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Pre and During COVID-19 Share Trading: Case of Australia and Southeast Asia

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A B S T R A C T
This research aims to analyze the share prices and trading volume activity in the pharmaceutical industry in Southeast Asia and Australia during the pre-and during COVID-19 periods. The data sample includes pharmaceutical companies listed in Southeast Asian countries and Australia from 2017 to 2022. The analysis utilizes monthly closing price data for 36 months before COVID-19 (2017-2019) and 36 months after (2020-2022). The data were processed and analyzed using the Wilcoxon Signed Rank Test. The findings indicate that there are significant differences in share prices and trading volume activity in the pharmaceutical industry between the pre-and during COVID-19 periods. Specifically, the research reveals differences in share price and trading volume in Australia, Indonesia, Malaysia, Vietnam, and Thailand. In contrast, no significant differences were observed in share prices and trading volumes in Singapore and the Philippines. It is important to note that the study only included a sample of the pharmaceutical industry from six Southeast Asian countries and one country from Oceania (Australia). The number of pharmaceutical samples varied across these countries, with the Philippines represented by only one sample. Therefore, generalizations about all listed companies in these countries cannot be made. Future research should consider increasing the sample size by expanding the scope to include more regions or countries. Additionally, employing regression analysis to examine the influence between variables is recommended.

INTRODUCTION

The initial report of COVID-19 emerged on November 17, 2019, in China. This virus is thought to be linked to the Huanan Seafood Market in Wuhan, known for selling seafood, fish, and various live animals including poultry, bats, and snakes in Hubei Province. The first worldwide death attributed to COVID-19 was documented on January 11, 2020 (Yang et al., 2020). The local government swiftly implemented measures to manage the COVID-19 outbreak, including closing city borders, enforcing quarantines, and urging residents to remain at home.

The COVID-19 pandemic has significantly weakened the economic sectors of many countries, particularly impacting the business and investment environment in China (Al-Awadhi et al., 2020). Previous research found a negative correlation between COVID-19 cases and the overall share price of companies listed on the Hang Seng Index and the Shanghai Composite Index (Handranata et al., 2022).

The announcement by President Joko Widodo on March 2, 2020, regarding the first confirmed case of COVID-19 in Indonesia had an immediate impact on business activities, leading to a sharp decline in the Composite Share Price Index (JCI). Analyzing the JCI and share trading volume from March 19, 2019, to March 20, 2020, reveals a significant downturn in both metrics. The lowest recorded JCI during March 2020 was on March 24, with a level of 3,937.632. In contrast, the index reached its highest point on March 5, 2020, at 5,638.136, just two days after the first COVID-19 case

was confirmed in the country. By the end of March 2020, the JCI closed at 4,538.930, coinciding with a total of 4,538 confirmed COVID-19 cases (Suryani et al., 2021)

Furthermore, the Indonesia Share Exchange is experiencing a significant decline, and the same trend is evident in the Singapore Share Exchange. This is illustrated by the fluctuations in the benchmark index of the Singapore Share Exchange, known as the Straits Times Index (STI). In March 2020, the STI recorded its lowest point on March 23, reaching 2,233.48, while its highest figure during the same month occurred on March 4, at 3,205.03. Despite Singapore being classified as a developed nation, the COVID-19 pandemic revealed vulnerabilities within its capital markets (Suryani et al., 2021)

Australia also faced a similar situation, with initial expectations that COVID-19 would not significantly affect the country. However, the number of cases and deaths continued to rise daily. This led to a growing awareness that the virus is highly contagious and severely disrupts economic activities. Concerns about the pandemic's economic impact soon became evident in the capital markets, where prices fell across all sectors. The most significant declines were seen in the financial, energy, consumer discretionary, and IT sectors. On March 16, 2020, the ASX 200 dropped by 9.7%, marking the largest decline in the past 30 years (Johnson et al., 2022).

The COVID-19 outbreak has led to decreased investor confidence due to differing government policies across countries (Mangindaan et al., 2024). This leads investors to withdraw funds from securities and invest in safer options like gold. The research contributes to providing a basic reference for investment decision-making, especially in pharmaceutical companies in Southeast Asia and Australia.

LITERATURE REVIEW

The efficient market hypothesis presents the idea that asset prices effectively incorporate all available information. This understanding can help investors make more informed decisions based on how information influences market behavior. A market can be considered efficient when all investors have equal access to information about a company (Fama, 1970). Furthermore, (Fama, 1970) noted that the discrepancies in negotiations among investors concerning the utilization of available information are insufficient to account for the market's inefficiencies. However, this situation can be mitigated if a significant number of investors analyze the available information more thoroughly than just focusing on the share price.

The imbalance of information between company management and investors plays a significant role in creating information asymmetry. This situation gave rise to the concept of signaling theory, which suggests that management and shareholders should ideally share the same information. In cases where there is a discrepancy, one party may send signals to the other to convey relevant information. The information released by management serves as the primary signal in the decision-making process. Internal stakeholders strive to provide this information with the goal of increasing the company's share price (Ross et al., 2007).

According to Tandelilin (2017), the capital market serves as a platform where entities with surplus funds (savings surplus units) connect with those in need of funds (savings deficit units), either directly or through intermediaries. It is the primary venue for the trading of debt and equity securities. In this market, the fund owner and the fund user negotiate the terms for the transfer of funds.

According to Tandelilin (2017), Shares represent proof of ownership in a company and its assets. When an individual invests in shares, they gain the right to a portion of the company's profits and wealth, provided they own shares in that company. According to (Darmadji & Fakhruddin, 2012), A share signifies an investor's ownership in a company whose shares have been sold to investors.

The price of a share, as defined by Darmadji & Fakhruddin (2012), is the price formed on the stock exchange at a specific moment. Investors should be mindful that share prices can change quickly, often within minutes or even seconds. The value of a stock is influenced by the ongoing interaction of supply and demand between buyers and sellers. According to (Hartono, 2017) Share trading volume refers to the total quantity of a particular share that is traded, serving as an indicator of the liquidity of that share. The measure of share trading volume activity (Trading Volume Activity) can be utilized as a benchmark to assess the scale of share trading volumes. This activity is evaluated by examining the relationship between total shares traded and total shares outstanding, providing valuable insights into market activity.

This research is conducted based on event study theory, which examines the impact of specific events on share prices in the capital market (Dau et al., 2024). The goal of this study is to effectively analyze share prices and trading volumes, providing valuable insights into market behavior and investment opportunities. We utilize the event study method to examine how the market responds to

events that may affect stock prices due to regulatory changes. This technique allows us to measure the market's impact based on event data. If the market reacts quickly to the released information, we can conclude that the market is efficient (Abushammala, 2022). The date of the event serves as the timeframe for evaluation and the moment the incident occurred (Hartono, 2017).

Previous scholars have conducted event studies. Chen & Chen (2019) examined the impact of the 2003 SARS outbreak on Taiwan's stock market using the GARCH process. The findings indicate that shares in the hospitality industry are particularly sensitive to SARS outbreaks and are expected to respond similarly to outbreaks of bird flu. The research highlights the negative effects of the SARS crisis on tourism, wholesale trade, and the retail sector. Conversely, the stock returns of biotechnology and pharmaceutical companies in Taiwan experienced a positive shock during the SARS crisis. Investors could benefit by buying and holding shares in the biotechnology sector during such crises.

Funck (2018) investigated the influence of media headlines about Ebola on stock shares. It demonstrated that both negative and positive daily news regarding Ebola affected trading activity, including share volumes, dollar volumes, and share turnover. Additionally, the research focused on industry-specific portfolios revealed that the returns for airlines, restaurants, and cruise lines experienced a decline or a reversal within one day following the Ebola news.

Al-Awadhi et al., (2020) conducted a study to analyze the influence of infectious diseases on stock market outcomes. This research employs panel data analysis to assess the impact of the COVID-19 virus on the Chinese stock market, effectively serving as a natural experiment. A detailed examination was undertaken of both the Hang Seng Index and the Shanghai Stock Exchange Composite Index. The findings indicate that daily increases in COVID-19 cases and fatalities significantly affect company share returns.

Permatasari et al. (2021) meticulously examined the variations in share prices and trading volumes both before and during the COVID-19 pandemic. It focuses on companies within the retail, hotel, restaurant, and tourism sectors that were listed on the IDX from 2019 to 2021. Utilizing a purposive sampling method, the research identified 20 retail companies and 21 hospitality companies that met the specified criteria. Observations were conducted for 12 months before and 12 months following the announcement of COVID-19. The findings revealed significant differences in share prices between retail companies and those in the hotel, tourism, and restaurant sectors before and after the pandemic. Additionally, the trading volumes of hotel, tourism, and restaurant companies experienced notable changes during this period. In contrast, the share volumes of retail companies remained relatively stable despite the challenging economic environment created by COVID-19, indicating resilience in this segment of the market.

(Gunarso et al., 2021) examined the impact of the 2020 announcement of COVID-19 in Indonesia on the share prices and trading volumes of pharmaceutical industry stocks listed on the IDX. A sample of 10 companies within the pharmaceutical sector was analyzed over an observation period of 360 days, which included 180 days before and 180 days after the official COVID-19 announcement. Market reactions were meticulously assessed through an event study focused on this announcement. The study employed the Wilcoxon signed-rank test, which revealed no significant differences in share prices; however, it did indicate a significant change in trading volumes. This suggests that the announcement of COVID-19 was perceived positively by the market, increasing in share trading volume.

Suryani et al. (2021) examined the impact of the COVID-19 pandemic designation on share price indices within the ASEAN region, focusing on changes both before and after the pandemic declaration. Utilizing secondary data from several stock exchanges in the ASEAN area, the analysis considered the opening and closing prices of share price indices. The research period spanned from January 29 to April 29, 2020, employing purposive sampling methods. The study included five ASEAN stock exchanges: JCI (Indonesia), SETI (Thailand), KLCI (Malaysia), STI (Singapore), and PSEI (Philippines). The data were rigorously analyzed using paired sample t-tests and Wilcoxon signed rank tests to ensure comprehensive and reliable findings. It was determined that share prices exhibited significant differences before and after the onset of COVID-19.

Pradana & Khabibah (2021) examined the fluctuations in share prices and trading volumes of pharmaceutical companies in Indonesia surrounding the announcement of COVID-19. It focused on 10 pharmaceutical firms listed on the IDX, utilizing the event study method and paired sample t-test for analysis. The findings revealed a notable variation in stock prices before and after the COVID-19 announcement, although there was no significant change in trading volume.

Angel et al. (2023) investigated the impact of the 1918 Spanish Flu on share prices in the United States. It utilized a new weekly dataset collected from 136 companies listed on the NYSE. By employing a panel regression approach, the research analyzed the effects of four waves of influenza on

share returns. The results indicate that the second and fourth waves significantly reduced share returns by 33% and 57% per year, respectively. The virus's impact is substantial, primarily affecting the working-age population, yet it has a temporary effect on share returns.

There has been no study comparing share prices and trading volumes of pharmaceutical companies in the Indo-Pacific region before and after COVID-19. Australia and Indonesia have formed a groundbreaking partnership, the AIHSP, to enhance Indonesia's COVID-19 vaccination efforts and effectively manage the pandemic (Ramadhan, 2021). Investment opportunities for pharmaceutical companies are anticipated due to their ability to effectively manage the COVID-19 pandemic. This research aims to bridge a knowledge gap by proposing the hypothesis that there is a significant difference in share price and trading volume within the pharmaceutical industry in Southeast Asia and Australia before and after the onset of COVID-19. This study stands out from previous research in its approach. Additionally, the hypotheses were tested individually for Australia and Southeast Asia, encompassing countries such as Indonesia, Malaysia, Vietnam, Thailand, Singapore, and the Philippines. Thus, the hypotheses proposed in this research are:

H_1: There is a difference in share prices and trading volumes in the pharmaceutical industry between Southeast Asia and Australia before and during COVID-19.

H_2: There is a difference in the share prices and trading volume of Australia's pharmaceutical industry before and during the COVID-19 pandemic.

H_3: There is a difference in the share prices and trading volume of Indonesia's pharmaceutical industry before and during the COVID-19 pandemic.

H_4: There is a difference in the share prices and trading volume of Malaysia's pharmaceutical industry before and during the COVID-19 pandemic.

H_5: There is a difference in the share prices and trading volume of Vietnam's pharmaceutical industry before and during the COVID-19 pandemic.

H_6: There is a difference in the share prices and trading volume of Thailand's pharmaceutical industry before and during the COVID-19 pandemic.

H_7: There is a difference in the share price and trading volume of Singapore's pharmaceutical industry before and during the COVID-19 pandemic.

H_8: There are a difference in the share price and trading volume of the Philippines's pharmaceutical industry before and during the COVID-19 pandemic.

RESEARCH METHODS

The study focuses on pharmaceutical companies in Southeast Asia and Australia. The sample comprises firms listed on stock exchanges in Southeast Asia (including Indonesia, Malaysia, Vietnam, Thailand, the Philippines, and Singapore) and Australia, covering the period from 2017 to 2022. The observation period has been divided into two phases: 2017-2019 (before COVID-19) and 2020-2022 (during COVID-19).

This research employs secondary data on share prices and trading volumes of pharmaceutical companies in the specified regions. The data consists of monthly closing prices and trading volumes for a duration of 36 months before (2017-2019) and 36 months after (2020-2022) COVID-19, available for download at www.finance.yahoo.com. Our sample includes 30 pharmaceutical companies selected through purposive sampling from a total of 49 firms that met the criteria outlined in Table 1.

Table 1. Research Sample

No.	Criterion	Sum
1.	Companies that are listed on the share exchange of their respective countries in the period 2017-2022	49
2.	Companies not found on the www.finance.yahoo.com website	(8)
3.	Companies that did not list during the observation period (incomplete share data)	(11)
4.	Number of pharmaceutical companies sampled	30
5.	Number of samples (n) in the study (sample company x 36 months)	1.080

Source: Data processed, 2024

This study analyzes share price variables and trading volume. The share price refers to the market price of a stock at a specific time, which is determined by market participants and influenced by the supply and demand for that particular share (Hartono, 2017). The share price referenced is the closing price, commonly known as the closing price. The data for the closing prices used is monthly and spans the years 2017 to 2022.

Share trading volume is the total number of shares traded, indicating the liquidity of these shares (Hartono, 2017). Share trading activity is measured using the following indicators:

$$TVA(it) = \frac{Stock\ volume\ traded}{Outstanding\ share} \quad (1)$$

Data analysis was conducted using SPSS version 22 software. The collected data will undergo descriptive statistical analysis, normality tests, and hypothesis testing. According to (Sugiyono, 2017) descriptive statistical analysis is a data analysis technique to explain data in general or generalization, by calculating minimum values, maximum values, mean values, and standard deviations. The normality test assesses whether the data follows a normal distribution. This statistical procedure employs the Kolmogorov-Smirnov test. If the significance value is greater than 0.05, it indicates that the data is normally distributed. Conversely, if the significance value is less than 0.05, it suggests that the data does not follow a normal distribution (Sugiyono, 2017). The analysis employs the Paired Sample T-Test when the data is normally distributed, and the Wilcoxon Signed Rank Test when it is not. Decisions regarding the paired sample t-test and the Wilcoxon signed rank test are determined by the significance value from the SPSS output. If this significance value is less than 0.05, the hypothesis is accepted, indicating that there is a significant difference in share prices and trading volumes before and after COVID-19. Conversely, if the significance value exceeds 0.05, the hypothesis is rejected, suggesting that there is no significant difference in share prices and trading volumes during these two periods.

RESULT AND DISCUSSION

The findings of the descriptive statistical analysis are presented in Table 2. Prior to the COVID-19 pandemic, the average share price of the pharmaceutical industry in Southeast Asia and Australia was USD 0.283. In contrast, following the pandemic, the average share price increased by $0.092, reaching $0.375.

Table 2. Results of Descriptive Statistical Analysis

	N	Minimum	Maximum	Mean	Std. Deviation
Pre COVID-19 share price	1080	.0010	2.2900	.282837	.3673680
During COVID-19 share price	1080	.0010	5.2800	.374756	.5781375
Valid N (istwise)	1080				
Pre COVID-19 share volume	1080	0	1912014200	43284075.44	126924899.7
During COVID-19 share volume	1080	0	6076398500	119384568.9	352060988.6
Valid N (listwise)	1080				

Source: Data processed, 2024

The findings from the descriptive statistical analysis of share trading volume indicate that the average trading volume of pharmaceutical industry shares in Southeast Asia and Australia before the COVID-19 pandemic was 43,284,075 million shares. In contrast, following the pandemic, the average trading volume for these shares surged significantly to 119,384,569 million shares.

The results of the One-Sample Kolmogorov-Smirnov normality test, presented in Table 3, indicate that the significant values for share prices and trading volumes within the pharmaceutical industry in Southeast Asia and Australia both before and after the COVID-19 pandemic are less than 0.05 (specifically, 0.000). This suggests that the data does not follow a normal distribution. Therefore, when formulating a hypothesis, utilising a non-parametric test, such as the Wilcoxon Signed Rank Test is essential.

Table 3. Normality Test Results

	Pre COVID-19 share price	During COVID-19 share price
Test Statistic	.248	.259
Asymp. Sig. (2-tailed)	.000	.000
	Pre COVID-19 share volume	During COVID-19 share volume
Test Statistic	.367	.367
Asymp. Sig. (2-tailed)	.000	.000

Source: Data processed, 2024

Discussion for Australia and Southeast Asia

The results of the different tests presented in Table 4 indicate that the significant values for share prices and trading volumes of the pharmaceutical industry in Southeast Asia and Australia, both before and after the COVID-19 pandemic, are 0.000, which is less than the 0.05 threshold. Therefore, we accept the hypothesis, suggesting a significant difference in share prices and trading volumes within this sector in Southeast Asia and Australia before and after the pandemic.

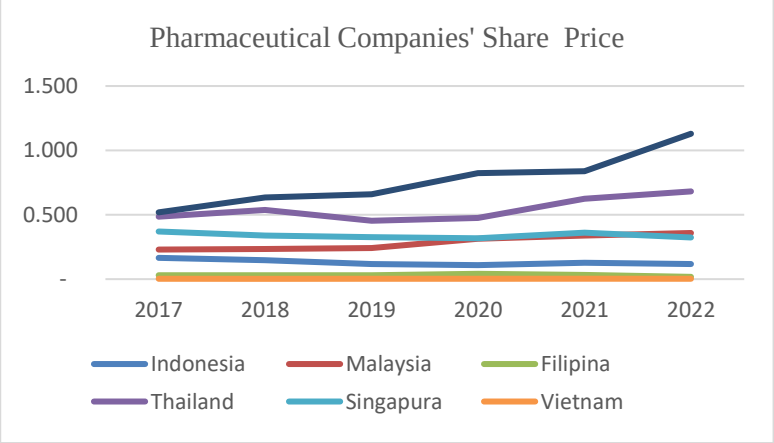
Table 4. Wilcoxon Signed Rank Test Results for Australia and Southeast Asia

	During COVID-19 share price Pre COVID-19 share price
Z	-8.748
Asymp. Sig. (2-tailed)	.000
	During COVID-19 share volume Pre COVID-19 share volume
Z	-14.840
Asymp. Sig. (2-tailed)	.000

Source: Data processed, 2024

This study demonstrates a significant difference in the share prices of the pharmaceutical industry in Southeast Asia compared to Australia, both before and after the COVID-19 pandemic. Before the pandemic, the average share price was USD 0.283. In contrast, the average share price for pharmaceutical industry stocks rose by $0.092 following the pandemic, reaching $0.375. These findings align with earlier research conducted by (Suryani et al., 2021) that stated that there were significant differences in share price indices in Indonesia (JCI), Thailand (SETI), Malaysia (KLCI), Singapore (SET), and the Philippines (PSEI) before and after COVID-19.

Based on the trend illustrated in Figure 1, the average share prices of the pharmaceutical industry in Southeast Asia and Australia showed notable changes during the 2017-2022 period. Specifically, three countries—Malaysia, Thailand, and Australia—experienced a positive trend, with an increase in average share prices following the COVID-19 pandemic from 2020 to 2022. In contrast, the average annual share prices of several other countries, including Indonesia, Vietnam, Singapore, and the Philippines, demonstrated a tendency to decline, although this decrease was not significant. Various factors contributed to the fluctuations in share prices within the pharmaceutical sector during pandemic. The rise in share prices can be attributed to heightened demand for medicines, vaccines, and medical devices. Conversely, the decline in share prices may stem from pandemic-related impacts on financial performance, such as increased production costs, global market sentiment, and government policies.



Source: Data processed, 2024

Figure 1. Share Price Chart Trend

Investors have recognized the pharmaceutical sector as a promising opportunity during the COVID-19 pandemic. As a result, many have shifted their investments to this low-risk industry, reducing their exposure to sectors significantly affected by the crisis. Throughout the pandemic, the pharmaceutical sector has demonstrated remarkable resilience against market fluctuations, drawing

interest from investors seeking to minimize risk while still anticipating modest returns. Speculative factors and prevailing market sentiment have contributed to a substantial increase in the trading volume of pharmaceutical shares across various countries. However, investors remain cautious due to potential challenges such as government policies and disruptions in the supply of raw materials, which can adversely impact company performance.

This study demonstrates a significant change in the trading volume of pharmaceutical industry shares in Southeast Asia and Australia before and after the COVID-19 pandemic. The average trading volume for these shares rose dramatically from 43,284,075 million shares prior to the pandemic to 119,384,569 million shares afterward. The results of this study are in line with previous research conducted by (Gunarso et al., 2021) which stated that there was a significant difference in share volume after the announcement of COVID-19 nationally in the pharmaceutical industry in Indonesia.

Discussion for Australia

According to the results of the different tests presented in Table 5, the significance value regarding share prices is 0.00, which is less than the 0.05 threshold. This indicates a significant difference in the share prices of the pharmaceutical industry in Australia before and after the COVID-19 pandemic. Prior to the pandemic, the average share price in this sector was USD 0.520. Following the pandemic, this average rose by USD 0.296 to reach USD 0.816. Imugene Limited recorded the lowest share prices both before and after the pandemic, with a pre-COVID-19 low of USD 0.009 occurring five times in 2017 (April 31, May 31, June 31, July 31, and December 31). After the pandemic, the lowest recorded share price for the company was USD 0.013 on February 31, 2020. Conversely, Neuren Pharmaceuticals Limited achieved the highest share prices in both periods, reaching USD 2.290 on January 31, 2018, before COVID-19, and soaring to USD 5.280 on October 31, 2022, after the pandemic.

Based on the different tests presented in Table 5, the significance value of the share trading volume is 0.00, which is less than 0.05. This indicates that there is a significant difference in the trading volume of pharmaceutical industry shares in Australia before and during the COVID-19 pandemic. The average trading volume for pharmaceutical industry shares before COVID-19 was 46,663,238 shares, which increased to 86,965,752 shares following the pandemic. Probiotic Limited recorded the lowest trading volume both before and after COVID-19, with a pre-pandemic volume of 125,783 thousand shares on February 31, 2017, and a during pandemic volume of 312,228 shares on June 31, 2022. Conversely, Imugene Limited was the company with the highest share volumes both pre and during COVID-19, achieving a peak of 1,495,440,792 shares on October 31, 2019, before the pandemic, and a during pandemic high of 864,704,887 shares on April 31, 2021.

Table 5. Wilcoxon Signed Rank Test Results for Australia, Indonesia, Malaysia, Vietnam, Thailand, Singapore, and Philippines.

During COVID-19 share price Pre COVID-19 share price							
	Aust.	Ind.	Malay.	Viet.	Thai.	Sing.	Phil.
Z	-7.95	-.10	-7.21	-5.04	-2.76	-1.78	-.21
Asymp. Sig. (2-tailed)	.00	.92	.00	.00	.01	.08	.84
During COVID-19 share volume Pre COVID-19 share volume							
	Aust.	Ind.	Malay.	Viet.	Thai.	Sing.	Phil.
Z	-7.82	-10.63	-5.48	-3.80	-4.91	-1.09	-4.59
Asymp. Sig. (2-tailed)	.000	.00	.00	.00	.00	.28	.00

Source: Data processed, 2024

Discussion for Indonesia

According to the outcomes of the different tests illustrated in Table 5, the significance value for the share price stands at 0.92, which is greater than 0.05, indicating that there is no significant difference in the share prices of the pharmaceutical sector in Indonesia before and during the COVID-19 pandemic. The average share price for the pharmaceutical industry in Indonesia prior to the COVID-19 outbreak was USD 0.143. In contrast, following the COVID-19 pandemic, the average share price in this industry decreased from USD 0.025 to USD 0.118. PT Pyridam Farma registered the lowest share price of USD 0.010 before the COVID-19 pandemic on August 31, 2018. Following COVID-19, PT Pyridam Farma again recorded the lowest price of USD 0.012 on January 31, 2020, and February 31,

2020. The decline in share prices is also reflected by the highest share price before the COVID-19 pandemic, which was reported by PT Merck Tbk at USD 0.598 on April 31, 2017. After the COVID-19 pandemic, PT Merck Tbk also recorded the highest share price, which decreased by USD 0.243 to USD 0.355 on July 31, 2022.

Based on the different tests results shown in Table 5, the significance value for share trading volume is 0.00, which is less than 0.05, signifying a significant difference in the trading volume of pharmaceutical shares in Indonesia before and during the COVID-19 pandemic. The average share trading volume of pharmaceuticals in Indonesia prior to the COVID-19 outbreak was 86,941,808 million shares, while after the pandemic, it saw a substantial increase to 214,736,095 million shares. The lowest share volume recorded before COVID-19 was 8,900 thousand shares by PT Darya-Varia Laboratoria Tbk on March 31, 2017. In comparison, PT Pyridam Farma noted the lowest share volume following COVID-19, which was 145,300 thousand shares on September 31, 2022. The highest trading volume before COVID-19 was noted by PT Kalbe Farma Tbk, totalling 963,443,400 million shares on July 31, 2019. After the COVID-19 pandemic, PT Kalbe Farma Tbk recorded its highest share trading volume again, which rose significantly to 3,303,562,900 billion shares on December 31, 2020.

Discussion for Malaysia

Based on the results of the different tests presented in Table 5, the significance value for the share price is 0.00, which is smaller than 0.05. This indicates a significant difference in the share prices of the pharmaceutical industry in Malaysia before and after COVID-19. The average share price in the Malaysian pharmaceutical sector before the pandemic was USD 0.235. After the pandemic, it increased by USD 0.102, reaching USD 0.337. The lowest share price recorded before COVID-19 was USD 0.039, which was noted for PeterLabs Holdings Berhad on October 31, 2019. Similarly, PeterLabs Holdings Berhad recorded the lowest share price after COVID-19 at USD 0.029 on February 31, 2020. In contrast, the highest share price before COVID-19 was USD 0.683, recorded by Y.S.P. Southeast Asia Holding Berhad on August 31, 2018. During COVID-19, the highest share price reached USD 1.386, recorded by Kotra Industries Berhad on November 31, 2022.

Furthermore, the different test results indicate that the significance value for share trading volume is also 0.00, smaller than 0.05. This suggests a significant difference in the trading volumes of pharmaceutical industry shares in Malaysia pre and during COVID-19. Before the pandemic, the average volume of pharmaceutical shares traded in Malaysia was 6,736,233 shares. After the pandemic, this number rose significantly to 41,804,826 shares. Notably, there was one company, Malaysian Genomics Resource Centre Berhad, that did not trade its shares on June 31, 2018, and January 31, 2019. After the pandemic, the lowest trading volume was recorded by Kotra Industries Berhad at 94,500 shares on July 31, 2021. Meanwhile, the highest trading volume before COVID-19 was 133,778,200 shares, recorded by PeterLabs Holdings Berhad on March 31, 2019. After COVID-19, the highest trading volume reached 1,018,804,001 shares, recorded by Duopharma Biotech Berhad on July 31, 2020.

Discussion for Vietnam

According to the results of the different tests shown in Table 5, the significance value for share prices is 0.00, which is below the threshold of 0.05. This indicates a significant difference in the share prices of the pharmaceutical industry in Vietnam before and after the COVID-19 pandemic. Prior to the pandemic, the average share price in this sector was USD 0.002, while during pandemic, it increased to USD 0.003.

Imexpharm Corporation recorded the lowest share price before the pandemic at USD 0.001. This price was observed four times in 2017 (January 31, February 28, March 31, and April 30), six times in 2018 (May 31, June 30, July 31, August 31, September 30, and December 31), and nine times in 2019 (January 31, March 31, April 30, May 31, June 30, July 31, August 31, September 30, and November 30). After the pandemic, Imexpharm Corporation once again reported a lowest share price of USD 0.001 on February 28, 2020.

In contrast, DHG Pharmaceutical Joint Stock Company recorded the highest share price before COVID-19, which was USD 0.004. This price was noted seven times in 2017 (April 30, May 31, June 30, July 31, August 31, October 31, and November 30), four times in 2018 (January 31, February 28, April 30, and May 31), and seven times in 2019 (January 31, February 28, March 31, April 30, May 31, June 30, and December 31). After the pandemic, DHG reported the highest share price of USD 0.004 six times in 2020 (July 31, August 31, September 30, October 31, November 30, and December 31), held for 12 consecutive months in 2021, and seven times in 2022 (January 31, February 28, March 31, April 30, June 30, July 31, and December 31).

The different tests also revealed a significance value of 0.00 for share trading volume, indicating a significant difference in the trading volumes of shares in the Vietnamese pharmaceutical industry before and after the pandemic. The average trading volume of pharmaceutical industry shares before COVID-19 was 2,154,622 million shares, which declined to 1,247,317 million shares after COVID-19.

Before the pandemic, DHG Pharmaceutical Joint Stock Company recorded its lowest trading volume at 155,940 thousand shares on August 31, 2019. After the pandemic, the lowest trading volume was reported by Imexpharm Corporation, which was 48,500 thousand shares on July 31, 2022. Conversely, the highest trading volume before COVID-19 was recorded by DHG Pharmaceutical Joint Stock Company at 8,240,000 million shares on January 31, 2019, while the highest trading volume after COVID-19 was noted by Imexpharm Corporation at 15,920,786 million shares on May 31, 2021.

Discussion for Thailand

According to the results of the different tests presented in Table 5, the significance value of the share price is 0.01, which is lower than the threshold of 0.05. This indicates a significant difference in the share prices of the pharmaceutical industry in Thailand before and after COVID-19. The average price of pharmaceutical shares in Thailand prior to the pandemic was USD 0.492, which increased by USD 0.102 to USD 0.594 following the pandemic. Eternal Energy Public Company Limited reported the lowest share price before COVID-19 at USD 0.014 on April 31, 2019, and recorded a during COVID-19 low of USD 0.012 on February 31, 2020. Conversely, Mega Lifescience Public Company Limited experienced a pre-COVID-19 high share price of USD 1,302 on December 31, 2017, which rose to a during COVID-19 peak of USD 1,484 on October 31, 2021.

The different tests Test results in Table 5 further reveal that the significance value for share trading volume is 0.00, also below 0.05, indicating a significant difference in the trading volume of pharmaceutical industry shares in Thailand before and after COVID-19. The average trading volume for pharmaceutical shares in Thailand before the pandemic was 104,758,543 shares, which saw a more than fourfold increase to 444,763,761 shares afterwards. Mega Lifesciences Public Company Limited recorded the lowest trading volume of 16,351,100 shares on November 31, 2018, while during pandemic trading volume increased to 23,420,900 shares on September 31, 2020. Meanwhile, Eternal Energy Public Company Limited had the highest trading volume both pre and during COVID-19, with a record of 1,912,014,200 shares on February 31, 2017, which surged to 6,076,398,500 shares as of August 31, 2021.

Discussion for Singapore

Based on the results of the different tests Test presented in Table 5, the significance value for share prices is 0.08, which is greater than 0.05. This indicates that there is no significant difference in the share prices of the pharmaceutical industry in Singapore before and after the COVID-19 pandemic. The average share price in this sector decreased from USD 0.345 before the pandemic to USD 0.334 afterward, reflecting a drop of USD 0.011. Pharmesis International Limited recorded the lowest pre-pandemic share price of USD 0.090 on September 30, 2019, and saw its share price fall to USD 0.061 on October 31, 2022. On the other hand, Tianjin Pharmaceutical Da Ren Tang Group Corporation Limited had the highest pre-pandemic share price of USD 0.895 on April 30, 2018, which increased to USD 0.977 on July 31, 2021, after the pandemic.

The results of the different tests also indicate a significance value of 0.28 for share trading volume, which is greater than 0.05. This suggests there is no significant difference in the trading volume of pharmaceutical industry shares in Singapore pre and during COVID-19. Before the pandemic, the average trading volume was 4,954,399 shares, which increased to 16,880,320 shares after COVID-19. Pharmesis International Limited experienced no share trading on ten occasions before the pandemic (on June 30, 2017; May 31, 2018; August 31, 2018; October 31, 2018; January 31, 2019; February 28, 2019; May 31, 2019; June 30, 2019; July 31, 2019; and August 31, 2019) and seven times after the pandemic (on February 28, 2020; August 31, 2020; September 30, 2020; February 28, 2021; April 30, 2021; June 30, 2022; and September 30, 2022). The highest share trading volume recorded before the COVID-19 outbreak was 46,786,100 shares for Tianjin Pharmaceutical Da Ren Tang Group Corporation Limited on April 30, 2018. In contrast, iX Biopharma Limited reported the highest trading volume after COVID-19, with 419,278,200 shares traded on June 30, 2020.

Discussion for the Philippines

The results of the different tests presented in Table 5 indicate that the significance value for share prices is 0.84, which exceeds the threshold of 0.05. This suggests that there is no significant

difference in the share prices of the pharmaceutical industry in the Philippines before and after the COVID-19 pandemic. The average share price in this sector remained relatively constant, fluctuating between USD 0.030 and USD 0.031. Euro-Med Laboratories recorded its lowest pre-COVID-19 share price of USD 0.027 on both September 31, 2018, and October 31, 2018. During COVID-19, the company observed its lowest price drop to USD 0.015 on September 31, 2018. Conversely, Euro-Med Laboratories achieved its highest share price before the pandemic at USD 0.043 on December 31, 2019, and after the pandemic reached USD 0.068 on January 31, 2020.

In terms of share trading volume, the different test results also detailed in Table 5 reveal a significance value of 0.00, which is below 0.05, indicating a significant difference between the volume of pharmaceutical industry shares before and during COVID-19. The average trading volume before the pandemic was 501,972 thousand shares, and this figure saw a considerable increase to 19,591,139 million shares after the pandemic. Euro-Med Laboratories noted a low share volume of 9,000 thousand before COVID-19 on October 31, 2018, while during COVID-19, the lowest volume recorded was 162,000 thousand on September 31, 2022. The highest trading volume for Euro-Med Laboratories before the pandemic was 7,260,000 million shares on December 31, 2019, which surged to 182,470,000 million shares on January 31, 2020, following the pandemic.

CONCLUSION

This study concludes that there is a significant difference in the share prices of the pharmaceutical industry between Southeast Asia and Australia. Prior to the COVID-19 pandemic, the average share price was USD 0.283. Following the pandemic, this average increased by $0.092, reaching $0.375. Additionally, there is a notable difference in the trading volume of pharmaceutical shares in these two regions. Before the pandemic, the average trading volume in Southeast Asia and Australia was 43,284,075 million shares, whereas during pandemic, this average rose significantly to 119,384,569 million shares. The pharmaceutical sector is anticipated to outperform other industries, showcasing greater resilience to market fluctuations during the COVID-19 outbreak. As a result, pharmaceutical shares have become a point of interest for investors seeking to mitigate risk while still aiming for modest returns.

The author's research does have certain limitations that can inform improvements for future studies. The investigation focused specifically on the pharmaceutical industry across six Southeast Asian countries—Indonesia, Malaysia, Vietnam, Thailand, Singapore, and the Philippines—along with one country from Oceania, Australia. Notably, the sample sizes varied significantly among these countries, particularly in the Philippines, which was represented by only one pharmaceutical company.

Given these limitations, the author offers several suggestions for future research to enhance its quality. Future studies could explore sectors beyond pharmaceuticals to enable comparative analyses with this research. Additionally, subsequent investigations might consider events that influence markets outside of the pharmaceutical sector. Expanding the research scope to include a larger geographic area or additional countries could bolster the credibility of the findings. The author also recommends employing regression analysis to investigate the relationships between variables.

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