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The Impact of the Covid-19 Pandemic on the Stock Market: Empirically (Analysis of Indonesia's Major Stock Index)

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ABSTRACT

This study aims to investigate the impact of the COVID-19 pandemic on major stock indexes in Indonesia. Researchers construct weekly data panels from stock index returns, new cases of the COVID-19 pandemic and new confirmed cases of the COVID-19 pandemic. Pooled OLS regression, conventional t-test and Mann Whitney test were used to estimate the results in this study. The results in this study show that new cases of the COVID-19 pandemic and new confirmed cases of the COVID-19 pandemic are significantly related to weekly stock index returns, then this study shows that there is a difference in weekly returns before the COVID-19 pandemic with weekly returns when occurrence of the COVID-19 pandemic.

1. Introduction

A pandemic, as a concept often used in research projects, is generally referred to as a disease that spreads that affects many countries of the world at the same time (BBC, 2020). Generally, pandemics are characterized by contagion, very low population immunity, widespread or severe disease and especially, adverse effects on various national and international community affairs such as health, economic, political, security, social and other aspects (Rutherford et. al. , 2017). Several cases of pandemics have occurred before, namely the Spanish flu; smallpox; Hong Kong flu; cholera; AIDS; the first SARS (in 2003); Influenza H1N1 (year 2009); Ebola (between 2014 and 2016); and the Corona COVID-19 virus is the most recent (Hiscott, Alexandridi, Muscolini, Tassone, Palermo, Soultsioti and Zevini, 2020).

The world is facing the spread of the corona virus or what is familiarly called COVID-19. Initially, the coronavirus was identified in Wuhan China since December 31, 2019 by the world health organization (WHO). Officially, COVID-19 was designated by WHO as a pandemic after March 11, 2020, this disease hit more than 150 countries in the world. Based on WHO data as of December 1, 2020, 220 countries have contracted COVID-19 with a total of 62,844,837 cases of COVID-19 infection and 1,465,144 deaths. The highest cases of COVID-19 infection in the world are in three major countries, namely the United States with a total of 13,234,551 cases and a death toll of 264,808, India with a total of 9,462,809 cases and a death toll of 137,621 and Brazil with a total of 6,314,740 cases and a death toll of 172,833. . COVID-19 is not only a medical health problem, but also halt business and economic activities, and the outbreak could pose a more severe threat to the global economy in the long term (Khan et.al., 2020). The state of emergency has evolved from a global public health case to an economic crisis that has affected the global economy (Congressional Research Service, 2020).

The financial stability report published in April 2020 stated that the pandemic had a significant impact on the financial system, and a further escalation of the crisis could affect global financial stability (Global Financial Stability Report, 2020). In another public report this crisis is referred to as "The Great Lockdown", this pandemic could result in a global economic downturn of 3% much worse than the global financial crisis of 2008-2009 (World Economic Outlook, 2020). The equity market experienced the fastest decline in history (Global Financial Stability Report, 2020).

Wren-Lewis (2020), based on certain assumptions, suggests that the COVID-19 pandemic will have a significant impact on GDP (gross domestic product) due to decreased production and changes in consumer demand. Further, the pandemic will exacerbate the situation if banks fail to meet corporate financing needs due to a sudden drop in demand. This will eventually lead to the collapse of stock markets around the world.

Zhang, Hu, and Ji, (2020) admit that with the infection cases increasing every day, European financial markets are starting to experience a downturn and fall with Italy being the most affected initially. In another study conducted by (Goodell, 2020), the impact of COVID-19 was shown to have caused intensive global economic disruption with very detrimental impacts on the financial sector including stock markets, banking and insurance.

During the COVID-19 pandemic, having a holistic and diversified investment portfolio must be carried out by an investor with extreme caution. Collins (2020) said the Composite Stock Price Index (JCI) of the Indonesia Stock Exchange experienced a decline in line with stock exchanges around the world that experienced similar declines on average.

Quoting from the International Monetary Fund (IMF) "Global growth is projected at –4.9 percent in 2020, 1.9 percentage points below the April 2020 World Economic Outlook (WEO) forecast. The COVID-19 pandemic has had a more negative impact on activity in the first half of 2020 than anticipated, and the recovery is projected to be more gradual than previously forecast." Based on the quote above it can be seen that the COVID-19 pandemic has a more negative impact than expected with global growth projected at -4.9% in 2020.

The stock index according to the Indonesia Stock Exchange (IDX) is a statistical indicator that reflects changes in the overall price of a group of stocks that are selected and evaluated periodically according to certain standards and methods. The Indonesia Stock Exchange (IDX) has 38 stock indices, but in this study, the author will focus on the top 9 indices as listed on the

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Indonesia Stock Exchange (IDX) but IDX Quality30 and IDX ESG Leaders are not included in this study because both This index was recently released so the required data is not available. Sourced from the Indonesia Stock Exchange, the top stock indexes are described as follows: Composite Stock Price Index (JCI), IDX80, LQ45, IDX30, IDX Value30, IDX Growth30, and IDX High Dividend 20.

The IDX Growth30 stock index has an initial share value of 100 with a base date of January 30, 2014, and was issued on August 12, 2019. IDX High Dividend 20 has an initial share value of 100 with a base date of January 30, 2009, and was issued on May 17 2018. Many newspapers and articles have been published by the media, stating that the COVID-19 pandemic will cause a tremendous economic setback to the affected countries (Khan et al., 2020). But based on previous research related to the Severe Acute Respiratory Syndrome (SARS) epidemic that the outbreak did not affect investment and the economy but was minimal and temporary. According to Keogh-Brown &

Based on the theoretical framework derived from the efficient market theory and rational expectations intertemporal asset pricing theory (Chen et al., 1986; Merton, 1973). Prices on securities always fully reflect all available information and whenever a particular asset is affected by systematic economic news, no additional rewards can be obtained by assuming diversified risk. This study aims to investigate the impact of the COVID-19 pandemic on the stock market as the stock market provides a current summary of what investors believe will be the impact of the COVID-19 pandemic. Therefore, the authors hope that there is a strong relationship between the COVID-19 pandemic and stock market index yields.

This research has two significances. First, although the impact of the COVID-19 pandemic on people's lives and the economy is still ongoing, this study will provide basic conclusions for future research. Second, this research will expand existing knowledge about the impact of the pandemic on the stock market.

Performance measurement in this study will use the Hausman test and Breusch and Pagan Lagrangian (xttest0) method to select the appropriate panel data analysis technique, and the results produce OLS which is collected as an appropriate estimation technique. Following the research of Nippani and Washer (2004), we used the Mann Whitney test and the Heteroscedastic t-test to compare the difference in average weekly returns in stock market indices on the Indonesian Stock Exchange (IDX) during the COVID-19 pandemic against the average returns before the pandemic. COVID-19.

2. Research methods

This type of quantitative research will be the main method in this research. Suliyanto (2018) suggests that quantitative research is research based on quantitative data, namely data in the form of numbers or numbers. Primary data and secondary data are the types of data used in this study. Primary data is information obtained first-hand by researchers and is related to variables of interest for specific research purposes (Sekaran, 2015). Secondary data refers to data that supports the needs of primary data such as books and related literature to support research (Sugiyono, 2017). Stock index price data were obtained from the yahoo finance website and from the Indonesian stock exchange.

Sugiyono (2012), population is a generalization area consisting of objects and subjects with certain qualities and characteristics that have been determined by researchers to be studied and then conclusions can be drawn on the results to be obtained. The population in this study is the stock index listed on the Indonesia Stock Exchange (IDX).

The sample is part of the population consisting of several members of the population. In research, it is not possible to take the entire population and make a sample, therefore a representative population is formed which is called a sample (Sugiyono, 2012). There are seven stock indexes included in this study, namely the Composite Stock Price Index (CSPI), IDX80, LQ45, IDX30, IDX Value30, IDX Growth30, and IDX High Dividend 20.

The analytical method used is multiple linear regression analysis, statistical descriptive test, panel data regression test, classical assumption test, hypothesis testing, robust regression test, Mann Whitney test and independent sample t-test. This study was conducted to determine the effect of the growth of new cases (X1), the addition of the number of confirmed COVID-19 population (X2) and stock index returns before the COVID-19 pandemic (X3) on stock index returns during the COVID-19 pandemic (Y).

3. Results and Discussion

3.1 Research result

Table 1
Statistical Descriptive Test

	Y	X1	X2
Mean	0.007583	511.1667	19603.25
Median	0.003000	405.0000	16137.50
Maximum	0.134000	1106.000	46845.00
Minimum	-0.098000	185.0000	2491.000
Std. Dev.	0.043049	319.5477	13803.89
Skewness	0.340293	0.760707	0.602864
Kurtosis	2.921530	2.061667	2.203767
Jarque-Bera	1.642745	11.18308	7.307190
Probability	0.439828	0.003729	0.025898
Sum	0.637000	42938.00	1646673.
Sum Sq. Dev.	0.153818	8475192.	1.58E+10
Observations	84	84	84

Based on the results of data processing above, the average value of Return is 0.007583, while the average value of the growth of new cases is 511.1667, and the average value of confirmed cases is 19603.25.

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a. Data Panel Test

Test Panel data is used to determine the testing in this study will use *common effect model, fixed effect model*, or random effects models. After the Chow test, and the Lagrange Multiplier test, it is known that the resulting test technique is the common effect model.

Redundant Fixed Effects Tests
Equation: FEM
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.117924	(6,75)	0.9940
Cross-section Chi-square	0.788734	6	0.9924

Cross-section fixed effects test equation:
Dependent Variable: Y
Method: Panel Least Squares
Date: 06/07/21 Time: 15:14
Sample (adjusted): 4/06/2020 6/22/2020
Periods included: 12
Cross-sections included: 7
Total panel (balanced) observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.006786	0.008559	0.792862	0.4302
X1	-9.15E-05	3.51E-05	-2.606188	0.0109
X2	2.43E-06	8.13E-07	2.985697	0.0037

Root MSE	0.040594	R-squared	0.100088
Mean dependent var	0.007583	Adjusted R-squared	0.077868
S.D. dependent var	0.043049	S.E. of regression	0.041339
Akaike info criterion	-3.498952	Sum squared resid	0.138423
Schwarz criterion	-3.412137	Log likelihood	149.9560
Hannan-Quinn criter.	-3.464053	F-statistic	4.504395
Durbin-Watson stat	2.175229	Prob(F-statistic)	0.013967

Fig1 Chow test 0.9924 > 0.05 (common effect model)

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	3.009794 (0.0828)	107.9155 (0.0000)	110.9253 (0.0000)
Honda	-1.734876 (0.9586)	10.38824 (0.0000)	6.118853 (0.0000)
King-Wu	-1.734876 (0.9586)	10.38824 (0.0000)	4.776001 (0.0000)
Standardized Honda	-1.592198 (0.9443)	12.14859 (0.0000)	3.899125 (0.0000)
Standardized King-Wu	-1.592198 (0.9443)	12.14859 (0.0000)	2.420288 (0.0078)
Gourieroux, et al.	--	--	107.9155 (0.0000)

Fig 2 Lagrange Multiplier test 0.0828 > 0.05 (common effect model)

b. Normality test

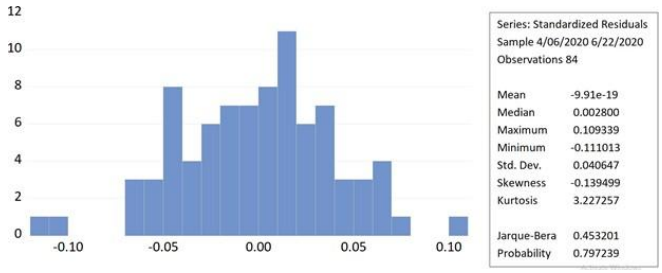

Fig 3 Normality test

The probability value of the normality test exceeds the significance value which is 0.797239 > 0.05, it can be concluded that the residuals are normally distributed.

c. Multicollinearity Test

	X1	X2
X1	1.000000	0.914521
X2	0.914521	1.000000

Fig 4 Multicollinearity Test

Based on the table above, it can be concluded that the independent variables (new cases of COVID-19 and confirmed cases of COVID-19) with a value of 0.914521 > 0.8 have multicollinearity problems because the correlation between variables exceeds the significance level of 0.8. To deal with the problem of multicollinearity, Robust Regression is carried out which uses an estimation coefficient that is resistant or robust to violations of the multicollinearity assumption.

d. Heteroscedasticity Test

Based on the probability value between the independent variables, with the Breusch-Pagan LM probability value on the heteroscedasticity test of 0.000 < 0.05, it can be concluded that there is heteroscedasticity, which means that the conditional error variance X is a non-constant number. To overcome the problem of heteroscedasticity, Robust Regression is carried out which uses an estimated coefficient that is immune to heteroscedasticity violations.

Table 2
Heteroscedasticity Test

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	143.4267	21	0.0000
Pesaran scaled LM	18.89085		0.0000
Pesaran CD	11.58601		0.0000

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Table 3
Autocorrelation Test

Dependent Variable: Y
Method: Panel Least Squares
Date: 06/07/21 Time: 15:14
Sample (adjusted): 4/06/2020 6/22/2020
Periods included: 12
Cross-sections included: 7
Total panel (balanced) observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.006786	0.008559	0.792862	0.4302
X1	-9.15E-05	3.51E-05	-2.606188	0.0109
X2	2.43E-06	8.13E-07	2.985697	0.0037

Root MSE	0.040594	R-squared	0.100088
Mean dependent var	0.007583	Adjusted R-squared	0.077868
S.D. dependent var	0.043049	S.E. of regression	0.041339
Akaike info criterion	-3.498952	Sum squared resid	0.138423
Schwarz criterion	-3.412137	Log likelihood	149.9560
Hannan-Quinn criter.	-3.464053	F-statistic	4.504395
Durbin-Watson stat	2.175229	Prob(F-statistic)	0.013967

Durbin Watson's value of 2.175229 which is above the du value of 1.6942 and below the value of 4 - du 2.3058, it can be concluded that there is no autocorrelation.

3.2 Hypothesis test

a. T test

Table 5
T test

Dependent Variable: Y
Method: Panel Least Squares
Date: 06/07/21 Time: 15:14
Sample (adjusted): 4/06/2020 6/22/2020
Periods included: 12
Cross-sections included: 7
Total panel (balanced) observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.006786	0.008559	0.792862	0.4302
X1	-9.15E-05	3.51E-05	-2.606188	0.0109
X2	2.43E-06	8.13E-07	2.985697	0.0037

Root MSE	0.040594	R-squared	0.100088
Mean dependent var	0.007583	Adjusted R-squared	0.077868
S.D. dependent var	0.043049	S.E. of regression	0.041339
Akaike info criterion	-3.498952	Sum squared resid	0.138423
Schwarz criterion	-3.412137	Log likelihood	149.9560
Hannan-Quinn criter.	-3.464053	F-statistic	4.504395
Durbin-Watson stat	2.175229	Prob(F-statistic)	0.013967

The weekly new case growth variable during the COVID-19 pandemic period (X1) has a significant effect on stock index returns, with a probability result of 0.0109 <0.05, this hypothesis is accepted because the probability result is smaller than the significance value. The results of this study are in line with the research of Khan (2020), that the average growth in weekly new cases significantly reduces weekly returns.

The variable addition to the number of confirmed populations during the COVID-19 pandemic period (X2) significantly affected stock index returns, with a probability result of 0.0037 < 0.05, so this hypothesis is accepted because the probability result is smaller than the significance value. The results of this study are in line with Ashraf's (2020) research, an increase in the number of confirmed cases and the number of deaths in a country negatively affects the stock market. Which means a decrease in stock market returns because the number of confirmed cases has increased.

b. F Uji test

The weekly new case growth variable and the confirmed population addition variable during the COVID-19 pandemic period together have a significant effect on stock index returns, with a probability result (F-statistic) of 0.0139 < 0.05, so this hypothesis is accepted because the probability result is smaller. of significance value.

c. Robust Regression

The probability value for the X1 variable is 0.0068, which means it is smaller than the 0.05 significance value, so it can be concluded that the X1 variable has a significant effect on the dependent variable. The probability value for the X2 variable is 0.0026, which means it is smaller than the 0.05 significance value, so it can be concluded that the X2 variable has a significant effect on the dependent variable.

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Table 6
Robust Regression

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.008236	0.008707	0.945966	0.3442
X1	-9.66E-05	3.57E-05	-2.704223	0.0068
X2	2.49E-06	8.27E-07	3.011003	0.0026

Robust Statistics

R-squared	0.095194	Adjusted R-squared	0.072853
Rw-squared	0.123113	Adjust Rw-squared	0.123113
Akaike info criterion	71.29862	Schwarz criterion	80.25292
Deviance	0.121827	Scale	0.042654
Rn-squared statistic	9.081055	Prob(Rn-squared stat.)	0.010668

Non-robust Statistics

Mean dependent var	0.007583	S.D. dependent var	0.043049
S.E. of regression	0.041349	Sum squared resid	0.138491

Table 7
Mann Whitney test

Mann-Whitney U	2527,000
Wilcoxon W	6097,000
Z	-3.176
asymp. Sig. (2-tailed)	.001

Based on the output of "statistical test" it is known that the Asymp value. Sig. (2-tailed) of 0.001 < 0.05. So it can be concluded that the results of the Mann-Whitney test are accepted, which means that it shows a significant effect on differences in returns before the COVID-19 pandemic and returns during the COVID-19 pandemic.

d. Test Independent Sample t-test Uji

In table 8 in the independent samples test table, it can be seen that the results of sig. (2-tailed) of 0.001 < 0.05 which means that there is a significant difference between returns before the COVID-19 pandemic and returns during the COVID-19 pandemic.

Table 8
Independent sample test

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
RETURN	Equal variances assumed	12.447	<.001	-3.334	166	.001	-.03335	.01000	-.05309	-.01360
	Equal variances not assumed			-3.334	126.475	.001	-.03335	.01000	-.05314	-.01355

4. Conclusion

The results of the study succeeded in proving that the variable of new cases of COVID-19 had a significant effect on stock index returns. Second, there is a significant effect on confirmed cases of COVID-19 on stock index returns. Third, there is a significant effect on the difference in returns before the COVID-19 pandemic and returns during the COVID-19 pandemic.

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