Ekonomi Bisnis
Volume 27, Nomor 1, Maret 2022 (24-39)
ISSN 0853-7283 (Print), 2528-0503 (Online)
Available online at: http://journal2.um.ac.id/index.php/ekobis

The Influence of Covid-19 Cases and Sentiments' on Indonesia Stock Market Trends

Muthiara Adlin Azzahra[1], Rizma Adlia Syakurah[2], Wulan Dri Puspita[3]

[1]Medical Profession Students, Faculty of Medicine, Universitas Sriwijaya, Palembang, Indonesia
[2]Public Health Faculty, Universitas Sriwijaya, Ogan Ilir, Indonesia
[3]Diploma Accounting and Taxation, Faculty of Economics and Business, Universitas Merdeka Malang, Indonesia

Info Article

History Article:
Submitted: 20 January 2022
Revised: 07 March 2022
Accepted: 12 April 2022

Keywords:
COVID-19 sentiments; Corona; Google Trends; PSBB; Stock market trends Vaksin

ABSTRACT

This study determined the COVID-19 cases and sentiments effect on the stock price index of selected sectors in Indonesia. The study applied time-series data from the period 2 March - 27 October 2020 by collecting data on COVID-19 cases, Indonesia Stock Index (IDX), 10 selected sectors (Jasica) and Google Trends (GT). The researchers used the search terms related to COVID-19 sentiments. The researchers used descriptive analysis for IDX and GT data and applied quantitative analysis with time lag correlation to analyze data based on COVID-19 cases and GT data on the IDX & 10 selected sectors. The researchers used the Manufacture and Mining sectors with the high-or-low negative correlation groups; IDX, Finance, and Miscellaneous Industry with the moderate-or-low negative correlation groups; Trade with the high-or-moderate-or-negligible negative correlation; Agriculture with the high-or-low-or-negligible negative correlation; Consumer Industry with high-or-negligible negative correlation group; Basic Industry and Infrastructure sectors with the moderate-or-negligible negative correlation groups; and Property sector with negligible correlation group. The correlation results showed different effects regarding the sentiments of COVID-19 in each sector.

Pengaruh Kasus dan Sentimen COVID-19 Terhadap Tren Pasar Saham Indonesia

ABSTRAK

Penelitian ini bertujuan untuk mengetahui kasus COVID-19 dan pengaruh sentimen terhadap indeks harga saham sektor-sektor terpilih di Indonesia. Penelitian menggunakan data time-series periode 2 Maret - 27 Oktober 2020 dengan mengumpulkan data kasus COVID-19, Indeks Saham Indonesia (BEI) dan 10 sektor terpilih (Jasica) dan search terms Google Trends (GT) terkait sentimen Covid-19. Analisis deskriptif digunakan untuk data BEI dan GT serta analisis kuantitatif dengan korelasi time lag digunakan pada kasus COVID-19 dan data GT di BEI & 10 sektor terpilih. Sektor Manufaktur dan Pertambangan termasuk dalam kelompok korelasi negatif tinggi atau rendah; BEI, Keuangan, dan Aneka Industri dalam kelompok korelasi negatif sedang-rendah; Perdagangan dengan korelasi negatif yang tinggi-atau-sedang-atau-diabaikan; Pertanian dalam korelasi negatif yang tinggi-atau-rendah-atau-diabaikan; Industri Konsumen dalam kelompok korelasi negatif tinggi atau dapat diabaikan; Sektor Industri Dasar dan Infrastruktur dalam kelompok korelasi negatif sedang-atau-diabaikan; dan Sektor properti dalam kelompok korelasi diabaikan. Hasil korelasi menunjukkan efek yang berbeda mengenai sentimen COVID-19 di masing-masing sektor.

How to Cite: Azzahra, M. A., Syakurah, R. A., & Puspita, W. D (2022). Covid-19 Cases and Sentiments' Impact on Indonesia Stock Market Trends. *Ekonomi Bisnis,* 27(1), 24-39

Correspondence Address
Institutional address: Public Health Faculty, Sriwijaya University, Ogan Ilir, Indonesia
E-mail: rizma.syakurah@gmail.com

ISSN
0853-7283 (print) 2528-0503 (online)
DOI: 10.17977/um042v27i1p24-39

COVID-19 spread widely in many countries. The WHO declared the outbreak as a Public Health Emergency International Concern (PHEIC) (WHO, 2020a, 2020c, 2020b). In Indonesia, COVID-19 reached 563.680 cases. The case prevalence was the highest one in Southeast Asia and was higher than the Philippine case prevalence (Worldometer, 2020). The increased COVID-19 case brings both threats to health and economic sectors, for example, the economic recession in various countries, including Indonesia.

The COVID-19 pandemic triggers a global economic recession. Indonesia's Bank or Bank Indonesia and the Minister of Economy of Indonesia predicted a decreased of economic capability in the future, at least until early 2021. On the other hand, economic growth would decrease in 2020 (Kusuma, 2020). The Indonesia Central Bureau of Statistics (BPS) explained that Indonesia's economy contracted 5,32% year-on-year (y/y) in Q2/2020 period. This rate was the lowest since 1999 (Herlando & Kurniawan, 2020). This situation happened after expanding 2,97% (y/y) in Q1/2020. In particular, many economic activities decreased, especially economic activities dealing with the hospitality sector, such as restaurants and hotels. The decreased rate reached a percentage of -15,33%. Then, the other decreased sector was fashion, such as clothes and footwear; and the maintenance service by 5,13%. The other sectors would suffer a decreased percentage of 3,23% (Widjanarko, 2020).

Some previous studies claimed that the COVID-19 pandemic became the Black Swan event. The signs of the Black Swan event are considered the current references and significant impact on social and economic life (Antipova, 2021; Listyorini, 2019). The Black Swan event is an unpredictable situation that has a major effect. This event not only provides benefits but also detriments. Any investors may panic with this situation; thus, they start selling their stocks without considering the stock price. This situation leads to a free fall of the capital market. Therefore, this pandemic becomes the black swan event. The situation is unpredictable and significantly influences health and the economy (Taleb, 2010).

Many scholars conducted studies on pandemics and their impacts. Nippani & Washer (2004); Chen et al., (2018); and Ichev & Marinč (2018). Nippani & Washer (2004) found the only influenced countries in terms of their stocks due to SARS were only Hongkong and Vietnam from 8 other countries in study: Canada, Hong Kong, Indonesia, Philippines, Singapore, & Thailand. Meanwhile, Chen et al (2018) observed that the stock price during SARS in China highly infected Hongkong, Taiwan, and Singapore, and slightly influenced Japan. Furthermore, Ichev & Marinč (2018) revealed that the Ebola outbreak harmed the financial markets.

Related to Covid-19 pandemic, it provides opportunities for scholars to study its impact, especially in Indonesia, where the Black Swan happened. Both central and local governments in Indonesia worked together to realize COVID-19 transmission preventive policies. Many people were also more responsive to COVID-19 news. They also carefully screened the information about COVID-19 (Pratomo, 2020). The increased daily COVID-19 cases, the declined economic activities, and the government's policy changes threatened the capital market of Indonesia. An unpredictable situation, such as the COVID-19 pandemic. Again, the pandemic provides opportunities for researchers to study the impact, especially on the Indonesian stock market (H. S. Lee, 2020).

Based on that situation, this study try determined the effect of the COVID-19 daily cases on the IDX and 10 selected sectors in Indonesia. This study also determined the impact of sentiments of COVID-19 on the IDX and 10 selected sectors in Indonesia. The researchers considered Google Trends to have the potential of observing public interest

during the COVID-19 pandemic in Indonesia and also could monitor the response of investors in Indonesia toward the sentiments regarding COVID-19 and prepare strategic investment plans (Cervellin, Comelli, & Lippi, 2017; Mahfuza, Syakurah, & Citra, 2020).

METHODS

This quantitative study used the time series data from the period of March 2, 2020, to October 27, 2020. The researchers took the data of official daily case report data from the website of the task force to accelerate the COVID-19 management in Indonesia by the National Disaster Management Agency (Badan Nasional Penanggulangan Bencana–BNPB, 2020) (https://bnpb-inacovid19.hub.arcgis.com/).

The researchers took the data of the stock price index from IDX and 10 selected sectors in Indonesia: Manufacture, Mining IDX, Finance, Miscellaneous Industry, Trade; Agriculture; Consumer Industry; Basic Industry and Infrastructure; and Property. One of the references was the Jakarta Stock Industrial Classification (Jasica). The data from 10 selected industries are taken from (https://www.investing.com/).

The daily case report data of Covid-19 cases were taken by researcher from the Indonesian Government daily case confirmation/report. The government confirmed two individuals with positive COVID-19 test results. Then, the researchers used Google Trends (2020) from the website (https://trends.google.com/trends) as the data to measure sentiments by tracing three popular terms related to COVID-19 in Indonesia. The terms were "corona", "PSBB", and “vaksin” (H. S. Lee, 2020), (Rizqullah & Syakurah, 2020).

The researcher descriptively analyzed each peak of the IDX trends and each peak of interest in the search for COVID-19 sentiments using Google Trends on the COVID-19 daily cases. In quantitative analysis, the researchers examined the COVID-19 cases and Google Trends to determine the correlation of the stock price index data for IDX and 10 selected sectors.

The researchers analyzed the data with Pearson correlation on normally distributed data. On the other hand, if the data were not normally distributed, the researchers used Spearman correlation with significance ≤ 0.05. The researchers used a time-lag correlation with three-day intervals to assess the increased daily cases data and sentiments regarding COVID-19 and the correlation with the stock price index trends (H. S. Lee, 2020) (Mahfuza et al., 2020), (Rizqullah & Syakurah, 2020).

RESULTS AND DISCUSSIONS

The results of time series data of Indonesia Stock Exchange (IDX) is shown in Figure 1.

Figure 1 is the result of time series data analysis of the Indonesia Stock Exchange (IDX) composite index trends during the period of March 2, 2020 – October 27, 2020.

The WHO’s declaration of COVID-19 as PHEIC, on January 31, 2020, made the IDX decline. The figure shows three declining peaks in the IDX: March 2, March 24, and September 9, 2020. The lowest peak is observable on March 24, 2020. At that time, the lowest observed peak coincided with many sentiments related to COVID-19.

The first peak occurred on March 2, 2020, at the level of Rp 5.361,25. The first peak coincided with the confirmation of the COVID-19 first case in Indonesia by Indonesia's President, Joko Widodo (Redaksi, 2020a). At that time, the WHO also shared the ultimatum and warning toward the European Union countries after the surging numbers of confirmed cases in Italy. On the same day, the Asian stock markets declined because many investors were worried about the massive sp-

Figure 1. IDX Trends for the Period of 2 March – 27 October 2020

A. The confirmation of the COVID-19 first case in Indonesia by Indonesian President, Joko Widodo.
B. the spread of COVID-19 was increasingly widespread in various countries including Indonesia
C. DKI Jakarta Governor Anies Baswedan plans to impose a second large-scale social restriction (PSBB) on September 14, 2020

read of COVID-19. Many factories stopped their production because they were worried about COVID-19 transmission. The policies to close international flight routes made foreign exchange significantly decrease, especially in the tourism sector (Arbar, 2002).

The second and lowest peak occurred on March 24, 2020, at the level of Rp 3.937,63. At that time, the spread of COVID-19 widely increased in various countries, including Indonesia. At that time, the news about positive COVID-19 cases also rapidly spread. The news told about the positive COVID-19 test results of the Director General of Railways of the Ministry of Transportation (Kemenhub) Zulfikri, Karawang Regent Cellica Nurrachdiana, and Deputy Mayor of Bandung Yana Mulyana (Anwar, 2020). The government decided to cancel the entire National Examination (UN) and changed the teaching mode due to the social distancing policy to prevent COVID-19 transmission (Redaksi, 2020b; Asmara, 2020).

The third peak occurred on September 10, 2020, at the level of Rp 4.891,46. At that time, the peak level coincided with the news regarding DKI Jakarta Governor Anies Baswedan. The governor planned to promote the second large-scale social restriction (PSBB) on September 14, 2020 (Putri, 2020). The plan restricted many sectors and only allowed 11 sectors to run their jobs, such as health, food or meal, and beverage, energy, communication & information technology (IT), finance, logistics, hospitality, construction, strategic industries, basic services, and daily needs with minimal operations (Sandi, 2020). The policy made entrepreneurs and investors to worried about the changes in the regulated sectors (Kowalewski & Śpiewanowski, 2020).

The correlation results between the daily cases of COVID-19 and the IDX and the 10 selected sectors by using time-lag differentiation is shown in Table 1.

The data shows that the IDX composite has a moderate and positive significant correlation (R=0,475) with the number the COVID-19 confirmed cases. Interestingly, several sectors also have significant correlations with the number of COVID-19 confirmed cases. The mining sector has a

Table 1. Result of time-lag correlations between the daily cases of COVID-19 in Indonesia and the IDX & 10 select sector indices

	Correlation			
	Lag 0	**Lag 1**	**Lag 2**	**Lag 3**
IDX	0,506*	0,506*	0,488*	0,469*
Agriculture	0,708*	0,708*	0,678*	0,652*
Basic Industry	0,419*	0,419*	0,400*	0,376*
Consumer Industry	0,702*	0,702*	0,712*	0,716*
Finance	0,485*	0,485*	0,465*	0,445*
Infrastructure	-0,199	-0,199	-0,173	-0,150
Manufacture	0,585*	0,585*	0,572*	0,558*
Mining	0,718*	0,718*	0,699*	0,680*
Miscellaneous Industry	0,356*	0,356*	0,328*	0,302*
Property	-0,207	-0,207	-0,220	-0,234
Trade	0,582*	0,582*	0,550*	0,520*

Note: Significant with P <0,05
Source: Data processed by researchers (2020)

several sectors also have significant correlations with the number of COVID-19 confirmed cases. The mining sector has a strongest and highest positive correlation (R=0,718) followed by agriculture (R=0,708), and consumer industry (R =0,702). On the other hand, the manufacturing sector has a higher moderate positive correlation (R=0,585) than the trading sector (R=0,582). Then, the finance sector has lower positive correlation (R=0,485) than basic industry (R=0,419) and miscellaneous industry (R= 0,356) based on the difference in time lag.

Figure 2 shows the result of a time series data analysis with the applied keywords related to COVID-19 sentiments based on the daily confirmed number of COVID-19 during the period March 2 – October 27, 2020.

The results of Google's Relative Search Volume (RSV) of Google Trends analysis, the applied keyword related to COVID-19 sentiments in Indonesia very fluctuated. The previous studies with the applied searching keywords, such as "corona" in Indonesia also showed four peaks. They were on March 2, March 16, March 22, and April 4, 2020, with the highest peak occurring on March 22, 2020. The search pattern of the keyword "corona" relied heavily on media coverage and government regulations instead of the citizens' curiosity about COVID-19 (Mahfuza et al., 2020).

Other research with the applied keyword of "PSBB" in Indonesia also had four peaks: April 9, April 19, April 22, and April 28, 2020. The increase in research interest was observable on March 31, 2020, when the president of Indonesia took a policy to implement PSBB. The interest kept increasing because the official PSBB was officially announced to be implemented in Indonesia's capital city (Rizqullah & Syakurah, 2020).

On the other hand, previous research with the applied keyword of "vaksin" in Indonesia had three peaks: March 2, March 19, and March 25, 2020. The first peak of "vaksin" was related to the outbreak of the first COVID-19 case in Indonesia. Then, the second peak coincided with the issuance of a Ministry of Education and Culture Circular (Kemendikbud) regarding online learning. The third peak coincided with the news about the government's decision to assign the Eijkman Molecular Biology Institute (LBME) to lead an agreement for the manufacture of anti-COVID-19 vaccines in Indonesia (Amelia & Syakurah, 2020).

Tables 2–4 show the Pearson and spearman correlation results of the IDX composite index data and the 10 selected

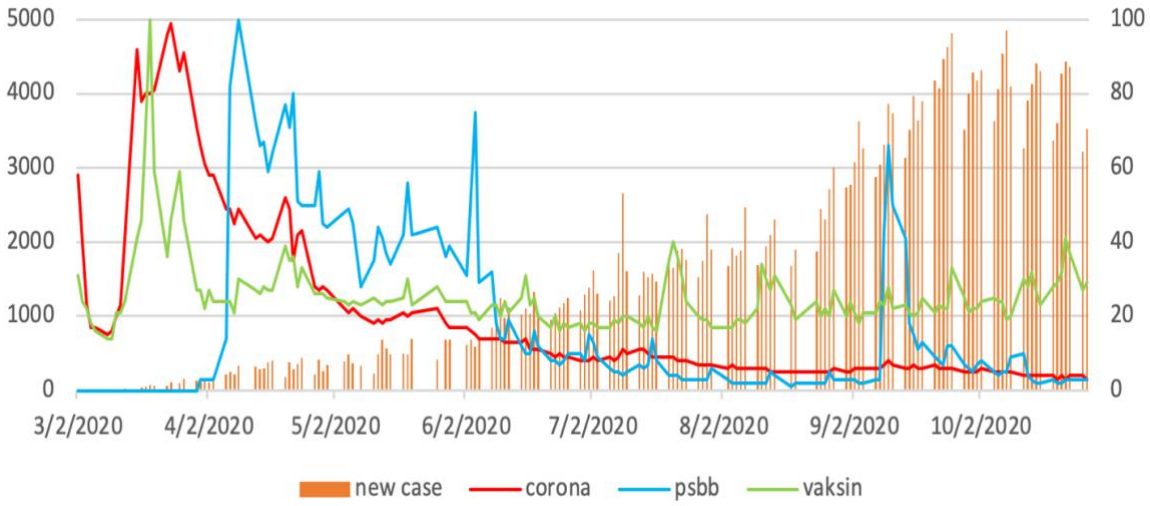

Figure 2. The Comparison between Search Interest Keywords in Google Trends and COVID-19 Daily Confirmed Cases in Indonesia for the Period of 2 March – 27 October 2020

Source: Data processed by researchers (2020)

sectors associated with the search for keywords related to the COVID-19 sentiments.

Results in Table 2-4 shows a significant and negative correlation in most composite stock price indexes in the selected sectors against the three keywords regarding the sentiment of COVID-19 "corona", "PSBB", and "vaksin". The data shows that the keyword "corona" has a significant and negative correlation with all sectors except the infrastructure and property sectors. The agriculture sector (R=- 0,829) has the strongest, high, and negative correlation compared to other sectors.

The table 4 shows that the keyword of "vaksin" on the stock index of all sectors has a negative correlation, except in agriculture, basic industry, consumer industry, mining, property, and trade. The strongest, moderate, and negative correlation is observable in the infrastructure sector (R=- 0,522).

The previous study research regarding the sentiments of COVID-19 analysis on the stock market found that stock market performance during a pandemic in large sectors with a high level of digital transformation was more resistant to the im pact of sentiment. Conversely, sectors that lack digital transformation rates were negatively affected (Kowalewski & Śpiewanowski, 2020).

Significance of the COVID-19 associated Google Trends Searches on Indonesia Stock Market

The movement of stock market returns happened due to several major events. Several previous studies identified some returns, such as disasters, sports, political, environmental, and news events. The stock market also responded to pandemic diseases with limited numbers of research on Severe Acute Respiratory Syndrome (SARS) and the Ebola Virus Disease (EVD) outbreak (M. P. Chen et al., 2018), (Ichev & Marinč, 2018), (Kowalewski & Śpiewanowski, 2020), (Buhagiar, Cortis, & Newall, 2018), (Li, 2018), (Bash & Alsaifi, 2019), (Ding, Guan, Chan, & Liu, 2020).

Table 2. Result of Pearson Correlations between "Corona" Google Trend keyword and the IDX & 10 Selected sectors

	Correlation			
	Lag 0	**Lag 1**	**Lag 2**	**Lag 3**
IDX	-0,697*	-0,697*	-0,698*	-0,698*
Agriculture	-0,829*	-0,829*	-0,830*	-0,829*
Basic Industry	-0,579*	-0,579*	-0,580*	-0,580*
Consumer Industry	-0,745*	-0,745*	-0,744*	-0,744*
Finance	-0,673*	-0,673*	-0,674*	-0,674*
Infrastructure	-0,011	-0,011	-0,011	-0,012
Manufacture	-0,731*	-0,731*	-0,732*	-0,732*
Mining	-0,758*	-0,758*	-0,759*	-0,760*
Miscellaneous Industry	-0,579*	-0,579*	-0,580*	-0,580*
Property	-0,227	-0,227	-0,227	-0,227
Trade	-0,742*	-0,742*	-0,742*	-0,742*

Note: Significant with *P* <0,05
Source: Data processed by researchers (2020)

Table 3. Result of Pearson Correlations between "PSBB" Google Trend keyword and the IDX & 10 Selected Sectors

	Correlation			
	Lag 0	**Lag 1**	**Lag 2**	**Lag 3**
IDX	-0,467*	-0,469*	-0,471*	-0,472*
Agriculture	-0,365*	-0,371*	-0,375*	-0,376*
Basic Industry	-0,258	-0,262	-0,268	-0,273
Consumer Industry	-0,107	-0,102	-0,098	-0,097
Finance	-0,579*	-0,581*	-0,583*	-0,584*
Infrastructure	-0,014	-0,007	-0,001	-0,005
Manufacture	-0,319*	-0,320*	-0,321*	-0,323*
Mining	-0,346*	-0,347*	-0,348*	-0,349*
Miscellaneous industry	-0,524*	-0,529*	-0,534*	-0,538*
Property	-0,004	-0,009	-0,015	-0,018
Trade	-0,419*	-0,425*	-0,430*	-0,434*

Note: Significant with *P* <0,05
Source: Data processed by researchers (2020)

Table 4. Result of Pearson Correlations between "Vaksin" Google Trend Keyword and the IDX & 10 Selected Sectors

	Correlation			
	Lag 0	**Lag 1**	**Lag 2**	**Lag 3**
IDX	-0,342*	-0,358*	-0,373*	-0,387*
Agriculture	-0,273	-0,299	-0,318*	-0,332*
Basic Industry	-0,290	-0,308*	-0,329*	-0,353*
Consumer Industry	-0,262	-0,249	-0,240	-0,238
Finance	-0,303*	-0,320*	-0,337*	-0,354*
Infrastructure	-0,522*	-0,498*	-0,476*	-0,450*
Manufacture	-0,324*	-0,335*	-0,345*	-0,361*
Mining	-0,399*	-0,415*	-0,429*	-0,456*
Miscellaneous Industry	-0,339*	-0,367*	-0,390*	-0,420*
Property	-0,001	-0,009	-0,020	-0,022
Trade	-0,221	-0,247	-0,271	-0,295

Note: Significant with *P* <0,05
Source: Data processed by researchers (2020)

Figure 3 shows a temporary stable correlation level between the cases of COVID-19 and the selected sector indices. The significance of IDX, mining, agriculture, finance, miscellaneous industry, basic industry, manufacture, and trade sectors declined in lag 1, while the consumer industry sector increased in the same lag.

Several previous studies found no significant influence between the stock price index and the COVID-19 number of cases. However, the COVID-19 cases directly influenced the policies made by the government. Therefore, COVID-19 influenced indirectly the stock price index trends. A previous study stated that government policies, such as social distancing and lockdowns influenced the stock price index although the increased-confirmed COVID-19 cases did not have a significant impact on the economy (C.-D. Chen, Chen, Tang, & Huang, 2009), (Hasan, Mahi, Sarker, & Amin, 2021), (Ahmed, 2020).

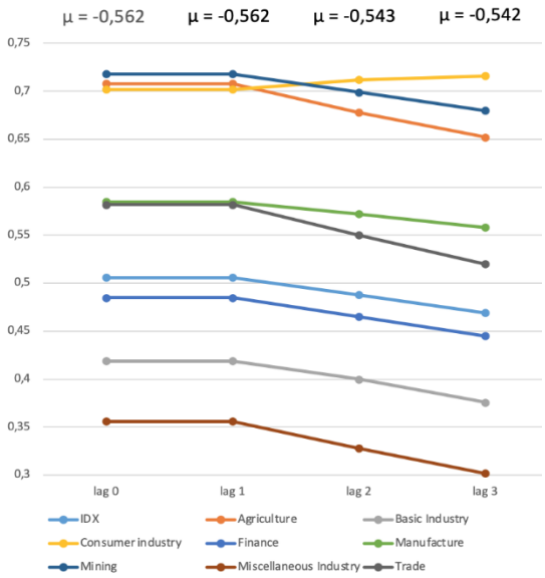

Figure 3. Changes in the level of association between COVID-19 daily new cases and selected sector indices by a time-lag difference
Source: Data processed by researchers (2020)

A previous study in Malaysia also suggested that the COVID-19 daily new cases had a significant effect on the returns of the indices. The other study in China found a significant positive correlation between the COVID-19 confirmed cases in China during the period 20 January 2020 to 23 February 2020. The returns on the indices depended on the characteristics of the constituent companies (K. Y. M. Lee, Jais, & Chan, 2020), (Sansa, 2020).

The other study found certain small sectors were influenced by the pandemic, such as the hotel, pharmaceutical, and biotech sectors. Other studies found the excellent performance of IT and pharmaceutical manufacturing sectors. Then, the beverages and transportation sectors performed significantly worse during the COVID-19 outbreak (M. P. Chen et al., 2018)(Ichev & Marinč, 2018), (C.-D. Chen et al., 2009), (Al-Awadhi, Alsaifi, Al-Awadhi, & Alhammadi, 2020).

Based on Indonesia Stock Exchange, the conditions of the COVID-19 pandemic did not discourage investors from trading stocks. The indication was observable from the daily average increase of retail stock numbers of the investors who made transactions from March to July 2020. The data also showed an increased percentage of 82.4% from March 2020 with 51 thousand investors to 93 thousand investors in July 2020. The total number of investors in the capital market during Semester I/2020 reached 2.92 million Single Investor Identification (SID). This figure increased rapidly by 436,019 or 17.55% from the last rank in 2019 (Indonesia Stock Exchange, 2020)(Yasyi, 2020).

The positive growth of the mining sector was not influenced by the number of COVID-19 cases. However, the growth was significantly influenced by China's coal import boycott from Australia. This situation made the Reference Coal Price (HBA) in Indonesia increase along with the increased demand for coal from China. The recovery of the Japanese and South Korean economies also increased global coal prices. The increase in the consumer industry sector during the

pandemic was influenced by the individual behavioral shift toward a healthy lifestyle during the pandemic and the sentiment about drugs and the manufacture of the COVID-19 vaccine. In the agriculture sector, the growth remained positive because the food was vital for any economic condition so the pandemic did not influence this sector (Umah, 2020)(CNBC Indonesia TV, 2002)(Situmorang, 2020).

Figure 4 shows a stable level of significant correlation between interest in searching for keywords regarding COVID-19 sentiment in all sectors. These results interpreted that the Google searches frequency for the "corona" keyword in one day had the same impact on investment in that sector on that day and several days later.

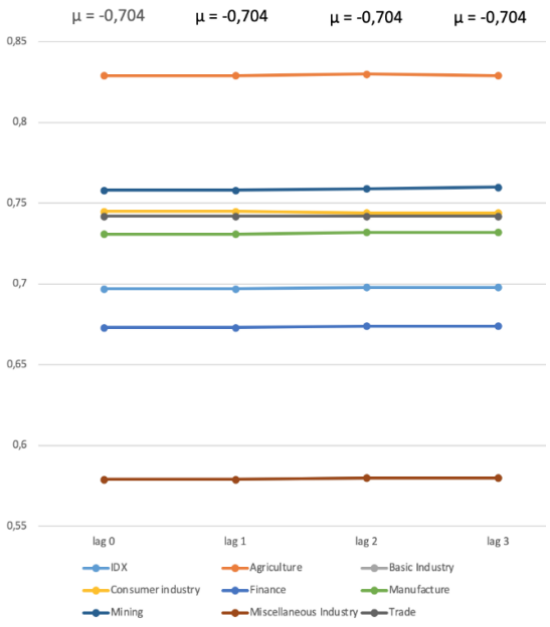

Figure 4. Changes in the level of association between the "corona" Google Trends keyword and selected sector indices by the time-lag difference
Source: Data processed by researchers (2020)

Figure 5 shows the increased significance correlation levels along with the time lag increases for all selected sector indices. These results revealed that the people's interest level in "PSBB" on a day had a lower impact in most sectors on investment on the same day than a few days later.

Figures 6 illustrates the correlation significance level increases along with the

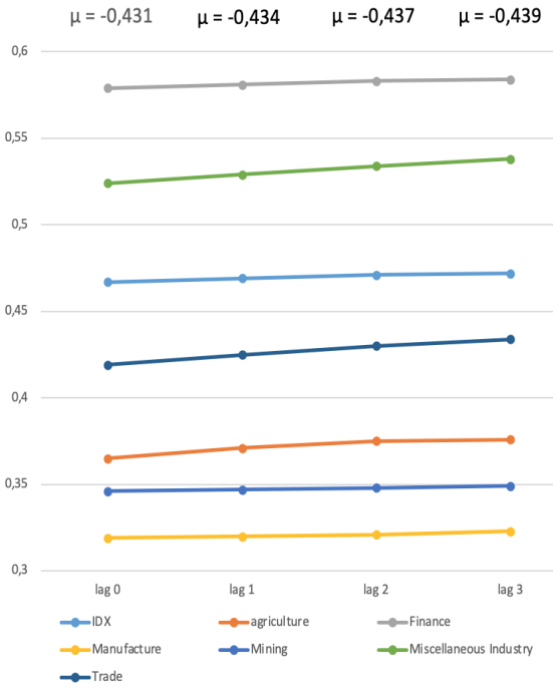

Figure 5. Changes in the level of association between the "PSBB" Google Trends keyword and selected sector indices by the time-lag difference
Source: Data processed by researchers (2020)

time lag increases for several selected sector indices, except for the infrastructure. These results indicated that the people's interest level in "vaksin" on a day had a lower impact on investment on the same day than a few days later. On the other hand, the infrastructure result indicated a higher impact on investment on the same day than a few days later.

The manufacturing and mining sectors were included in the high-or-low negative correlation groups; while the IDX, finance, and miscellaneous industry sectors were included in the moderate-or-low negative correlation groups. The trade sector was in a high-or-moderate-or-negligible negative correlation; the agriculture sector was included in the high-or-low-or-negligible

negative correlation; while the consumer industry was included in the moderate-or-negligible negative correlation groups; also, in particular, the property sector was included in the negligible correlation group.

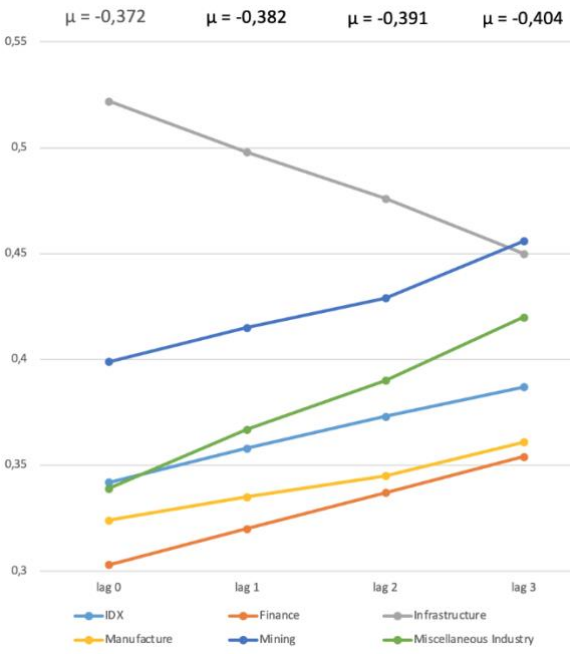

Figure 6. Changes in relationship level between "vaksin" Google Trends keyword and selected sector indices by time lag difference
Source: Data processed by researchers (2020)

By investigating the correlation between the stock price index composite in Indonesia (IDX) and the 10 selected sectors on COVID-19 sentiments, the study provided an overall portrayal of the COVID-19 sentiment impacts in Indonesia. In several previous studies regarding the performance of stock markets in the world during the post-COVID-19 outbreak, they experienced negative returns but gradually recovered. Overall, the results of these studies indicate uncertainty regarding future predictions due to the pandemic that led to panic sales in the world stock markets (Hong, H., & Stein, 1999), (Hou, 2007), (Singh, Dhall, Narang, & Rawat, 2020),(Ashraf, 2020), (Papadamou, Fassas, Kenourgios, & Dimitriou, 2020).

Information from these results is useful for investors' consideration in formulating strategies. This consideration is important because their focus lies on identifying sectors that are closely related to the sentiment of COVID-19 or that are not closely related to COVID-19. The consideration facilitates the investors to promote investment managers in adjusting their risk exposure portfolios in trading stocks. The consideration could also offer important implications for stock market investors in Indonesia in the face of future pandemic disasters.

CONCLUSIONS AND SUGGESTIONS

Several sectors found significant correlations between COVID-19 cases. The correlation showed different effects on the sentiments of COVID-19 in each sector from the period of March 2, 2020, to October 27, 2020, in Indonesia. The COVID-19 pandemic still occurs today. Many people cannot predict the extent of the pandemic's impact. The current research has limitations. A complete conclusion regarding the impact of COVID-19 on the Indonesian stock market may not be sufficient for this study to draw.

This study offers a comprehensive view of the impact of COVID-19 sentiment on the Indonesian stock market by investigating the correlation between the number of COVID-19 cases, the sentiment on sector-specific stock indices, and predictions of industry returns by COVID-19 sentiment. Our contributions to the literature in the field include insight into the impact of the COVID-19 pandemic on the long-term Indonesian stock market for a period of 7 months. The researchers took Stock price index data from IDX and 10 selected sectors in Indonesia (Jasica).

This study only explored the influence of COVID-19 cases and sentiments on Indonesia's stock market in general sectors and only uses sentiments data based on

Google Trends. In addition, the limitation of this study is the cases of COVID-19 are still happening beyond when this paper was finished. Future research can be enriched by adding to the analysis of what the COVID-19 pandemic has brought as a whole to global stock markets and adding to the development of new investment strategies for asset managers in times of COVID-19.

REFERENCES

Ahmed, S. (2020). *Impact of COVID-19 on Performance of Pakistan Stock Exchange*. https://doi.org/http://dx.doi.org/10.2139/ssrn.3643316

Al-Awadhi, A. M., Alsaifi, K., Al-Awadhi, A., & Alhammadi, 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

Amelia, L., & Syakurah, R. A. (2020). Analysis of public search interest towards immune system improvement during the COVID-19 pandemic using google trends. *International Journal of Public Health Science*, *9*(4), 414–420. https://doi.org/10.11591/ijphs.v9i4.20518

Antipova, T. (2021). Coronavirus Pandemic as Black Swan Event. In T. Antipova (Ed.), *Integrated Science in Digital Age 2020* (pp. 356–366). Cham: Springer International Publishing. https://doi.org/https://doi.org/10.1007/978-3-030-49264-9_32

Anwar, M. C. (2020). Positif COVID-19, Cepat Sembuh Pak Dirjen KA Kemenhub. Retrieved November 14, 2020, from CNBC Indonesia website: https://www.cnbcindonesia.com/news/20200324161546-4-147301/positif-COVID-19-cepat-sembuh-pak-dirjen-ka-kemenhub

Arbar, T. F. (2002). Kasus Corona Melonjak 2x Lipat di Italia, Ini Ultimatum WHO. Retrieved November 14, 2020, from CNBC Indonesia website:https://www.cnbcindonesia.com/news/20200302091804-4-141608/kasus-corona-melonjak-2x- lipat-di-italia-ini-ultimatum-who

Ashraf, B. N. (2020). Stock markets' reaction to COVID-19: Cases or fatalities? *Research in International Business and Finance*, *54*, 101249. https://doi.org/10.1016/J.RIBAF.2020.101249

Asmara, C. G. (2020). UN 2020 Dibatalkan, Nadiem: Banyak Risiko Ketimbang Benefit. Retrieved November 14, 2020, from CNBC Indonesia website:https://www.cnbcindonesia.com/news/20200324131535-4-147245/un-2020-dibatalkan-nadiem-banyak-risiko-ketimbang-benefit

Badan Nasional Penanggulangan Bencana (BNPB). (2020). Situasi COVID-19 di Indonesia. Retrieved November 4, 2020, from Badan Nasional Penanggulangan Bencana (BNPB) website:https://experience.arcgis.com/experience/57237ebe9c5b4b1caa1b93e79c920338

Bash, A., & Alsaifi, K. (2019). Fear from uncertainty: An event study of Khashoggi and stock market returns. *Journal of Behavioral and Experimental Finance*, *23*, 54–58. https://doi.org/10.1016/J.JBEF.2019.05.004

Buhagiar, R., Cortis, D., & Newall, P. W. S. (2018). Why do some soccer bettors lose more money than others? *Journal of Behavioral and Experimental Finance*, *18*, 85–93. https://doi.org/10.1016/J.JBEF.2018.01.010

Cervellin, G., Comelli, I., & Lippi, G. (2017). Is Google Trends a reliable tool for digital epidemiology? Insights from different clinical settings. *Journal of Epidemiology and Global Health*, *7*(3), 185–189. https://doi.org/10.1016/J.JEGH.2017.06.001

Chen, C.-D., Chen, C.-C., Tang, W.-W., & Huang, B.-Y. (2009). The positive and negative impacts of the sars outbreak: a case of the Taiwan industries. *Journal of Developing Areas, Tennessee State University, College of Business*, *43*(1), 281–293. Retrieved from https://ideas.repec.org/a/jda/journl/vol.43year2009issue1pp281-293.html

Chen, M. P., Lee, C. C., Lin, Y. H., & Chen, W. Y. (2018). Did the SARS epidemic weaken the integration of Asian stock markets? Evidence from smooth time-varying cointegration analysis. *Economic Research-Ekonomska Istraživanja*, *31*(1), 908–926.https://doi.org/https://doi.org/10.1080/1331677X.2018.1456354

CNBC Indonesia TV. (2002). KINO: Produk Hygiene Topang Kinerja Penjualan Saat Pandemi. Retrieved November 14, 2020, from CNBC Indonesia website: https://www.cnbcindonesia.com/market/20200708171812-19-171239/kino-produk-hygiene-topang-kinerja-penjualan-saat-pandemi

Ding, D., Guan, C., Chan, C. M. L., & Liu, W. (2020). Building stock market resilience through digital transformation: using Google trends to analyze the impact of COVID-19 pandemic. *Frontiers of Business Research in China*, *14*(1), 21. https://doi.org/10.1186/s11782-020-00089-z

Google Trends. (2020). Minat seiring waktu di Google Trends untuk Corona, PSBB, Vaksin. Retrieved from Google Trends website: https://trends.google.com/trends/explore?date=2020-03-03 2020-10-27&geo=ID&q=corona,psbb,vaksin

Hasan, M. B., Mahi, M., Sarker, T., & Amin, M. R. (2021). Spillovers of the COVID-19 Pandemic: Impact on Global Economic Activity, the Stock Market, and the Energy Sector. *Journal of Risk and Financial Management*, *14*(5), 200. https://doi.org/10.3390/jrfm14050200

Herlando, D., & Kurniawan, P. A. (2020). *Pertumbuhan Ekonomi Indonesia Triwulan II-2020*. Jakarta. Retrieved from https://www.bps.go.id/pressrelease/2020/08/05/1737/-ekonomi-indonesia-triwulan-ii-2020-turun-5-32-persen.html

Hong, H., & Stein, J. C. (1999). A unified theory of underreaction, momentum trading, and overreaction in asset markets. *The Journal of Finance*,

54(6), 2143–2184. https://doi.org/https://doi.org/10.1111/0022-1082.00184

Hou, K. (2007). Industry Information Diffusion and the Lead-lag Effect in Stock Returns. *The Review of Financial Studies*, *20*(4), 1113–1138. https://doi.org/10.1093/revfin/hhm003

Ichev, R., & Marinč, M. (2018). Stock prices and geographic proximity of information: Evidence from the Ebola outbreak. *International Review of Financial Analysis*, *56*, 153–166. https://doi.org/https://doi.org/10.1016/j.irfa.2017.12.004

Indonesia Stock Exchange. (2020). Indonesia Stock Exchange. Retrieved from Indonesia Stock Exchange website: https://www.idx.co.id/

Kowalewski, O., & Śpiewanowski, P. (2020). Stock market response to potash mine disasters. *Journal of Commodity Markets*, *20*, 100124. https://doi.org/10.1016/J.JCOMM.2020.100124

Kusuma, H. (2020). Ekonomi RI Masuk Skenario Sangat Berat. Retrieved July 6, 2020, from detikfinance website: https://finance.detik.com/berita-ekonomi-bisnis/d-5005400/ekonomi-ri-masuk-skenario-sangat-berat

Lee, H. S. (2020). Exploring the initial impact of COVID-19 sentiment on the US stock market using big data. *Sustainability*, *12*(16), 6648. https://doi.org/https://doi.org/10.3390/su12166648

Lee, K. Y. M., Jais, M., & Chan, C. W. (2020). Impact of COVID-19: evidence from Malaysian stock market. *International Journal of Business and Society*, *21*(2), 607–628. https://doi.org/https://doi.org/10.33736/ijbs.3274.2020

Li, K. (2018). Reaction to news in the Chinese stock market: A study on Xiong'an New Area Strategy. *Journal of Behavioral and Experimental Finance*, *19*, 36–38. https://doi.org/10.1016/J.JBEF.2018.03.004

Listyorini. (2019). Penyebab Naik dan Turunnya Harga Saham. Retrieved from Investor.id website: https://investor.id/investory/penyebab-naik-dan-turunnya-harga-saham

Mahfuza, N., Syakurah, R. A., & Citra, R. (2020). Analysis and potential use of google trends as a monitoring tool for risk communication during COVID-19 pandemic. *International Journal of Public Health Science*, *9*(4), 399–405. https://doi.org/10.11591/ijphs.v9i4.20512

Nippani, S., & Washer, K. M. (2004). SARS: a non-event for affected countries' stock markets? *Applied Financial Economics*, *14*(15), 1105–1110.https://doi.org/https://doi.org/10.1080/0960310042000310579

Papadamou, S., Fassas, A., Kenourgios, D., & Dimitriou, D. (2020). *Direct and indirect effects of COVID-19 pandemic on implied stock market volatility: Evidence from panel data analysis*. Retrieved from https://mpra.ub.uni-muenchen.de/100020/

Pratomo, W. A. (2020). Bauran Kebijakan Melawan COVID-19. Retrieved November 14, 2020, from iNews website:https://www.inews.id/ne

ws/nasional/bauran-kebijakan-melawan-dampak-COVID-19

Putri, C. A. (2020). PSBB Total DKI, Ekonomi RI Negatif Hingga Kuartal IV-2020? Retrieved November 14, 2020, from CNBC Indonesia website: https://www.cnbcindonesia.com/news/20200910170558-4-185931/psbb-total-dki-ekonomi-ri-negatif-hingga-kuartal-iv-2020

Redaksi. (2020a). Alert! Pernyataan Lengkap Jokowi Soal 2 Orang Positif Corona. Retrieved November 14, 2020, from CNBC Indonesia website: https://www.cnbcindonesia.com/news/20200302114455-4-141660/alert-pernyataan-lengkap-jokowi-soal-2-orang-positif-corona

Redaksi. (2020b). Lagi! Ridwan Kamil: 2 Pimpinan Daerah Jabar Positif COVID-19. Retrieved November 14, 2020, from CNBC Indonesia website:https://www.cnbcindonesia.com/news/20200324173203-4-147340/lagi-ridwan-kamil-2-pimpinan-daerah-jabar-positif-COVID-19

Rizqullah, M. F., & Syakurah, R. A. (2020). PUBLIC SEARCH INTEREST ANALYSIS ON INDONESIAN COVID-19 CONTAINMENT POLICY. *JURNAL KEBIJAKAN KESEHATAN INDONESIA : JKKI*, *09*(03), 147–153.

Sandi, F. (2020). 3 Hari Jelang PSBB Total DKI, Pengusaha Jadi Panik. Retrieved November 14, 2020, from CNBC Indonesia website: https://www.cnbcindonesia.com/news/20200910151642-4-185888/3-hari-jelang-psbb-total-dki-pengusaha-jadi-panik

Sansa, N. A. (2020). The Correlation between COVID-19 Confirmed and Recovered Cases in China: Simple Regression Linear Model Evidence. *Electronic Research Journal of Social Sciences and Humanities*, *2*(1), 121–129. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3567867

Singh, B., Dhall, R., Narang, S., & Rawat, S. (2020). The outbreak of COVID-19 and stock market responses: An event study and panel data analysis for G-20 countries. *Global Business Review*, 0972150920957274. https://doi.org/https://doi.org/10.1177/0972150920957274

Situmorang, R. T. (2020). 6 Bulan Corona di Indonesia: Kejutan Emiten Farmasi di Masa Pandemi. Retrieved November 14, 2020, from Bisnis.com website: https://market.bisnis.com/read/20200902/7/1286490/6-bulan-corona-di-indonesia-kejutan-emiten-farmasi-di-masa-pandemi

Taleb, N. N. (2010). *The black swan: the impact of the highly improbable* (2nd ed.; Random trade pbk, Ed.). New York: Random House Trade Paperbacks. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.695.4305&rep=rep1&type=pdf

Umah, A. (2020). Impor Batu Bara China Meroket, HBA November Naik ke US$ 55,71. Retrieved November 14, 2020, from CNBC Indonesia website: https://www.cnbcindonesia.com/news/20201104113715-4-199192/impor-batu-bara-china-meroket-hba-november-naik-ke-us-5571

WHO. (2020a). Novel Coronavirus (2019-nCoV) Situation Report-1. January 21, 2020. Retrieved November 14, 2020, from World Health Organization website:

https://reliefweb.int/report/china/novel-coronavirus-2019-ncov-situation-report-1-21-january-2020?gclid=CjwKCAiAzrWOBhBjEiwAq85QZ6g4xPB1niMeHVjCpAWfiMCjLY9XRjNLUq5lo4P57F6EkHZxixQY0xoCwCAQAvD_BwE

WHO. (2020b). Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). Retrieved November 14, 2020, from World Health Organization website: https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)

WHO. (2020c). WHO Director-General's remarks at the media briefing on 2019-nCoV on 11 February 2020. Retrieved November 14, 2020, from World Health Organization website: https://www.who.int/director-general/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020

Widjanarko, O. (2020). NATIONAL ECONOMIC GROWTH IMPACTED BY COVID-19 IN Q2/2020. Retrieved from Bank Indonesia: Communication Department website: https://www.bi.go.id/en/iru/highlight-news/Pages/National-Economic-Growth-Impacted-by-COVID-19-in-Q2-2020.aspx

Worldometer. (2020). Coronavirus Update Worldwide.

Yasyi, D. N. (2020). BEI Cetak Rekor Transaksi Harian Sepanjang Sejarah di Tengah Kekhawatiran PSBB Jakarta Jilid 2. Retrieved from Media Indonesia website:https://www.goodnewsfromindonesia.id/2020/09/12/bei-cetak-rekor-transaksi-harian-sepanjang-sejarah-di-tengah-kekhawatiran-psbb-jakarta-jilid-2

APPENDIX

AVAILABILITY OF DATA

Data openly available in a public repository that does not issue DOIs:
The data that support the findings of this study are openly available in

Source	Link
National Disaster Management Agency (BNPB)	https://experience.arcgis.com/experience/57237ebe9c5b4b1caa1b93e79c92033
Google Trends	https://trends.google.com/trends/explore?date=2020-03-03 2020-10-27&geo=ID&q=corona,psbb,vaksin
Jakarta Stock Industrial Classification (Jasica)	
Agriculture (JKAGRI)	https://m.id.investing.com/indices/idx-agriculture-historical-data
Basic Industry (JKBIND)	https://m.id.investing.com/indices/idx-basic-industry-historical-data
Consumer Industry (JKCONS)	https://m.id.investing.com/indices/idx-consumer-industry-historical-data
Finance (JKFINA)	https://m.id.investing.com/indices/idx-finance-historical-data
Infrastructure (JKINFA)	https://m.id.investing.com/indices/idx-infrastructure-historical-data
Manufacture (JKMNFG)	https://m.id.investing.com/indices/idx-manufacture-historical-data
Miscellaneous Industry (JKMISC)	https://m.id.investing.com/indices/idx-miscellaneous-industry-historical-data
Property (JKPROP)	https://m.id.investing.com/indices/idx-cons.-property---real-estate-historical-data
Trade (JKTRAD)	https://m.id.investing.com/indices/idx-trade-and-servic-historical-data