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Comparative Analysis Of Stock Prices and Trading Volume of Pharmaceutical Companies Before and After The Covid-19 Pandemic (Case Study Of Companies Listed on The IDX 2018-2023)

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Abstract *– Global financial markets, particularly in Indonesia, were significantly affected by the COVID-19 pandemic, and the pharmaceutical sector attracted heightened investor attention during this period. This study compares stock prices and trading transaction volumes of pharmaceutical companies listed on the Indonesia Stock Exchange before and after the COVID-19 outbreak. Using a comparative quantitative approach with purposive sampling, seven firms were selected from a population of eleven over the 2018–2023 period. Because the data were not normally distributed, hypotheses were tested using the non-parametric Wilcoxon Signed Rank Test. The results indicate statistically significant differences in both stock prices and trading transaction volumes between the pre-pandemic and post-pandemic periods. Stock prices increased in the post-pandemic period, reflecting improved valuation of pharmaceutical firms during the crisis, while trading volume also changed significantly, indicating a shift in market participation and liquidity conditions. These findings suggest that the pandemic carried information content that reshaped investor behavior toward pharmaceutical stocks. This study contributes to understanding sectoral market dynamics during global health crises and provides insights for investors, regulators, and corporate managers regarding valuation and liquidity considerations.*

Keywords: *Stock Price, Trading Transaction Volume, Covid-19, Wilcoxon Signed Rank Test*

INTRODUCTION

Businesses nowadays must contend with increasing rivalry and economic unpredictability, which might have a detrimental impact on their sustainability and performance. Businesses that are unable to adjust to changes in the economy often see their profitability decline and their financial performance deteriorate. The COVID-19 pandemic, which first surfaced in Wuhan, China, at the end of 2019, is one of the worst worldwide shocks to economic and financial market circumstances in recent memory. In March 2020, the World Health Organization (WHO) formally proclaimed COVID-19 a worldwide pandemic because of its fast spread via human-to-human contact. Panic selling occurred in international stock markets, especially those in Asia and Indonesia, as a result of this declaration's widespread uncertainty and unfavorable investor sentiment (Schell et al., 2020; Baker et al., 2020).

On March 2, 2020, the first COVID-19 case in Indonesia was reported. The government imposed Large-Scale Social Restrictions (PSBB) to stop the virus's spread, but this severely interrupted business operations and hampered economic development in general. These circumstances had a negative impact on the capital market, as seen by the Indonesia Composite Index's (IDX Composite) fall. Similar trends were seen in international financial markets, as key indexes had steep drops in the first few months of 2020 before progressively rising in the months that followed. According to empirical data, the pandemic had a more significant impact on Asian stock markets than on European ones, especially in the early phases of the crisis (Topcu & Gulal, 2020).

Investors and market experts were more anxious as a result of the COVID-19-induced economic downturn and worries about a possible recession and financial instability (Chandra & Herawati, 2023). Not every industry had the same degree of decrease, despite the pandemic's broad detrimental effects. The pharmaceutical industry showed comparatively good resilience throughout the COVID-19 era among the nine sectoral indexes published on the Indonesia Stock

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Exchange. The pharmaceutical industry was positioned as a defensive and strategic sector that continued to boost the economy due to the high demand for medications, vaccines, and healthcare items. This tendency confirms earlier results that, as a result of increased demand brought on by emergency situations, health-related industries often function better during public health emergencies (Rifaâ et al., 2020).

The stock values of pharmaceutical businesses before and during the COVID-19 pandemic differed significantly, according to empirical evidence. Pre-pandemic stock prices tended to fall, while post-pandemic stock prices tended to rise, indicating that investors responded favorably to the sector's key role during the global health crisis. Table 1.1, which provides a summary of pharmaceutical firms' stock values from 2018 to 2023, and Figure 1.1, which displays the average stock price movement across the observation period, both highlight these tendencies.

Table 1. Pharmaceutical Company Stock Prices 2018-2023

Company Name	**YEAR**						
	2018	**2019**	**2020**		**2021**	**2022**	**2023**
			June	**Des**			
Darya Varia Laboratori(DVLA)	1.940	1.150	2.180	2.420	2.750	2.370	1.665
Indo Far*ma (INAF)*	1.500	870	985	4.030	830	1.150	580
Kimia Farma *(KAEF)*	2.000	1.250	1.120	4.250	2.430	1.085	1.445
Kalbe Far*ma (KLBF)*	1.520	820	1.460	1.480	1.615	5.090	1.610
Merck (MERK)	4.300	2.850	1.050	3.280	890	4.750	5.180
Pyridam Farma (FYFA)	189	198	131	975	815	865	945
Tempo Scan Pacific (TSPC)	1.390	1.395	790	900	800	1.410	5.835
Average	1.834	1.219	1.102	2.476	1.447	2.389	2.466
	Pre-pandemic period				Post-pandemic period		

Source: www.idx.co.id (Data processed, 2025)

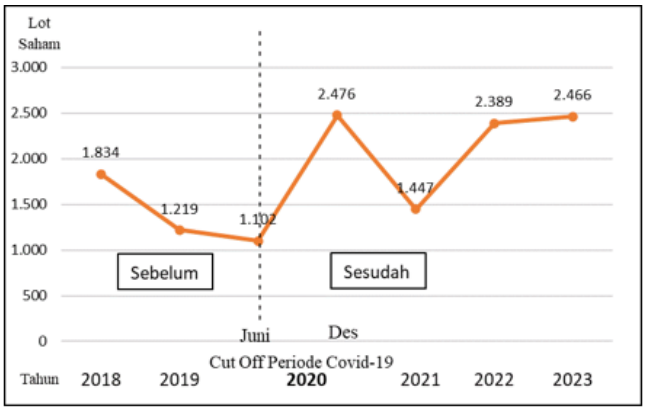

Figure 1. Stock Prices of Pharmaceutical Companies for the 2018-2023 Period
Source: www.idx.co.id (Data processed, 2025)

Trading volume is a crucial measure of market activity and liquidity in addition to stock prices. Variations in trading volume reveal the degree of investor confidence and the activity of a stock's trading. The pharmaceutical industry's trade volume varied before and after the pandemic, as seen in Table 1.2 and Figure 1.2. Even if there was an increase in demand for pharmaceutical items, a drop in or instability in trading volume might be a sign of increasing investor concern and liquidity risk.

Table 2. Trade Transaction Volume of Pharmaceutical Companies 2018–2023 (Rp Million)

Company name	**2018**	**2019**	**2020 (Juni)**	**2020 (Des)**	**2021**	**2022**	**2023**
Darya Varia Laboratorium (DVLA)	4.449.390 .000	1.646.167. 500	6.286.030.0 00	20.287.344. 000	27.137.275. 000	16.106.520. 000	20.927.551. 500
Indofarma	38.239.76	46.936.56	98.504.698.	8.753.594.4	1.766.979.7	77.980.350.	45.528.086.

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(INAF)	0.000	0.900	450	34.000	48.000	000	000
Kimia Farma (KAEF)	3.821.508 .600	7.021.215. 000	1.652.040.5 44.000	23.223.137. 725.000	7.459.204.5 45.000	377.861.232 .000	1.414.259.7 92.500
Kalbe Farma (KLBF)	81.401.43 4.000	89.449.10 1.900	6.532.223.5 22.000	15.404.236. 344.000	19.480.937. 661.500	21.775.542. 591.000	12.690.731. 459.000
Merck (MERK)	199.854.9 70.000	66.267.91 5.000	9.750.125.0 00	59.388.992. 000	93.268.071. 000	77.368.475. 000	29.970.182. 000
Pyridam Farma (PYFA)	792.628.2 00	871.516.8 00	3.721.146.7 00	621.827.017 .500	676.969.678 .000	26.792.164. 000	133.157.202 .500
Tempo Scan Pacific (TSPC)	72.599.00 5.000	267.405.0 39.000	58.626.586. 000	184.842.980 .000	972.279.000 .000	269.678.151 .000	1.338.554.1 45.500
Average	57.308.38 5.114	68.513.93 0.871	1.194.450.3 78.879	6.895.330.6 90.929	4.353.825.1 39.786	3.231.618.4 97.571	2.239.018.3 45.571

Source: www.idx.co.id (Data processed, 2025)

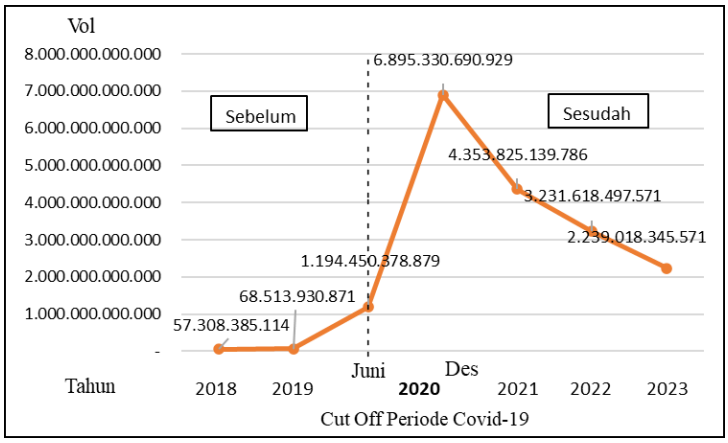

Figure 2. Stock Prices of Pharmaceutical Companies for the 2018-2023 Period
Source: www.idx.co.id (Data processed, 2025)

According to Hartono (2017) and Jogiyanto (2014), stock prices and trading volume in the capital market are determined by supply–demand mechanisms that are strongly shaped by investor perceptions of risk and future prospects. Existing COVID-19 capital market studies generally report that the pandemic triggered market disruptions and significant price reactions, yet most evidence is derived from aggregate indices or broad sectors and is concentrated on the early shock period in 2020 (Suryani, 2021; Mangindaan & Manossoh, 2020; He et al., 2021; Nurmasari, 2020; Bakhtiar et al., 2020). This creates three limitations in prior research: first, a short observation horizon that cannot capture how market responses evolve from pre-crisis conditions to crisis escalation and recovery; second, limited sector-specific insight, which is critical because COVID-19 created uneven effects across industries; and third, a tendency to focus on price outcomes alone, with less emphasis on trading volume as a liquidity and participation channel. These limitations are particularly relevant for pharmaceuticals, a sector that may receive “positive crisis signals” due to increased demand for health-related products and policy prioritization, meaning that its market reaction may differ in direction, persistence, and liquidity dynamics compared with other industries. Therefore, further investigation of the pharmaceutical sector is required to clarify whether COVID-19 produced not only a statistically detectable change, but also a distinct sectoral pattern that persists beyond the initial shock.

From a theoretical standpoint, this study integrates Signaling Theory and the Event Study framework to move beyond a descriptive before–after comparison and provide an analytical

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interpretation of crisis-driven market reactions. The COVID-19 pandemic represents a macroeconomic shock that generated strong informational signals about corporate risk, uncertainty, and future performance expectations, and signaling theory predicts that investors translate these signals into valuation adjustments and trading decisions (Yang et al., 2025). Consistent with event study logic, comparing pre- and post-event windows enables the study to detect systematic market adjustments attributable to the crisis signal and to assess the joint behavior of prices and trading activity as complementary outcomes of investor response (Sasikumar et al., 2024). Accordingly, this research examines pharmaceutical companies listed on the Indonesia Stock Exchange over the 2018–2023 period to capture dynamics across pre-pandemic, crisis, and recovery phases, while also interpreting the price–volume pattern as evidence of both valuation re-assessment and liquidity-related behavior. By doing so, the study strengthens theoretical implications by linking crisis signaling to sectoral valuation and liquidity responses, rather than merely reporting whether differences exist.

LITERATURE REVIEW

Signaling Theory

A key idea in corporate financial management is signaling theory, which describes how management informs investors about the company's prospects. This theory, which was first presented by Spence in 1978 and further extended in 2002, highlights the function of investors as information consumers and management as information producers. Spence, as quoted in Siswantoro (2020), asserts that in order to lessen information asymmetry, management must provide pertinent and helpful information. According to Priyati et al. (2019) and Hertina et al. (2019), negative signals may result in falling stock prices and capital losses, which would diminish investor trust, while positive signals boost investor confidence, resulting in increasing stock prices and possible capital profits.

Event Study

By tracking changes in stock prices and trading activity, event studies analyze how the market responds to certain occurrences (Hartono, 2022). This method examines changes in stock prices, returns, and trading volume to determine if an event causes unusual market reactions. Event studies are often used to evaluate the informational value of events and market efficiency, claims Hartono (2022). In order to evaluate how fresh information affects stock prices and trade activity in the capital market, the COVID-19 pandemic is considered a noteworthy event in this research.

Stock Price

In the capital market, supply and demand exchanges among investors determine the stock price (Hartono, 2017). Because these events include information that affects investment choices, stock prices are very susceptible to investor emotion and external emergency occurrences (He et al., 2021). According to empirical data, the COVID-19 pandemic significantly altered stock values in a number of industries. While Mangindaan and Manossoh (2020) and Nurmasari (2020) reported major reductions in certain firms, Suryani (2021) identified notable changes in ASEAN stock indexes. On the other hand, Bakhtiar et al. (2020) noted that the increased demand for digital services during the pandemic led to a rise in the stock price of the telecoms industry.

Trading Volume

A key indication of liquidity and market activity, trading volume is the total number of shares traded in the capital market during a certain time period. According to (Pingel et al., 2023), trading volume indicates a stock's liquidity level, which is an important factor for investors. (Choi, 2019) asserts that increasing stock prices and higher trading volume are signs of positive market conditions and growing investor confidence. As a result, trade volume is crucial for comprehending market dynamics and investor behavior, especially during unpredictable times like the COVID-19 epidemic (Srivastav et al., 2022).

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Conceptual Framework and Hypothesis Development

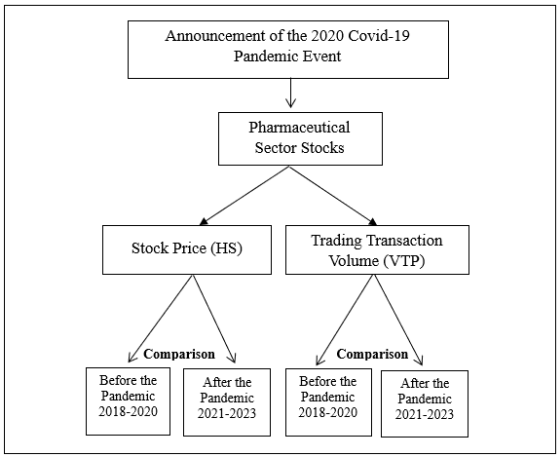

Figure 3. Conceptual Framework
Source: (Data processed, 2025)

This study develops hypotheses to test whether the COVID-19 pandemic caused significant differences in two capital market indicators of Indonesian pharmaceutical companies, namely stock prices and trading volume. Because the data are paired and not normally distributed, the hypotheses are tested using the Wilcoxon Signed Rank Test.

H1: There is a statistically significant difference in the average stock prices of pharmaceutical companies before and after the COVID-19 pandemic in Indonesia (Larasanti, 2017; Muzdalifah & Maslichah, 2021; Fatimala, 2021).

H2: There is a statistically significant difference in the average trading volume of pharmaceutical companies before and after the COVID-19 pandemic in Indonesia (Maramis et al., 2019; Muzdalifah & Maslichah, 2021; Safitri, 2021; Fatimala, 2021).

METHODS

In order to objectively analyze differences between variables, this study uses secondary data and a quantitative research technique, focusing on numerical measurement and statistical analysis (Sugiyono, 2023). The Indonesia Stock Exchange and Yahoo Finance, which provide historical stock price and trading volume data, were the official publicly available sources of the data. The study was conducted starting in April 2024 using an observation period from 2018 to 2023. A comparative approach was applied because it is appropriate for examining differences in conditions before and after the COVID-19 pandemic (Sugiyono, 2023).

Two variables were examined on a ratio scale: stock price and trading volume. Stock price refers to the closing price at the end of the trading session, which reflects the final market value assessed by investors (Pernici, 2018). Trading volume is defined as the total number of shares traded within a certain period and is commonly used as an indicator of market activity and liquidity (Ghozali, 2018). To reduce short-term volatility, the data were aggregated into monthly averages.

To operationally define the “before” and “after” COVID-19 periods, this study uses March 2, 2020 as the cut-off date because it corresponds to the first officially confirmed COVID-19 case announcement in Indonesia, which marked a clear shift in public information and market uncertainty. Accordingly, the pre-pandemic period is defined as January 2018 to February 2020, while the post-pandemic period is defined as March 2020 to December 2023. This cut-off strengthens the comparability of conditions by anchoring the period division to a concrete national event that is widely recognized as the initial pandemic shock in Indonesia.

The population includes all pharmaceutical companies listed on the Indonesia Stock Exchange between 2018 and 2023. The sample was selected using purposive sampling, which determines samples based on predefined criteria consistent with the research objectives (Sugiyono, 2023). Based on these criteria, seven pharmaceutical firms were included in the analysis. Data analysis combined descriptive statistics to summarize key characteristics and inferential statistics to test the research

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hypotheses (Sugiyono, 2023; Ghozali, 2018).Before hypothesis testing, data normality was assessed using the Kolmogorov–Smirnov test. If the data were normally distributed, a Paired Sample t-test would be applied; otherwise, the Wilcoxon Signed Rank Test was used as a non-parametric alternative (Ghozali, 2018; Pramana & Mawardi, 2012). All statistical analyses were conducted using IBM SPSS version 25 with a 5% significance level (α = 0.05).

Regarding potential confounding factors such as government policy responses and macroeconomic conditions, this study acknowledges that the pandemic period coincided with multiple overlapping shocks. Because the research design is a within-sample pre–post comparison at the sector level and applies a non-parametric difference test, it does not explicitly model macroeconomic controls in a multivariate framework. To mitigate confounding influence operationally, the study uses a long longitudinal window and monthly averaging to reduce short-term noise and avoid reliance on extreme market days. Nevertheless, the interpretation of results is framed as reflecting the combined market response to the COVID-19 crisis environment in Indonesia, rather than a strictly isolated causal effect of a single policy announcement. Future research is encouraged to incorporate macroeconomic controls and policy indicators within panel regression or formal event study abnormal return frameworks to better isolate mechanisms.

RESULTS and DISCUSSION

Results

Descriptive Statistics

Research data is summarized and presented using descriptive statistical analysis in the form of tables, graphs, pie charts, and other visual aids. Using metrics like mean, median, mode, minimum, maximum, standard deviation, and total values, this analysis gives a broad picture of the data's properties (Sugiyono, 2023). The primary research variables in this study stock prices and trading volume are described using descriptive statistics.

Table 3. Pharmaceutical Company Stock Prices Before and After Covid-19

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Stock Prices Before Covid-19	21	131.00	4300.00	1385.1429	942.47548
Stock Prices After Covid-19	28	580.00	5835.00	2194.4643	1584.37003
Valid N (listwise)	21				

Source: Processed data (2025)

The descriptive data show that the average stock values of pharmaceutical businesses before and after the COVID-19 pandemic differed, as shown in Table 3. The average stock price rose from IDR 1,385.14 before to the pandemic to IDR 2,194.46 after it, indicating a general rising tendency in pharmaceutical industry stock prices. This rise might be explained by increased investor interest in the healthcare industry both during and after the epidemic, as well as increased demand for pharmaceutical goods. These findings, however, are only descriptive and do not yet suggest statistical significance.Furthermore, the standard deviation increased from IDR 942.48 before to the pandemic to IDR 1,584.37 after it, suggesting increased price volatility during the post-pandemic phase. This rise in unpredictability might be attributed to speculative trading, unexpected spikes in demand for medical supplies, and economic instability. Additionally, both lower and higher price levels improved as the minimum and maximum stock prices moved upward, from IDR 131–4,300 before to the pandemic to IDR 580–5,835 after it. Overall, these descriptive findings point to the pharmaceutical industry's successful recovery from the COVID-19 epidemic.

Table 4. Trading Transaction Volume of Pharmaceutical Companies Before and After Covid-19

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Trading Transaction Volume Before Covid-19	21	792628200.00	6532220000000.00	440090704240.4762	1440219367659.92300

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Trading Transaction Volume After Covid-19	28	16106520000.00	232231000000.00	41799410718.5703	7311550118050.93200
Valid N (listwise)	21				

Source: Processed data (2025)

Following the COVID-19 pandemic, pharmaceutical firms' average trade transaction volume significantly rose, as seen in Table 4. The average trade volume was at IDR 440.09 billion before the epidemic, but it increased significantly to around IDR 4.18 trillion after it ended. Due to the healthcare industry's key position during the global health crisis, investors are probably paying more attention to it, which is shown in the significant rise in pharmaceutical stock trading activity and liquidity.Additionally, the trading volume standard deviation rose from IDR 1.44 trillion before to the epidemic to IDR 7.31 trillion after it, demonstrating a considerable rise in trading activity volatility. This implies that pandemic-related information, such as vaccine research and growth forecasts in the pharmaceutical business, caused market responses to become more volatile. A wide growth in trading activity across the industry was confirmed by the significant increases in both the minimum and maximum trading volumes. All things considered, these descriptive results show that the pandemic caused a spike in investor involvement and trading activity in pharmaceutical companies.

Normality Test

In order to choose the best statistical testing technique, the normality test is used to ascertain if the data have a normal distribution. A paired sample t-test may be used to evaluate hypotheses when the data are regularly distributed. On the other hand, a non-parametric method like the Wilcoxon Signed Rank Test is better suitable if the data are not regularly distributed. The One-Sample Kolmogorov–Smirnov Test is used in this research to evaluate the normality of the data. If the significance value is less than 0.05, it implies that the data deviate from normalcy; if it is larger than 0.05, it shows that the data are normally distributed. The following table displays the findings of the normalcy test for trading volume and stock prices.

Table 5. Normality Test of Stock Price Data

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Stock Prices Before Covid-19	.205	21	.021	.878	21	.013
Stock Prices After Covid-19	.207	21	.019	.885	21	.018
a. Lilliefors Significance Correction						

Source: Processed data (2025)

The significant values for stock prices before (0.021) and after (0.019) the COVID-19 pandemic are both below 0.05, suggesting that the data are not normally distributed, according to the findings of the Kolmogorov–Smirnov test shown in Table 5. This finding implies that the normalcy assumption needed for parametric testing is not fulfilled. Parametric techniques like the paired sample t-test are thus inappropriate for further analysis.The non-normal distribution of stock price data is further supported by the Shapiro-Wilk test, which consistently yields findings with significance values of 0.013 before to and 0.018 after the pandemic. These results support the conclusion that the data deviate from normality since the Shapiro-Wilk test is more sensitive for small to medium sample sizes. For hypothesis testing, a non-parametric statistical technique is thus necessary.

Table 6. Normality Test of Trading Transaction Volume Data

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Trading Transaction Volume Before Covid-19	.452	21	.000	.335	21	.000
Trading Transaction Volume After Covid-19	.340	21	.000	.702	21	.000
a. Lilliefors Significance Correction						

Source: Processed data (2025)

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For both pre- and post-pandemic trade volume data, the Kolmogorov–Smirnov test produces significance values of 0.000, as Table 6 illustrates, suggesting that the data are not regularly distributed. This result implies that trade volume deviates significantly from the normal distribution, making parametric testing inappropriate. Additionally, the Shapiro-Wilk test yields significance values of 0.000 for both periods, supporting these findings. The Wilcoxon Signed Rank Test is a non-parametric approach that is considered acceptable to assure proper statistical inference because of the significant evidence of non-normality from both tests.

Hypothesis Testing

The Wilcoxon Signed Rank Test, a non-parametric statistical technique for assessing differences between two related samples with ordinal or interval data that do not follow a normal distribution, is employed in this work to test hypotheses (Hidayat, 2017). The significance value serves as the basis for the test's decision criteria: if the significance level is less than 0.05, the alternative hypothesis is accepted; if it is larger than 0.05, the hypothesis is rejected. Because the results of the normality test indicate that the data for stock prices and trading volume are not normally distributed, the Wilcoxon Signed Rank Test is used in this study. The next section presents the findings of the hypothesis testing for both variables.

Table 7. Wilcoxon Signed Rank Test of Stock Prices

Ranks				
		N	**Mean Rank**	**Sum of Ranks**
Stock Prices After Covid-19 - Stock Prices Before Covid-19	Negative Ranks	6[a]	8.00	48.00
	Positive Ranks	15[b]	12.20	183.00
	Ties	0[c]		
	Total	21		
a. Stock Price After Covid-19 < Stock Price Before Covid-19				
b. Stock Price After Covid-19 > Stock Price Before Covid-19				
c. Stock Price After Covid-19 = Stock Price Before Covid-19				

Test Statistics[a]	
	Stock Prices After Covid-19 - Stock Prices Before Covid-19
Z	-2.346[b]
Asymp. Sig. (2-tailed)	.019
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

Source: Processed data (2025)

According to Table 7's Wilcoxon Signed Rank Test findings, the significant value of 0.019 below the 0.05 cutoff was attained. This suggests that stock prices before and after the COVID-19 epidemic differed statistically significantly. It seems that stock values typically rose after the epidemic, as shown by the preponderance of positive rankings (15 instances) over negative ranks (6 cases). As a result, the study hypothesis that claims there is a substantial difference in stock prices between the two eras is accepted.

These results align with the research conducted by Nurmasari (2020), which found significant variations in stock prices before to and after the announcement of Indonesia's first COVID-19 case. The same market reaction underscores the significant impact of pandemic-related information on investor perception, even though the research concentrated on a non-pharmaceutical firm. Increased demand for medical supplies and positive development prospects in the pharmaceutical industry help to explain the observed increase in stock prices, supporting earlier findings that COVID-19 was a significant external factor affecting stock market dynamics.

Table 8. Wilcoxon Signed Rank Test Trading Transaction Volume

Ranks				
		N	**Mean Rank**	**Sum of Ranks**
Trading Transaction Volume After Covid-19 - Trading Transaction Volume Before Covid-19	Negative Ranks	3[a]	9.33	28.00
	Positive Ranks	18[b]	11.28	203.00
	Ties	0[c]		
	Total	21		

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a. Post-COVID-19 Trading Volume < Pre-COVID-19 Trading Volume	
b. Post-COVID-19 Trading Volume > Pre-COVID-19 Trading Volume	
c. Post-COVID-19 Trading Volume = Pre-COVID-19 Trading Volume	
Test Statistics[a]	
	Trading Transaction Volume After Covid-19 - Trading Transaction Volume Before Covid-19
Z	-3.041[b]
Asymp. Sig. (2-tailed)	.002
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

Source: Processed data (2025)

Table 8's Wilcoxon Signed Rank Test findings reveal a significant difference in trade transaction volume before and after the COVID-19 pandemic, with a significance value of 0.002, below 0.05. The fact that there were more positive rankings (18 instances) than negative ranks (3 cases) indicates that trade volume rose in the post-pandemic era on average. This outcome demonstrates how the pandemic had a major impact on trade activities in the pharmaceutical industry.

This result is consistent with earlier research by Siswantoro (2020), who observed a notable increase in traded shares after the announcement of COVID-19 cases in Indonesia, and Bakhtiar et al. (2020), who discovered higher stock trading activity throughout the pandemic. Similar increases in trade volume were also reported by Hamid and Arshanty (2021) in Malaysia and Indonesia, especially in industries like healthcare and pharmaceuticals that have promising futures during times of crisis. The conclusion that the COVID-19 pandemic increased trading activity and increased investor interest in pharmaceutical companies is supported by all of these research taken together.

Discussion

This study examines differences in stock prices and trading volumes of pharmaceutical companies listed on the Indonesia Stock Exchange over the 2018–2023 period, comparing pre-pandemic and post-pandemic conditions. The Wilcoxon results show statistically significant changes in both variables, and the rank distribution provides additional economic meaning beyond significance alone. For stock prices, the dominance of positive ranks indicates that the post-pandemic period is characterized by broadly higher valuations across most observations, suggesting a systematic re-pricing rather than isolated firm-specific movements. Interpreted through signaling theory, the pandemic functioned as a high-salience information shock that shifted investor expectations about relative sector prospects. Pharmaceuticals were not only exposed to crisis risk but also received favorable demand-related signals linked to healthcare urgency, which plausibly improved expected cash flows and reduced perceived downside risk compared with more cyclically exposed sectors. This pattern supports a sector resilience interpretation: investors treated pharmaceuticals as a defensive allocation during the crisis and maintained stronger valuation expectations into the recovery phase.

Trading volume also changed significantly, yet the direction of movement indicates weaker liquidity during the later recovery period despite higher prices, which deepens the interpretation from a simple difference finding. Economically, rising prices with lower turnover is consistent with a shift in investor time horizons and trading incentives. As valuations improved and expectations became more long-term oriented, investors may have reduced trading frequency and preferred holding positions, decreasing turnover even as prices remained supported. From a market microstructure perspective, liquidity can remain constrained after a systemic shock because uncertainty and heterogeneous beliefs increase effective trading frictions and reduce market depth, making investors more selective in executing trades. Under this mechanism, prices reflect revised fundamental expectations, while trading volume reflects the willingness and ability of investors to transact under evolving liquidity conditions. Therefore, the asymmetric price–volume response is theoretically meaningful: it suggests that crisis signals can strengthen valuation without proportionally improving post-crisis liquidity, implying that sector resilience in prices does not automatically translate into resilience in trading activity.

Importantly, these patterns may differ across contexts because crisis information is filtered through institutional quality, market maturity, and investor structure. In developed markets, stronger disclosure regimes, deeper institutional participation, and higher market depth tend to support faster liquidity recovery and more efficient price discovery, so valuation changes are more likely to be accompanied by stable trading activity. In emerging markets such as Indonesia, crisis episodes often

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coincide with higher uncertainty, greater sensitivity to policy shifts, and more heterogeneous investor behavior, which can prolong liquidity frictions even when sector valuations improve. From a signaling perspective, the credibility and interpretability of signals depend on the information environment; where disclosure quality is uneven, investors may respond with more cautious trading behavior. From a microstructure perspective, lower market depth and higher transaction-cost sensitivity can make turnover more responsive to uncertainty than prices, producing outcomes in which valuation rebounds while liquidity remains constrained. This contextual lens helps explain why similar pharmaceutical-sector "defensive" narratives may yield different price–volume trajectories across countries and why emerging-market evidence adds value to the broader crisis-finance literature.

This study contributes new knowledge by providing sector-specific, longitudinal evidence from an emerging market that distinguishes valuation re-pricing from liquidity adjustment during a global health crisis. By jointly examining stock prices and trading volume over the 2018–2023 period, the study shows that pharmaceuticals can experience sustained valuation improvements while liquidity conditions evolve differently, highlighting the importance of using multiple market indicators to capture the full market response. The findings advance theory by integrating signaling theory with market microstructure reasoning to explain why the same crisis signal can produce asymmetric outcomes: prices incorporate revised expectations about fundamentals, whereas trading activity reflects investor horizons, transaction frictions, and post-crisis uncertainty that may persist even when valuations improve. For policymakers and market authorities, these results imply that safeguarding liquidity and price discovery during recovery phases requires stronger disclosure quality, timely information dissemination, and measures that support market depth, especially in strategic sectors that attract defensive reallocations. For investors, the findings offer strategic guidance for crisis-oriented portfolio decisions: pharmaceuticals may provide defensive exposure and capital gain potential, but investors should actively monitor liquidity indicators alongside price movements, plan entry and exit discipline, manage position sizing, and maintain liquidity buffers to reduce exit risk when turnover weakens. These contributions strengthen the academic and practical relevance of the study by clarifying what changes, why it changes, and how the insights can be applied in crisis investment and market governance.

These findings generate clearer practical implications for key stakeholders. For investors, the results indicate that pharmaceuticals may offer valuation protection and capital gain potential during systemic crises, but liquidity conditions can tighten even when prices rise, increasing exit risk and potentially widening transaction costs. Crisis investment strategies should therefore integrate valuation assessment with liquidity monitoring and adopt disciplined entry–exit planning, prudent position sizing, and adequate liquidity buffers. For regulators and market authorities, the decline in trading activity alongside rising prices highlights the importance of preserving market depth and supporting efficient price discovery during recovery phases through stronger disclosure quality, timely information dissemination, and policies that reduce trading frictions. For corporate managers, the evidence underscores that maintaining valuation is not sufficient if liquidity deteriorates; firms should strengthen investor communication on demand sustainability, innovation pipelines, and risk controls to reduce uncertainty and support market participation. Liquidity-supportive corporate policies, including consistent dividend policy, well-communicated buyback decisions when appropriate, and attention to free-float planning, can help sustain investor confidence and trading activity. Overall, this study contributes to understanding sectoral market reactions during global crises by demonstrating that valuation re-pricing and liquidity adjustment can follow different trajectories, reinforcing the need to evaluate multiple market indicators when interpreting crisis effects.

In conclusion, the results support the hypothesis outcomes that stock prices and trading volumes of pharmaceutical companies differ significantly between the pre-pandemic and post-pandemic periods. Stock prices increased in the post-pandemic period, indicating a broad revaluation of pharmaceutical firms consistent with a sector resilience interpretation during a global health crisis. Trading volume also changed significantly, yet it weakened during the later recovery phase, implying that higher valuation was not accompanied by stronger liquidity. These findings suggest that crisis-driven signals can improve sector valuation while liquidity normalizes more slowly, so both valuation and liquidity indicators should be jointly considered in crisis-related market assessments.

Several limitations should be acknowledged. First, the sample includes only seven firms, which may limit generalizability and statistical power. Second, the study focuses on a single sector, so

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conclusions may not reflect cross-sector differences. Third, the analysis does not estimate abnormal returns or apply a formal event-window approach, limiting the ability to isolate COVID-19 information effects from other concurrent influences and to quantify the magnitude of market reaction using standard event study metrics. Future research should expand the sample across sectors, incorporate abnormal returns and cumulative abnormal returns, and include additional liquidity measures such as bid-ask spreads and illiquidity ratios to strengthen economic interpretation and theoretical inference regarding price–liquidity mechanisms.

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