Firm Size, Market Risk, And Return Reversal Anomalies During The COVID-19 Pandemic

Ferikawita M. Sembiring*

Faculty of Economics & Business, Jenderal Achmad Yani University, Cimahi, Indonesia

Email Address:
*ferikawita.magdalena@lecture.unjani.ac.id**
Corresponding Author

Abstract: This research aims to prove whether firm size and market risk based on CAPM affect return reversal anomalies as indicators of market overreaction during the COVID-19 pandemic. This explanatory research used a sample of stocks on the Indonesia Stock Exchange (IDX) that could be profitable during the pandemic period up to the effective period of phase one and two vaccination. It was found that return reversal anomalies occurred in the short term on the IDX, and contrarian strategies resulted in profits. Factors of firm size and market risk affected the reversal of returns in specific periods but did not affect other periods. When firm size and market risk had no effect, the return reversal anomaly occurred entirely due to the investors' overreaction in response to the pandemic without regard to the size and market risk factors of companies whose stocks were the investment target.
Keywords: Contrarian Strategy; Firm Size; Market Overreaction; Market Risk; Return Reversal.

Abstrak: Penelitian ini bertujuan untuk membuktikan apakah ukuran perusahaan dan risiko pasar berdasarkan CAPM berpengaruh terhadap anomali pembalikan return yang merupakan indikator dari peristiwa market overreaction pada kondisi pandemi COVID-19. Metode penelitian adalah explanatory research dengan sampel saham-saham di Bursa Efek Indonesia (BEI) yang berpotensi menguntungkan selama periode pandemi sampai dengan periode masa efektif pelaksanaan vaksin tahap satu dan tahap dua. Temuan dari hasil penelitian adalah bahwa anomali pembalikan return terjadi dalam jangka pendek di BEI dan strategi kontrarian telah memberikan keuntungan. Faktor ukuran perusahaan dan risiko pasar mempengaruhi pembalikan return di beberapa periode saja sementara di beberapa periode tidak berpengaruh. Pada periode dimana ukuran perusahaan dan risiko pasar tidak berpengaruh, hal ini mengindikasikan bahwa anomali pembalikan return yang terjadi sepenuhnya merupakan perilaku investor yang bereaksi secara berlebihan dalam merespon kondisi pandemi yang terjadi tanpa memperhatikan faktor ukuran dan risiko pasar dari perusahaan yang sahamnya menjadi target investasi.
Kata Kunci: Market Overreaction; Pembalikan Return; Risiko Pasar; Strategi Kontrarian; Ukuran Perusahaan.

INTRODUCTION

Empirically, the Capital Asset Pricing Model (CAPM) proposed by (Sharpe, 1964) has been used frequently to assess the fair value of a financial asset, which is also the pioneer of asset pricing models. CAPM is the model that relates the expected return of risky assets to the level of risk of those assets in equilibrium market conditions. The main assumption of the CAPM is that, due to the market being in a state of equilibrium, thus it is no longer possible for investors to gain abnormal returns. This equilibrium market assumption is related to the efficient market hypothesis (EMH) theory proposed by (Fama, 1970), stating that the more efficient a market is, the smaller the chance for investors to gain abnormal returns. However, subsequent research in response to this theory resulted in

findings of anomalous conditions, an anomaly of reversal return, or called return reversal, an indicator of events where market participants overreact (market overreaction). This anomaly created a contrarian investment strategy, allowing investors to earn abnormal returns. Abnormal returns obtained from anomalous conditions in the capital market, especially in the stock market, are contrary to the CAPM and EMH theories, so until now, this theory has still been debatable.

(De Bondt & Thaler, 1985) They first proved the existence of the market overreaction phenomenon in the long term after first classifying stocks in the United States stock market into groups (portfolios) of the winner and loser. During the observation period (formation and testing), the winners and losers would experience a price reversal anomaly or return (return reversal) in which losers would become winners, and conversely, winners would become losers. The investment strategy proposed by (De Bondt & Thaler, 1985) in this anomaly condition is a contrarian strategy implemented by buying the loser stocks and selling the winner. The advantage of the contrarian strategy is obtained from the positive difference in the abnormal returns of the loser portfolio over the winners.

Empirically, as found by (De Bondt & Thaler, 1985), the phenomenon of market overreaction, which is characterized by an anomaly of return reversal, occurs in the long term, as also found by (Blackburn & Cakici, 2017) in several developed markets (categorized into North America, Europe, Japan and Asia). Several empirical studies also found that these anomalies occur in the short term, as found by (Piccoli et al., 2017) in America and Brazil and by (Reddy et al., 2020) in Shanghai. Furthermore, (Truong et al., 2023) found this market anomaly in Vietnam. The finding of this result supports the hypothesis that the Vietnam stock market is inefficient in its weak form.

Empirical research in Indonesia also found that return reversal anomalies occur in the short term, as in the findings of (Sembiring, 2022) and (Syafitri et al., 2022). (Sembiring, 2022) Moreover, (Syafitri et al., 2022) conducted their research during the initial period, which was the peak of the COVID-19 pandemic (before the implementation of the phase one and two vaccination programs). However, in other research, a market overreaction phenomenon was not found in Indonesia. (Musnadi & Majid, 2018) There was no market overreaction phenomenon in several sectoral index stocks in Indonesia. (Hadimas, 2019) did not find the reversal of the return when using a sample of superior stocks that were members of the LQ 45 Index, while (Satria & Yadnya, 2021) did not find this reversal when using a sample of the IDX 30. (Hadimas, 2019) and (Satria & Yadnya, 2021) found the phenomenon but not statistically significant.

(Hadimas, 2019) uses two types of research periods, namely annual and semester. The result of the research found that the phenomenon of overreaction occurred on superior stocks of the LQ 45 Index, finding that the loser can outperform the winner. However, when the statistical test was carried out, it was found that the phenomenon that occurred was not significant. Similar to (Hadimas, 2019), (Satria & Yadnya, 2021) found the phenomenon insignificant statistically.

The different results in Indonesia were found by (Meiliani et al., 2021). They found this phenomenon in Indonesia but did not find it in Singapore. These differences in findings indicate inconsistencies in research results, which allow for further research on the phenomenon of market overreaction in the stock market and the profit opportunities that may be obtained when applying a suitable investment strategy.

The research above on several stock markets in several countries also yielded findings that contrarian investment strategies were profitable when implemented in overreacting market conditions. De Bondt and Thaler, proponents of this strategy, have found a significant advantage in the American stock market. (Ma et al., 2018) found it on the exchanges of several Asian countries, namely China, Hong Kong, Japan, Korea, Malaysia, Singapore, and Taiwan (Chowdhury et al., 2019) found these profits in the Bangladesh market (Reddy et al., 2020) in Shanghai market, and (Truong et al., 2023) in Ho Chi Minh Stock Exchange (HOSE) Vietnam. (Truong et al., 2023) Found the anomaly and, at the same time, also supported the hypothesis that the Vietnam stock market is inefficient in its weak form, so the investors can earn abnormal returns using the contrarian investment strategy.

The results of research by (Sembiring, 2022) and (Syafitri et al., 2022) found advantages of implementing the contrarian investment strategy in the Indonesian market (Indonesia Stock Exchange) in the short term. However, (Hadimas, 2019) did not find the advantages of the strategy through the research results since previously, occurred of the overreaction phenomenon was found insignificant statistically. Furthermore, the research of (Satria & Yadnya, 2021) also found a similar result with (Hadimas, 2019). They found an anomaly of return reversal, but it was insignificant statistically. Based on this research result, they concluded that the contrarian strategy did not have a beneficial result.

The existence of information or news that enters the market in the form of bad news and good news triggers investors' reactions, which causes the phenomenon of market overreaction. This information can be sourced from the company's internal and external conditions. An external condition that still affects the national and international economy is the Coronavirus pandemic (COVID-19), which has spread since the end of 2019, reached its peak throughout 2020, and began to subside at the end of 2021, along with the effectiveness of the vaccination phase one and two.

Meanwhile, the Indonesian economy showed signs of decline as it entered the third quarter of 2019, which also affected trading conditions on the stock exchange. In stock trading activities, the Indonesia Stock Exchange (IDX) performance with the Composite Stock Price Index (CSPI) indicator showed volatile conditions during the COVID-19 pandemic. Tempo. Com noted that the CSPI weakened since the beginning of 2020 due to the sentiment of the COVID-19 pandemic. Nevertheless, some practitioners and observers of the capital market continued to express optimism that many domestic and foreign investors were still willing to transact or trade on the Indonesian stock exchange. Several financial analysts from several securities companies, as well as information from several economic and business sources, stated that there were stocks that had the potential to be profitable for investors, even though they previously had experienced price fluctuations, which had an impact on returns.

It was proven that at the end of 2021, Liputan6.com informed that the IDX recorded quite encouraging results throughout 2021. As of December 2021, the CSPI had closed at 6,600 with a stock market capitalization value of IDR 8,277 trillion. Trading liquidity significantly increased value growth, trading frequency growth, and transaction volume growth. This condition implies that research on the performance of stocks on the IDX, especially in several sectors, is still essential, especially during the COVID-19 pandemic, so that information regarding potential profits can be obtained when investing. Meanwhile, based on the results of previous research, (Sembiring, 2022) found that during the pre-

pandemic and peak periods (January 2019 to December 2020), return reversal anomalies were indicated to occur on the IDX, especially in the short term. Information from the results of this research also later became the basis for conducting this research by continuing until the end of 2021, when the implementation of vaccination phases one and two was effectively carried out.

(De Bondt & Thaler (1987) researched firm size and risk differences based on the CAPM beta variable to strengthen the evidence of previous research findings regarding market overreaction events marked by a reversal of returns. The research found consistency with the results of previous research, in which the two variables were found not to affect the market overreaction events. However, (Zarowin, 1990) then criticized (De Bondt & Thaler, 1987) findings by stating that market overreaction events are just another form of size effect and market efficiency conditions only occur in stocks of large companies.

Responding to the contrasting results, research was conducted in several countries and obtained different results. Supporting the findings of (De Bondt & Thaler, 1987) that included the firm size variable in testing market overreaction, (Blackburn & Cakici, 2017) also found no size effect on return reversal anomalies in several developed countries grouped into North America, Europe, Japan, and Asia. Meanwhile, Indonesia (Tanady & Sukamulja, 2020) found no size effect when an anomaly of reversal return occurred. However, the research results (Sianipar, 2017) found that firm size affected the folio price's reverse sale. (Nidar & Ulfa, 2017) In both the winner and loser stock groups, firm size affected that reversal anomaly. (Sembiring & Komara, 2020) Also, firm size using the Fama and French multifactor model affected portfolios in anomaly markets or normal conditions.

The CAPM states that the fair value of a financial asset (stock) is a market risk factor (systematic risk) with a beta value indicator. Beta measures the systematic risk of a stock or portfolio against market risk. (Sharpe, 1964) stated that beta had a positive effect on asset returns. This is also supported by the findings of (Fama & French, 2015) in their three-factor model, which was then complemented into a five-factor model, namely market risk factors, firm size, firm value, level of profit (profitability), and level of investment. Based on these two models, they proved that market risk was not the only determining factor for returns. Likewise, the research result (Sembiring & Komara, 2020) proved a positive effect of market risk on abnormal portfolio returns. This result research further proved that even by including other factors in the CAPM model combined with the Fama and French multifactor models, it was found that market risk factors make the estimated return model more robust. Those results were found in both anomaly markets and normal conditions.

Other research provides different findings when implemented in market conditions that experience anomalous return reversals or experience market overreaction conditions. This is what makes the CAPM model still debatable. Empirically, market overreaction generated profits by implementing contrarian strategies and beta CAPM as a market risk factor could explain these benefits. It was also found that in one condition, the winner's market risk (beta) is higher than the beta of the loser, and in other conditions, the loser's beta is higher than the winner's beta. This explains why winners become losers. Conversely, losers become winners.

48

(Piccoli et al., 2017) Found a link between market overreaction and market volatility as measured by beta. This market overreaction is driven by the performance of the loser portfolio even though the beta value is lower than the winner portfolio. Overreaction in the Brazilian market was found to occur after a negative shock (bad news) associated with systematic market risk. Several empirical studies found that CAPM beta cannot explain the advantages of the contrarian strategy. However, when combined with factors based on Fama and French's multifactor model (firm size, firm value, profitability, and investment), beta became better in explaining these profits. (Sembiring & Komara, 2020) It was found that beta CAPM could explain the return significantly, and market risk factors measured by beta became a component that could strengthen the estimation model formed together with the factors in the Fama and French multifactor model.

Based on the description above, research on anomalies in the capital market, especially market overreaction anomalies, has been carried out quite often by researchers in several countries, including Indonesia. However, these studies are generally conducted in market conditions suspected of experiencing an overreaction in the specified research period, not in special conditions such as the COVID-19 pandemic. Previously, there had been research conducted during this pandemic, but the research only aimed to prove whether or not this anomaly occurred, which was marked by a return reversal event. This return reversal may occur due to changes in investor behaviour, which will respond to information formed from abnormal market conditions due to a situation, for example, the COVID-19 pandemic.

Significant test results can be an indicator that a market overreaction has occurred. However, it also needs to be proven whether this event was caused by changes in investor behaviour responding to information or other factors. These factors can be grouped into internal factors, such as company size, and external factors, such as market risk, measured by the beta value of the company's shares. If one or both factors influence the return reversal event, then the market anomaly only affects the company's size and market risk factors.

Furthermore, by focusing on the period from the pre-pandemic COVID-19 to the effective period of the phase one and phase two vaccination programs (January 2019 to December 2021), the purpose of this research is to find out: (1) Did the market overreaction phenomenon marked by a return reversal anomaly occur on the Indonesia Stock Exchange (IDX) in the short term? (2) Was the return reversal anomaly influenced by firm size? Moreover, (3) Was the return reversal anomaly influenced by market risk factors (beta)?

THEORETICAL REVIEW

CAPM and EMH. The Capital Asset Pricing Model (CAPM) was introduced by (Sharpe 1964) as a model that links the expected return of a financial asset with its risk level in an equilibrium market condition. It is assumed that each investor will diversify his portfolio and form an optimal one based on his risk preference.

In theory, since investors can no longer obtain abnormal returns in a balanced market condition, they will be encouraged to choose a market portfolio of all risky assets. The market portfolio is optimal. Considering all the risky assets, the market portfolio is well-diversified, so the market portfolio risk will only consist of systematic risk. This systematic risk is related to economic factors affecting all existing securities.

The CAPM is a pioneer in determining the price of financial assets by considering systematic or market risks as the only risk factor (measured by beta). The beta value greatly influences the expected return of a financial asset or security.

The market risk relates to all information (insufficient or good news) affecting asset price movements. New incoming information related to assets or securities will be used to analyze and interpret the value of the relevant asset so that a new equilibrium price will be achieved. This theory relates to the efficient market hypothesis (Efficient Market Hypothesis-EMH), put forward by (Fama, 1970), which tried to explain how the market processes information towards a new equilibrium position. If the market reaction is fast and accurate in reaching a new equilibrium price that reflects all available information, the market reacts to the available information. If investors believe that the market is efficient, a passive management strategy is applied by forming a portfolio that can replicate the market index.

Conversely, if investors believe the market is inefficient, an active management strategy is applied to obtain abnormal returns. When the market becomes inefficient, securities generate abnormal returns, which are the difference between realized and expected returns. Realized return is calculated by comparing the current price to the previous price, while the expected return is determined using the market model. Meanwhile, the active trading strategy (active management strategy) can also be carried out if investors believe that the market is in an anomalous condition, one of which is market overreaction.

Market overreaction and the contrarian strategy. (De Bondt & Thaler, 1985) Market overreaction results from the investors' tendency to overvalue any new incoming information but pay little attention to previous information. This results in an overvaluation of the company's prospects when receiving good news and undervaluation when receiving bad news. However, when an overvaluation or undervaluation occurs, investors will immediately realize their mistake so that the price will return to its fundamental form.

(De Bondt & Thaler, 1985) They proved the occurrence of market overreaction after researching the US stock market. By forming a portfolio of stocks into groups of winners and losers, (De Bondt & Thaler, 1985) found a reversal of returns from the two groups of stocks throughout the analysis period. Under these conditions, (De Bondt & Thaler, 1985) proposed that investors took a strategy by buying loser stocks and selling winner stocks because it was proven that there would be a reversal of returns, which would cause loser stocks to be able to outperform winners and provided higher profits. This strategy is known as the contrarian investment strategy. This strategy is implemented by buying loser stocks and selling winner stocks immediately (buy low sell high strategy). Abnormal return from implementing this contrarian strategy is obtained from the return reversal. Investors will sell stocks in demand by the market (winners) and use the proceeds from the sale to buy less desirable stocks (losers). The advantage of applying the contrarian strategy is the positive difference between loser and winner returns. Several empirical studies have proven that market overreaction events which are characterized by the occurrence of return reversal anomalies, also occur in Indonesia, as found by (Meiliani et al., 2021) (Sembiring, 2022) and (Syafitri et al., 2022), as well as in several other emerging markets, such as in Shanghai (Reddy et al., 2020) and in Ho Chi Minh Stock Exchange or HOSE (Truong et al., 2023).

Firm size and market risk. Several empirical studies have been carried out to examine the factors that are considered to influence the occurrence of anomalous reversal returns in overreacting market conditions. Factors of firm size and market risk (beta) based on the CAPM were found to be used intensively in several studies and provided varied results.

Firm size is one of the factors examined in several empirical studies to determine its effect on the market overreaction phenomenon. (De Bondt & Thaler, 1987) Conducted research by incorporating firm size and risk level variables based on CAPM beta into previous studies. The results of this research found that the two variables did not affect the market overreaction events that occurred. Firm size is the multiplication of the stock price by the number of outstanding stocks or the market value of the company's equity (Zarowin, 1990). The bigger the company's size, the more information available for investors, which will change the stock price quickly (up or down). (Zarowin, 1990) concluded that market overreaction is another side effect that only applies to small firms, while market efficiency only occurs in big firms. To prove it, (Zarowin, 1990) reused the data used by (De Bondt & Thaler, 1987) and controlled the firm size of the stocks that made up the portfolio. The research found differences between big and small firms' portfolio returns, in which small firms' stocks had more significant returns when anomalies occurred. Based on these results, (Zarowin, 1990) stated that firm size affected price reversal or return reversal, and the phenomenon of market overreaction was another form of the size effect.

Regarding the return reversal anomaly, in large firms, the stock returns will be smaller in the reversal period. Conversely, the stock returns will be more significant in small firms in the reversal period. This condition is seen when stocks have been grouped into winner and loser portfolios, which later establish an observation period (formation and testing). The winner's portfolio will become the loser's, and the loser's portfolio will win. However, empirical results also show that return reversal events only occur in loser portfolios and are positively related to firm size. Investors tend to buy shares of big firms, and when investors experience losses due to buying these shares, they will tend to repurchase the same shares. This is related to their behaviour to try again, hoping to profit from the next opportunity. Since this attitude then tends to be carried out almost simultaneously by many investors in a relatively short period, the purchase will be able to raise stock prices.

Empirically, the market risk factor with the CAPM beta indicator is also associated with a return anomaly (return reversal). CAPM estimates the relationship between the expected rate of return of an asset or risky security, such as stocks, and the risk of that asset in an equilibrium market condition. The CAPM test aims to prove a linear and positive relationship between returns and market risk of ten, referred to as systematic risk. This positive beta value indicator explains that if there is an increase in stock market risk, the opportunity to gain a return on the company's stocks will also increase. Several empirical results have proven the consistency of this theory, including research on market conditions that experienced market overreaction, such as those found by (Piccoli et al., 2017).

The findings from previous research support the CAPM theory regarding the effect of beta on returns or abnormal returns obtained from reversing returns based on applying a contrarian strategy. The CAPM beta explained the gains, and the beta value of the winner portfolio was higher than that of the loser portfolio**.** However, in other research, the beta value of the losers was higher than the beta value of the winners (Piccoli et al., 2017). The

difference in risk between the two portfolios (the winner and loser) could explain the return reversal. Furthermore, based on their previous and current research, (Sembiring & Komara, 2020) found that the CAPM beta could explain the portfolio return and the potentially reversed returns that occurred. It was also found that the market risk factor was a component that could strengthen the estimation model formed together with other factors proposed in the Fama and French multifactor model.

Based on the above explanation, the formulated hypotheses are: (a) Market overreaction events, which are characterized by short-term return reversal anomalies, occurred during the pre-pandemic period until the pandemic decreased as the phase one and two vaccination programs were conducted, (b) The firm size factor influences the occurring return reversal, and (c) The occurring reversal of returns is influenced by market risk factors (beta).

METHODS

This is quantitative research with an explanatory or explanatory survey method, which aims to explain the clarity of the relationship between research variables through hypothesis testing.

The operationalized research variables, along with their explanations, are as follows: **Abnormal return (AR)** for both winner and loser portfolios. Abnormal return calculations were based on cumulative abnormal return (CAR) and average cumulative abnormal return (ACAR) calculations as follows:

$$CAR_t = \sum_{t=1}^{n} ARi, t \quad .... (1)$$

$$ACAR_t = CAR_t / n \quad .... (2)$$

Where CAR is a cumulative abnormal return for every share in each portfolio, both winners and losers; ACAR is an average cumulative abnormal return for each portfolio, counted by dividing CAR by the number of periods used.

The winners and losers were determined based on the CAR position of each stock in the portfolio against the average portfolio return (ACAR); namely, the winner's position is above average, and the loser's position is below average.

Market risk factor (beta) was obtained from the regression results between the abnormal return of each portfolio (winner and loser) and the market portfolio return. Market portfolio return (excess return), which is the difference between market portfolio return and risk-free asset return $[E(R) - R)$, was based on CAPM proposed by Sharpe. The CAPM model is as follows:

$$E(R) = R + \beta i [E(R) - R) \quad .... (3)$$

The market portfolio proxy was the Composite Stock Price Index (CSPI), and the risk-free asset proxy was Bank Indonesia Certificates (*Sertifikat Bank Indonesia*/SBI). The market risk factor (beta) was obtained from the regression results between the abnormal return of each portfolio (winner and loser) and the market portfolio return.

Firm size, with a proxy for the level of stock market capitalization, was formulated

as the result of multiplying the market price of the stocks (stock price) by the number of common stocks outstanding.

Next, to test whether market risk and firm size variables affected the reversal of returns, a regression process was performed using multiple regression models between the two variables with portfolio abnormal returns. The existence of a positive difference between losers' abnormal returns and winners' abnormal returns during the observation period indicated that there were profits to be gained through implementing a contrarian investment strategy (buy low sell high strategy).

The research sample was the stocks of issuers on the Indonesia Stock Exchange (IDX), which were estimated to have profitable potential after experiencing losses or have been proven to have increased profit levels after declining during the pre-COVID-19 pandemic until the end of 2021. The period was the effective period for implementing phase one and phase two vaccines, as well as disseminating information about the phase three vaccine (booster). These stocks consisted of, among others, stocks in the manufacturing, mining, telecommunication, transportation, hospital, pharmaceutical, tourism and banking sectors, totalling eighty-two issuer stocks.

Furthermore, the stages in data processing and analysis were as follows: (1). The observation period (formation and testing) was determined, which was from January 2019 until December 2021 (period 1–1). The periods are 1 – 1, with one month for formation and the next for testing. Based on these criteria, there were 35 (thirty-five) sub-periods of observation (2). Winner and loser portfolios were formed based on the abnormal return position of the stocks against the average return. The winner portfolio consisted of stocks with above-average abnormal returns, while the loser portfolio had below-average abnormal returns (3). The occurrence or absence of a return reversal was analyzed, which is an indicator of the market overreaction anomaly phenomenon, by using the one-sample t-test and paired sample t-test statistical tools, as well as to test the first hypothesis, and (4). An analysis was conducted using the regression model on firm size and market risk factors on the abnormal return (AR) of winner and loser stocks (portfolios), as well as to test the second and third hypotheses. The test tool used was the ordinary least squares (OLS) multiple regression test with the following equation:

$$AR = \alpha + \beta_1 firmsize + \beta_2(R_m - R_f) + e \quad \text{.............. (4)}$$

As previously explained, firm size in this research was measured using the market value of the company's equity, which is the multiplication of the stock price by the number of outstanding shares. Meanwhile, a process based on the CAPM model was used to calculate the market portfolio excess return ($R_m - R_f$). This also follows the calculation approach based on the model proposed by (Zarowin, 1990) for firm size and (Sharpe, 1964) for market risk factor (beta).

To support the analysis results using the multiple regression model, a test was also carried out to obtain a BLUE (Best Linear Unbiased Estimator) model by conducting a classical assumption test. These tests included a data normality test using the Jarque-Bera model, a heteroscedasticity test using the White model, an autocorrelation test using the Durbin-Watson model, and a multicollinearity test using the VIF model. The criteria for each model, except for the VIF model, referred to the p-value, which must be greater than 5 per cent. Meanwhile, the VIF model required a score of less than 10. All data processing

was carried out using the Excel and E-views software.

RESULTS

The observation period (formation and testing) in this research was determined by following the pattern 1-1 (months) during the period January 2019–December 2021 (thirty-five months). The periods are held 1 – 1, with one month for formation and the next month for testing. When January is the formation period, then February is the testing, or, when February is the formation, then March is the testing period, and continue. Based on these criteria, there were thirty-five sub-periods of observation.

Table 1. Observation Periods: Formation and Testing

Periods (Jan 2019 to Dec 2021)	Observation Periods	
	Formation Periods	Testing Periods
1	January, 2019	February, 2019
2	February, 2019	March, 2019
3	March, 2019	April, 2019
4	April, 2019	May, 2019
5	May, 2019	June, 2019
6	June, 2019	July, 2019
7	July, 2019	August, 2019
8	August, 2019	September, 2019
9	September, 2019	October, 2019
10	October, 2019	November, 2019
11	November, 2019	December, 2019
12	December, 2019	January, 2020
13	January, 2020	February 2020
14	February 2020	March, 2020
15	March, 2020	April, 2020
16	April, 2020	May, 2020
17	May, 2020	June, 2020
18	June, 2020	July, 2020
19	July, 2020	August, 2020
20	August, 2020	September, 2020
21	September, 2020	October, 2020
22	October, 2020	November, 2020
23	November, 2020	December, 2020
24	December, 2020	January, 2021
25	January, 2021	February, 2021
26	February, 2021	March, 2021
27	March, 2021	April, 2021
28	April, 2021	May, 2021
29	May, 2021	June, 2021
30	June, 2021	July, 2021
31	July, 2021	August, 2021
32	August, 2021	September, 2021
33	September, 2021	October, 2021
34	October, 2021	November, 2021
35	November, 2021	December 2021

Source: Processed data, 2022

Table 1 shows how the periods hold into 1 – 1, one month for formation and the next month for testing. The formation and testing periods were intended to determine whether market overreaction occurred during the research or observation period, which was marked by an anomaly of return (return reversal) on winner and loser stocks.

During the observation period, descriptive statistical analysis was carried out on the abnormal return values of stocks (portfolios) included in the winner and loser groups.

Table 2. Summary of Descriptive Statistics of Loser Portfolio and Winner Portfolio during the Observation Period (in per centage)

| | Formation Period | | Testing Period | |
	LOSER	WINNER	LOSER	WINNER
Mean	-7.068	9.991	10.181	7.296
Standard Deviation	6.678	10.647	10.309	6.250
Observation	35	35	35	35

Source: Processed data, 2022

Table 2 shows that the winner's portfolio is, on average, superior to the loser's during the observation period. This can be inferred from the average abnormal return of the winner portfolio, which is higher (positive value) than the average abnormal return of the loser portfolio (negative value) during the formation period. However, in the following month, the test period, the loser portfolio outperformed the winner portfolio, where the abnormal return of the loser portfolio was positive while the winner portfolio was negative. This indicates that in the short term, on average, a return reversal has occurred in both stock portfolios.

The results in **Table 2** are only indications by considering the description of the average data processing results. Therefore, it is necessary to carry out a one-sample t-test to determine the significance of the average abnormal return of the winner's portfolio, which becomes a loser and the average abnormal return of the loser's portfolio, which becomes a winner. This process will determine whether the reversal of returns is real and significant during the observation period.

Table 3. Summary of Loser Portfolio and Winner Portfolio's Abnormal Return Test Results in the Testing Period (in per centage)

Period (Jan 2019 – Dec 2021)	LOSER Abnormal Return	WINNER Abnormal Return	Period (Jan 2019 – Dec 2021)	LOSER Abnormal Return	WINNER Abnormal Return
1	1.31[***]	-1.16[***]	19	0.93[***]	-4.66[***]
2	0.45[***]	-1.13[***]	20	2.99[***]	-0.01[***]
3	1.09[***]	-0.45[***]	21	0.02[***]	0.110
4	0.60[***]	-0.78[***]	22	0.28[***]	0.210
5	1.41[***]	-0.41[***]	23	0.25[***]	53.52[***]
6	1.03[***]	-0.83[***]	24	8.06[**]	-10.62[***]
7	0.66[***]	-1.37[**]	25	0.79[***]	-9.50[***]
8	0.59[***]	-0.88[***]	26	5.59[***]	-11.47[***]
9	0.81[***]	-0.25[**]	27	0.72[***]	-2.96[***]
10	0.240	-1.75[***]	28	0.19[**]	-7.40[***]
11	1.17[***]	-0.18[**]	29	8.03[**]	-11.47[***]

12	-0.30**)	-1.52***)	30	48.51**)	-12.21***)
13	0.270	-9.19***)	31	0.99***)	-6.16***)
14	0.94***)	-2.14***)	32	0.19**)	-2.79**)
15	2.64***)	0.150	33	5.66***)	-12.29**)
16	1.19***)	-0.65***)	34	0.180	-7.04***)
17	1.29***)	-0.74***)	35	0.31**)	-8.15***)
18	1.19***)	-0.46***)			

***) significant at 1 per cent; **) significant at 5 per cent; *) significant at 10 per cent
Source: Processed data, 2022

Table 3 shows, it can be inferred that the return reversal event is proven to occur significantly in loser portfolios and winner portfolios in almost all periods. This is shown in the significant abnormal return values in both the winner and loser portfolios. This reversal of returns indicates that during this period, market overreaction occurred in the Indonesian capital market, particularly on the Indonesian Stock Exchange. In several periods, the test results were insignificant on the winners' or losers' portfolios. This indicates that in these periods, the abnormal returns were not accurate. However, these conditions' per centages could be more significant than the overall test results. Thus, the temporary conclusion is that a return reversal was proven to occur, both in loser portfolios and winner portfolios throughout the observation period.

After conducting a one-sample t-test to determine the significance of the abnormal returns that occurred throughout the observation period, a paired sample t-test was also carried out to find out the significance of the difference in the return values of the two portfolios (winners and losers) before and after a return reversal.

Table 4. Summary of Test Results for Abnormal Differences in Loser Portfolio Returns and Winner Portfolios Before and After Return Reversal (in per centage)

| | LOSER | WINNER | | LOSER | WINNER |
Period (Jan 2019 – Dec 2021)	Abnormal Return	Abnormal Return	Period (Jan 2019 – Dec 2021)	Abnormal Return	Abnormal Return
1	1.298**)	-30.632***)	19	0.014***)	-0.016***)
2	1.197***)	-23.527***)	20	0.082***)	-0.024***)
3	2.331***)	-6.412***)	21	0.036***)	-0.013***)
4	1.088***)	-16.223***)	22	0.025***)	-0.019***)
5	2.262***)	-10.936***)	23	0.026***)	-0.022***)
6	1.236***)	-18.742***)	24	0.016***)	-0.029***)
7	1.102***)	-20.275***)	25	0.019***)	-0.018***)
8	1.796***)	-16.113***)	26	0.014***)	-0.022***)
9	1.713***)	-8.146***)	27	0.024***)	-0.088***)
10	0.355	-27.404***)	28	0.064***)	-0.016***)
11	3.080***)	-0.720	29	0.016***)	-0.014***)
12	-1.785	-28.038***)	30	0.015***)	-0.016***)
13	1.848***)	-6.811***)	31	0.019***)	-0.014***)
14	2.015***)	-24.539***)	32	0.023***)	-0.013***)
15	4.524***)	-7.208**)	33	0.087***)	-0.032***)
16	1.201**)	-36.314***)	34	0.012***)	-0.012***)
17	2.039***)	-16.124***)	35	0.093***)	-0.098***)
18	1.877***)	-17.655***)			

***) significant at 1 per cent; **) significant at 5 per cent; *) significant at 10 per cent
Source: Processed data, 2022

Table 4 shows, it can be inferred that there is a significant difference between the abnormal return of the winner and loser portfolios before and after the return reversal. This shows that the difference in return values is real, where the previous loser portfolio significantly turned into a winner in the following period. Conversely, the portfolio that was previously a winner turned into a loser. This also supports the results shown in **Table 3**. As previously explained, although there are conditions in specific periods that showed insignificant test results, because the per centage is tiny, it can be argued that the return reversal is confirmed.

An analysis is carried out for the investment objectives to determine whether the investment objectives, namely profits, will be obtained if a particular strategy is implemented. As previously explained, when an anomaly of return reversal occurs, the investment strategy that is relevant and appropriate to apply is the contrarian investment strategy. This anomaly is proven to occur through the significance of the value of the return reversal. Hence, a test was carried out in the next stage to determine whether profit was obtained. By implementing a contrarian investment strategy (buy, low, sell, high strategy), it is hoped that profits will be obtained in the form of significant abnormal return values.

To prove whether or not there is such a profit, further testing was carried out using the one-sample t-test to determine whether significant profits were obtained based on the difference in the abnormal return of the loser portfolio over the winner portfolio throughout the observation period (formation and testing).

Table 5. Summary of Abnormal Positive Difference Test Results for Loser Portfolio Returns on Winner Portfolios Based on Contrarian Investment Strategy Implementation (in Per centage)

Period (Jan 2019 – Dec 2021)	LOSER Abnormal Return	WINNER Abnormal Return	Period (Jan 2019 – Dec 2021)	LOSER Abnormal Return	WINNER Abnormal Return
1	0.84**)	-34.54***)	19	14.20***)	-15.58***)
2	1.10***)	-22.44**)	20	8.19***)	-24.19***)
3	2.21***)	-8.42***)	21	35.50***)	-13.40***)
4	1.13***)	-15.48***)	22	24.90***)	-18.95***)
5	2.33***)	-11.62***)	23	25.86***)	-33.19***)
6	1.39***)	-19.28***)	24	16.00***)	-28.94***)
7	1.04***)	-23.95**)	25	18.68***)	-18.21***)
8	1.76***)	-15.88***)	26	14.42***)	-22.27***)
9	1.76***)	-8.66**)	27	23.57***)	-8.83***)
10	0.350	-24.49***)	28	6.36***)	-16.07***)
11	2.82***)	-1.660	29	15.97***)	-13.70***)
12	-1.500	-29.60***)	30	15.39***)	-16.07***)
13	1.87***)	-7.24***)	31	18.66***)	-13.60***)
14	2.23***)	-25.40***)	32	23.47***)	-12.54***)
15	4.66***)	-7.26**)	33	8.74***)	-31.78***)
16	1.00**)	-36.01***)	34	12.44***)	-12.04***)
17	2.21***)	-18.11***)	35	9.35***)	-9.78***)
18	1.84***)	-18.10***)			

***) significant at 1 per cent; **) significant at 5 per cent; *) significant at 10 per cent
Source: Processed data, 2022

Table 5 shows, it is known that from the implementation of the contrarian investment strategy, the difference between the profitable (positive) abnormal returns from the loser portfolio, which then becomes a winner and the difference in adverse (negative) abnormal returns from the winner portfolio which then becomes a loser. This can be inferred from the significance of the abnormal return values of the two portfolios.

Furthermore, hypotheses testing was done by taking the period 2019 to 2022 and divided into testing per year (three years), namely during January to December 2019, 2020, and 2021, and testing per three years (January 2019 to December 2021).

Table 6. Summary of Test Results for the Effect of Firm Size and Market Risk Factors on Reversal Returns (in per centage)

	LOSER			
	2019	**2020**	**2021**	**2019-2021**
Constant: AR	-0.044	**-0.305**[*]	-0.178	-0.046
t-test: Firm size	**-0.000**[***]	-0.000	-0.000	**-0.000**[*]
t-test: Market risk	0.164	**0.608**[**]	0.359	**0.179**[*]
F-test	**5.191**[**]	**7.368**[**]	0.205	**2.736**[*]
R Square	0.585	0.621	0.043	0.146
	WINNER			
	2019	**2020**	**2021**	**2019-2021**
Constant: AR	-0.175	-0.109	**-0.495**[***]	**-0.225**[***]
t-test: Firm size	-0.000	-0.000	-0.000	-0.000
t-test: Market risk	0.239	**0.661**[***]	0.034	**0.261**[***]
F-test	1.878	**13.231**[***]	0.006	**5.815**[***]
R Square	0.319	0.746	0.013	0.267

***) significant at   1 per cent; **) significant at   5 per cent; *) significant at   10 per cent
Source: Processed data, 2022

Table 6 shows, each variable or factor influences the abnormal return from an anomalous return reversal event. Some are found to be insignificant, meaning that the effect is not natural or could be statistically insignificant. The R square value obtained also shows a tendency for the same movement between loser and winner portfolios. The explanation of this condition will be discussed in the next section.

The classical assumption test on the model formed based on **Table 6** was also carried out by knowing the model's strength in estimating. Tests were carried out using the Jarque-Bera criteria to test data normality problems, White criteria to test heteroscedasticity problems, Durbin-Watson criteria to test autocorrelation problems, and VIF criteria to test multicollinearity problems.

Table 7. Summary of Classical Assumption Test Results

	LOSER			
	2019	**2020**	**2021**	**2019-2021**
Jarque-Bera (more than 5 per cent)	0.117	1.199	7.755	1.881
White (more than 5 per cent)	0.333	2.344	0.697	7.261
Durbin-Watson (1.54-2.45)	1.875	1.992	1.849	2.099
VIF (more than 10)	1.002	1.353	1.297	1.102
	WINNER			
	2019	**2020**	**2021**	**2019-2021**

Jarque-Bera (more than 5 per cent)	0.843	1.231	0.963	1.361
White (more than 5 per cent)	1.001	1.615	0.313	1.644
Durbin-Watson (1.54-2.45)	1.875	2.407	2.273	2.244
VIF (more than 10)	1.231	1.045	1.553	1.000

Source: Processed Data, 2022

The summary results in **Table 7** show the values where the estimation model formed based on the regression process is free from classical problems. The normality test based on the Jarque-Bera criteria and the heteroscedasticity test based on White's criteria shows a significance above 5 per cent, meaning the model is accessible from both problems. Likewise, the autocorrelation test using the Durbin-Watson criteria range of 1.540 to 2.450 and the multicollinearity test (VIF), which is less than 10, indicates that the model is accessible from the following two classic problems.

DISCUSSION

The research summary results shown in **Table 2, Table 3**, and **Table 4** prove that during the pre-pandemic period of COVID-19 up to the period when the pandemic situation relatively began to decline along with the effectiveness of the implementation of Phase 1 and Phase 2 vaccinations and the socialization of phase 3 vaccination (booster) in Indonesia, the phenomenon of market overreaction with an anomaly indicator of return reversal occurred significantly. Each portfolio experienced a reversal of returns during the observation period formed in the holding period 1–1, in which the winner portfolio became a loser, and vice versa, the loser portfolio became a winner. The results of the one-sample t-test and the paired sample t-test have also proven that the return reversal events that occur are actual (significant), in which the portfolio was a winner (loser) in the formation period and then turned into a loser (winner) in the testing period.

The summary of the research results, presented in **Table 5**, also shows that a contrarian investment strategy implemented in market conditions experienced the phenomenon of market overreaction due to the COVID-19 pandemic provided significant benefits.

Table 2 to **Table 5** shows that the reversal of returns was proven to occur in the short term during the observation period with a formation and testing period (holding period) 1–1. However, based on **Table 6**, there were indications that these events would also occur in a more extended period, namely throughout 2020 for loser portfolios, even though they were weak, and in 2021 and 2019-2021 for the winner portfolio. However, the return reversal did not provide benefits, as seen from the negative abnormal return value. This supports previous findings, which stated that the benefits of implementing a contrarian investment strategy in return reversal events tended to be obtained in the short term. These results also support the findings of (Piccoli et al., 2017), (Reddy et al., 2020), (Sembiring, 2022), and (Syafitri et al., 2022).

According to (De Bondt & Thaler, 1985), the phenomenon of market overreaction occurred because investors tended to overestimate the latest information, changing investors' perspectives and expectations of the company. Assessment should have paid more attention to previous information, so there was an overvaluation of the company's prospects for good information (good news) and an undervaluation of insufficient information (bad news). However, investors later realized their mistake in responding to

this information so that the price would return to its fundamental position. Research conducted after the first findings of (De Bondt & Thaler, 1985) produced evidence supporting that the reversal of returns was indeed an exaggerated response from investors in addressing the conditions that occurred, resulting in overvaluation/undervaluation as previously explained by (De Bondt & Thaler, 1985). However, there were also research results that do not support this statement, along with the discovery of variables that significantly affected abnormal returns from reversal events. These two variables are firm size and market risk factors (beta).

The results summarized in **Table 6** show how firm size and market risk factors affected the return reversal event. The regression process was carried out annually or every twelve months (2019, 2020, 2021) and every three years (2019 to 2021) for loser and winner portfolios.

The factor of firm size with a proxy for the value of stock market capitalization was found to only affect the reversal of loser portfolio returns throughout 2019, with a negative direction. This supports conditions for the occurrence of side effects, especially for market conditions that experience anomaly of return reversal. The negative direction explains the occurrence of an anomaly in which the higher the size of the company, the lower the value of stock returns, and conversely, the lower the size of the company, the higher the return value. This is by the condition of the anomaly of return reversal. In this situation, the investors' behaviour is to invest in stocks with low market capitalization values (losers) based on the belief that in short-term market overreaction conditions, stocks with low market capitalization values will generate profitable returns. At the same time, it supports the findings of (Fama & French, 2015) in their multifactor model, which mentioned the presence of firm size anomalies. Likewise, the findings of (Sianipar, 2017) (Nidar & Ulfa 2017) found an anomaly in firm size when there was a market overreaction phenomenon in Indonesia. However, in 2020 and 2021, the firm size factor was found not to affect the return reversal that occurred, by the findings of (Blackburn & Cakici, 2017) and (Tanady & Sukamulja, 2020). This indicates that in 2020, when the COVID-19 pandemic occurred, investors' exaggerated responses or reactions in dealing with pandemic conditions were carried out without regard to the size factor of the companies that were their investment targets.

Based on the research results in **Table 6**, in 2020, the reaction that triggered a reversal of returns was more influenced by market risk factors, both for the winner and loser portfolios. Meanwhile, in 2021, the overreaction that occurred would not be influenced by firm size or market risk factors. Market risk factors were found to be positive in all periods, both in the loser portfolio and the winner portfolio. However, only in 2020 and throughout the period from January 2019 to December 2021 were these risks found to be significant or significantly affected, while in other years, they had no effect. This significantly positive beta value indicates a relationship whereby if the stock market risk increases, the benefits derived from the reversal of this return will also increase. These results are consistent with the findings of (Sembiring & Komara, 2020) and (Piccoli et al., 2017).

Table 6 also shows that in 2019 and 2020, the firm size and market risk factors had a reasonably large R square value, meaning that these two factors can explain anomalous return reversals. However, in 2021, there was a significant decrease in the R squared value, supporting the results found for the variables tested. No factors or variables significantly

influenced the reversal of returns that occurred in 2021. It is suspected that this was still influenced by conditions in 2020, namely when the pandemic was considered the worst in Indonesia. The reaction of investors who were still excessive in responding to market conditions became less considering the problem of firm size and market risk of the stocks of companies that were their investment targets, as they tended to do before. It is suspected that they will have several considerations. However, they are not significant enough to explain their decision to make an investment, which then causes an anomaly to reversal returns in the short term.

The results showing that firm size and market risk do not affect the return reversal show support for the findings put forward by (De Bondt & Thaler, 1987). These results indicate that during that period, the return reversal anomaly was entirely the behaviour of investors who overreacted in response to the pandemic conditions without regard to the firm size and market risk of the company's stocks that investors targeted in their investment strategy.

CONCLUSION

The COVID-19 pandemic in Indonesia began at the end of 2019 and reached an emergency period throughout 2020. Vaccination phases one and two were carried out effectively throughout 2021, as was the socialization of the phase three booster or vaccination program. In these three years or 35 months of observation, a return reversal anomaly occurred in the short term due to overreaction from market players, especially investors, in responding to the pandemic conditions. In the short term, the return reversal event was profitable by implementing a contrarian investment strategy, as seen from the positive difference in the loser portfolio's abnormal return over the winner portfolio's abnormal return.

The firm size factor with a proxy for the value of stock market capitalization was found only to hurt the reversal of loser portfolio returns throughout 2019 (ahead of the pandemic period), which explains that the higher the size of the firm (big firms), the lower the value stock returns, and conversely, the lower the size of the firm (small firms), the higher the return value, this is by the condition of the return reversal anomaly that occurred. In this situation, the behaviour of investors is to invest in stocks with low market capitalization values (losers) based on the belief that in short-term market overreaction conditions, stocks with low market capitalization values will generate profitable abnormal returns. In 2020 and 2021 (the pandemic period), the firm size factor did not affect the return reversal for the loser and the winner portfolios. This indicates that in that year, the investors' overreaction or response to pandemic conditions was carried out without regard to the size factor (stock market capitalization value) of the companies that were their investment targets.

Furthermore, it is also known that in 2020, reactions that triggered a reversal of returns were influenced more by market risk factors, both for the winner and the loser portfolios. Meanwhile, in 2021, the overreaction was influenced by firm size or market risk factors. The market risk factor was only found to have a positive effect in 2020 and throughout the period from January 2019–December 2021. The positive value indicates that if stock market risk increases, the profit derived from this reversal will also increase.

In the period when the factors of firm size and market risk did not affect the return reversal, the return reversal anomaly was entirely the behaviour of investors who overreacted in responding to pandemic conditions that occurred without regard to the size factor and market risk of companies whose stocks are the investment target.

Anomalous conditions in the Indonesian capital market, particularly on the IDX, have been shown to occur frequently in the short term, and these conditions provide an opportunity for investors to benefit by implementing relevant active investment strategies. Under conditions of anomaly return reversal, an indicator of a market phenomenon experiencing market overreaction, the contrarian strategy has proven profitable for investors who apply it in their investments. However, investors need to carefully form their portfolios so that significant profits can be obtained from both groups of portfolios.

For further research, it is necessary to find out whether other factors influence the reversal of returns, which are proven to occur frequently and gain profits from contrarian strategies. An example is idiosyncratic factors based on the Fama and French multifactor model, namely factors of company value, profitability, and investment level, or by including consideration of market conditions (bullish and bearish) related to a market risk factor (beta) using the relevant methodology.

REFERENCES

Blackburn, D. W., & Cakici, N. (2017). Overreaction And The Cross-Section Of Returns: International Evidence. *Journal of Empirical Finance*, *42*, 1–14. https://dx.doi.org/10.1016/j.jempfin.2017.02.001.

Chowdhury, S. S. H., Sharmin, R., & Rahman, M. A. (2019). Presence And Sources Of Contrarian Profits In The Bangladesh Stock Market. *Global Business Review*, *20*(1), 84–104. https://dx.doi.org/10.1177/0972150918803992.

De Bondt, W. F. M., & Thaler, R. (1985). Does The Stock Market Overreact? *The Journal of Finance*, *40*(3), 793–805. https://dx.doi.org/10.1111/j.1540-6261.1985.tb05004.x.

De Bondt, W. F. M., & Thaler, R. H. (1987). Further Evidence On Investor Overreaction And Stock Market Seasonality. In *The Journal of Finance,* 42(3), 557-581, https://doi.org/10.1111/j.1540-6261.1987.tb04569.x.

Fama, E. F. (1970). American Finance Association Efficient Capital Markets : A Review Of Theory And Empirical Work. *The Journal of Finance*, *25*(2), 383–417. https://doi.org/10.2307/2325486.

Fama, E. F., & French, K. R. (2015). A Five-Factor Asset Pricing Model. *Journal of Financial Economics*, *116*(1), 1–22. https://dx.doi.org/10.1016/j.jfineco.2014.10.010.

Hadimas, H. (2019). Overreaction Anomaly Di Pasar Modal Indonesia (Studi Pada Saham-Saham Lq-45 Tahun 2014-2018). *Jurnal Ilmiah Ekonomi Bisnis*, *24*(1), 88–99. https://doi.org/10.35760/eb.2019.v24i1.1857.

Ma, J. Z., Ho, K. C., Yang, L., & Chu, C. C. (2018). Market Sentiment And Investor Overreaction: Evidence From New York Listed Asian Country Exchange Traded Funds. *Emerging Markets Finance and Trade*, *54*(11), 2455–2471. https://dx.doi.org/10.1080/1540496X.2018.1464907.

Meiliani, M., Puspita, D., Tarigan, M., & Fathoni, A. F. (2021). Comparative Analysis Of

Market Overreaction In Indonesia And Singapore Stock Exchange 2016-2019. *International Journal of Economics, Business and Applications*, *6*(2), 19. https://dx.doi.org/10.31258/ijeba.6.2.19-44.

Musnadi, Said, & Faisal, Majid, M. S. (2018). Overreaction And Underreaction Anomalies In The Indonesian Stock Market: A Sectoral Analysis. *International Journal of Ethics and Systems*, *34*(4), 442–457. https://doi.org/10.1108/IJOES-12-2017-0235.

Nidar, S. R., & Ulfa, N. (2017). Overreaction Market Analysis, Dividend Policy, Firm Size, And Seasonality To Price Reversal Phenomena. *GATR Accounting and Finance Review*, *2*(2), 73–77. https://dx.doi.org/10.35609/afr.2017.2.2(10).

Piccoli, P., Chaudhury, M., & Souza, A. (2017). How Do Stocks React To Extreme Market Events? Evidence From Brazil. *Research in International Business and Finance*, *42*, 275–284. https://doi.org/10.1016/j.ribaf.2017.07.166.

Reddy, K., Qamar, M. A. J., Mirza, N., & Shi, F. (2020). Overreaction Effect: Evidence From An Emerging Market (Shanghai Stock Market). *International Journal of Managerial Finance*, *17*(3), 416–437. https://doi.org/10.1108/IJMF-01-2019-0033.

Satria, I. G. A. E., & Yadnya, I. P. (2021). Market Overreaction Pada Idx 30 (Periode Penelitian 2016-2019). *E-Jurnal Manajemen*, *10*(8), 779. https://doi.org/10.24843/ejmunud.2021.v10.i08.p03.

Sembiring, F. M. (2022). How Well Is The Implementation Of CAPM In Condition Of Market Anomaly? Case In Market Overreaction Anomaly At Indonesia Stock Exchange. *INFLUENCE: International Journal of Science Review*, *4*(1), 166–178. https://dx.doi.org/10.54783/influencejournal.v4i1.14.

Sembiring, F. M., & Komara, E. F. (2020). Analisis CAPM Serta Model Multifaktor Fama And French Pada Perusahaan Non Keuangan Di Bursa Efek Indonesia. *Jurnal Kajian Akuntansi*, *4*(2), 184–196. http://dx.doi.org/10.33603/jka.v4i2.3538.

Sharpe, W. F. (1964). American Finance Association Capital Asset Prices: A Theory Of Market Equilibrium Under Conditions Of Risk. *The Journal of Finance*, *19*(3), 425–442. https://doi.org/10.1111/j.1540-6261.1964.tb02865.x.

Sianipar, F. (2017). Pengaruh Ukuran Perusahaan, Bid Ask Spread, Dan Volume Perdagangan Terhadap Price Reversal. *Performance*, *24*(1), 8–12. https://dx.doi.org/10.20884/1.performance.2017.24.1.312.

Syafitri, W., Effendi, J., & Irfany, M. I. (2022). Is There A Short-Term Overreaction To Pandemic Covid-19? A Case Study Of The Indonesia Islamic Capital Market. *Al-Uqud : Journal of Islamic Economics*, *6*(2), 177–191. https://dx.doi.org/10.26740/aluqud.v6n2.p177-191.

Tanady, M. & Sukamulja, S. (2020). Market Overreaction Pada Bursa Efek Indonesia. *Jurnal Ekonomi Bisnis Dan Kewirausahaan (JEBIK)*, *9*(3), 206–217. https://dx.doi.org/10.26418/jebik.v9i3.40833.

Truong, L. D., Cao, G. N., Friday, H. S., & Doan, N. T. (2023). Overreaction In A Frontier Market: Evidence From The Ho Chi Minh Stock Exchange. *International Journal of Financial Studies*, *11*(2), 58. https://doi.org/10.3390/ijfs11020058.

Zarowin, P. (1990). Size, Seasonality, And Stock Market Overreaction. *The Journal of Financial and Quantitative Analysis*, *25*(1), 113–125. https://dx.doi.org/10.2307/2330891.