

## Capital Market Reaction to Several Announcements Related to COVID-19 Vaccine in LQ-45 Index

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### Abstract

COVID-19 has caused many losses to stock markets worldwide, including in Indonesia. All industrial sectors' stock prices have declined significantly from December 2019 to May 2020. Due to the pandemic, the COVID-19 vaccine brings hope and optimism to the country's economy, which will cause a reaction in the capital market. This study aims to test is there any market reaction to several cases related to the COVID-19 vaccine. Those events are: the government received the first dose Covid-19 vaccine, the government canceled the paid individual vaccination program, and COVID-19 vaccination has penetrated more than 100 million people. This study was measured by abnormal return and trading volume activity within two different periods, i.e., a day before (D-1) to a day after (t-1) and three days before (t-3) to three days after (t+3) of each event. This research was conducted on companies listed on LQ-45 that were determined using the purposive sampling technique and will be analyzed using a one-sample Kolmogorov Smirnov test, Paired sample t-test, and Wilcoxon signed-rank test. This study indicates a capital market reaction to all the cases related to the COVID-19 vaccine researched in this study, which causes changes in abnormal returns and a significant increase in volume after the announcement.

*Keywords: abnormal return, COVID-19 vaccine, trading volume activity, LQ-45, event study*

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## 1. INTRODUCTION

The stock market is crucial in the financial market and in developing a country's industry by providing optimal distribution of funds between users and investors. Economic and non-economic events influence stock market performance. Non-economic events include environmental conditions, human rights issues, political events, and unpredictable, extraordinary events that are very sensitive to market conditions. COVID-19 pandemic is one of the non-economic risks that can influence investors' decisions to invest. Many endogenous and exogenous factors can affect stock prices in the market. Still, factors from COVID-19 also cause price fluctuations in the market, which shows that the events related to the COVID-19 pandemic have a relationship with a specific event announcement and affect the movement of capital markets.

The coronavirus outbreak has already spread to various countries, including Indonesia, and has claimed millions of lives. A study on the United States, India, Brazil, Russia, and France stock markets found that stock returns were significantly negative as the market reacted to COVID-19 media reports and pandemic announcements (Khanthavit, 2021). The same thing also occurred to Indonesia Composite Stock Price Index, which dropped significantly from Rp 6.300 to Rp 3.900 since the government announced its first two COVID-19 cases (IDX, 2020). The pandemic harmed the capital market and caused investors to be more interested in selling their shareholdings. The pandemic caused stock exchanges worldwide to experience a decline and increased inefficiencies in the stock market (Ganiarto et al., 2020). In Indonesia, this also harms the capital market and affects investors' investment decisions (Pitaloka et al., 2020).

The Indonesian government began implementing the Work From Home (WFH) policy for its citizens because the number of cases keeps increasing. Many companies even laid off employees because decreasing demand from buyers causes the company to temporarily reduce or even stop production, ultimately affecting sales (Cakranegara, 2020). Even the government requested banking sector participants for credit relaxation without establishing defined processes or direct engagement with business actors (Johan, 2020). In addition, 475 companies' revenues fell by 58.73% for the first quarter of 2020 (Utami, 2020). The decline in sales is a result of social restrictions due to Covid-19. The decline in sales resulted in a decrease in the company's performance.

As there are many losses due to the COVID-19 outbreak, World Health Organization (WHO) has deemed vaccines to be one of the most cost-effective methods of preventing and delaying the coronavirus (WHO, 2019). Michelle & Joy (2021) studied the impact of launching the COVID-19 vaccine event on the Philippine Stock Exchange (PSE), increasing stock returns significantly. Similar research conducted by Kewei and Yuanyuan (2021) found a positive correlation between stock market returns and the approval of the world's first deactivated COVID-19 vaccine clinical study, with both returns peaking two days after the occurrence. Since COVID-19 vaccine brings hope to the country's economy and is one of the events that can indirectly impact share purchases and cause a reaction in the capital market in Indonesia. As a result, this research focuses on several events related to COVID-19 vaccine announcements that will be used in this research:

1. Government is the country's representative to receive vaccines at the Merdeka Palace, Jakarta. (13th January 2021)
2. The government canceled the plan that allowed citizens to pay for individual COVID- 19 vaccination. (16th July 2021)
3. COVID-19 vaccination has penetrated over 100 million people who received the first injection. (10th October 2021)

Three significant occurrences are the subject of this study. These three incidents have significant momentum in managing the Covid-19 epidemic in Indonesia. A momentous occasion for the Indonesian people is the vaccination of high-ranking officials. This incident demonstrates how crucial immunizations are to the Indonesian people. The distribution of free immunizations to the entire community is the second incident. This reflects the government's dedication to the well-being of its people. The third factor is the momentum created by administering 100 vaccination doses. This demonstrates the government's capacity to quickly administer immunizations to Indonesia's more than 200 million citizens.

Based on the background and research described previously, it is obtained that events related to the COVID-19 vaccine impact stock price fluctuations that ultimately affect the returns generated on investment in the capital market. The event study method can measure the response generated in the capital market as a reaction to events related to the COVID-19 vaccine. Therefore, the formulation of the problems to be answered in this study is the difference in average abnormal stock return between before and after three cases related to the COVID-19 vaccine. Second, the significance of the difference in the trading volume activity before and after several instances related to the COVID-19 vaccine.

## **2. LITERATURE REVIEW**

The capital market is where long-term financial instruments, which consist of stocks, bonds, derivatives, and other instruments, can be traded (Darmadji & Fakhrudin, 2012). Husnan (2005) defines the efficient capital market as one in which the prices of its securities represent all related information. Fama (1970) mentioned that the market is categorized into semi-strong forms if the stocks' prices reflect all publicly available information, including companies' financial statements and historical stock prices. The information published can only affect the company that issued the information, several companies, or even all listed companies' stock prices. This semi-strong form efficiency test can be done using an event study.

Previous researchers have researched how the capital market reacts to events related to the COVID-19 pandemic in many countries. From the research conducted with various methods, different results are obtained regarding how the COVID-19 information/events affect the capital market. According to Sholichah & Johan (2021), the announcement of the COVID-19 first case in Indonesia affected the trading volume activity but did not significantly affect abnormal returns. However, different results obtained from Ryandono et al. (2021) found that the global Covid-19 pandemic is terrible news that, indicated by many investors selling their stocks as a cutloss strategy which turned average actual return, expected return, and AAR to be significantly negative as well as affected the trading volume activity.

An event study, as defined by Kritzman (1994), is a research approach for observing the influence of a specific event on stock prices. An event study is usually carried out by observing the behavior of stock returns around the reported events. How the market reacts to public information as part of an announcement is studied using an event study. Events containing helpful information are likely to cause a reaction in markets, according to Jogiyanto (2010). Changes in stock prices are an indicator of how the market is responding to an announcement.

In an efficient market, a security price should reflect information about risks and expected returns. A return commensurate with the stock's risk is called a normal return. Meanwhile, if the market is inefficient, securities will generate a greater return than normally, called an abnormal return (Tandelilin, 2010). Abnormal return is the difference between actual return and expected return. Abnormal return is a condition with an unusually large profit or loss from one investment period (Jogiyanto, 2010).

Halim & Hidayat (2000) explained that trading volume is the number of shares traded on a certain day. A large trading volume indicates an active stock, which means investors are currently looking for it. Stock trading volume can be used in technical analysis to value stock prices and also as a tool to see how the capital market reacts to an information/issue.

From the other events regarding how the government intervenes in solving COVID-19 cases, M. Alam et al. (2020) noted that India's stock market reacted positively during the lockdown period, followed by a positive abnormal return found in the study. However, different results were obtained from Agustawan & Sujana (2020), who found out that the Investors were unmoved by government policy announcements addressing the emergency status of the COVID-19 tragedy because this study finds out AAR and ATVA on LQ-45 equities are not affected.

Research on changes in stock prices and stock transactions before and after the incident is the main focus of this study. This study aims to demonstrate how events affect stock transaction price and volume. Thus, the following is the research hypothesis:

**H1:** There is a significant gap in abnormal return between before and after some events related to the COVID-19 vaccine

**H2:** There is a significant gap in trading volume activity between before and after some events related to the COVID-19 vaccine

### **3. METHODOLOGY**

This study uses an event study design to determine how the capital market will react to several cases related to the COVID-19 vaccine. Market reaction is proxied by the appearance of abnormal returns and changes in trading volume activity around the event period. There are two different periods: three days before & 3 days after the announcement/event and one day before & 1 day after the announcement of the covid-19 case.

The sampling technique used purposive sampling with a sample of companies listed in LQ-45 – IDX (2021), which indicates the researcher has made boundaries based on the characteristics of the subjects that will be used as research samples

(Sugiyono 2013). Some of the criteria used in the selection of examples for this study are:

- a. Stocks listed as issuers on the Indonesia Stock Exchange (IDX) remain included in the LQ45 group during the study period, starting from 23 November 2020 – 2 August 2021 (trading working days).
- b. Do not carry out corporate actions during the observation period to avoid the confounding effect caused by corporate action.

The following is the calculation formula for this research.

### 3.1. Actual Return

The real return calculation is the difference between profits from prices before and after, divided by the price before. This number displays the investment return.

$$R_{i,t} = \frac{P_t - (P_{t-1})}{(P_{t-1})}$$

Notation:

$R_{i,t}$  = Actual Return of stock  $i$  on day  $t$

$P_t$  = Stock Price on day  $t$

$P_{t-1}$  = Stock Price on the day before day  $t$  (Previous Price)

### 3.2. Expected Return

The expected return is the return that is projected based on the stock market's overall stock price index. This rating reflects whether a stock will follow a change in the index.

$$R_{mt} = \frac{\text{Index LQ-45}_t - \text{Index LQ-45}_{t-1}}{\text{Index LQ-45}_{t-1}}$$

Notation:

$R_{mt}$  = Market return at time  $t$

$\text{Index LQ45}_t$  = LQ-45 Index value at the time  $t$

$\text{Index LQ45}_{t-1}$  = LQ-45 Index value at the time  $t-1$

### 3.3. Abnormal Return

A comparison of actual and anticipated stock returns is known as an abnormal return. The predicted return is the same as the actual return if the abnormal return is

zero. On the other hand, if it is larger or less, the expected return is not the same as the actual return.

$$AR_{i,t} = R_{i,t} - E(R_{i,t})$$

Notation:

$AR_{i,t}$  = Abnormal Return of stock  $i$  on day  $t$

$R_{i,t}$  = Actual Return of stock  $i$  on day  $t$

$E(R_{i,t})$  = Expected Return of stock  $i$  on day  $t$

### 3.4. Trading Volume Activity (TVA)

$$TVA = \frac{\sum \text{Stocks } i \text{ traded on time } t.}{\sum \text{Circulating stocks } i \text{ on time } t}$$

Trading Volume Activity displays the quantity of traded shares in relation to the total number of shares outstanding. This demonstrates stock activity. If the TVA result is tiny, it means the stock is not active, and if the TVA result is significant, it means the stock is.

This study uses Kolmogorov-Smirnov for normality test with the rules that if the Kolmogorov-Smirnov significance value  $> 0.05$ , then the data is normally distributed. On the other hand, if the significance value of Kolmogorov-Smirnov is  $< 0.05$ , then the information is not normally distributed (Ghozali, 2011).

## 4. RESULT AND DISCUSSION

### 4.1. Data Result Analysis of Event 1

The first event is the government as Indonesia's representative to receive their first vaccines in the free mass vaccination program on 13<sup>th</sup> January 2021.

**Table 1.** Descriptive Statistics of Event 1

Period	Mean	Minimum	Maximum	Std Deviation
Panel A. Before Event 1				
AAR t-3	0.9508	-3.2654	3.6570	0.8539
AAR t-1	0.6592	-1.8837	5.0954	0.6303
ATVA t-3	0.8218	0.0224	14.9313	2.2989
ATVA t-1	0.7925	0.0264	14.8186	2.3116
Panel B. After Event 1				
AAR t+3	1.5823	-2.6881	4.1672	1.2817
AAR t+1	1.5544	-2.0783	4.0469	1.1577
ATVA t+3	1.1595	0.0223	20.0133	3.0844

ATVA t+1	1.2741	0.0321	20.8200	3.3069
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Source: research results (2021).

As shown in Table 1, the behavior of mean abnormal returns and trading volumes after the event show an increase. The occurrence of differences in the average value of abnormal returns in the observation period before and after the government received the first COVID-19 vaccine in Indonesia shows that this event has sufficient information to make the capital market react. The difference in the average TVA between before and after the event indicates that investors are very responsive to the event, which suggests that this event can be considered good news by investors.

The average abnormal return is quite close to the mean, according to the findings of the standard deviation test. This demonstrates how consistent the research data is. At the same time, the trade volume standard deviation results indicate a diverse research sample.

**Table 2. Normality Test of Event 1**

Period	Sig. Value	Data Distribution
<b>Panel A. Before Event 1</b>		
AAR t-3	0.200	Normal
AAR t-1	0.200	Normal
ATVA t-3	0.000	Not Normal
ATVA t-1	0.000	Not Normal
<b>Panel B. After Event 1</b>		
AAR t+3	0.200	Normal
AAR t+1	0.152	Normal
ATVA t+3	0.000	Not Normal
ATVA t+1	0.000	Not Normal

Source: research results (2021).

To test the data normality, the Kolmogorov-Smirnov test is used in this study. Table 2 presents the results of data normality tests before and after event 1. All average abnormal return (AAR) has a significant value above 0.05, indicating the data are normally distributed. Meanwhile, all average trading volume activity (ATVA) data have a significance value of less than 0.05, meaning the data are not normally distributed (Khoiriah et.al., 2020). This significant result shows that stock returns experienced a significant change between before and after the event. It is stated in table 3. However, these stock price changes have a concentration on specific industries only.

**Table 3. Paired Sample T-Test AAR Before and After Government as Indonesia's representative to receive their first vaccines**

Variable	Period	Sig	Results
AAR	3 Days Before – 3 Days After	0.034	Significant
	1 Day Before – 1 Day After	0.026	Significant

Source: research results (2021).

The existence of significant differences in abnormal returns in this period before and after the event can be interpreted that the announcement of the government receiving their first vaccine does contain any information/signal about future profits. Many investors believe that this event gives Indonesia much hope since more widespread vaccinations keep people healthier and make it easier to do their jobs, cut health-care expenses, and boost general economic activity. It is described in Table 3.

**Table 4.** Wilcoxon Test on ATVA Before and After Government as Indonesia's representative to receive their first vaccines

Variable	Period	Sig	Results
ATVA	3 Days Before – 3 Days After	0.009	Significant
	1 Day Before – 1 Day After	0.013	Significant

Source: research results (2021).

The inference is that there is a significant difference in trading volumes between before and after the government received its first vaccine and was caused by increased demand for stocks. The difference in ATVA in this event might be regarded as a positive event or good news so that investors will buy shares with the hope that they will get an abnormal return. The transaction value increased significantly after the event occurred. This is discussed in table 4.

#### 4.2. Data Result Analysis of Event 2

The second event was that the government canceled the plan that allowed citizens to pay for COVID-19 vaccination on 16<sup>th</sup> July 2021.

**Table 5.** Descriptive Statistics of Event 2

Period	Mean	Minimum	Maximum	Std Deviation
Panel A. Before Event 2				
AAR t-3	0.7649	-2.1156	2.8160	0.7475
AAR t-1	0.4616	-2.2052	2.7298	0.4480
ATVA t-3	0.3421	0.0124	8.7754	1.1555
ATVA t-1	0.3544	0.0096	8.9974	1.8142
Panel B. After Event 2				
AAR t+3	1.1531	-1.8501	5.0560	1.1270
AAR t+1	1.2114	-1.6656	5.1561	1.1778
ATVA t+3	0.5913	0.0195	15.0077	2.2398
ATVA t+1	0.4872	0.0215	11.5431	1.7396

Source: research results (2021).

Table 5 showed an increase in the mean value of AAR and ATVA after the event. The differences in the average value of abnormal returns and trading volumes before and after the government canceled the plan that allowed citizens to pay for COVID-19 vaccination show that this event has sufficient information to make the capital market react.

The results of the standard deviation test indicate that the average abnormal return is near the mean. This demonstrates that the research data is more uniform.



A heterogeneous research sample is shown by the results of the standard deviation for the trading volume.

**Table 6.** Normality Test of Event 2

Period	Sig. Value	Data Distribution
Panel A. Before Event 1		
AAR t-3	0.200	Normal
AAR t-1	0.150	Normal
ATVA t-3	0.000	Not Normal
ATVA t-1	0.000	Not Normal
Panel B. After Event 1		
AAR t+3	0.200	Normal
AAR t+1	0.200	Normal
ATVA t+3	0.000	Not Normal
ATVA t+1	0.000	Not Normal

Source: research results (2021).

Table 6 presents the results of data normality tests before and after the event 2. All average abnormal return (AAR) data have a significance value  $> 0.05$ , indicating the data are normally distributed. Meanwhile, all average trading volume activity (ATVA) data have a significance value of  $\leq 0.05$ , meaning the data are not normally distributed. This significant result shows that stock returns experienced a significant change between before and after the event. It is stated in Table 3. However, these stock price changes have a concentration on specific industries only.

**Table 7.** Paired Sample T-Test AAR Before And After Government Cancelled The Plan That Allowed Citizens To Pay For COVID-19 Vaccination

Variable	Period	Sig	Results
AAR	3 Days Before – 3 Days After	0.019	Significant
	1 Day Before – 1 Day After	0.015	Significant

Source: research results (2021).

The significant differences in AAR before and after the event can be interpreted that the announcement of the government canceled the individual paid vaccination program does contain any information/signal about future profits and is considered good news. Many investors believe every citizen has the equal possibility to get access. Any vaccination payment could pose an ethical issue, particularly during a pandemic when we need the coverage and the vaccines to reach all of the most vulnerable. The faster society moves toward herd immunity. The faster economic activity can recover.

**Table 8.** Wilcoxon Test on ATVA Before and After Government Cancelled The Plan That Allowed Citizens To Pay For COVID-19 Vaccination

Variable	Period	Sig	Results
ATVA	3 Days Before – 3 Days After	0.000	Significant
	1 Day Before – 1 Day After	0.000	Significant

Source: research results (2021).

The inference is that there is a significant difference in trading volumes before and after the government canceled the individual paid vaccination program, which was caused by increased demand for stocks. The difference in ATVA in this event

might be regarded as good news, implying investors will choose to invest in countries with higher vaccination rates since decreased volatility may benefit trading conditions and long-term development. The transaction value increased significantly after the event occurred. This is discussed in Table 8.

#### 4.3. Data Result Analysis of Event 3

The third event was the announcement that the COVID-19 vaccination had penetrated more than 100 million people who received the first injection on 10th October 2021.

**Table 9.** Descriptive Statistics of Event 3

Period	Mean	Minimum	Maximum	Std Deviation
Panel A. Before Event 3				
AAR t-3	0.8660	-2.1355	3.1456	0.7741
AAR t-1	0.6795	-4.5890	3.7600	0.6397
ATVA t-3	0.9077	0.0242	23.2479	3.5448
ATVA t-1	0.7075	0.0187	16.7498	2.5489
Panel B. After Event 3				
AAR t+3	1.1710	-0.7277	3.1456	0.7741
AAR t+1	1.8003	-1.3030	6.4489	1.1778
ATVA t+3	1.2158	0.0284	33.9606	5.1883
ATVA t+1	1.0374	0.0243	25.4010	3.8829

Source: research results (2021).

Table 9 showed an increase in the mean value of AAR and ATVA after the event. The occurrence of differences in the average value of abnormal returns and trading volumes between before and after COVID-19 vaccination has penetrated more than 100 million people who received the first injection, shows that this event has sufficient information to make the capital market react.

The results of the standard deviation test indicate that the average abnormal return is near the mean. This demonstrates that the research data is more uniform. A heterogeneous research sample is shown by the results of the standard deviation for the trading volume.

**Table 10.** Normality Test of Event 3

Period	Sig. Value	Data Distribution
Panel A. Before Event 1		
AAR t-3	0.200	Normal
AAR t-1	0.200	Normal
ATVA t-3	0.000	Not Normal
ATVA t-1	0.000	Not Normal
Panel B. After Event 1		
AAR t+3	0.123	Normal
AAR t+1	0.145	Normal
ATVA t+3	0.000	Not Normal
ATVA t+1	0.000	Not Normal

Source: research results (2021).

Table 10 presents the results of data normality tests before and after the event 2. All average abnormal return (AAR) data have a significance value  $> 0.05$ , indicating the data are normally distributed. Meanwhile, all average trading volume activity (ATVA) data have a significance value of  $\leq 0.05$ , meaning the data are not normally distributed. This significant result shows that stock returns experienced a significant change between before and after the event. It is stated in Table 3. However, these stock price changes have a concentration on specific industries only.

**Table 11.** Paired Sample T-Test AAR Before And After COVID-19 Vaccination Has Penetrated More Than 100 Million People Who Received The First Injection

Variable	Period	Sig	Results
AAR	3 Days Before – 3 Days After	0.015	Significant
	1 Day Before – 1 Day After	0.000	Significant

Source: research results (2021).

The existence of significant differences in abnormal returns before and after the event can be interpreted that the announcement of the COVID-19 vaccination reaching more than 100 million people who received the first dose contains future profits. Many investors believe that the recovery rate for countries with higher vaccination rates is likely to be faster and potentially lead to economic growth. Less money is spent as costs are avoided through fewer medical tests, procedures, and treatments. Investing in vaccinations can potentially help keep citizens healthy and empower them to contribute independently to society and stay active longer. The transaction value increased significantly after the event occurred. This is discussed in Table 11.

**Table 12.** Wilcoxon Test on ATVA Before and After COVID-19 Vaccination Has Penetrated More Than 100 Million People Who Received The First Injection

Variable	Period	Sig	Results
ATVA	3 Days Before – 3 Days After	0.013	Significant
	1 Day Before – 1 Day After	0.014	Significant

Source: research results (2021).

The inference taken is that the announcement of COVID-19 vaccination has penetrated more than 100 million people who received the first injection is considered good news, so there is a significant increase in the stock returns and volume of shares. As a result, transactions.

The outcomes of statistical testing revealed a significant and favorable change between the before and after events. This suggests that investors have faith in investing in the government and capital markets. Stock returns following events exhibit a higher return than they did beforehand.

#### 4.4. Conclusion

The capital market reacted to COVID-19 vaccine events, including the announcement that the government had received its first vaccine, canceled the paid individual vaccination program, and the COVID-19 vaccination penetrated more than

100 million people who received the first dose injection. The results showed that the events have information content that causes the market to react, and it has been proven by the abnormal returns and trading volumes that occurred around the event window period. The abnormal returns that occurred have significant positive value since these events are considered good news by investors because they bring optimism and potentially lead to Indonesia's economic growth. In addition, trading volumes that are formed have significant positive value, namely the increase in the volume of shares traded after the announcements, which indicates that investor interest in LQ-45 company's stocks increased. The data in this study are calculated by using a market-adjusted model. The recommendation for further research can try to use other calculation models, such as the mean adjustment model or market model so that the consistency of the results of this research can be seen.

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