

American Journal of Humanities and Social Sciences Research (AJHSSR)

e-ISSN :2378-703X

Volume-5, Issue-3, pp-74-80

www.ajhssr.com

Research Paper

Open Access

Capital Market Reaction to Covid-19 Pandemic on LQ45 Shares at Indonesia Stock Exchange (IDX)

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ABSTRACT : Information contained in a non-economic event and not directly related to the capital market can influence investors in making investment decisions. Outbreaks of infectious diseases can cause serious economic disruption. The purpose of this study is to test whether the announcement of the first case of COVID-19 in Indonesia contains information that can make the market react marked by an abnormal return in the observation period. This research was conducted on issuers that are members of the LQ45 Index with a sample size of 40 companies through non-probability sampling, namely purposive sampling technique. This study uses the event study method with an event window period of five months before (t-5) to five months after (t + 5) including the day of the event announcement, the estimated return in this study uses the market adjusted model. The data analysis technique of this research is the paired sample t test parametric statistical test. The results show that the announcement of the first case of COVID-19 in Indonesia had a negative impact on the Indonesia Stock Exchange but it was not significant, as evidenced by the absence of differences in abnormal returns before and after the announcement of the first case of COVID-19 in Indonesia.

Keywords -*covid-19, event study, abnormal return, efficient market hypothesis*

I. INTRODUCTION

The capital market has an important role in the economy of a country. Nia (2020), "The capital market is an alternative choice for companies and other institutions such as the government as a means for investment activities. The capital market is a means of bringing together parties who have excess funds (investors) and those who need funds (issuers)." The capital market can also be interpreted as a market where actors trade securities in the form of stocks or bonds with a maturity of more than one year (Untari & Yasa, 2020)

According to Stosic-Mihajlovic (2016), "The function of the capital market in the economy of a country is the economic function and the financial function. The capital market in carrying out its economic function, namely the capital market provides facilities or means of bringing together two interested parties. The capital market in carrying out its financial function, namely the capital market, provides the possibility or opportunity for investors to obtain returns or returns from funds that have been distributed according to the characteristics of the chosen investment." An investor, in investing their funds in the capital market, hopes to obtain capital gains, while the issuer or party that needs funds, namely, can obtain funds from the capital market to fund his company's activities.

The economic and non-economic environment can affect the capital market, which is one of the economic instruments in a country. Mahliza et al. (2016) states that "the influence of the economic environment consists of the influence of the macro and micro economic environment." In the microeconomic environment, it includes company performance, corporate dividends, changes in corporate strategy and financial reports, while the macroeconomic environment includes foreign exchange rates, changes in savings and deposit rates as well as various economic regulations and deregulations (Machmuddah et al., 2020). The influence of the non-economic environment includes several events such as the existence of legislative elections, political unrest, natural disasters, wars, terrorism and other non-economic events that affect stock price fluctuations in the capital market (Tavor & Teitler-Regev, 2019).

Research on market reactions to non-economic events is widely carried out because there are many phenomena that are considered to affect the investment decisions of investors in a capital market outside of economic events. Tao et al. (2019) examined the market reaction to the earthquake in Japan with the result that the Japanese stock market reacted negatively to the event. Bae et al. (2017) stated that the Middle East conflicts caused the stock markets of 33 national and international oil companies to react positively to these events.

Information is all news within the capital market and outside the capital market received by investors with the hope of being used as a basis for making investment decision. The dissemination of information at this

time is supported by the rapid development of technology, very rapid technological advances encourage information to spread more rapidly in society (Khan et al., 2017). According to Islam et al. (2020), "Information on economic and non-economic events can influence investors' investment decisions. Economic and non-economic events that occur in the capital market environment contain information that can affect the capital market." An infectious disease epidemic is a non-economic event that can affect the movement of shares in the capital market. The corona virus was first discovered in December 2019 in Wuhan, China (Cheng & Shan, 2020; Wu et al., 2020). Indonesia is the 22nd country in Asia to be exposed to the corona virus, the announcement of the first case of COVID-19 in Indonesia was delivered by President Joko Widodo together with the Minister of Health at the Jakarta Presidential Palace on March 2, 2020 (Djalante et al., 2020).

The LQ45 or Liquid 45 index is a collection of 45 stocks on the Indonesia Stock Exchange (IDX) which have a trading liquidity level above the average liquidity level of other shares on the Indonesia Stock Exchange (Hersugondo et al., 2020; Rondonuwu & Kalangi, 2020). The 45 stocks that are included in the LQ45 index are selected based on the level of trading liquidity of their shares (Arnaya & Purbawangsa, 2020). According to Putra & Dana (2020), "The shares of listed companies that are included in the LQ45 index are actively traded on the Indonesia Stock Exchange and their share prices fluctuate according to the intensity of their trading." LQ45 index stocks are also selected based on specific criteria in ensuring that the index only has shares of listed companies with high levels of liquidity and market capitalization with good company fundamentals, therefore the LQ45 index can be used as a reference in assessing the performance of stock trading in the Indonesian capital market (Ratih & Candradewi, 2020).

Data compiled from the Indonesia Stock Exchange (IDX) shows that in the months prior to the announcement of the first COVID-19 case in Indonesia, the LQ45 Index has increased as well as weakened. In October, the LQ45 Index was at the level of 984.84 and in November it was weakened by 2.85 percent to reach the level of 956.82. In December the LQ45 Index increased by 6.03 percent reaching the level of 1014.47 and then decreased until the day of the announcement of the first COVID-19 case in Indonesia by 15.29 percent reaching the level of 859.3. One month after the announcement of the first COVID-19 case in Indonesia, the LQ45 Index weakened by 19.57 percent to touch the level of 691.13 and then in the second month, namely April it strengthened by 3.26 percent to touch the level of 713.64. In the third month to the fifth month the LQ45 index increased by 12.52 percent reaching the level of 803.01. Based on this phenomenon, it can be seen that the announcement of the first case of COVID-19 in Indonesia affected stock price movements. An outbreak of an outbreak directly or indirectly affects the economic condition of a country. Basically, bad news will have a negative effect on some sectors but can also have a positive effect on other sectors. The spread of infectious diseases will cause the demand for drugs, vaccines and related medical products to increase which will benefit the biotechnology industry (Shafi et al., 2020).

Marinč (2016) with the results that "the 2014 Ebola outbreak was followed by a negative abnormal return rate on the financial market accompanied by a reversal effect one day later." However, Yang (2012), found "a significant positive cumulative abnormal return before the second day of the Taiwan biotechnology industry due to infectious disease outbreaks, but no cumulative abnormal return was significantly positive after the second day." Wang et al. (2013) stated that "there was no significant negative Cumulative Abnormal Return, the research carried out obtained results which stated that infectious disease outbreaks significantly affected the stock performance of biotechnology companies, there was a significant positive Cumulative Abnormal Return before day 2 and which was different from previous research, result shows that there is a significant negative Cumulative Abnormal Return after day 12."

The inconsistency of the results of previous studies is the basis for finding a research gap which is the reason for re-examining the reaction of the capital market to infectious disease outbreaks. This research was conducted to test the market reaction to the spread of COVID-19, which focused on abnormal returns before and after the announcement of the first COVID-19 cases in Indonesia. This research is important to do so that investors and other market players can find out the reaction of the capital market to an infectious disease outbreak that occurs in a country by looking at the difference in abnormal returns before and after the announcement of the event. This research was conducted on companies that are members of the LQ45 index on the grounds that the LQ45 index consists of listed companies with the highest levels of liquidity and market capitalization and have good fundamentals and performance. Based on this explanation, the research hypothesis can be structured as follows:

H1: "There is a significant difference in abnormal returns before and after the announcement of the first COVID-19 case on the Indonesia Stock Exchange."

II. METHODS

This research is a comparative study of market reactions before and after the announcement of the first COVID-19 cases in Indonesia. This research uses an event study method to analyze the market reaction caused by the announcement of the first case of the spread of COVID-19 in Indonesia so that later the level of

efficiency of the Indonesian capital market can be determined. The events of the first announcement of COVID-19 cases in Indonesia are tested with an event window period of 10 months, 5 months before to 5 months after the announcement of the event.

The companies included in the scope of this research are all companies on the Indonesia Stock Exchange and are members of the LQ45 Index for the period February 2019 to July 2020 which can be accessed through www.idx.co.id. This index was chosen because it consists of listed companies that have the highest level of liquidity and capitalization value and are stocks that have good fundamentals and performance. The object of this research is the market reaction seen from the difference in abnormal returns before and after the announcement of the first case of COVID-19 in Indonesia on March 2, 2020 for all listed companies on the Indonesia Stock Exchange and incorporated in the LQ45 Index for the period February 2019 to July 2020. The population in This study includes all companies included in the list of listed companies that are included in the LQ-45 Index in the period February 2019 to July 2020, namely 45 listed companies. This study uses non-participant observation collection methods

This study uses a non-probability sampling method with a purposive sampling technique. The criteria considered in determining the sample in this study are 1) Companies that are included in the LQ-45 Index for the period February 2019 to July 2020 and are not being suspended by the IDX during the observation period 2) Companies that are included in the LQ-45 Index and publish data stock prices during the study period and are free from the confounding effect during the observation period. The confounding effect means that the company does not carry out corporate actions such as stock splits, dividend announcements, rights issues, acquisitions and mergers.

Operational Definition of Variables

Abnormal return

Abnormal return is the real excess of return against normal return (expected return) or it can also be interpreted as the positive or negative difference between actual return and expected return. In this study, the market adjusted model calculation method is used in estimating the expected return.

Calculating individual stock returns that actually occur (actual return)

$$R_{it} = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Calculating the monthly market return (expected return)

$$R_{m,t} = \frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}}$$

Calculating abnormal return (AR)

$$AR_{it} = R_{it} - R_{mt}$$

Calculating Cumulative Abnormal Return (CAR)

$$CAR_{i,t} = \sum_{t=1}^t AR_{i,t}$$

III. RESULTS AND DISCUSSION

Table 1. Results of Descriptive Statistic Analysis of Cumulative Abnormal Return

	N	Min.	Max.	Total	Mean	Std. Dev
CAR Before	40	-0.3523	0.3352	-0.4545	-0.0113	0.1753
CAR After	40	-0.5191	0.5273	2.5125	0.0628	0.2248

Based on Table 1, it can be seen that before the announcement of the first case of COVID-19, a negative average Cumulative Abnormal Return (CAR) was found, namely -0.0113 and a standard deviation of 0.1753. The highest Cumulative Abnormal Return value occurred at Sarana Menara Nusantara Tbk (TOWR) which was 0.3352 and the lowest Cumulative Abnormal Return value occurred at Aneka Tambang (Persero) Tbk (ANTM) which was equal to -0.3523. After the announcement of the first case of COVID-19, it was found that the average Cumulative Abnormal Return (CAR) value was positive, namely 0.0628 and a standard deviation of 0.2248. The highest Cumulative Abnormal Return value occurs at Indah Kiat Pulp & Paper Tbk (INKP), which is 0.5273 and the lowest Cumulative Abnormal Return value occurs at Matahari Department Store Tbk (LPPF), which is -0.5191. Table 1 shows the amount of Cumulative Abnormal Return before the announcement of the event of -0.4545 and after the announcement of the event of 2.5125 which indicates that the Indonesian capital market is classified as less efficient. Judging from the average Cumulative Abnormal Return (CAR) obtained, where the average Cumulative Abnormal Return (CAR) before the announcement was -0.0113 and the

Cumulative Abnormal Return (CAR) after the announcement was 0.0628. The average value of Cumulative Abnormal Return (CAR) before announcement is smaller than the average value of Cumulative Abnormal Return (CAR) after the announcement ($-0.0113 < 0.0628$), so it can be interpreted that there is a descriptive difference between the average Cumulative Abnormal Return (CAR) before and after the announcement of the first COVID-19 case in Indonesia.

Table 2. Paired Sample Hypothesis Test Results

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
CAR before CAR after	-0.0741	0.3125	0.0494	-0.1741	0.0257	-1.501	39	0.141

Table 2 shows the results of the hypothesis test with the Paired Sample t-test parametric statistical test, which is the significance value or the Sig value. (2-tailed) of 0.141. Based on the basis for the decision making of hypothesis testing that has been previously described, it can be seen that the significance value or Sig. (2-tailed) which is 0.141 is greater than the significance level of 5% or 0.05 ($0.141 > 0.05$), so it can be concluded that H_0 is accepted and **H_1 is rejected.**

In table 1 it can be seen that t count is negative, namely -1.501, t count is negative because the average value of Cumulative Abnormal Return (CAR) before is smaller than the average value of Cumulative Abnormal Return (CAR) after. In this case, the negative t table can be positive, so the t count in the table above becomes 1,501. In the table above, it is known that the df (degree of freedom) is 39 and to find out the t table value, the significance value ($\alpha / 2$) is 0.025.

The value of t table is 2.023, it can be seen that t count is smaller than t table ($1.501 < 2.023$). The test results above can be interpreted that there is no significant difference in abnormal returns before and after the announcement of the first case of COVID-19 in Indonesia which implies that the information content contained in the announcement of the first case of COVID-19 in Indonesia was not strong enough so that there was no market reaction. significant from the announcement of the first COVID-19 case in Indonesia to companies that are included in the LQ45 index in the observation period of 10 months, 5 months before to 5 months after the announcement of the event.

In general, announcements regarding the COVID-19 pandemic will have a negative impact on most existing industrial sectors, as evidenced by the negative average abnormal return in the one month period after the announcement of the event ($t + 1$) of -0.1167 which provides information that the announcement of the first case event COVID-19 in Indonesia has had a negative impact on the capital market. 60 percent of small, medium and large industries are affected by COVID-19, some of which include the metal industry, electronics and telecommunications equipment, automotive, airplanes, trains, and the tourism industry which is heavily affected by COVID-19. The airline industry has experienced a decline of 80 percent since the start of the year in some regions. The decrease in the number of flights also had a direct effect on tourist visits which caused the tourism industry to decline. COVID-19 has also disrupted export and import activities which have an impact on the supply of spare parts needed by several companies, such as companies in the automotive industry and several other industries.

Investors will basically expect stock prices to react negatively to the announcement of an infectious disease outbreak and expect to get a higher return to compensate for the higher risk (Norouzi et al., 2020). The insignificant reaction in this study could be caused by the absence of accurate information or lack of information in the market and the lack of intelligence among market players in analyzing and interpreting the available information to obtain abnormal returns (Dewi & Candraningrat, 2019). The absence of a result which states that there is a significant difference in abnormal returns, which indicates that market enthusiasm is quite low due to the lack of awareness of market players regarding the information contained in the announcement of an outbreak of infectious diseases. The absence of significant differences in abnormal returns can also be caused by investors who have expected that the spread of COVID-19 will spread to various countries including Indonesia before the announcement of the first COVID-19 case in Indonesia (Djalante, Lassa, Setiamarga, Sudjatma, & Indrawan, 2020).

Investors focus on stock prices to determine the development of company value in a capital market. In the COVID-19 event (Machmuddah et al., 2020), the company will strive to maintain its corporate value by providing a positive signal to investors in the capital market (Smith et al., 2019). One of the positive signals given was the company Bank Rakyat Indonesia (BRI) which announced a strategy to face the new normal by transforming workers and networks, digital information technology (IT) and business processes. In accordance with the signal theory, information that provides a positive or negative signal will be reflected in the price of the

security. The positive signal aimed at investors aims to overcome the possibility of asymmetric information that will affect investors' investment decisions in a capital market (Delivorias & Scholz, 2020).

In this study, the stock prices of most of the sample companies in the period before the announcement of the event had decreased until the date of the event announcement and a considerable decrease in price occurred in a period of one month after the date of the event ($t + 1$) then continued with price strengthening until a period of five months after the date of the event, event ($t + 5$). This can also be seen in the average positive and negative abnormal returns in the five months before the event date to the event date ($t-5$ to t_0) and in the one month period after the event ($t + 1$) there is an average negative abnormal return, which is quite large then in a period of two months to five months after the announcement of the event ($t + 2$ to $t + 5$) there is an average positive abnormal return. The average negative abnormal return prior to the event announcement date could be caused by the announcement of the COVID-19 event that has been obtained since December regarding the spread of COVID-19 that occurred outside Indonesia (Handayani, 2020).

This research can show that the semi-strong form of the Indonesian capital market is in accordance with the efficient market hypothesis. The Indonesian capital market is categorized as a semi-strong market because the market price is formed starting from past information as well as current published information. In the semi strong form, abnormal returns are found on the date of the announcement of the event and around the date of the announcement of an event which is the market response to information published and accepted by the market. Information that enters the market and can have a positive or negative effect on the market in the form of bad news or good news will make the market speculate whether this information will cause overadjusted or underadjusted before the equilibrium price is formed in the market. Investors' speculation in a capital market will be reflected in the Cumulative Abnormal Return (CAR) generated before and after the announcement date, where the Cumulative Abnormal Return (CAR) with a negative value implies that the market reacts negatively to the information contained in the announcement of the event. Cumulative Abnormal Return (CAR) with a positive value indicates that the market reacts positively to the information contained in an event announcement.

IV. CONCLUSION

Based on the results of the analysis and discussion previously described, the conclusion that can be drawn is that the announcement of the first case of COVID-19 in Indonesia has a negative but insignificant impact on the acquisition of abnormal returns. The announcement of the first case of COVID-19 in Indonesia did not have a significant effect on abnormal returns before and after the incident caused by investors who had expected that the spread of COVID-19 would be more widespread in various countries including Indonesia. Negative abnormal returns generated around the date of the event indicate a negative market reaction which is reflected in the decline in share prices due to the large number of investors who dispose of their shares in the two months prior to the announcement date of the event and one month after the date of the event announcement which had the highest negative abnormal return value at the observation period is ten months around the date of the announcement of the first case of COVID-19 in Indonesia.

Empirically, the events of the spread of infectious disease outbreaks are proven to cause the market to react either positively or negatively. Investors should be careful in making investment decisions around the date of the announcement of an infectious disease outbreak due to the high volatility of stock price movements. Investors should also pay more attention to circulating public information and other relevant and accurate sources of information in using it as a basis for analyzing the risks faced with the expected return on an investment.

Further research can do research again using the same variable, namely abnormal return, but it is better in future studies to add other variables such as Trading Volume Activity (TVA). Further research can also be carried out using an expected return estimation model that is different from the estimation model used in this study and further research can add samples to increase population coverage and can also add other infectious disease outbreak events to strengthen the results of further research.

REFERENCES

- [1] Arnaya, N. A. D. D., & Purbawangsa, I. B. A. (2020). Comparative Study of Portfolio Group Performance of Blue Chips and Small Chips Shares on the Indonesia Stock Exchange. *American Journal of Humanities and Social Sciences Research (AJHSSR)*, 4(8), 303–309.
- [2] Bae, J. Y., Lee, Y., & Heo, E. (2017). Effects of the Middle East Conflicts on Oil Company Returns. *Energy Sources, Part B: Economics, Planning, and Policy*, 12(3), 243–249.
- [3] Cheng, Z. J., & Shan, J. (2020). 2019 Novel coronavirus: where we are and what we know. *Infection*, 48(2), 155–163. <https://doi.org/10.1007/s15010-020-01401-y>
- [4] Delivorias, A., & Scholz, N. (2020). Economic impact of epidemics and pandemics. *European Parliamentary Research Service*, 1(February), 1–10.

- [5] Dewi, N. P. L., & Candraningrat, I. R. (2019). Market reaction to the rights issue announcement on the Indonesia stock exchange. *International Research Journal of Management, IT and Social Sciences*, 6(6), 264–269. <https://doi.org/10.21744/irjmis.v6n6.805>
- [6] Djalante, R., Lassa, J., Setiamarga, D., Sudjatma, A., & Indrawan, M. (2020). Review and analysis of current responses to COVID-19 in Indonesia: Period of January to March 2020. *Progress in Disaster Science Journal*, 6(January), 1.
- [7] Djalante, R., Lassa, J., Setiamarga, D., Sudjatma, A., Indrawan, M., Haryanto, B., Mahfud, C., Sinapoy, M. S., Djalante, S., Rafliana, I., Gunawan, L. A., Surtiari, G. A. K., & Warsilah, H. (2020). Review and analysis of current responses to COVID-19 in Indonesia: Period of January to March 2020. *Progress in Disaster Science*, 6(1), 100091. <https://doi.org/10.1016/j.pdisas.2020.100091>
- [8] Handayani, E. (2020). Abnormal return of Indonesian banking shares in the time of COVID 19: An event study on the announcement of government regulation, POJK 11 of 2020. *International Journal of Research in Business and Social Science (2147- 4478)*, 9(7), 108–114. <https://doi.org/10.20525/ijrbs.v9i7.964>
- [9] Hersugondo, H., Sadiyah, C., Handriani, E., Subagyo, H., & Astuti, D. (2020). An Analysis of Sharia and Conventional Shares ' System at Indonesia Stock Exchange. *The Universitas Muhammadiyah Sidoarjo Journals*, 4(1), 1–16. <https://doi.org/10.21070/perisai.v4i1.228>
- [10] Islam, M. M., Jannat, A., Al Rafi, D. A., & Aruga, K. (2020). Potential Economic Impacts of the COVID-19 Pandemic on South Asian Economies: A Review. *World*, 1(3), 283–299. <https://doi.org/10.3390/world1030020>
- [11] Khan, S., Jafri, R. A., Baig, N., Shaique, M., & Usman, M. (2017). Stock Index Manipulation Around Election Announcements: Evidence from Pakistan Stock Exchange. *International Journal of Accounting and Economics Studies*, 5(2), 87–91.
- [12] Machmuddah, Z., Utomo, S. D., Suhartono, E., Ali, S., & Ghulam, W. A. (2020). Stock market reaction to COVID-19: Evidence in customer goods sector with the implication for open innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 6(4), 1–13. <https://doi.org/10.3390/joitmc6040099>
- [13] Mahliza, F., Priatna, W. B., & Burhanuddin. (2016). Pengaruh Keluarga Dan Lingkungan Ekonomi Terhadap Kinerja Usaha Tahu Di Kabupaten Bogor. *Jurnal Agribisnis Indonesia*, 4(1), 17–26.
- [14] Marinč, R. I. M. (2016). Geographic Proximity of Information to Financial Markets and Impact on Stock Prices: Evidence from the Ebola Outbreak. *UBT International Conference*, 19(1), 1.
- [15] Nia, V. M. (2020). The Effect of Corona Outbreak on the Indonesian Stock Market. *American Journal of Humanities and Social Sciences Research (AJHSSR)*, 4(3), 358–370.
- [16] Norouzi, N., Zarazua, G., Rubens, D., Choupanpiesheh, S., & Enevoldsen, P. (2020). When pandemics impact economies and climate change: Exploring the impacts of COVID-19 on oil and electricity demand in China. *Energy Research & Social Science*, 68(January), 1.
- [17] Putra, I. K. A. A. S., & Dana, I. M. (2020). Study of Optimal Portfolio Performance Comparison : Single Index Model and Markowitz Model on LQ45 Stocks in Indonesia Stock Exchange. *American Journal of Humanities and Social Sciences Research (AJHSSR) 2020*, 3(12), 237–244.
- [18] Ratih, I. G. A. A. N., & Candradewi, M. R. (2020). The Effect of Exchange Rate, Inflation, Gross Domestic Bruto, Return on Assets, and Debt to Equity Ratio on Stock Return in LQ45 Company. *American Journal of Humanities and Social Sciences Research (AJHSSR)*, 4(6), 170–177.
- [19] Rondonuwu, D. I., & Kalangi, J. B. (2020). The Effect Analysis Of Stock Market And Stok's Financial Indicators To In/Out Shares In Lq-45 Index. *Jurnal EMBA*, 8(4), 278–287.
- [20] Shafi, M., Liu, J., & Ren, W. (2020). Impact of COVID-19 pandemic on micro, small, and medium-sized Enterprises operating in Pakistan. *Research in Globalization*, 2(1), 100018. <https://doi.org/10.1016/j.resglo.2020.100018>
- [21] Smith, K. M., Machalaba, C. C., Seifman, R., Feferholtz, Y., & Karesh, W. B. (2019). Infectious disease and economics: The case for considering multi-sectoral impacts. *One Health*, 7(June 2018), 100080. <https://doi.org/10.1016/j.onehlt.2018.100080>
- [22] Stosic-Mihajlovic, L. (2016). Functioning of financial and capital markets in modern conditions. *Journal of Process Management. New Technologies*, 4(4), 30–38. <https://doi.org/10.5937/jouproman4-12134>
- [23] Tao, Z., Han, L., Song, Y., & Bai, K. (2019). Stock Market Reactions to the 2011 Great East Japan Earthquake. *International Journal of Disaster Risk Reduction*, 1(1), 101.
- [24] Tavor, T., & Teitler-Regev, S. (2019). The impact of disasters and terrorism on the stock market. *Jambá Journal of Disaster Risk Studies*, 11(1), 1–8. <https://doi.org/10.4102/jamba.v11i1.534>
- [25] Untari, P. M. D., & Yasa, G. W. (2020). Reaction Of Indonesia Capital Market To Unusual Market Activity Announcements. *American Journal of Humanities and Social Sciences Research (AJHSSR)*, 4(5), 146–153.

- [26] Wang, Y. H., Yang, F. J., & Chen, L. J. (2013). An Investor's Perspective on Infectious Diseases and their Influence on Market Behavior. *Journal of Business Economics and Management*, 14(1), S112–S127.
- [27] Wu, Y. C., Chen, C. S., & Chan, Y. J. (2020). The outbreak of COVID-19: An overview. *Journal of the Chinese Medical Association*, 83(3), 217–220. <https://doi.org/10.1097/JCMA.0000000000000270>
- [28] Yang, F. J. (2012). Reexamination of Infectious Diseases Outbreak, Information Value and Market Behavior. *Journal of Accounting, Finance & Management Strategy*, 7(1), 89.