

## VOLATILITY ANALYSIS OF INDONESIA COMPOSITE INDEX DURING COVID-19

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### ABSTRACT

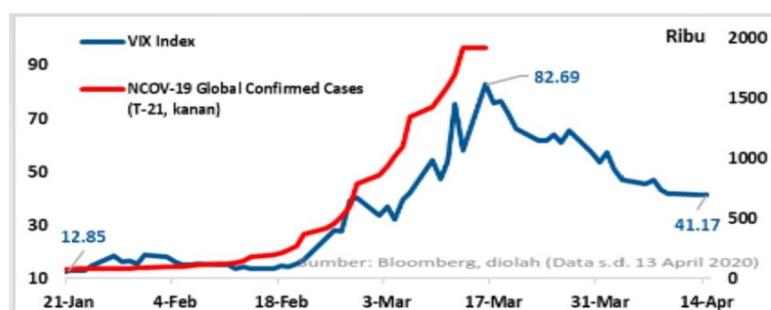
*Concerns over Covid-19 hit global financial markets, indicating that during the period of Covid-19 spread, financial markets experienced high uncertainty, from fluctuating tendencies several times to declining and difficult to control. At the beginning of the pandemic, Indonesia's capital market conditions were worse than during the 2008 crisis. At the end of March 2020, JCI was far behind 3,938. IDX and OJK conduct various stock policies so that the Indonesian capital market and JCI recover. The study aims to calculate and analyze differences in the volatility of JCI before and during Covid-19 in Indonesia. The data analysis method used is paired with a simple t-test using R Studio as a calculation tool. As we hypothesized that there are differences in the volatility of JCI before and during the Covid-19 pandemic in Indonesia, the results showed that there was a significant difference in the volatility of JCI before and during Covid-19 in Indonesia.*

*Keywords: Volatility, Composite Index, R Studio*

*Received: October 3<sup>rd</sup>, 2021 Revision: November 12<sup>th</sup>, 2021 Accepted for Publication: November 25<sup>th</sup>, 2021*

### INTRODUCTION

The Covid-19 pandemic first appeared in China (Wuhan) in late 2019. The entry of the Covid-19 outbreak into Indonesia was reported on March 2, 2020. The rapid spread of the Covid-19 outbreak in Indonesia is able to have a major impact on the Indonesian economy. The existence of preventive policies such as social distancing, work from home, transportation restrictions, and restrictions on the number of employees in all corporate sectors, both private and state-owned enterprises (Ali, 2013). This policy has caused the wheels of the Indonesian economy to slow down. Concerns over Covid-19 have also hit global financial markets, which show that during the period of Covid-19 spread, financial markets experienced high uncertainty. This figure shows financial market uncertainty in anticipation of Covid-19:



**Figure 1. Financial Market Uncertainty in Anticipation of Covid-19**

Figure 1 shows that the VIX Index or volatility index in the January period was 12.85. Meanwhile, in the March period, the volatility index increased to 82.69. In the third week of the March and April periods, the volatility index declined to 41.17. According to research conducted by Halisa and Annisa (2020), it was found that the number of cases of Covid-19 against the Composite Stock Price Index (JCI) makes the rate of JCI very volatile, this state indicates high stock volatility. From the results of the study also found that, a few days after the discovery of the first case of Covid-19 in Indonesia, there was panic among market participants that caused the decline in the rate of the index, causing the IDX to issue an asymmetric policy of auto rejection below (ARB).

In the study conducted by Halisa and Annisa (2020), the analysis of IHSG Indonesia was conducted by identifying many variables, such as the Case of Covid-19, Rupiah Exchange Rate, and Foreign Stock Price Index (IHSA), while this study only focused on the phenomenon of covid-19 cases against the volatility of JCI before and during Covid-19 in Indonesia. The impact of the financial crisis due to the Covid-19 pandemic can be reflected in the volatility of the Indonesia Composite Index (ICI). Indonesia Composite Index (ICI) is a stock price index that is compiled and calculated to produce trends, where the numbers processed in such a way can be used to compare stock prices over time (Jogiyanto, 2013). Here is an image showing the Indonesia Composite Index (ICI) during the Covid-19 pandemic in Indonesia:



**Figure 2. Indonesia Composite Index During the Covid-19 Pandemic (March-November 2020)**

Based on Figure 2, in March 2020, JCI reached the level of 5,361 (March 2), then weakened to 4,531 (April 2), and fluctuated to the level of 4,605 (May 2), then the JCI

reached the level of 5,311 (September 2), but corrected again at the level of 4,926 (October 2) then reached the level of 5,115 (November 2). As can be seen in Figure 2, at the end of March 2020, ICI was lagging behind by 3,938. The Covid-19 pandemic also caused rupiah exchange rate volatility against the US dollar which made the US dollar stronger. According to Halisa and Annisa (2020), the rupiah exchange rate against the US dollar also affects ICI.

Speaking of ICI, this is related to the capital market, where the capital market is an investment alternative for people who want to invest their money and the capital market can also be a long-term funding tool for companies to get additional capital. Indonesia's capital market is a rapidly growing market. The growth in stock prices on the Indonesia Stock Exchange, reflected in the movement of the Composite Stock Price Index, has shown much better growth compared to the region, even when compared to some major countries in the world. Where the average growth of ICI in the last 7 years has reached 15.64 percent per year, which is well above the average for major countries in Asia, which is only about 5.06 percent. Seeing the rapid growth of Indonesia's capital market, it turns out that the capital market in Indonesia is still classified as vulnerable to macroeconomic conditions in the world in general, including the Covid-19 pandemic problem. At the beginning of the pandemic, conditions in Indonesia's capital market were much more precarious than during the 2008 crisis. At that time, JCI began to enter the red zone. At the beginning of 2020, ICI was still at the level of 6,200, but by February it had fallen to the 5,900s.

ICI recorded a decrease of up to 37% from its initial position at 6,283 to 3,973 on March 24, 2020. The biggest decline occurred in less than a month in March 2020. At that time Indonesia admitted that there had been a positive case of Covid-19. Seeing the urgency, the IDX decided to take swift steps by issuing a series of policies. One of them is trading halt; This policy was taken as an emergency brake from the fall of the ICI. This is because almost all investors in the Indonesian capital market continue to sell. Throughout 2020, IDX itself has conducted 7 trading stops. In addition, IDX also issued an auto rejection policy of 7%. This means that the stock can only fall by 7%. To save stocks that have fallen, IDX and OJK have also issued buyback easing policies where share buybacks are allowed without having to hold a General Meeting of Shareholders. From a series of policies, Indonesia's JCI is now starting to recover and has returned to the level of around 6,000. Based on the background of this paper, researchers aim to analyze the volatility of ICI differences before and after the Covid-19 pandemic in Indonesia.

From this phenomenon, the author aims to provide solutions in the form of efforts to mitigate the spread of covid-19 cases so as not to make the stock market in Indonesia weaken. Some previous studies have focused more on the exchange rate (Rupiah exchange rate against the US dollar), the New York Composite Index (NYWE), and the Shanghai

Composite Index (SSE). The study forgets the variables of the Covid-19 Pandemic that we can see are able to affect various things, even exchange rate turmoil is affected. This is due to the absence of policies or early anticipation to deal with a pandemic. Therefore, in this study it is very intense to discuss the effect of covid-19 on the volatility of JCI during the covid-19 Pandemic and policies that can be used as early anticipation in dealing with it. From the statement, the author pulled a title that is "volatility analysis of Indonesia's composite index during covid 19". Based on the background of the study, the researchers formulated the following problem: Was there a difference in ICI volatility before and during the Covid-19 pandemic in Indonesia?

## **LITERATURE REVIEW**

### **Volatility**

Volatility can be used as a measure of the level of risk faced by investors. Stock price volatility is the movement of ups and downs in stock prices on the stock exchange (Khumiaji and Raharja, 2013). High stock price volatility indicates unusual supply and demand characteristics for stocks in the capital market because volatility is a measure of stock fluctuations over a given period (Purbawati and Dana, 2016). Volatility is a thing that often refers to the amount of uncertainty or risk associated with a measure of changes in the value of a security. Higher volatility means that the value of the security could potentially be spread across a larger range of values. Meanwhile, lower volatility means that the value of a security does not fluctuate dramatically, and tends to be more stable. Factors that influence volatility include rational factors that are internal and external factors of a company (Surbakti and Kusumastuti, 2013). Volatility can be affected by investor behavior (Herman, 2011). Research by Surbakti and Kusumastuti (2013) states that factors that influence volatility are dividend yield (percentage distribution of shares to shareholders), dividend payout ratio (percentage of a company's earnings distributed to shareholders), company size, trading volume, inflation, and interest rates, and exchange rate.

### **Capital Market**

According to capital market law No.8 of 1995 the definition of capital market is "An activity related to public offering and trading of securities, a public company related to the securities it issues, as well as institutions and professions related to securities. With the capital market, fresh funds obtained by the company from investors will be used to expand business activities or improve unhealthy financial conditions so that the company's business activities can run smoothly again. Capital markets play a big role for a country's economy and business because the capital market provides facilities that unite two interests, namely parties who have excess funds or investors with parties who need funds or issuers. With the capital market, parties who have excess funds can invest the funds in the hope of obtaining returns, while issuers can use the funds for investment purposes

without having to wait for the availability of company operational funds. Thus, it can be concluded that the capital market serves as an institution that encourages efficient allocation of funds through the transfer of funds from lenders to borrowers who are able to trigger the economic growth of a country by channeling more funds to the productive sector.

### **Indonesia Stock Exchange (IDX)**

The Indonesia Stock Exchange (abbreviated IDX), or Indonesia Stock Exchange (IDX) is an exchange resulting from the merger of the Jakarta Stock Exchange (IDJ) with the Surabaya Stock Exchange (BES). For the sake of operational and transaction effectiveness, the Government decided to merge the Jakarta Stock Exchange as a stock market with the Surabaya Stock Exchange as a bond and derivatives market. The exchange began operations on December 1, 2007. IDX uses a trading system called Jakarta Automated Trading System (JATS) since May 22, 1995, replacing the manual system used previously. Since March 2, 2009, the JATS system itself has been replaced with a new system called JATS-NextG provided by OMX. Indonesia Stock Exchange is centered on Indonesia Stock Exchange Building, Sudirman Commercial Area, Jalan Jenderal Sudirman 52-53, Senayan, Kebayoran Baru, South Jakarta (Ana, 2011).

To provide more complete information about the development of the exchange to the public, IDX disseminates data on stock price movements through print and electronic media. One indicator of stock price movement is the stock price index. Currently, IDX has several types of indices, coupled with ten types of sectoral indices. JCI, using all listed stocks as components of index calculations. Individual Index, which is the Index for each stock based on the base price. The LQ45 Index, using 45 selected stocks after going through several stages of selection. The IDX30 Index, using 30 selected stocks after going through several stages of selection. Kompas100 Index, using 100 daily choice stocks Kompas. Sectoral indices, using all stocks that fall into the same sector. Jakarta Islamic Index, using 30 selected stocks included in the Sharia Securities List issued by Appeal (Now OJK). Indonesia Sharia Stock Index (ISSI), which uses all stocks included in the Sharia Securities List issued by Bapepam-LK (now OJK). Business Index-27, using 27 selected stocks in collaboration with Bisnis Indonesia Daily. Pefindo25 Index, using 25 selected stocks in collaboration with Pelindo. The SRI-KEHATI Index, using 25 selected stocks that apply the principles of good governance and environmental concern, in collaboration with the KEHATI Foundation. SMinfra18 Index, using 18 selected stocks engaged in infrastructure and supporting it, in collaboration with PT Sarana Multi Infrastructure (Persero). Main Board index and Development Board, an index based on the group of stocks listed on the IDX, namely the Main Board and Development Board group.

### **Indonesian Composite Index (ICI)**

Indonesia Composite Index (ICI) or ODX Composite. ICI is an effective stock market index used on the Indonesia Stock Exchange (IDX). The Composite Stock Price Index (JCI) uses all listed stocks as components of index calculation (Handini and Astawinetu, 2020). The Composite Stock Price Index (JCI) in each country has different levels of development (Prasojo, 2012). In general, ICI is used as a reference for the rise or fall of the stock investment market both nationally and internationally. Monitoring the movement of JCI can also help determine economic conditions in the country. Another benefit of ICI is to tell investors about the time to add funds for a particular company's stock or even withdraw funds or sell their shares (Prasojo, 2012).

### **Benefits of Going Public**

Going public is the starting point for companies to gain easier access to funding, among other things through limited public offerings or through secondary offerings and private placements. Going public makes it easier to attract investors to invest in company stocks. The disclosure of information makes banks or other financial institutions more trustworthy in the company. Going public also makes it easier for companies to issue debentures, both short-term and long-term (Ali, 2013). Going public increases the value of a public company because it can be seen from the company's stock price and market capitalization. Any improvement in operational performance and financial performance will generally have an impact on the stock price on the stock exchange, thereby increasing the overall value of the company (Handini and Astawinetu, 2020). Once it goes public, information and news about the company will often be covered by media, data providers and analysts at securities firms. Free publication will improve the company's image and increase exposure to the introduction of the products the company produces. This will create new opportunities and new customers in the company's business (Herman, 2011).

Open companies listed on the IDX can get a 5% reduction in the corporate income tax rate as long as they meet the requirements, including with public ownership of 40% and owned by at least 300 shareholders whose ownership does not exceed 5%. In addition to the company, shareholders can also buy and sell their shares in the IDX at a tax rate of only 0.1% as long as they comply with applicable regulations (Purbawanti and Dana, 2016). By becoming a public company, each party in the family can own the company's shares in their respective portions and at any time can make a sale or purchase through the stock exchange, the stock price can be formed fairly based on supply and demand in the market. Founding shareholders can also entrust the management company to competent professionals who can easily supervise the company through financial statements or company disclosures required by the authorities.

### **METHODS**

This paper uses quantitative approaches to describe and test predefined hypotheses. This study uses secondary data on the movement of the Composite Stock Price Index for

the period March to November 2020 sourced from Bursa Efek Indonesia website, as well as financial market uncertainty volatility data for the period January 21-April 14, 2020 sourced from Indonesian Bank.

The data analysis technique in this paper uses a paired sample t-test, which is a comparative test or difference if the scale of the data of the two variables is quantitative. This test is used to compare whether there is a difference in the average of two paired groups. Where, pairing means that the data source comes from the same subject. This test can also be used as an approach to build a good model of heterogeneous data (Pham and Jimenez, 2012). Paired t-test samples are usually used to test different treatments when observing pairs where differences in pair values are assumed to be distributed normally (Hsu and Lachenbruch, 2005). Manually, the t-test formula used for paired samples is:

$$t = \frac{\bar{d} - \mu_D}{S_d / \sqrt{n}} \quad (i)$$

$\bar{D}$  : average difference in observation pairs of two samples,

$\mu_D$  : the average difference between the observation pairs of the two populations,

$S_d$  : the standard deviation value of the difference between the pair of observations of the two samples.

Here is the calculation formula standard deviation (Gio and Irawan, 2016):

$$S_d = \sqrt{\frac{\sum(d - \bar{d})^2}{n-1}} \quad (ii)$$

$S_d$  : standard deviation,

$\sum(d - \bar{d})^2$  : number of squares of individual measurements – the number of individual measurements,

$n$  : the number of samples analyzed

Furthermore, the study also used a t-test that uses the R studio app that can be accessed for free. R is open software that makes it easy for users to get help from the user community (Gio and Irawan, 2016). For the hypotheses test, this is a decision-make rules of thumbs for hypotheses based on the t-test:

If  $|t_{count}| \leq |t_{kritic}|$ , then  $H_0$  is accepted and  $H_1$  is rejected

If  $|t_{count}| > |t_{kritic}|$ , then  $H_0$  is rejected and  $H_1$  is accepted

Decision-making can use the following probability-based rules (Enterprise, 2014):

If the probability value  $\geq$  the significance level, then  $H_0$  is accepted and  $H_1$  is rejected.

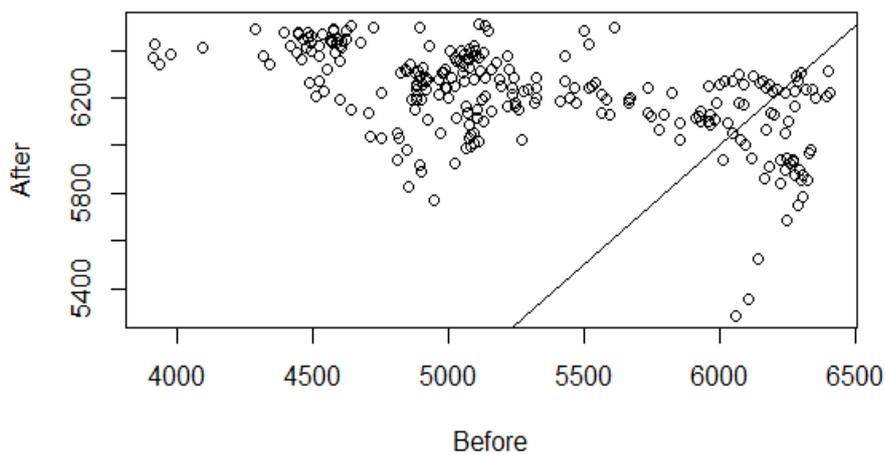
If the probability value  $<$  a significant level, then  $H_0$  is rejected and  $H_1$  is accepted.

Hence, here is the hypotheses of this study:

H0 : There are no differences in the volatility of JCI before and during the Covid-19 pandemic in Indonesia

H1 : There are differences in the volatility of JCI before and during the Covid-19 pandemic in Indonesia

**RESULTS**



**Figure 3. Spread ICI Plot Before and During Covid-19 Pandemic**

Figure 3 provides information on data distribution where diagonal lines cut ICI distributions along Covid-19 more than before Covid-19. This shows that there was a noticeable difference in volatility before and during the Covid-19 Pandemic in Indonesia. This statement is also supported by a table of statistical test results, as follows:

**Tabel 1. Statistical Test Results**

<b>t-value</b>	-19,537
<b>p-value</b>	0,00

*Source: Processed by researchers (2021)*

From Table 1, it can be seen that the value of t (t count) resulting from the paired t-test sample obtained a value of t -19,537 with a critical value of 1.9692 so that the  $| -19,537 | > | 1.9692 |$  then it means that H0 is rejected in the sense that there is a real difference in ICI volatility before and during the Covid-19 pandemic in Indonesia. A probability value (p-value) of 0.000 < s of significance 0.05 supports decision making; The value of t is proportional to the critical value meaning that H0 is rejected, and it can be concluded that partially the number of Covid-19 cases in Indonesia affects the movement of JCI.

**DISCUSSION**

The results of the analysis conducted by Halisa and Annisa (2020) on the number of Covid-19 cases against the Composite Stock Price Index (JCI) namely the spread of the Covid-19 pandemic in Indonesia make the rate of JCI very volatile. A few days after the discovery of the first case of Covid-19 in Indonesia, there was panic among market participants that caused the decline in the rate of the index, causing the IDX to issue an asymmetric policy of auto rejection down (ARB). In addition, throughout March 2020 alone the Indonesian capital market has experienced 6 trading halts. The large increase in the number of Covid-19 cases in Indonesia per day encourages the government to take several policies, one of which is the implementation of PSBB in several major cities in Indonesia which indirectly causes the weakening of JCI. In this case, economic actors and governments must anticipate the impact of the Covid-19 pandemic. If there is no early anticipation, which is the emergence of rupiah exchange rate turmoil against the US dollar. The rupiah exchange rate is at a vulnerable position during the spread of the Covid-19 outbreak.

Research conducted by Halisa and Annisa (2020) is in line or in accordance with the flow of thinking of this study, where the symptoms of panic due to the covid-19 pandemic cause a decrease in production, demand, decreased purchasing power, burden of production costs, and income. According to Haryanto (2020) in times of crisis, global investors are more interested in storing their wealth in the form of safe assets and avoiding risky assets such as stocks. This condition affects the financial market cycle and has an impact on the decline in global stock prices and results in a decrease in the Composite Stock Price Index (JCI). In theory, the Covid-19 pandemic caused panic by investors resulting in the sale or withdrawal of funds from the Stock Exchange resulting in disruption of JCI volatility. Significantly different JCI volatility before and during Covid-19 is evident from the suspension of trading related to the 5% decrease on the basis point of JCI. Trading stop or trading halt is carried out by the Indonesia Stock Exchange seven times during Covid-19. The volatility of JCI decreased very sharply in early March 2020 compared to the end of December 2019. The 258 bases point decrease in JCI on March 12, 2020 started the next decline during Covid-19 to a decrease of more than 5%.

**CONCLUSION**

Based on the results of data analysis and discussions on the volatility of the composite stock price index during the Covid-19 pandemic in Indonesia, it can be concluded that the statistical test with paired t-test samples shows that there was a significant difference in volatility before and during the Covid-19 pandemic in Indonesia. In addition, the first hypothesis or H<sub>0</sub> in this paper is not rejected, meaning that there was a difference in ICI volatility before and during the Covid-19 pandemic in Indonesia. From

the results of comparison with previous research, it is seen that this study in the party has conformity with other studies, where the case of the covid-19 pandemic is indeed true to make the pace of the Composite Stock Price Index more volatile.

Efforts to mitigate the spread of Covid-19 cases are very important so that the stock market in Indonesia does not weaken. Weakening stock market conditions will of course have an impact on the real sector. In addition, the role of the stock market is important as an instrument of economic growth and acceleration of development through transmission to the real sector. The existence of capital markets is very important to meet the investment needs of sustainable economic development. Government policies can also affect stock prices. Some examples of government policies that cause stock price volatility include company policies, export-import policies, debt policies, and foreign investment policies. Based on the direct experience of researchers in this research process, there are some limitations experienced and can be several factors that can be more considered for researchers who will come in further refining their research because this study itself certainly has shortcomings that need to be improved in future studies. Some limitations in the study, including the variable influence of JCI which is the benchmark for only covid-19 cases, of course there are many other influences that can cause the JCI to fluctuate; the research time only ends until November 2020, considering that it has now entered the end of 2021, therefore the latest update is needed.

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