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Covid-19 Pandemic Effect on Herding Behavior in Indonesian Market

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ABSTRACT

The purpose of this paper is to examine the herding behavior in the Indonesian stock market during the Covid-19 pandemic and pre Covid-19 pandemic. Using the samples from all the listed stocks in LQ45 and Kompas100 index, from the period of 01 January 2017 to 31 December 2019 to represent pre Covid-19 period and 01 February 2020 to 30 September 2021 to represent the Covid-19 period. We find that overall, herding behavior only exists in the Indonesian stock market during the Covid-19 period. Furthermore, we explore herding behavior asymmetric properties during up and down market conditions. We find that herding behavior is more pronounced for downside market movement. We also conduct an investigation to herding correlation to net foreign buy or sell transactions in the Indonesian stock market. We find that herding is more pronounced during the times of net foreign sale throughout the Covid-19 pandemic. These results are important for investors to enhance their understanding of stock markets and the financial effects of the Covid-19 pandemic.

Keywords: Herding Behavior, Indonesian Stock Market, Behavioral Finance, Equity Return Dispersion, Covid-19

1. INTRODUCTION

In 2020, the pandemic hit the world, many countries suffered great loss from an economic point of view. During the year 2020, the global Gross Domestic Product was having a negative growth rate of minus 3.593% (World Bank, 2021). This pandemic hit all countries and there was no exception for Indonesia. Last year, many people lost their jobs and lots of businesses were being closed. However, the number of people that are investing in the stock market, Forex Online Trading, Cryptocurrencies, and other financial instruments are increasing. Based on Kustodian Sentral Efek Indonesia (KSEI) published statistics in September 2021, the number of Single Investor Identification (SID) on the Indonesian stock market grew by 65.73% year-to-date. As of September 2021 there are 6,431,444 stock market investors listed in KSEI (KSEI, 2021).

In this paper, we are going to discuss investor behavior in Indonesia, especially during these past years. Our study is intended to prove whether herding exists during the pandemic, as we discover that in the previous study conducted by Fransiska et al. (2018) found that herding does not exist in the Indonesian market during the pre-pandemic era. We are conducting two separate measurements with two sets of data on different time spans (pre pandemic era and pandemic era) to prove herding existence, or its absence, within those two periods.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Empirical Evidence

Herding behavior is a condition where investors are acting as a group, a conforming unity, and they disregard their own knowledge and information, so that they are behaving as a follower to the general market trend, without fully understanding the situation and condition of stocks that they're investing in. Herding behavior is often shown by a conformity of stocks return within an index, to the overall market return (Tan et al., 2008).

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Herding behavior can also be defined as an investor behavior who contradicts his knowledge and information to fall prey to a communal belief, regardless if the actions of this group are not based on rational reasons (Keynes, 1936). Another study defined herding behavior as investors' tendency to imitate the actions, in regards to decision-making, of other market participants, and thus ignoring their own information and what they know before (Chesnay and Jondeau, 2000).

2.2 Hypothesis Development

A study found a positive correlation between trading volume and extreme volatility (Bikhchandani et al., 1992). An excessive trading volume amplified herding behavior and caused a significant increase in stock prices and overvaluation. This study shows that people act as groups and have a tendency to trade massively on some specific stocks, which leads to abnormal trading volume and generates the increase of their corresponding volatilities.

The idea is, during the period of high trading volume, it is very common that it's being followed by high volatility, and during that period, investors, whom are afraid to have substantial losses, may ignore their belief and trading behavior to imitate a more informed institutional investor (Lakonishok et al., 1992).

The Covid-19 pandemic is predicted to descend into economic downturn. Investors in the Indonesian stock market have growing risk of uncertainty regarding the economic condition, which results in substantial increase of volatility and trading volume (Dewi, 2020), which creates investors' tendency to mimic decisions from other market participants (Kurz and Kurz-Kim, 2013).

3. RESEARCH METHODOLOGY

3.1 Data Collection

The data used in this study are required from secondary data, which are collected from the historical stock price from stocks in the LQ45 to represent the blue-chip of top 45 stocks in Jakarta Composite Index and IDX Kompas100, which gives wider representation of the Indonesian stock market. The data that is being used in this research is daily price. To represent the Covid-19 period, we select the time span of February 1st, 2020 to September 30th, 2021. We chose February as the start of our sampling period, because the World Health Organization (WHO) first announced the Covid-19 as a Public Health Emergency of International Concern on January 30th 2020 (WHO, 2020). As for the pre-pandemic period, we choose the time span of January 1st 2017 to December 31th 2019 to represent normal conditions before the pandemic.

3.2 Methodology

The analysis of herding behavior in this research is conducted using the *Cross-Sectional Absolute Deviation* (Chang et. al., 2000) model. After gathering the return dispersion models, we apply those data into a regression model to investigate the herding indicators.

The authors have noted that the *CSAD* model is an improved and perfected version of the previous *CSSD (Cross-Sectional Standard Deviation)* model by Christie and Huang (1995). However, after we conducted herding test measurement with the CSSD model, the results have failed to get any substantial evidence of herding in any condition (even during the pandemic). These results complement other previous journals that criticize the accuracy and effectiveness of the CSSD model (Chang et al. (2000), Gleason et al. (2004), and Tan et al. (2008)).

3.3 Cross-Sectional Absolute Deviation (CSAD)

Cross-Sectional Absolute Deviation first introduced by Chang, Cheng, and Khorana (2000). *CSAD* gives an effective measure of herd behavior through return dispersion, which is derived from the conventional *CAPM*, which is defined as the Eq. (1).

$$\boldsymbol{CSAD_t = \frac{1}{N_t}\sum_{i=1}^{N_t}|R_{i,t} - R_{m,t}|} \quad (1)$$

$R_{i,t}$ value represents the observed stocks' return of company *i* at time *t*. While$R_{m,t}$ is the overall market return at time *t* in the aggregate market stock.

If herding exists, the relationship between $CSAD_t$ and $R_{m,t}$ should be nonlinear. However, if the rational asset pricing is in accordance with the *CAPM*, then the relationship between $CSAD_t$ and $R_{m,t}$ would be linear.

The $R^2_{m,t}$ is used to capture the nonlinearity between *CSAD* and the average market return, as shown in Eq. (2) (Dhall & Singh, 2020).

$$\boldsymbol{CSAD_t = \alpha + \gamma_1 R_{m,t} + \gamma_2 |R_{m,t}| + \gamma_3 R^2_{m,t} + \varepsilon_t} \quad (2)$$

This equation can be an indicator of herding existence, which is captured by the value of coefficient γ_3. If herding exists, its presence will be shown by a significantly negative value of γ_3.

Asymmetric Properties in Herding Behavior during *Up* and *Down* Market

The direction of the market is also very possible to affect the herding behavior. We conduct a robustness test on this matter to see if there is any asymmetry property in herding behavior during positive or negative market movement. We separate the regression equation based on the trajectory of the market return whether it's positive ($R_{m,t} > 0$) or negative ($R_{m,t} < 0$) as shown in the Eq. (3) and Eq. (4) (Munkh-Ulzii et al., 2020) (Yao et al., 2013).

$$CSAD_t^{UP} = \alpha + \gamma_1 |R_{m,t}^{UP}| + \gamma_2 (R_{m,t}^{UP})^2 + \varepsilon_t \quad (3)$$

When $R_{m,t} > 0$, and:

$$CSAD_t^{DOWN} = \alpha + \gamma_1 |R_{m,t}^{DOWN}| + \gamma_2 (R_{m,t}^{DOWN})^2 + \varepsilon_t \quad (4)$$

When $R_{m,t} < 0$.

As in the CSAD model, the significant negative value of in both γ_2 Eq. (3) and Eq. (4) will prove the existence of herding behavior in the market.

Asymmetric Property of Herding Behavior in Regards to Net Foreign Flow

In Indonesia's stock market, there's a quite sizable amount of foreign investors, which by the data from *IDX* quarterly statistics on the second quarter of 2021, the foreign investors are making 28% of the total trading value in the Jakarta Composite Index *(IDX, 2021)*. In that case, there is a good possibility that the more informed foreign investor may contribute to herding in the Indonesian market.

We took the model from Yao et al. (2013), whose study about the correlation between return dispersion in the *Up* and *Down* market condition, as shown in Eq. (3) and Eq. (4). Then, we modified the variable $R_{m,t}^{UP}$ and $R_{m,t}^{DOWN}$ which is representation of market return condition on the time t, and replace it with $R_{m,t}^{Buy}$ and $R_{m,t}^{Sell}$ which are the representation of net foreign flow (buy/sell) on the Indonesian stock market, and we got the Eq. (5) and Eq. (6) as follows.

$$CSAD_t^{Buy} = \alpha + \gamma_1 |R_{m,t}^{Buy}| + \gamma_2 (R_{m,t}^{Buy})^2 + \varepsilon_t \quad (5)$$

When foreign investors net buy in the Indonesian stock market at the time t.

$$CSAD_t^{Sell} = \alpha + \gamma_1 |R_{m,t}^{Sell}| + \gamma_2 (R_{m,t}^{Sell})^2 + \varepsilon_t \quad (6)$$

When foreign investors net sell in the Indonesian stock market at the time *t*.

4. RESULTS

4.1 Herding Behavior Test on Covid-19 Period (Feb 2020 – Sep 2021)

To prove the existence of herding behavior during the Covid-19 period, we use the daily data of *Kompas100* index and the *LQ45* index within the period of 01 February 2020 to 30 September 2021. The *CSAD* is able to capture evidence of herding on its regression results, shown in Table 1, the negative value of coefficient with statistically significant results.

Table 1. Coefficient of CSAD regression model during the Covid-19 period

Market	Companies Count	R_m	$\|R_m\|$	R_m^2	Constant	$\bar{R}^2$
Kompas100	100	0.0925 (4.8956)***	0.3580 (5.7997)***	-2.7142 (-2.0918)**	0.0166 (33.1894)***	0.2262
LQ45	45	0.1102 (6.9206)***	0.3175 (8.3420)***	-1.2447 (-2.9126)***	0.0147 (31.5386)***	0.3109

**Notes: The number in the parentheses are the t-stats value of each coefficient. The symbol (***), (**), and (*) represent statistical significance at the 1%, 5%, and 10% levels, respectively.*

The results from Table 1 indicates that herding does exist in *Kompas100* and *LQ45* index during the period of Covid-19 according to the *CSAD* regression model, shown by the negative value of coefficient by -2.7142 and -1.2447 respectively.

4.2 Herding Behavior Test on Pre Covid-19 Period (Jan 2017 – Dec 2019)

To prove whether herding does not exist in normal condition, we use the time span from pre Covid-19 condition of the year 2017 to 2019, considering in that period, the normal condition is applied in Indonesian stock market.

Table 2. Coefficient of CSAD regression model during the pre Covid-19 period

Market	Companies Count	R_m	$\|R_m\|$	R_m^2	Constant	$\bar{R}^2$
Kompas100	100	0.0241 (0.6705)	0.2031 (1.5179)	10.2442 (2.0803)**	0.0152 (23.0534)***	0.0999
LQ45	45	0.0580388 (2.1674)**	0.40005724 (3.9470)***	6.4491 (1.8247)**	0.0149 (31.5386)***	0.226

**Notes: The number in the parentheses are the t-stats value of each coefficient. The symbol (***), (**), and (*) represent statistical significance at the 1%, 5%, and 10% levels, respectively.*

The positive values of all the coefficients show a positive relationship between the CSAD return dispersion model with the average market return. Which indicates that the market is behaving rationally.

4.3 Robustness Test on UP and DOWN Market Condition

We also conduct robustness tests to measure the asymmetric property of herding behavior in *Up* and *Down* market conditions. We separate the data from the previous measurement based on the value of . The value of > 0 means the market is on up condition, and the value of < 0 means the market is in a down condition.

4.3.1 Covid-19 Period

As what we've expected, during the Covid-19 period, herding behavior is present in both *Up* and *Down* market conditions, with the exception of the Kompas100 index on *Up* market condition that has statically insignificant results (*p-value* > 10%). As shown in Table 3 and Table 4, the negative value of coefficient and prove the existence of herding.

Table 3. Coefficient of robustness test on UP market condition with CSAD regression model in Kompas100 and LQ45 index during the Covid-19 period

Market	Companies Count	$\lvert R_{m,t}^{UP}\rvert$	$(R_{m,t}^{UP})^2$	Constant	$\bar{R}^2$
Kompas100	100	0.4099 (7.4549)***	-0.3655 (-0.6868)	0.0167 (24.9699)***	0.4531
LQ45	45	0.4222 (7.4240)***	-1.1845 (-2.2771)**	0.0148 (19.9211)***	0.3571

**Notes: The number in the parentheses are the t-stats value of each coefficient. The symbol (***), (**), and (*) represent statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 4. Coefficient of robustness test on DOWN market condition with CSAD regression model in Kompas100 and LQ45 index during the Covid-19 period

Market	Companies Count	$\lvert R_{m,t}^{DOWN}\rvert$	$(R_{m,t}^{DOWN})^2$	Constant	$\bar{R}^2$
Kompas100	100	0.3035 (3.9144)***	-3.2949 (-2.3626)**	0.0162 (24.7741)***	0.1151
LQ45	45	0.2613 (3.3712)***	-2.4204 (-1.7748)*	0.0145 (21.0091)***	0.1124

**Notes: The number in the parentheses are the t-stats value of each coefficient. The symbol (***), (**), and (*) represent statistical significance at the 1%, 5%, and 10% levels, respectively.*

4.3.2 Pre Covid-19 Period

The absence of herding during the pre Covid-19 period in *Kompas100* and *LQ45* is also consistent with the previous measurement. Although we found negative value of coefficient in the measurement of the LQ45 index, but the statistical significance value is above 10%, hence it can't prove the existence of herding. As shown in Table 5 and Table 6, herding is absent during the pre Covid-19 period.

Table 5. Coefficient of robustness test on UP market condition with CSAD regression model in Kompas100 and LQ45 index during the pre Covid-19 period

Market	Companies Count	$\lvert R_{m,t}^{UP}\rvert$	$(R_{m,t}^{UP})^2$	Constant	$\bar{R}^2$
Kompas100	100	0.3681 (1.8440)*	2.5526 (0.3095)	0.0150 (16.5514)***	0.0814
LQ45	45	0.0972 (0.8439)	21.2314 (4.8398)***	0.0162 (28.4825)***	0.377

**Notes: The number in the parentheses are the t-stats value of each coefficient. The symbol (***), (**), and (*) represent statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 6. Coefficient of robustness test on DOWN market condition with CSAD regression model in Kompas100 and LQ45 index during the pre Covid-19 period

Market	Companies Count	$\lvert R_{m,t}^{DOWN} \rvert$	$(R_{m,t}^{DOWN})^2$	Constant	$\bar{R}^2$
Kompas100	100	0.1285 (0.6730)	13.1426 (2.0499)**	0.0151 (15.2365)***	0.1182
LQ45	45	0.5888 (3.5164)***	-2.1820 (-0.4032)	0.0139 (15.1563)***	0.1552

**Notes: The number in the parentheses are the t-stats value of each coefficient. The symbol (***), (**), and (*) represent statistical significance at the 1%, 5%, and 10% levels, respectively.*

4.4 Robustness Test on Net Foreign Flow (Buy/Sell Condition)

We conduct a robustness test on the asymmetric property of foreign net buy and foreign net sell condition in Jakarta Composite Index may contribute to herding behavior. Using the herding test Eq. (5) and Eq. (6) for each net foreign buy and net foreign sell condition for each day of stock market total transactions. The samples are being grouped as two, which are the Pre-Covid condition and during the pandemic condition, similar to previous herding measurement.

4.4.1 Covid-19 Period

During the Covid-19 period, in both net foreign buy and sell conditions, herding is present. Based on the result, it points out that the foreign investor net sell condition is impacting the herding behavior in the stock market, stronger than the net foreign buy condition in both *LQ45* and *Kompas100* indexes.

Table 7. Coefficient of robustness test on Net Foreign Buy condition with CSAD regression model in Kompas100 and LQ45 index during the Covid-19 period

Market	Companies Count	$\lvert R_{m,t}^{Buy} \rvert$	$(R_{m,t}^{Buy})^2$	Constant	$\bar{R}^2$
Kompas100	100	0.3743 (4.8944)***	-2.2035 (1.7477)*	0.0163 (24.7410)***	0.2779
LQ45	45	0.3906 (5.5128)***	-2.4177 (-2.1913)**	0.0140 (21.3639)***	0.3097

**Notes: The number in the parentheses are the t-stats value of each coefficient. The symbol (***), (**), and (*) represent statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 8. Coefficient of robustness test on Net Foreign Sell condition with CSAD regression model in Kompas100 and LQ45 index during the Covid-19 period

Market	Companies Count	$\lvert R_{m,t}^{Sell} \rvert$	$(R_{m,t}^{Sell})^2$	Constant	$\bar{R}^2$
Kompas100	100	0.4042 (4.4939)***	-3.5963 (-2.0217)**	0.0164 (21.1412)***	0.1793
LQ45	45	0.4158 (4.3776)***	-4.1452 (-2.2616)**	0.0145 (17.0806)***	0.1543

**Notes: The number in the parentheses are the t-stats value of each coefficient. The symbol (***), (**), and (*) represent statistical significance at the 1%, 5%, and 10% levels, respectively.*

As shown in Table 7 and Table 8, the asymmetric property of herding behavior is obvious that it is stronger during the net foreign investor sale during the Covid-19 period.

4.4.2 Pre Covid-19 Period

Consistent with our previous herding measurement, we find no evidence of herding behavior in both net foreign investors' buy and sell condition in both LQ45 and Kompas100 index during the pre-Covid 19 period.

As shown in Table 9 and Table 10, both conditions of net foreign investor flow (buy/sell) are not creating herding behavior, confirmed by the positive correlations of return dispersion (CSAD) and the squared market return.

Table 9. Coefficient of robustness test on Net Foreign Buy condition with CSAD regression model in Kompas100 and LQ45 index during the pre Covid-19 period

Market	Companies Count	$\lvert R_{m,t}^{Buy} \rvert$	$(R_{m,t}^{Buy})^2$	Constant	$\bar{R}^2$
Kompas100	100	0.1353 (1.3031)	4.3458 (0.9728)	0.0159 (34.0233)***	0.1174
LQ45	45	0.1418 (3.7760)***	16.2414 (0.4006)	0.0158 (18.7508)***	0.2016

**Notes: The number in the parentheses are the t-stats value of each coefficient. The symbol (***), (**), and (*) represent statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 10. Coefficient of robustness test on Net Foreign Sell condition with CSAD regression model in Kompas100 and LQ45 index during the pre Covid-19 period

Market	Companies Count	$\lvert R_{m,t}^{Sell} \rvert$	$(R_{m,t}^{Sell})^2$	Constant	$\bar{R}^2$
Kompas100	100	0.3507 (1.7987)*	7.5015 (1.1103)	0.0146 (14.7191)***	0.1053
LQ45	45	0.5372 (1.1212)	1.8751 (3.1556)***	0.0145 (23.3005)***	0.3253

**Notes: The number in the parentheses are the t-stats value of each coefficient. The symbol (***), (**), and (*) represent statistical significance at the 1%, 5%, and 10% levels, respectively.*

These results amplify the theory that the Covid-19 pandemic has a strong contribution to the herding behavior in the Indonesian stock market.

5. CONCLUSION

It is undeniable that the ongoing Covid-19 pandemic has affected this country in so many dimensions. Based on our CSAD model, we found evidence that herding behavior existed during the Covid-19 period, in both *LQ45* and *Kompas100* indexes, while we did not find any sign of herding in the pre Covid-19 period. Which proves that Covid-19 has affected the investor behavior in the Indonesian market resulting in herd behavior.

The Covid-19 pandemic has triggered the Indonesian stock market to become more volatile and somehow increase its volume transaction quite significantly. The pandemic also creates an uncertainty in the market, as the pandemic like Covid-19 is an uncharted territory to the capital market. Our research is able to prove that all of those factors caused by the pandemic have led the investors in the Indonesian stock market to herd and imitate other market participants when they make an investment decision.

We also conducted robustness tests on Up and Down market conditions, and we find that during the Covid-19 pandemic, there are clear signs of herding behavior in both Up and Down market conditions for *LQ45* index. In the Kompas100 index, we only found evidence of herding during the Down market during the pandemic. Moreover, we found that herding behavior is stronger during the Down market condition (for *LQ45* index), which is consistent with the previous studies on herding that suggest herding is more likely to occur during the period of market stress (Chang et al. (2000), Lao and Singh (2011), and Yao et al. (2013)). We also found that during the pre Covid-19 period, there is no evidence that herding is present in the Indonesian stock market. This result further strengthens the idea that herding does not exist in pre pandemic conditions.

In addition, we also conducted a robustness test on how the foreign investor flow of net buy or net sell may contribute to herding behavior in the Indonesian stock market. We found that there is an asymmetric condition where herding is clearly intensified during the period of net foreign sale during the Covid-19 pandemic. We find stronger evidence of herding behavior in both *LQ45* and *Kompas100* during the net foreign sell rather than the net foreign buy condition within the same period. Furthermore, we did not find any evidence of herding during the pre Covid-19 period in both the net foreign buy and sell condition. These findings show that local retail investors have a tendency to go by with the foreign investor in the period of uncertainty or market turmoil, as they see the foreign investor as the more informed ones.

Therewith, this research is able to prove both hypotheses that herding behavior did not exist in the Indonesian stock market during the pre Covid-19 pandemic, as it only exists in the Covid-19 pandemic. Therefore, we conclude that the Covid-19 is clearly has a significant effect on herding behavior in the Indonesian stock market.

With the limited time of research, we still cannot determine the effects of herding behavior itself on the Indonesian investors, especially the followers (new investors with limited knowledge). We hope that future research may be able to go through what are the positive and negative impacts of herding behavior in the Indonesian stock market, looking from the investors' point of view.

Herding behavior is a phenomenon in the midst of global pandemic, or, it may be a new beginning of an era. Further research may dig deep in the social aspects of this phenomenon. As we also see that this could be a new disruptive era of the stock market that shifts investors' perspective on how they value a stock, or other financial instrument.

There are also other opportunities to perfect the model of this research, or to have future tests on how this pandemic really affects the investors' behavior in the long run. As the authors only have a limited time span while currently, the pandemic is still ongoing by the time of this paper being written, and we don't know for sure when it will end. We do not rule out the possibility that future studies with a longer time span could result in more accurate and established conclusions.

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