatively increased to 10%, far more substantial than the impact of SARS. While the vaccination updates also impacted the volatility, Bakry et al. (2021) found that news regarding the development of vaccines led to increased volatility in both developed and emerging markets. However, they found no impact of the PfizerBioNTech vaccine administration on market volatility.

Moreover, Rouatbi et al. (2021) reported a significant favourable influence of immunization programs across 66 countries. Using a range of variables to capture the immunization program, including variables of the daily number of vaccines managed, daily vaccine rates, the vaccination period, and a dummy for the increase in the number of daily vaccines, they found that immunization significantly decreases stock returns volatility across these markets. Before the COVID-19 pandemic, Rothenstein et al. (2011) proved the impact of the development of vaccine updates and successful trials on stocks of pharmaceutical companies. Based on these prior studies, the researcher considers that the COVID-19 pandemic and its related news must have effects on the stock prices of pharmaceutical companies.

3. Method

This research used a descriptive research method of historical data from the daily stock prices of 4 (four) issuers; two are state-owned —Indofarma (INAF)

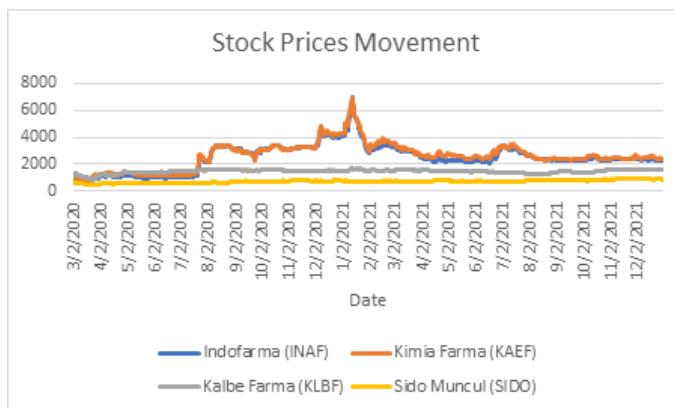
and Kimia Farma (KAEF)—while the remaining two are non-state-owned—Kalbe Farma (KLBF), and Sido Muncul (SIDO)—from March 2, 2020, to December 30, 2021, to determine whether there is a similar trend of price movements in each of these observed stocks. The duration selection to capture trends after the first case of COVID-19 broke out was from March 2, 2020 until the end of 2021, when the number of cases can be said to be sloping. The researcher used Microsoft Excel to capture the stock price fluctuations in this trend comparison. In addition, the researcher also summarized the monthly closing stock prices and reviewed the available online news updates for the months in that period. This approach aims to see whether abnormal price movements occur due to the market reaction to the recent news.

Last but not least, the researcher also decided to use the autoregressive conditional heteroskedasticity (ARCH) model for each company to analyse whether there was a direct relationship between the number of ongoing COVID-19 cases and the company's stock prices. The stock price data used were the daily closing prices at the end of the trading days—the stock data were obtained from Yahoo! Finance and COVID-19 confirmed cases data were obtained from Our World in Data by Oxford Martin School and Global Change Data Lab.

4. Results and Discussion

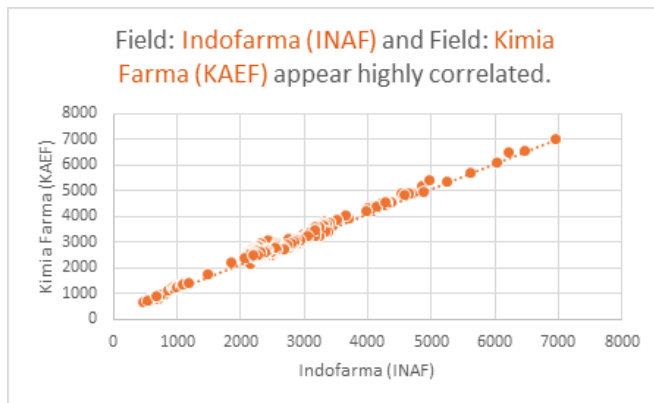
With different starting prices, respectively, Indofarma (INAF), Kimia Farma (KAEF), Kalbe Farma (KLBF), and Sido Muncul (SIDO), IDR535, IDR665, IDR1,195, and IDR544 per share prices on March 2, 2020, are depicted in the following graph of price movements over 22 months:

Figure 1: Stock Prices Movement



Remarkably, in Figure 1, we can find a relatively similar movement pattern between the two state-owned pharmaceutical companies' share prices of Indofarma (INAF) and Kimia Farma (KAEF), including a sharp price increase in January 2021 and a sharp decline after that. However, this is not the case for other observed companies. In contrast, Kalbe Farma (KLBF) and Sido Muncul (SIDO) tend to experience stagnation in their share prices for these two years. The correlation test conducted by researchers using Microsoft Excel software strengthened this discovery; the stock prices between two state-owned show such a pattern:

Figure 2: Price Similarity between Indofarma and Kimia Farma



This highly correlated phenomenon is most likely because both were state-owned enterprises; the same perception emerged from investors towards the two companies and created like prices. To find out further how the average stock prices fluctuated in more detail, the researcher also recaps them in monthly closing stock price data as follows:

Table 1: Stock Prices from March 2020 to December 2021

	INAF			KAEF			KLBF			SIDO		
	Stock Price in the beginning	Stock Price in the ending	Increase/Decrease in a Month (%)	Stock Price in the beginning	Stock Price in the ending	Increase/Decrease in a Month (%)	Stock Price in the beginning	Stock Price in the ending	Increase/Decrease in a Month (%)	Stock Price in the beginning	Stock Price in the ending	Increase/Decrease in a Month (%)
03/20	535	1080	101,87%	665	1310	96,99%	1195	1200	0,42%	544	535	-1,68%
04/20	1085	1110	2,30%	1285	1330	3,50%	1165	1440	23,61%	505	589	16,67%
05/20	1110	1010	-9,01%	1330	1160	-12,78%	1380	1415	2,54%	599	571	-4,69%
06/20	1010	985	-2,48%	1180	1120	-5,08%	1385	1460	5,42%	580	568	-2,02%
07/20	985	2280	131,47%	1100	2250	104,55%	1465	1565	6,83%	587	608	3,59%
08/20	2180	3060	40,37%	2110	3040	44,08%	1560	1580	1,28%	601	648	7,78%

	INAF			KAEF			KLBF			SIDO		
	Stock Price in the beginning	Stock Price in the ending	Increase/ Decrease in a Month (%)	Stock Price in the beginning	Stock Price in the ending	Increase/ Decrease in a Month (%)	Stock Price in the beginning	Stock Price in the ending	Increase/ Decrease in a Month (%)	Stock Price in the beginning	Stock Price in the ending	Increase/ Decrease in a Month (%)
09/20	3140	2860	-8,92%	3090	2890	-6,47%	1595	1550	-2,82%	655	697	6,43%
10/20	3180	3140	-1,26%	3180	3150	-0,94%	1610	1525	-5,28%	697	748	7,38%
11/20	3070	3160	2,93%	3080	3150	2,27%	1495	1505	0,67%	748	722	-3,49%
12/20	3210	4030	25,55%	3200	4250	32,81%	1485	1480	-0,34%	760	765	0,62%
01/21	4150	3000	-27,71%	4340	3120	-28,11%	1475	1465	-0,68%	755	694	-8,18%
02/21	2870	3290	14,63%	2980	3530	18,46%	1490	1470	-1,34%	717	755	5,30%
03/21	3340	2460	-26,35%	3610	2560	-29,09%	1520	1570	3,29%	746	746	0,00%
04/21	2500	2290	-8,40%	2630	2800	6,46%	1550	1440	-7,10%	741	774	4,42%
05/21	2240	2280	1,79%	2730	2600	-4,76%	1435	1450	1,05%	764	755	-1,27%
06/21	2260	3110	37,61%	2600	3140	20,77%	1445	1400	-3,11%	759	691	-8,97%
07/21	3390	2650	-21,83%	3370	2660	-21,07%	1400	1260	-10,00%	730	784	7,33%
08/21	2690	2340	-13,01%	2690	2410	-10,41%	1305	1345	3,07%	779	789	1,30%
09/21	2320	2330	0,43%	2370	2400	1,27%	1365	1430	4,76%	789	770	-2,41%
10/21	2290	2340	2,18%	2360	2430	2,97%	1400	1600	14,29%	770	845	9,74%
11/21	2320	2570	10,78%	2430	2740	12,76%	1590	1600	0,63%	840	915	8,93%
12/21	2400	2230	-7,08%	2550	2430	-4,71%	1590	1615	1,57%	900	865	-3,89%
Monthly Average			11,18%	Monthly Average		10,16%	Monthly Average		1,76%	Monthly Average		1,95%

Starting from March 2020 with the second increase of 101.87% and 96.99%, respectively, which is very likely due to the first time COVID-19 appeared in Indonesia (Information Portal of Indonesia, 2020), Table I confirms the trend of the unusual monthly increase in stock prices (>20%) experienced by Indofarma (INAF) and Kimia Farma (KAEF) repeatedly. After that, there are also price increases for both in July 2020 in the order of 131.47% and 104.55%. These increases are closely related to the collaborative decision between the two in the distribution of vaccines throughout Indonesia (Puspitasari & Handoyo, 2020).

The other three increments are as follows:

- August 2020 (INAF: 40.37%; KAEF: 44.08%)

The increase in stock prices is closely related to the parent company, PT Biofarma (Persero), which signed a strategic agreement with one vaccine producer from China, Sinovac Biotech Ltd., on August 20, 2020, for cooperation in delivering bulk vaccines (Biofarma, 2020).

- December 2020 (INAF: 25.55%; KAEF: 32.81%)

Based on Intan and Perwitasari (2020), this month was the first time the Sinovac brand of COVID-19 vaccine landed in Indonesia. As a subsidiary of PT Biofarma (Persero), both Indofarma (INAF) and Kimia Farma (KAEF) experienced notable stock price increases in December 2020.

- June 2021 (INAF: 37.61%; KAEF: 20.77%)

There are many possible reasons for the increase in stock prices in June 2021, e.g., the collaboration of PT Biofarma (Persero) with Baylor College Medicine, United States, in COVID-19 vaccine development (CNBC Indonesia, 2021), the use of Ivermectin released by Indofarma (INAF) as a medicine to treat COVID-19 patients (Elvira & Rafie, 2021), and the distribution of vaccines to Papua by the subsidiary of Kimia Farma (KAEF), PT Kimia Farma Diagnostika (Firdaus, 2021).

The increases mentioned above seem to have been influenced by the government's policies for handling the COVID-19 pandemic, which directly involved pharmaceutical companies in the manufacture and distribution of vaccines and medicines. Although several policies did not directly involve Indofarma (INAF) and Kimia Farma (KAEF) as a subsidiary, both received positive market sentiments from the news related to their parent company, Biofarma.

As a result, high increases in stock prices only occurred to Indofarma (INAF) and Kimia Farma (KAEF) and had little effect on non-state-owned companies such as Kalbe Farma (KLBF) and Sido Muncul (SIDO) although the increases were often followed by profound decreases in the following month due to policy changes and updates to existing cases. Examples of these events are Ivermectin, which was declared a prescription drug by the Indonesian Drug and Food Supervisory Body (BPOM, 2021), and cases of poisoning from the use of Ivermectin that occurred and the prohibition of its use as a medicine for COVID-19 in other countries, e.g., the United States (FDA, 2021).

The result of the above finding is in line with what has been stated by Fama (1990), that the increase in stock prices from observed stocks tends to be influenced by investors' perceptions of future production growth and future cash flows from these two pharmaceutical companies, as evidenced by the drastic price increases that occurred in March, August, December 2020, and June 2021. In addition, this study also complements the research conducted by Rothenstein et al. (2011), which examined and stated that information related to vaccines impacts the stocks of pharmaceutical companies. The new finding

is that in Indonesia, only pharmaceutical companies with majority ownership by government or state-owned enterprises are affected by their share prices and have no significant effect on other pharmaceutical companies, including herbal medicine manufacturers. Regarding vaccination, in contrast to Rouatbi et al. (2021), in the case of Indonesia, the vaccination program increased the volatility of Indofarma (INAF) and Kimia Farma (KAEF) stocks significantly when news related to vaccination emerged to the public. In contrast to what happened to the PfizerBioNTech vaccine administration, which according to Bakry (2021), did not affect market volatility in several developed and emerged capital markets, updates related to Sinovac or CoronaVac vaccine specifically affected the volatility of Indofarma (INAF) and Kima Farma (KAEF) stocks in Indonesia's capital market.

Furthermore, the researcher also tested the regression for daily COVID-19 cases per million people to each company's stock prices. By using the heteroskedasticity test, Breusch-Pagan-Godfrey, it was found that stock price data contained heteroskedasticity. The researcher then decided to use the ARCH model. Regrettably, the adjusted R-squared statistical tests on the number of new cases per 1000 population for each company showed insignificant results (INAF: -0.003451; KAEF: 0.020340; KLBF: -0.027154; SIDO: -0.167697). Subsequently, the output of the ARCH model could not be used because the number of new cases of COVID-19 was not directly related to changes in the stock prices of these pharmaceutical companies. In short, it was impossible to forecast the observed stock prices based on the number of new COVID-19 cases.

Instead of aligning with previous research regarding the effect of the number of new cases of COVID-19 on market volatility or stock returns (Albulescu, 2020; Zeren & Hizarci, 2020; Kusumahadi & Permana, 2021; Mishra & Mishra, 2021; Gherghina & Simionescu, 2021), the result of R-squared on these observed stocks, namely Indofarma (INAF), Kimia Farma (KAEF), Kalbe Farma (KLBF) and Sido Muncul (SIDO), presented different results. This study confirmed no association between new cases of COVID-19 and observed stock prices which could indicate that investors on the Indonesian Stock Exchange do not consider the number of new cases of COVID-19 when deciding their investment choices for pharmaceutical companies. Meanwhile, it is also necessary to conduct a thorough study of the Indonesian Stock Exchange to obtain a complete picture of whether these new cases of COVID-19 have a relationship with the capital market in Indonesia or not.

5. Conclusions

From the research results and discussions, it can be concluded that state-owned pharmaceutical companies such as Indofarma (INAF) and Kimia Farma (KAEF) are advantaged because of the pandemic handling policies issued by the Indonesian government, which majorly tend to involve state-owned enterprises. The non-state-owned listed companies such as Kalbe Farma (KLBF) and PT Sido Muncul (SIDO) are less involved, making investors preferring to buy Indofarma (INAF) and Kimia Farma (KAEF) shares compared to buying the other pharmaceutical stocks, e.g., Kalbe Farma (KLBF) and Sido Muncul (SIDO).

The limitations of this research comprise the narrow scope of the object of observation, which is only four pharmaceutical stocks, a limited timeframe of about two years, and being limited to the Indonesian Capital Market. Further research can be carried out with a broader objective of observation, a more extended observation period—until the pandemic is wholly ended, observing other countries' capital markets with various ways of handling COVID-19. It aims to capture whether the involvement of state-owned companies in handling serious issues is the only factor that affects stock price fluctuations or if other possibilities influence it.

Regarding the ARCH test, which attained an insignificant R-squared result, the researcher's suggestions for future studies are to conduct a comprehensive study of the Indonesian capital market and the capital market in other emerging countries to test whether there is a relationship between new cases of COVID-19 and Indonesian Stock Exchange composites and other composite indexes. These prospective studies are essential because if the R-squared is significant enough, the modelling generated in the ARCH model can be used as a reference for analysts and investors in compiling their investment portfolios. Even though the current situation of the COVID-19 pandemic is starting to reach the stage of becoming endemic, the model will likely be helpful in similar situations in the future.

Policy recommendations for the Indonesian government should involve the non-state-owned companies more in handling severe issues such as the COVID-19 pandemic. Therefore, it may not only make the national economic recovery faster, it can also trigger an increase in the efficiency of the state-owned enterprise business activities themselves, with more companies being involved in handling the COVID-19 pandemic. A fairer 'sharing of the cake' is needed to ensure no more gaps are created. In addition, as previously mentioned in the introduction, the potential for herbal medicine/*jamu* in Indonesia is enormous. A government campaign of consuming *jamu* as an immune booster may not only directly impact

increasing sales and stock prices of a large company such as Sidomuncul (SIDO) but also encourage the growth of smaller-scale *jamu* producers.

The short suggestion for capital market investors, especially for retail investors, is that significant price changes due to recent updates regarding corporate actions should not be a scourge, let alone the only consideration in buying or selling shares because of their temporary nature. This is evident from the market price corrections in the following days.

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