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The Impact of COVID-19 Social and Public Activity Restrictions and Vaccination on Stock Returns in Indonesia

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Abstract

This study investigates both coronavirus disease (COVID-19) social and public activity restrictions as well as vaccination impact on stock returns of 351 listed companies in Indonesia. This study utilizes panel-data regression models, with the period of 2 March 2020 to 31 October 2021. Through this study, it is confirmed that lockdown did not significantly impact stock returns of listed firms. However, those listed firms' stock returns were positively and significantly affected by vaccination.

Keywords
covid-19; social; public activity

I. Introduction

Over the past decade, the amount of stocks listed on the Indonesia Stock Exchange has increased as much as 70% (The World Bank, 2021). Its main stock exchange, Indonesia Stock Exchange lists 38 indices, which includes 10 sectors (PT Bursa Efek Indonesia, 2021).

In 2020, countries worldwide (including Indonesia) were suffering from the spread of a new disease, known as coronavirus disease (COVID-19). This virus' main transmission routes for person-to-person are through respiratory droplet and contact transmission (Shi et al., 2020). In Indonesia, the first confirmed COVID-19 case was announced on 2 March 2020. Not long after, due to its rapid widespread worldwide, on 11 March 2020, WHO announced COVID-19 as pandemic disease. Up until 29 October 2021, the total of confirmed COVID-19 cases in Indonesia has accumulated to 4,242,532 cases, including 143,333 deaths (WHO, 2021).

Covid 19 pandemic caused all efforts not to be as maximal as expected (Sihombing and Nasib, 2020). The outbreak of this virus has an impact of a nation and Globally (Ningrum *et al*, 2020). The presence of Covid-19 as a pandemic certainly has an economic, social and psychological impact on society (Saleh and Mujahiddin, 2020).

From economy point of view, stock returns are also affected, since they respond to major events, including disasters and pandemic diseases (Al-Awadhi et al., 2020). Indonesia stock market performance even has dropped sharply to the level of 3,937.63 on 24 March 2020. Severe impact on financial market like this occurs due to additional costs related to pandemic, which includes social distancing that disrupts economic activity (Goodell, 2020).

During pandemic times, extreme quarantine measures were taken, including closing borders and keeping people in their homes to curb the virus spread (Yang et al., 2020). In line with that, Huo and Qiu (2020) also stated that due to its contagious characteristic, central governments worldwide have imposed hard-hitting policies, which can extremely hurt and shut economic activities. In Indonesia, the government took preventive action by applying different levels of social restrictions (also known as lockdown) since 10 April 2020. The highest level of social and activity restrictions was applied between the period

of (1)10 April 2020 to 4 June 2020 and (2)26 July 2021 to 4 October 2021, where only companies that lies under essential sector category, could operate on-site minimally.

Aside from lockdown implementation, scientist, and government also managed to deliver COVID-19 vaccines to nations as an effort to help contain the virus spread. Indonesia got its first shot on 13 January 2021. This resulted in Indonesia's achievement for being the first in terms of COVID-19 recovery among other ASEAN countries, according to Nikkei COVID-19 Recovery Index, as of 6 October 2021.

Previous studies conducted by Anh and Gan (2020) and Rouatbi et al. (2021) have studied the impact of COVID-19 lockdown and vaccination on stock performances. However, the former focused on Vietnam's stock market returns, while the latter focused on stock market volatility (Rouatbi et al., 2021).

Based on those research gaps, this research studied both COVID-19 lockdown and vaccination impact on stock returns in Indonesia, a country with aggressively developing economy which managed to recover from its rock bottom point due to the pandemic. This study raises the awareness regarding Indonesia stock market returns throughout COVID-19 period, with factors such as lockdown and vaccination. Besides, this study also acts as a reference for fellow academics, government officials, researchers, and all stakeholders in stock market in case of similar sudden pandemic situation in the future.

II. Review of Literature

2.1 COVID-19 Social and Public Activity Restriction Impact on Indonesia Stock Returns

According to Anh and Gan (2020), stock returns in Vietnam was negatively affected before any coronavirus disease (COVID-19) lockdown implementation. On the other hand, after the government finally decided to impose the lockdown policy, stock returns in Vietnam went into opposite trend. This was due to investors' positive sentiment towards government regulation (lockdown) to fight COVID-19 spread.

In addition, Alam et al. (2020) also stated that stock market return in India affected positively after lockdown implementation. Even though the situation is not ideal, stock market investors responded positively to it, with the hope of better market performance after the pandemic. Empirical results of this study showed that during pre-lockdown period, the AAR of India stock market was negative. Soon after lockdown implementation, the AAR turned upwards into positive trend, along with optimism from the investors.

H_1: COVID-19 social and public activity restrictions positively impacted returns of Indonesia stock market.

2.2 COVID-19 Vaccination Impact on Indonesia Stock Returns

According to Rouatbi et al. (2021), mass vaccination would stabilize equity market globally. Stock market volatility happened due to higher economic uncertainty throughout pandemic period, along with unexpected government intervention in controlling the pandemic. This caused disruption and decoupling in supply-demand mechanism in market. Through vaccination, consumer confidence would increase, which would bring positive trend on household consumption and investment activities.

Simamora (2021) also stated that vaccination partially and considerably affected the Indonesia's stock market return throughout 2021's first quarter. Vaccination is believed to control the pandemic, which resulted in economic recovery. The result of T-partial test in this study showed that significancy value of vaccination variable was < 0.05, which means that vaccination impacted Indonesia stock returns.

Since the focus of government was to create herd immunity, mass vaccination is considered as an essential tool to achieve it. By having herd immunity, the risk of virus spread as well as potential death could decrease. Therefore, vaccination would help stabilize economic and inflation of a country.
H_2: COVID-19 vaccination positively impacted Indonesia stock returns.

III. Research Method

3.1 Data

Data is a collection of facts, while information puts those facts into context. While data is raw and unorganized, information is organized (Asyraini et al., 2022, Octiva, 2018; Pandiangan et al., 2022). Data points are individual and sometimes unrelated. Information maps out that data to provide a big-picture view of how it all fits together (Octiva et al., 2018; Pandia et al., 2018; Pandiangan, 2015).

This research aims to assess both coronavirus disease (COVID-19) social and activity restriction as well as vaccination impact on stock returns in Indonesia. Based on S&P Capital IQ, out of 756 companies that are listed in Indonesia stock exchange, filtered by companies under 10 sectors listed in Table 1 below, which had initial public offering before 2 March 2020, the result narrowed down to 351 companies. Stock returns of these 351 companies then were divided into periods based on determined variables. Table 1 below shows the descriptive statistics regarding listed companies based on its industry.

Table 1. Descriptive Statistics of Listed Companies Based on Industry

Industry	Qty	Percentage
Consumer Discretionary	42	11.97%
Consumer Staples	42	11.97%
Energy	30	8.55%
Financials	50	14.25%
Health Care	8	2.28%
Industrials	76	21.65%
Information Technology	18	5.13%
Materials	33	9.40%
Real Estate	52	14.81%
Total	351	100%

The stock data (daily) was taken from 2 March 2020, the day where the first COVID-19 case was confirmed in Indonesia. The daily stock data used is up to 31 October 2021.

3.2 Empirical Model

Adopting Al-Awadhi et al. (2020), this research uses panel data regression, since the peak of thisphenomenon is not represented by the start date, and the event has been going on for months. Panel data also suits better for this research, since it could capture individual behavior (firm-level, in this case). Independent variables include social and public activity restriction and vaccination that significantly influences stock returns.

In this research, we use five dummy variables: (1) BLOCK which represents the period before lockdown (2 March 2020 to 9 April 2020) and (2) LOCK1 as well as (3) LOCK2 which represents first (10 April to 4 June 2020) and second (26 July 2020 to 4 October 2021) period of lockdown, respectively for the regression analysis. In addition, we

also use variables of (4) BVAC, and (5) VAC which represents period before and after vaccination was held, respectively.

The models for panel-data regression are as follows:

(1) Models (1) and (2) investigate COVID-19 lockdown period (before and after the implementation) impact on the stock return oflisted firms:

$$RE = \alpha1 + \alpha2\ MRKT_{d-1} + \alpha3\ MTBR_{d-1} + \alpha4\ SIZE_{d-1} + \alpha5\ BLOCK1_t + \varepsilon \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$RE = \alpha1 + \alpha2\ MRKT_{d-1} + \alpha3\ MTBR_{d-1} + \alpha4\ SIZE_{d-1} + \alpha5\ LOCK1_t + \alpha6\ LOCK2_t + \varepsilon \quad \ldots\ldots\ldots (2)$$

(2) Models (3) investigates COVID-19 vaccination impact on the stock return of listed firms:

$$RE = \alpha1 + \alpha2\ MRKT_{d-1} + \alpha3\ MTBR_{d-1} + \alpha4\ SIZE_{d-1} + \alpha5\ VAC_t + \varepsilon \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where:

RE = the return of stock j on day t.

$MRKT_{x,d-1}$ = natural logarithm of market capitalization (daily) of firm x on day d-1.

$MTBR_{x,d-1}$ = market-to-book ratio of firm x on day d-1.

$SIZE_{x,d-1}$ = natural logarithm of total assetof firm x on day d-1.

$BLOCK1_{x,d}$ equals to 1 when the period is in between 2 March 2020 and 9 April 2020; 0 otherwise.

$LOCK1_{x,d}$ equals to 1 when the period is in between10 April 2020 and 4 June 2020; 0 otherwise.

$LOCK2_{x,t}$, equals to 1 when the period is in between26 July 2021 and 4 October 2021; 0 otherwise.

$VAC_{x,d}$ equals to 1 when the period is in between13 January 2021 to 31 October 2021; 0 otherwise.

3.3 Operationalization of Variables

Dependent variable is the variable that is being measured or tested in an experiment. 1 For example, in a study looking at how tutoring impacts test scores, the dependent variable would be the participants' test scores, since that is what is being measured (Pandiangan, 2018; Pandiangan, 2022; Tobing et al., 2018). Independent variable is the variable you manipulate or vary in an experimental study to explore its effects (Octiva et al., 2021; Pandiangan et al., 2018; Pandiangan et al., 2021). The dependent variable is return of listed companies in Indonesia, while the independent variables are lockdown and vaccination period. Other factors included are market capitalization (MRKT), market-to-book ratio (MTBR) as well astotal asset of listed firms (SIZE).

During data processing, the observation was winsorized to reduce the impact caused by outliers. Based on hausman test and chow test, this study implements the fixed-effects estimation for panel-data regression models. The models then regressed after we correct heteroskedastic and auto collinearity problem that appeared (robust).

IV. Results and Discussion

4.1 Empirical Results of Study on COVID-19 Restrictions and Vaccination Impact towards Stock Returns in Indonesia

Table 2. Descriptive Statistics of Listed Companies

Variable	Mean	Std. Dev.	Min	Max
Return	0	.005	-.157	.286
BLOCK1	.07	.255	0	1
LOCK1	.096	.295	0	1
LOCK2	.123	.328	0	1
VAC	.454	.498	0	1
MRKT	.002	.074	-.362	.401
newMarkettoBookRatio	2.461	4.222	.167	29.951
ln SIZE	4.452	1.856	-.616	11.062

Table 2 displays the descriptive statistics of listed companies between 2 March 2020 and 31 October 2021. The average returns of listed companies were positive during the study period. The average of market capitalization and market-to-book values were 0.002 and 2.46, respectively. These findings are better compared to study conducted by Anh and Gan (2020) in Vietnam. The average stock returns of listed companies there were negative throughout the period. However, in terms of MTBR value of listed firms on Vietnam stock markets (HASTC and HOSE) were 0.84 and 1.13, respectively, which were smaller compared to Indonesia's.

Table 3. Correlation Matrix of the Models' Variables Matrix of Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Return	1.000							
(2) BLOCK1	-0.037	1.000						
(3) LOCK1	0.008	-0.080	1.000					
(4) LOCK2	0.008	-0.108	-0.110	1.000				
(5) VAC	0.002	-0.259	-0.264	0.417	1.000			
(6) MRKT	0.118	-0.184	0.030	0.016	-0.025	1.000		
(7) newMarkettoBoo~	0.005	0.001	-0.014	0.036	0.046	-0.002	1.000	
(8) lnSIZE	0.001	-0.023	-0.029	0.034	0.062	-0.001	0.270	1.000

Table 3 above displays the correlation among variables in the models. In general, it can be implied that there was no strong correlation among variables, since the values are below 0.5. Out of all regressions, the strongest correlation exists between vaccination and second period of lockdown. The underlying reason to this findingis that both events happened at the same period.

Table 4. The Results of Regression on Model (1), (2), and (3) For Indonesia Stock Exchange

Variables	No. of Obs.	(1)	(2)	(3)	(4)
BLOCK1	124,203	-.0004083			-.0003812
		.000			.001
LOCK1	146,016		.0000067		-.000019
			.912		.755
LOCK2	146,016		.0001139		.0000584
			.095		.445
VAC	146,016			.0001163	.0000503
				.014	.344
MRKT	135,135	.0077653	.0080324	.0080613	.0077896
		.000	.000	.000	.000
newMarkettoBookRatio	127,202	.0001237	.0001166	.0001199	.0001252
		.000	.000	.000	.000
lnSIZE	131,305	-.0005386	-.0004969	-.0005347	-.0005689
		.000	.000	.000	.000
F-stats		1.84	1.77	1.81	100.94
		.000	.000	.000	.000

Table 4 above suggests that pre-lockdown period has negative and significant impact on stock returns in Indonesia. This represents investors' concern towards coronavirus disease (COVID-19) in the beginning. At that time, the virus was perceived as a new and strange outbreak with unknown symptoms and negative health effects. Combined with adverse media coverage regarding this virus, the stock return in Indonesia then affected negatively and significantly. In line with studies conducted by Anh and Gan (2020), people in Vietnam also perceived the pre-lockdown period as chaos and plunge situation, in which the government has not taken any action yet. This situation even lasted for almost up to 2 months, until the government decided to implement lockdown scheme. Therefore, the pessimism of investors there caused the performance of stocks in Vietnam plummeted down throughout that period.

According to a study conducted by Hutomo and Hanggraeni (2021), the stock return was positively influenced by lockdown. They wrote that lockdown decision imposed by Indonesian government can be seen as their endeavor to curb the spread of COVID-19 in Indonesia. Both stricter or more tolerant, lockdown policies have encouraging impact on stock market returns. In line with that study, Bouri et al. (2021) stated that lockdown in New Zealand has positive impact on NZ50 market returns. This implies that the government initiative to lockdown, in general, has increased investors' confidence in the market.

In contrast to those findings, results in Table 4 suggest that lockdown did not significantly impact stock returns in Indonesia. By this period, investors already had more awareness of COVID-19. The fear and uncertainty towards virus had also declined at this point. According to Narayan et al. (2021) which studied the effect of government responses of G7 countries to COVID-19, there are types of reaction to news in financial markets, which are attributed to investor under reaction and over reaction. Therefore, it can be implied that investors in Indonesia projected under reaction towards the media coverage of lockdown in this period.

As for vaccination, this variable positively impacted stock returns in Indonesia significantly. This result is in line with research conducted by Unal et al. (2022) and Mishra et al. (2022), where vaccination has positive contribution towards financial markets included in MSCI and Dow Jones indices, respectively.From global perspective, a study conducted by Ngwakwe (2021) also found that several major global stock market indexes (Dow Jones, Shanghai, S&P, FTSE, and EURONEXT) experienced sharp and note worthy increase instock returnas COVID-19 vaccines arrived.

Since vaccination is a faster means to achieve herd immunity, investors had positive sentiment and better confidence towards stock market throughout this period. According to Hartono (2021), advances in vaccine production stages conveyed through scientific journals and media coverage have received high appreciation from stock investors. Similar to a study conducted by Behera et al. (2022), mass vaccination process in India was perceived as positive action in the stock market, since it decreases chaos and volatility in the stock market.

V. Conclusion

This study examined coronavirus disease (COVID-19) social and public activity restrictions (known as lockdown) and vaccination impact on stock returns of 351 listed firms on Indonesia stock market between 2 March 2020 to 31 October 2021. The hypothesis of this study suggested that lockdown and vaccination have significant impact on Indonesia stock market.

Adopting panel-data regression models, the results of this study surprisingly confirmed that lockdown did not have significant impact on stock market returns in Indonesia throughout the given period. The underlying reason to this finding might be caused by investors' confidence in better financial market recovery after gradual awareness of COVID-19, along with its effects medically and financially. Therefore, lockdown implementation did not have significant impact on stock market returns in Indonesia.

In addition to lockdown, vaccination was also held by Indonesia's government to achieve herd immunity faster. Investors believed that vaccination could help curb the virus outbreak, which ultimately affects financial markets positively. This perspective then reflected by the result of this study.

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