

# Local and National Covid-19 Cases and Stock Return: Evidence From Regions in Indonesia

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## ABSTRACT

The stock market in Indonesia crashed during the Covid-19 pandemic. This paper aims to examine the relationship between the local and national Covid-19 cases with the abnormal return of the local companies in Indonesia. Previous studies have found that coronavirus has impacted the global stock market, including Indonesia, but there is a lack of research in the local area. This paper uses the event study model and regression panel data with a random-effect model. The statistical result shows a significant correlation between the growth of local cases into the average abnormal return of local companies in Indonesia; also, there is a significant correlation between growth national cases into the average abnormal return of local companies in Indonesia in the following day. In conclusion, the growth of local Covid-19 cases affects the average abnormal return of local companies' stocks in Indonesia; meanwhile, national Covid-19 cases only impact the following days.

**Keywords:** covid-19, local cases, national cases, abnormal return, local companies

## 1 INTRODUCTION

Coronavirus outbreak has now spread to 221 countries in the world. The total number of positive cases and the total deaths increases every day. So that on March 11, 2020, WHO declared Covid-19 as a pandemic. Until the end of 2020, there were 84 million positive cases and 1.8 million deaths recorded worldwide (*Coronavirus Graphs* 2021.). In early March, precisely on March 2, 2020, coronavirus' first case was found in Indonesia. Financially the pandemic leads to a negative economy.

Investors began to withdraw their money because of what happened in the other ASEAN stock market index country. Indo-

nesia's stock market price (IHSG) decreased by 1,712.51 points before getting revived (*PT Bursa Efek Indonesia* 2020). The difference between national and local cases estimate has potentially generated abnormal returns to the companies' stock. This paper will discuss the effect of national cases and local cases reported on companies' abnormal returns in local areas. Many studies have discussed positive coronavirus cases into abnormal returns in certain countries (Al-Awadhi et al. 2020, Ashraf 2020, Maneenop & Kotcharin 2020, Pandey 2021, Salisu & Vo 2020), but no studies have yet discussed positive coronavirus cases in a region in a country.

### 1.1 Event Study

The event study method is divided into three timelines: 1. Estimation Windows; 2. Windows events; 3. Post Event Windows. (Mackinlay 2021) says that there is no specific size about it in determining the event window. The event window is carried out based on the needs of a study researched by researchers. However, (Pandey 2021) states that research on covid-19 requires an event window of 61 days, consisting of D-30, the event, and D + 30.

### 1.2 Abnormal Return Stock

(Al-Awadhi et al. 2020, Ashraf 2020, Pandey 2021, Salisu & Vo 2020) reveal that the addition of Covid-19 cases has a negative relationship with stock returns nationally, therefore:

H1: The increase in the number of local Covid-19 cases negatively affects average abnormal returns at local companies.

H2: The increase in the number of national Covid-19 cases negatively affects average abnormal returns at local companies.

### 1.3 Single Index Model

The Single Index model relates the calculation of each asset's return to the market index return. The assumption used is that securities will be correlated only if they have the same response to market changes. This model is quite simple and considers aspects of the market and its uniqueness (Binder 1998).

### 1.4 Alfa and beta

Alpha is a measure of the amount of return on investment compared to a market index or other benchmark being compared. It is usually calculated using a percentage. An alpha of 1.0 means that the investment exceeds the reference index by 1%. Alfa -1.0

means the investment is performing worse than the benchmark index by 1%. If alpha is zero, then the return matches the reference index.

Beta is a measurement of the level of risk of stock to market price index movements. The higher the beta, the higher the volatility compared to the reference index. The beta base number is 1, which indicates that the security's price moves exactly as the market moves (same with market risk). Beta <1 means that the volatility level is low compared to the market (lower than market risk), while beta > 1 indicates that the level of volatility is higher than that of the market (greater than market risk) (Binder 1998).

### 1.5 Cumulative Abnormal Return (CAR)

CAR is used to measure the effect of lawsuits, purchases, and other events on stock prices. CAR can be used to measure the increase or decrease in average abnormal returns from an industrial sector, subsector, or other things. On a broader scale, measuring a particular sector or area is usually called the cumulative average abnormal return (CAAR). (Bodie et al. 2014).

### 1.6 Other Previous Research

(Ding et al. 2021) who study the Air Quality Index on company stock returns in a city in China reveal that a low Air Quality Index in a city will affect the stock returns of local companies in that city. This result proves that the effect of an event at a particular time in a specific area will impact the stock returns of companies in that area.

Furthermore, (Yilmaz & Gulay 2006) conduct their research on event studies related to the reaction of trading prices before and after dividend distribution. Their study reveals an increase in the buying and selling price of shares that were not normal (abnormal) occurred before the dividend distribu-

tion took place. However, after the dividend distribution, a minor increase occurred. That proves that before and after certain events, stock prices can fluctuate abnormally.

(Ortmann et al. 2020) conduct a study on stock investors' behavior in the United Kingdom in 2020, where the data were based on a UK broker license. The research results show a surge in the intensity of buying and selling shares starting from January to April. This condition happens to stocks and all investment things such as gold, cryptocurrency, indexes, CFD Stocks, etc. This proves that there is abnormal trading in stocks and other investments in the UK.

(Wang et al. 2020) who conduct a research on the level of liquidity reveal the empirical relationship between liquidity and stock returns distribution for all companies listed on the London Stock Exchange from 2002 to 2018. Moreover, they explain a relationship between liquidity and stock returns distribution, as measured by skewness and kurtosis, and liquidity. AR is used to measure the effect of lawsuits, purchases.

## 2 RESEARCH METHOD

### 2.1 Objectives and Scope

This study aims to examine local and national covid-19 cases' impact on average abnormal return on local companies. Daily abnormal return from many companies the total cases and the growth of cases provincially and nationally was calculated. If the null hypothesis is rejected, there is an impact between local and national covid-19 cases and average abnormal return on local companies. Otherwise, if the null hypothesis is accepted, local and national covid-19 cases have no impact on average abnormal return on local companies. The limitations in this study were as follows: first, we use data from 2019 and 2020 as the research data; second, assuming data on the increase in Covid-19 cases as reported; indeed, and third, mapping addresses of +/- 646 subsidi-

aries/branch offices in all cities/regencies in Indonesia which results in the mapping of local companies based on head office addresses.

### 2.2 Event Study

This study adopted (Afik, 2019; Pandey, 2021; Tamechika, 2020)'s research:

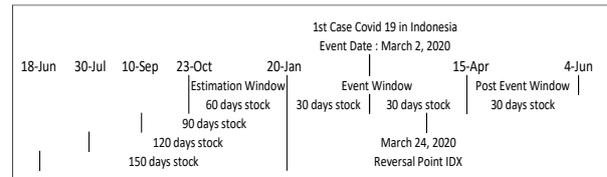


Figure 1. Event Study period to be researched

Figure 1 uses the following data: data on closed price D-30 and D+30 from the start of Covid-19 in Indonesia, data on abnormal stock returns companies in Indonesia, the growth, and total local and national cases daily. This study used the REM (Random Effect Model) regression data panel using Eviews.

### 2.3 Calculation of Stock Return

Stock return is the level of return enjoyed by investors on an investment they do. In calculating stock returns, researchers use the following formula. (Pandey, 2021):

$$R_{i,t} = \ln(p_{i,t} / P_{i,t-1}) \quad (1)$$

where,

$R_{i,t}$  = Stock Return Company

$P_{i,t}$  = Closed Price on day t

$P_{i,t-1}$  = Closed Price on day t-1

### 2.4 Calculation of Market Return

Return Market is a return calculated based on developing the stock price index in a specific country.

$$R_{m,t} = \ln(p_{m,t} / P_{m,t-1}) \quad (2)$$

where,

$R_{i,t}$  = Stock Return Company

$P_{i,t}$  = Closed Price on day t  
 $P_{i,t-1}$  = Closed Price on day t-1

### 2.5 Calculation of Abnormal Return

Abnormal returns need to be compared with previous events that have never occurred. (Binder 1998, Schimmer 2012, Stephen A. Ross, Randolph et al. 2016)

$$AR_{i,t} = R_{i,t} - ER_{i,t} \quad (3)$$

$$AR_{i,t} = R_{i,t} - (\alpha + \beta \times R_{m,t}) \quad (4)$$

Where,

$AR_{i,t}$  : the abnormal return of stock i on day t

$ER_{i,t}$  : normal return on stocks i

$R_{i,t}$  : stock return i on day t  $\ln(P_{i,t} / P_{i,t-1})$

$R_{m,t}$  : market return index on day t  $\ln(P_{m,t} / P_{m,t-1})$

$\alpha$  and  $\beta$ : Intercept and slope on OLS regression

As the researchers aim to examine the abnormal return in each province, the researchers calculate the average of each abnormal return on companies' stocks in a particular province. (Pandey, 2021)

$$AAR = \frac{1}{N} \sum_{t=1}^N AR_{i,t} \quad (5)$$

### 2.6 Calculation of CAAR

Cumulative Average Abnormal Return (CAAR) accumulates the average abnormal return obtained from the previous calculation.

$$CAAR = \sum_{t=1}^N (AAR_{i,t}) \quad (6)$$

### 2.7 Panel Data Test

In this study, the researchers used the Random Effect Model because the researchers assumed that the variations between each company's subjects in a particular province had their respective characteristics that were random. Also, every company has a different intercept. Thus, researchers used cross sec-

tion data following existing literature references (Gasbarro 2002, Gujarati & Porter 2009, Idris et al. 2011) Typography for references.

#### 2.7.1 t - test

The t-test carried out to test the partial relationship between X1 and Y1 to determine whether or not this relationship exists. The t-test is usually seen based on its significance test: (Gujarati & Porter, 2009)

The significance of  $\alpha < 5\%$  or t count  $>$  t-table  $\rightarrow$  then there is an effect of X1 on Y

The significance of  $\alpha > 5\%$  or t count  $<$  t-table  $\rightarrow$  then there is no effect of X1 on Y

Calculating t-table:

$t(\alpha / 2; n-k-1) \rightarrow$  when obtained, then we can match the t-distribution table

where,

$\alpha$  = Significance level

n = Number of samples

k = Number of variable independent

## 3 RESULTS AND DISCUSSION

### 3.1 Variations of Alfa and Beta

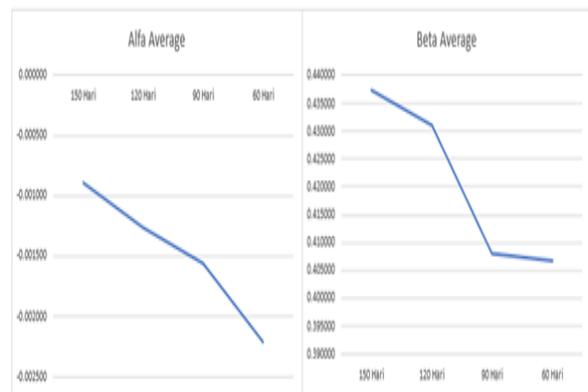


Figure 2. Average of alfa and beta

Figure 2 shows a significant decrease in alpha and beta from the 150-day estimation window to 60 days. The average Alfa of all stocks has a negative value indicating that investment performance is lower than the

reference index (IHSG). In contrast, Beta has a positive value indicating that volatility is increasing than the market index.

### 3.2 Single Index Market Model

From the results of the panel data regression Tables 1 and 2, many significant values occur in local cases on the D-day, both starting on the national date (start date of the Covid-19 cases to be precise on March 2, 2020) and on the local date (start date of Covid-19 cases in each province).

Table 1. Panel Data Regression at National Date

Estimation Windows Observations	N	AAR	t-value (1-tailed)
Local Case (60 days)	61	<b>-0.0083</b>	<b>-1.80242*</b>
Local Case (90 days)	61	<b>-0.0122</b>	<b>-2.592657*</b>
Local Case (120 days)	61	<b>-0.0122</b>	<b>-2.548292*</b>
Local Case (150 days)	61	<b>-0.0114</b>	<b>-2.471224*</b>
Local Case (-1) (60 Days)	60	-0.0022	-0.488939
Local Case (-1) (90 Days)	60	<b>-0.0063</b>	<b>-1.348219**</b>
Local Case (-1) (120 Days)	60	-0.0046	-0.961265
Local Case (-1) (150 Days)	60	<b>-0.0063</b>	<b>-1.388719**</b>
National Case (60 days)	61	-0.0012	-0.142831
National Case (90 days)	61	0.0046	0.554913
National Case (120 days)	61	0.0044	0.517476
National Case (150 days)	61	0.0052	0.631988
National Case (-1) (60 days)	60	0.0059	0.728903
National Case (-1) (90 days)	60	-0.0084	1.01577
National Case (-1) (120 days)	60	0.0072	0.850112
National Case (-1) (150 days)	60	0.0082	1.018188

Table 2. Panel Data Regression at Local Date

Estimation Windows Observations	N	AAR	t-value (1-tailed)
Local Case (60 days)	61	<b>-0.0060</b>	<b>-1.376485**</b>
Local Case (90 days)	61	<b>-0.0095</b>	<b>-2.107058*</b>
Local Case (120 days)	61	<b>-0.0095</b>	<b>-2.062409*</b>
Local Case (150 days)	61	<b>-0.0095</b>	<b>-2.167177*</b>
Local Case (-1) (60 Days)	60	-0.0010	-0.235446
Local Case (-1) (90 Days)	60	-0.0049	-1.099884
Local Case (-1) (120 Days)	60	-0.0034	-0.752843
Local Case (-1) (150 Days)	60	-0.0055	-1.270226
National Case (60 days)	61	<b>-0.0112</b>	<b>-2.562454*</b>
National Case (90 days)	61	<b>-0.0077</b>	<b>-1.717902**</b>
National Case (120 days)	61	<b>-0.0083</b>	<b>-1.799715**</b>
National Case (150 days)	61	-0.0054	-1.239252
National Case (-1) (60 days)	60	<b>0.0107</b>	<b>2.461047*</b>
National Case (-1) (90 days)	60	<b>0.0105</b>	<b>2.343797*</b>
National Case (-1) (120 days)	60	<b>0.0104</b>	<b>2.283453*</b>
National Case (-1) (150 days)	60	<b>0.0100</b>	<b>2.324696*</b>

(\*) = a significance level of <5%

(\*\*) = a significance level of <10%.

These results indicate that an increase in the number of Covid-19 cases in each province (local case) affects the average abnormal return of local companies in the prov-

ince. It is different on the D + 1 day where the national case only has a significant effect on the national date (the initial date of the Covid-19 case was March 2, 2020).

### 3.3 Cumulative Average Abnormal Return (CAAR)

The graph can be seen in Figure 3. Vertical line precisely on March 2, 2020. The chart shows the Average Abnormal Return (AAR) graph to compare the AAR movement with its CAAR. The graph made is in accordance with the research conducted by (Pandey, 2021) with the same research results, namely negative CAAR. Eight provinces experienced negative CAAR and five provinces experienced positive CAAR. If we analyze it further, the five provinces where CAAR is positive are the provinces with illiquid stocks. In addition, these five provinces are dominated by stocks with low market capitalization (Average less than 1 Trillion). Yogyakarta, Riau, South Kalimantan, and South Sulawesi provinces only have less than three companies, so that the ups and downs of shares only depend on the two illiquid (low capitalization) stocks alone. This result corresponds with (Lei et al. 2013)'s research, which states that illiquid stocks will have a very high capital gain, thus increasing a sudden and high stock return. Likewise, (Chen et al. 2018) state that the capital gains obtained from illiquid stocks can be very high during a specific period.



Figure 3. Cumulative Average Abnormal Return Estimation Window 90 Days

**4 CONCLUSION**

The increase in the number of Covid-19 cases in each province affects the average abnormal return of local companies' stocks. The increase in the number of Covid-19 cases in each province has a significant negative impact on the average abnormal return, meanwhile national cases only affect local companies in the following days. The analy-

sis by province concludes that provinces with many companies with liquid stocks will have a high negative correlation with the increasingly widespread Covid-19 case. Provinces with few companies and illiquid stocks tend to be less affected by the Covid-19 case. This statement is evidenced by Central Java, Yogyakarta, Riau, South Kalimantan, and South Sulawesi provinces, which are dominated by illiquid shares, and the number of companies is small compared to other provinces.

## REFERENCES

- Afik, Z. 2019. Advance notice labor conflicts and firm value—An event study analysis on Israeli companies. *Finance Research Letters*, 5.
- Al-Awadhi, A. M., Alsaifi, K., Al-Awadhi, A., & Alhammedi, S. 2020. Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns. *Journal of Behavioral and Experimental Finance*, 27: 100326. <https://doi.org/10.1016/j.jbef.2020.100326>
- Ashraf, B. N. 2020. Stock markets' reaction to COVID-19\_ Cases or fatalities? *Research in International Business and Finance* 54:1-18
- Binder, J. J. 1998. *The Event Study Methodology Since 1969. Review of Quantitative Finance and Accounting* 11:111-137.
- Bodie, Z., Kane, A., & Marcus, A. J. 2014. *Investments* (Tenth edition). McGraw-Hill Education.
- Chen, Y., Eaton, G. W., & Paye, B. S. 2018. Micro(structure) before macro? The predictive power of aggregate illiquidity for stock returns and economic activity. *Journal of Financial Economics* 130(1): 48–73. <https://doi.org/10.1016/j.jfineco.2018.05.011>
- Coronavirus Graphs: Worldwide Cases and Deaths - Worldometer*. (2021). Retrieved March 16, 2021, from <https://www.worldometers.info/coronavirus/worldwide-graphs/#total-deaths>
- Ding, X., Guo, M., & Yang, T. (2021). Air pollution, local bias, and stock returns. *Finance Research Letters* 39: 101576. <https://doi.org/10.1016/j.frl.2020.101576>
- Gasbarro, D. 2002. *The Changing Relationship Between CAMEL Ratings and Bank Soundness during the Indonesian Banking Crisis*. Gasbarro, D., Sadguna, I. G. M., & Zumwalt, J. K. (2002). *Review of Quantitative Finance and Accounting* 19(3), 247–260. doi:10.1023/a:10207249070319(3):247-260
- Gujarati, D. N., & Porter, D. C. 2009. *Basic econometrics* (5th ed). Singapore: McGraw-Hill Irwin.
- Idris, A. R., Salim, N. J., Mustaffa, R., & Jusoff, K. 2011. *Determinant of Islamic Banking Institutions' Profitability in Malaysia. World Applied Sciences Journal* 12 (Special Issue on Bolstering Economic Sustainability): 01-07.
- Lei, X., Zhou, Y., & Zhu, X. 2013. Capital gains, illiquidity, and stock returns. *Pacific-Basin Finance Journal*, 25: 273–293. <https://doi.org/10.1016/j.pacfin.2013.10.001>
- Mackinlay, A. C. 2021. Event Studies in Economics and Finance. *Journal of Economics Literature* 35(March): 13-39.
- Maneenop, S., & Kotcharin, S. (2020). The impacts of COVID-19 on the global airline industry: An event study approach. *Journal of Air Transport Management*, 89: 101920. <https://doi.org/10.1016/j.jairtraman.2020.101920>
- Ortmann, R., Pelster, M., & Wengerek, S. T. 2020. COVID-19 and investor behavior. *Finance Research Letters* 37: 1-9.
- Pandey, D. K. 2021. *Event study on the reaction of the developed and emerging stock markets to the 2019-nCoV outbreak. International Review of Economics & Finance* 71 (January):467-483
- PT Bursa Efek Indonesia. (2020). Retrieved February 24, 2021, from <https://www.idx.co.id/>
- Salisu, A. A., & Vo, X. V. 2020. Predicting stock returns in the presence of COVID-19 pandemic: The role of health news. *International Review of Financial Analysis* 71: 101546. <https://doi.org/10.1016/j.irfa.2020.101546>
- Schimmer, M. 2012. April 9. *Expected Return Models* [Text]. <https://www.eventstudytools.com/expected-return-models>
- Stephen A. Ross, Randolph W. Westerfield, Jeffrey Jaffe, Bradford D. Jordan. 2016. *Corporate finance* (11ed ed.). Singapore: McGraw-Hill International Edition.
- Tamechika, H. (2020). Effects of environment-related stimulus policies: An event study approach. *Case Studies on Transport Policy* 8(3): 895–900. <https://doi.org/10.1016/j.cstp.2020.05.012>
- Wang, A., Hudson, R., Rhodes, M., Zhang, S., & Gregoriou, A. 2020. Stock liquidity and return distribution: Evidence from the London Stock Exchange. *Finance Research Letters* 39: 101539–101539. <https://doi.org/10.1016/j.frl.2020.101539>
- Yilmaz, A. K., & Gulay, G. (2006). Dividend Policies and Price-Volume Reactions to Cash Dividends on the Stock Market: Evidence from the Istanbul Stock Exchange. *Emerging Markets Finance and Trade* 42(4): 19–49. <https://doi.org/10.2753/REE1540-496X420402>