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The Anomalies of Winner and Loser Stock Portfolios: Investor Behavior in the Indonesian Sharia Stock Index

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Abstract
The purpose of this study is to determine if winning and losing stock portfolios within the Indonesian Sharia Stock Index demonstrate overreaction or underreaction in the event of a pandemic caused by the COVID-19 virus. Across three times intervals that are not specified, both overreaction and underreaction are conducted for analysis. When examining the hypotheses, the paired samples t-test and the Wilcoxon signed rank test are both carried out with the assistance of SPSS. Over the course of all observation periods, the results show that the portfolio of the winner exhibits a significant overreaction anomaly. On the other hand, an underreaction anomaly that is statistically significant is discovered in each and every period for the portfolio that is losing. The results of this study indicate that investors have the ability to capitalize on the overreaction by taking a contrarian stance, which might potentially result in increased returns. When seen from the opposite perspective, the underreaction anomaly provides an opportunity for traders who have been unsuccessful to utilize the momentum approach and increase their earnings.

Keywords
Anomalies, Indonesian Sharia Stock Index (ISSI), Loser stock portfolio, Overreaction-underreaction, Winner stock portfolio

INTRODUCTION

Indonesia is not immune to the worldwide shockwave being caused by the COVID-19 epidemic (Falefi, & Purwoko, 2020). While the spread of the Corona virus is a major issue, investment is another area of concern (Herwany, Febrian, Anwar, & Gunardi, 2021). In the world of investing, a container or hub that connects people with cash and those looking to raise it is essential. Online investors must have complete familiarity with all aspects of a certain investment instrument before making a purchase (Wardani & Komara, 2021). The capital market provides a venue for individuals to put their money to work in this instance. There are two distinct sorts of the capital market: the traditional market and the Islamic market. The tools and transactional processes used in Islamic capital markets are distinct from those used in conventional markets (IDX Islamic, 2022).

The Islamic capital market is an activity in the capital market that as a whole depends on and fulfills Islamic principles (IDX Islamic, 2021). The capital market activity known as the Islamic capital market is one that adheres to and is based on Islamic principles (IDX Islamic, 2021). If all transaction processes, market participants, market infrastructure, and securities traded there adhere to Islamic principles, then the capital market is said to be capable of fulfilling Islamic principles. The Indonesia Sharia Stock Index (ISSI), a composite index of Islamic companies that includes all Islamic stocks listed on the Indonesia Stock Exchange (IDX), was first introduced in 2011, marking a significant turning point in

the resurrection of the Indonesian Islamic capital market. The rise in the number of companies that joined ISSI between 2011 and February 2022 is shown in the following figure.

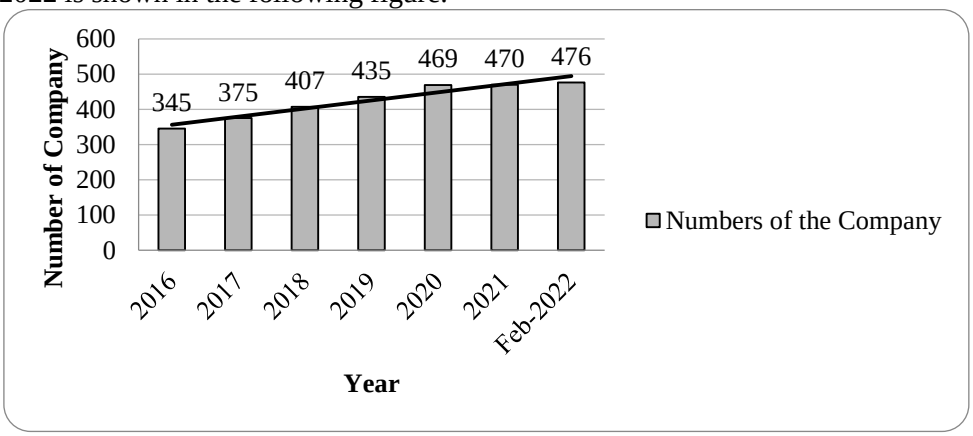

Fig. 1 Number of Company Registered at ISSI (***Source***: ojk.go.id)

In 2021, ISSI expects to see a decline in the number of sharia shares it has on file. According to the results of periodic reviews by the OJK of the financial statements of issuers and public companies, supporting data and information, and the DE (as stipulated by the Decree of the Board of Commissioners of the Financial Services Authority (OJK) Number Kep-33/D.04/2021), 42 sharia shares that underwent a reshuffle were subsequently excluded from ISSI membership. Due to its huge Muslim population, Indonesia has been identified as a potential participant in the Islamic capital market and a promising location for the growth of the Islamic finance sector (KNEKS, 2018). There has been an uptick in both investors and sharia stock transactions alongside the growth in the number of companies registered with ISSI. According to CNBC Indonesia, as of March 2022, the overall market capitalization on the IDX was IDR 4,315 trillion, with sharia shares accounting for 46% of that value.

From 2017 to March of 2022, the number of Islamic stock investors increased by 367%. There were just 23,207 investors in Islamic stocks in 2017, but by 2018 that number had risen to 44,535. There were 68,599 investors in 2019, 85,889 in 2020, 105,174 in 2021, and 108,345 as of March 2022. Research by Siregar (2020) corroborates this rise in sharia stock transactions, showing that the stock market's sharia stock index, which fluctuates in response to economic conditions, increased even as the Indonesian economy declined during the COVID-19 pandemic. and saw an average increase of 0.14 percent. This is inversely related to the performance of the traditional stock index, which has fluctuated and fallen by 1.22% during the same time period. Therefore, it is clear that Islamic stocks do not affect the severity of the current COVID-19 outbreak. The following is a monthly closing price-based comparison of traditional stock indices and Islamic stock indices from August 2020 through February 2022.

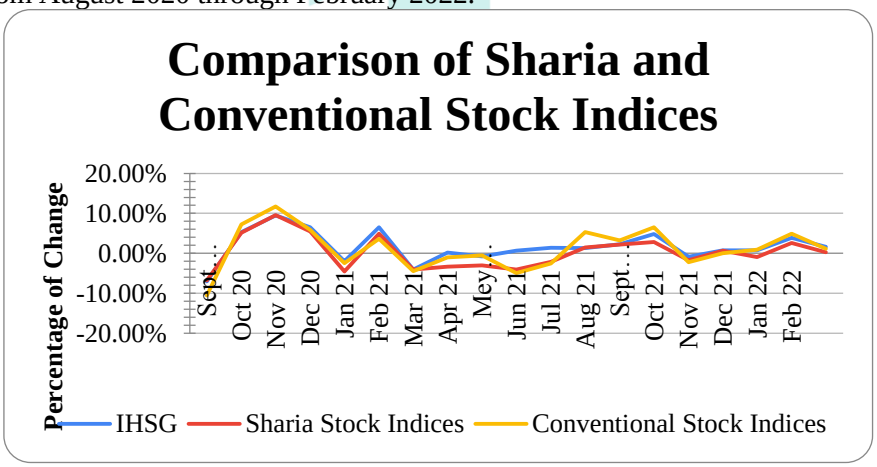

Fig. 2 Comparison of Sharia and Conventional Stock Indices (***Source***: information processed, 2022)

Siregar's research (2020) found that while conventional stock indexes and the IHSG (JCI) both gained in average movement, the Islamic stock index, which tracks only Islamic companies, declined. This is consistent with the findings of Utomo and Hanafi (2022), who found that while the Islamic stock index as a whole underperformed the JCI and conventional stock indices, liquid and large-capitalized Islamic equities outperformed the market and conventional performance.

The term "efficient market" refers to a state in which all traded securities' prices accurately reflect all relevant information, including data from the past and data from the present, as well as data in the form of opinions and rational expectations that are widely disseminated and can influence price movements (Tandelilin, 2010). Several studies, however, have shown that this is not the case and that investors' market realization frequently reveals an illogical mindset. Given the fluidity of market conditions, investors face decision-making challenges as well (Ferli, 2018). Anomalies are defined as any findings from research that go counter to or in the opposite direction of conventional financial theory.

Abiprayu's research (2022), building on the work of Zarowin (1990), concludes that a price reversal phenomenon, likewise at odds with an efficient market, exists in the most recent study. When a price reversal occurs between a high-performing stock portfolio (the winner stock portfolio) and a low-performing stock portfolio (the loser stock portfolio), we say that the market has experienced a price reversal. Overreaction and underreaction anomalies can lead to price reversal. If investors overreact, abnormal returns in the winner group will shift, and if they underreact, abnormal returns in the loser group will rise (Isnawati, 2015). Excessive gains and declines (overreaction) are detrimental to all stock markets, including the Islamic stock market and contribute to the development of abnormal returns (Santosa & Huda, 2020).

Using weekly closing prices and split into three formation periods and testing periods, this study will analyze overreaction and underreaction anomalies in the Indonesian Sharia Stock Index. In the meantime, earlier study has found that various Indonesian sectoral stock indices experienced overreaction and underreaction anomalies between 2009 and 2012, citing studies by Musnadi et al. (2018). Overreaction anomalies and underreaction are discussed; the results of this study corroborate those of Fang (2013) and Rahmawati & Budiwati (2007), demonstrating the presence of such an anomaly on the Chinese stock market and the Jakarta stock exchange.

Accordingly, the following issues are investigated in light of the context provided: 1. Is the winning stock portfolio of the Indonesian Sharia Stock Index subject to an overreaction anomalous phenomenon? 2. Is the portfolio of stocks that make up the Indonesian Sharia Stock Index's losers experiencing an underreaction anomaly? This led to the establishment of the following goals: 1. The goal of this study is to investigate and assess the possibility of an overreaction anomalous occurrence in the stock portfolio of the Indonesian Sharia Stock Index's top performers. 2. The goal of this study is to investigate whether or not the portfolio of losing stocks comprising the Indonesian Sharia Stock Index exhibits characteristics of an underreaction anomaly. It is envisaged that more informed investment decisions will be made as a result of this research.

MATERIALS AND METHODS

This research is a quantitative study with descriptive analysis that uses secondary data and documentation data collection techniques to view weekly stock prices for the Indonesian Sharia Stock Index listed on the IDX for the period 2020–2022. Throughout the 2020-2022 period, all stock index price data was obtained from https://finance.yahoo.com/.

The population used in this study was 476 companies listed on the Indonesia Sharia Stock Index for the period 2020–2022, with a sample of 248 companies for observation 1 and 222 companies for observations 2 and 3. The sampling criteria used, were: The company is registered on the IDX and included in ISSI during the observation period from March 2020 to March 2022. The shares used are shares that are consistently registered with ISSI during the observation period, and are the result of the upper third of the highest CAR (winner shares) and are the result of the lower third of the lowest CAR (loser shares).

This study's observation period will run from March 2020 to March 2022 and is divided into three categories:

Table 1 Observation Table of Formation Period and Testing Period

Observation	Formation Period	Testing Period	No. of week
1.	March 2, 2020 – August 28, 2020	August 31, 2020 – February 26, 2021	26 weeks
2.	January 4, 2021 – July 2, 2021	July 5, 2021 – December 31 2021	26 weeks
3.	March 2, 2020 – February 26, 2021	March 1, 2021 – March 2, 2022	52 weeks

Source: information processed

Meanwhile, the analysis technique used for this research is by forming Winner Shares and Loser Shares. The formation of winner and loser stock portfolios must be divided into two stages based on time, namely the formation period stage, which is the decisive period in making a winner-loser stock portfolio, and the testing period stage, which is the period for testing or observing the return of the winner stock portfolio -- loser. Based on research by Musnadi et al., (2018), the steps for determining the formation period and testing period are as follows:

a. Formation Period

i. Calculating Abnormal return using the formula:

ARi,t = Ri – E(Ri,t) (1)

Whereas:

ARit = Abnormal return

Rit = Realised return by using a formula:

$$R_{it} = \frac{(P_{it} - P_{io})}{P_{io}} \quad (2)$$

Whereas:

E(Rit) = Expected return, by using the market-adjusted model formula:

E (Rit) = RMit

Whereas:

$$RM_{it} = \frac{IHSG_t - IHSG_o}{IHSG_o} \quad (3)$$

ii. Cumulative Abnormal Return (CAR) calculation using the formula:

$$CAR_{it} = \sum_{a=1}^{t} AR_{it} \quad (4)$$

iii. Classifying between winner and loser stocks refers to research by Lihara et al., (2004) namely for the highest one-third CAR is categorized as winner stocks, the next third as neutral stocks, and the lowest one-third CAR for loser stocks.

b. Testing Period

i. Continuing the calculation of the Average Abnormal Return (AAR) of stocks included in the winner and loser stock portfolio using the formula:

$$AAR_t = \frac{\sum_{i=1}^{k} AR_{it}}{k} \quad (5)$$

Whereas:
AARt= Average Abnormal Return
ARit = Abnormal Return
k = The number of winner shares and loser shares during the formation period

ii. Comparing the AAR between the formation period and the test period based on the mean in the descriptive statistical analysis.

iii. Doing hypothesis testing using the Paired sample t-test or Wilcoxon Signed Ranks

RESULTS

This study uses the Indonesian Sharia Stock Index for the period March 3, 2020–March 3, 2022. The choice of ISSI as the research object was made because ISSI covers all Islamic stocks listed on the IDX, and, according to Siregar's research (2020), listed Islamic stocks are not affected by the conditions of the COVID-19 pandemic.
Based on the selection of sample criteria that have been described, 248 results were obtained in observation 1, and 222 samples in observations 2 and 3 as the final results obtained with the following details:

Table 2 Details of Research Sample Criteria

No	Criteria
1.	All companies listed on the IDX and included in ISSI during the observation period.
2.	The shares are included in the observation period and are not new shares.
3.	Stocks included in the winner stock portfolio category are those with the highest 1/3 cumulative abnormal return value and loser stock portfolios, namely the lowest 1/3 cumulative abnormal return value.

Source: Information processed

After determining the portfolio of winner and loser stocks, it will be followed by calculating the average abnormal return (AAR). If the winner's stock portfolio experiences a difference in AAR which can be seen from the mean difference between the formation period and the testing period, which states that the AAR of the formation period is higher than the testing period, then the winner's stock portfolio experiences an overreaction anomaly. Meanwhile, if the loser stock portfolio experiences a difference in AAR which can also be seen from the mean difference between the formation period and the testing period, indicating that the AAR value for the testing period is higher than the formation period, then the loser stock portfolio experiences an underreaction anomaly.

Descriptive Statistical Analysis Test

Table 3 Test Results of Descriptive Statistical Analysis on Winner's Stock Portfolio

	N	Minimum	Maximum	Mean	Std. Deviation
Winner1_Formation	124	,0011337	1,7295692	,054516618	,1970316720
Winner1_Testing	124	-,668646	-,000554	-,03927007	,1247380553
Winner2_Formation	111	,0014458	,0305545	,006145127	,0058148315
Winner2_Testing	111	-,008966	,0333107	,002236470	,0059452112
Winner3_Formation	111	,0019011	,8879117	,014808485	,0837982029
Winner3_Testing	111	-,0101362	,0510490	,002106331	,0082930059
Valid N (listwise)	111				

Source: data processed

Based on the average value of the winner stock portfolio in observations 1, 2, and 3, the average abnormal return value during the formation period is higher than the testing period. This shows that investors react more positively to the formation period in observations 1, 2, and 3, which indicates that there is an overreaction anomaly.

Table 4 Test Results of Descriptive Statistical Analysis on Loser Stock Portfolios

	N	Minimum	Maximum	Mean	Std. Deviation
Loser1_Formation	124	-,7356777	-,0005585	-,045198483	,1394808976
Loser1_Testing	124	-,9205849	1,6178902	,024833329	,2126199907
Loser2_Formation	111	-,0084168	-,0005194	-,002432611	,0017115169
Loser2_Testing	111	-,0076002	,0273545	,001106316	,0041293469
Loser3_Formation	111	-,0243147	-,0013119	-,003581112	,0034072858
Loser3_Testing	111	-,0111302	,0396296	,002217986	,0062099493
Valid N (listwise)	111				

Source: Data processed

Based on the average value of the loser stock portfolio, observations 1, 2, and 3, the average abnormal return value during the test period is higher than the formation period. This shows that investors react more positively to the test period in observations 1, 2, and 3, which indicates that there is an underreaction anomaly.

Normality test

After conducting a descriptive statistical analysis test, the next step is to carry out a normality test with the Kolmogorov-Smirnov technique using SPSS 21 with a significance level of between 1% and 5%. If the data is normally distributed, it will be continued with the paired sample t-test, and if the data is not normally distributed, it will be continued with the Wilcoxon signed rank test.

Table 5 Normality Test Results on Winner's Stock Portfolio

Data	Normality Test Asymp. Sig. (2-tailed)	Conclusion
Winner1_Formation	0,000**	Not normally distributed
Winner1_Testing	0,000**	Not normally distributed
Winner2_Formation	0,000**	Not normally distributed
Winner2_Testing	0,015***	Normally distributed
Winner3_Formation	0,000**	Not normally distributed
Winner3_Testing	0,000**	Not normally distributed

Information: ** significant value of 5%
Keterangan: *** significant value of 1%
Source: data processed

According to table 5, the winner stock portfolio observed over two testing periods is normally distributed with an asymptotic sig value of 0.015 or greater, so the paired sample t-test will be used. Meanwhile, for the winner stock portfolio observations 1 and 3, both the formation period and the testing period show that the data is not normally distributed with an asymptotic sig value of less than 0.05, so the hypothesis test will use the Wilcoxon Signed Ranks Test.

Table 6 Results of the Normality Test on the Loser Stock Portfolio

Data	Normality Test Asymp. Sig. (2-tailed)	Conclusion
Loser1_Formation	0,000**	Not normally distributed
Loser1_Testing	0,000**	Not normally distributed
Loser2_Formation	0,002**	Not normally distributed
Loser2_Testing	0,008**	Not normally distributed
Loser3_Formation	0,000**	Not normally distributed
Loser3_Testing	0,002**	Not normally distributed

Information: ** significance value of 5%
Source: data processed

Based on table 6, the loser stock portfolio, observations 1, 2, and 3, both the formation period and the testing period show that the data is not normally distributed with an asymptotic sig value of less than 0.05, so the hypothesis test will use the Wilcoxon Signed Ranks Test.

Hypothesis testing

After carrying out the normality test, the next stage of testing is hypothesis testing. This study uses the paired sample t-test and the Wilcoxon signed rank test to determine the significance of whether there are overreaction and underreaction anomalies by looking at differences in average abnormal returns on winner and loser stock portfolios.

Table 7 Results of Wilcoxon Hypothesis Test on Winner's Stock Portfolio

	Winner1_Testing - Winner1_Formation	Winner3_Testing - Winner3_Formation
Z	-1.648[b]	-5.658[b]
Asymp. Sig. (2-tailed)	,000**	,000**

Information: ** significance value of 5%
Source: data processed

Observation 1 and Observation 3 show significant results, with significance values of 0.000 or less than 0.05, according to the results of the Wilcoxon signed-rank test for the winner stock portfolio. Meanwhile, based on the results of this significance, it can be stated that Ho is rejected or that there is a significant overreaction anomaly in the winner's stock portfolio (observations 1 and 3).

Table 8 Paired Sample Hypothesis Test Results on Winner's Stock Portfolio

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Winner2_Formation - Winner2_Testing	,0039086572	,0090459934	,0008586077	,0022070983	,0056102161	4,552	110	,000**

Information: ** significance value of 5%
Source: data processed

According to table 8, the paired sample t-test findings for observation 2's winner stock portfolio are significant since the significance value is less than 0.05, or 0.000. Ho may be disqualified or there may be a substantial overreaction abnormality in the winner observation 2 stock portfolio, according to the significance results.

Table 9 Result of Wilcoxon Hypothesis Test on Loser Stock Portfolio

	Loser1_Testing – Loser1_Formation	Loser2_Testing - Loser2_Formation	Loser3_Testing - Loser3_Formation
Z	-7.182[c]	-7.415[c]	-8.021[c]
Asymp. Sig. (2-tailed)	,000**	,000**	,000**

Information: ** significance value of 5%
Source: data processed

Observation 1, observation 2, and observation 3 are significant findings based on the Wilcoxon Signed Ranks Test results on loser stock portfolios since the significance value is less than 0.05, or 0.000. Meanwhile, based on the findings of this significance, it can be concluded that either Ho is disproven or that the loser stock portfolio in Observation 1 has a major underreaction anomaly.

It may be inferred that there is a large overreaction anomaly from the test results for the Wilcoxon Signed Rank Test and paired sample t-test on the winner stock portfolio observations 1, 2, and 3.

According to the descriptive statistical analysis test's comparison of average abnormal returns, the average abnormal return during the three observations' formation period was higher than during the test period.

Due to the influence of heuristic behavior, investors are thought to have overreacted to the winner's stock portfolio during observation periods 1, 2, and 3. This is due to the fact that investors exaggerate the estimates offered since they are overconfident that the company would generate favorable earnings.

Investors might utilize the contrarian approach, which is purchasing a portfolio of losing stocks at a loss and selling them when there is price reversal, since it has been demonstrated that there is an overreaction abnormality (Kaluge & Kinesti, 2022). The findings of this research are consistent with the results of Anggraeni's (2020) study of the overreaction anomaly in LQ45 for the 2016–2018 period, Santosa and Huda's (2020) study of the overreaction anomaly in the Islamic capital market, and Lalwani et al (2018) study of the overreaction anomaly in 10 global stock markets.

In testing hypothesis 2, it can be concluded that there is a significant underreaction anomaly by showing that the average abnormal return in the testing period is higher than the formation. Investors are considered to be wrong by underestimating loser stock portfolios during the observation period 1, observation 2, and observation 3 which are caused by the influence of heuristic behavior. This is because investors use initial assessments to make estimates resulting in an underreaction anomaly.

Meanwhile, the research findings are also supported by studies by Mufti and Rahmawati (2016), who looked at underreaction anomalies in loser stock portfolios on the Indonesia Securities Stock Exchange for the years 2013 to 2014, and by Aulia, Topowijoyo, and Sulasmiyati (2016), who examined underreaction at LQ45 for the years 2014 to 2015. The two studies stated that there was a significant increase in abnormal returns on loser stock portfolios.

DISCUSSION

There is several paired-sample t-tests and the Wilcoxon Signed Rank Test that investors and stakeholders can use and consider. The following management implications are related to the findings of the study:

1. The Covid-19 pandemic is an outbreak that is severely impacting all countries of the world, including Indonesia.
The Covid-19 outbreak has had a major impact on all sectors, including trade, transportation, tourism and the economy. In the investment world, Indonesian investors have seen very rapid growth in both traditional and Islamic stocks as the pandemic has impacted public perceptions of investing in the capital markets. In terms of cash investment news, one of the reasons for the increase in investors in Islamic equities is that Islamic equities continue to perform well amid the

Covid-19 pandemic. This is evidenced by the steady rise of the Indonesian Sharia Stock Index (ISSI), Jakarta Islamic Index 70 (JII 70) and Jakarta Islamic Index 30 (JII 30). According to Indonesian Stock Exchange (IDX) data cited by CNBC Indonesia, in March 2022, the market capitalization of Shariah shares will reach IDR ,315 trillion, representing 6% of IDX's market capitalization. Specifically, the ISSI Mental Level Year-to-Date (YTD) also registered a 5.76% increase to a level of 203.5. Furthermore, a study by Pratitis and Setiyono (2022) found no significant difference in average ISSI stock prices before and during the Covid-19 pandemic. Meanwhile, the decline in ISSI stock early in the pandemic was attributed to investor panic and the impact of JCI's decline, as well as several other external factors. To encourage active Islamic investors, IDX regularly conducts training, market development and product innovations to accelerate the growth of Islamic equities and investors (Purwanti, 2022).

2. Portfolio winner stocks and portfolio loser stocks

Drawing on the work of Musnadi et al., (2018), the formation of winning and losing stock portfolios in this study was done by calculating and sorting the cumulative abnormal return (CAR) values. The third with the highest CAR falls into the winning portfolio and the third with the lowest CAR falls into the losing portfolio. On the other hand, the investor's goal when building portfolios is to group winning stock portfolios, i.e., stocks with above-average returns, and to include stocks with negative or below-average returns in loser stock portfolios to reduce investment risk (Julianti, 2016).

3. Overreaction anomaly in winner's stock portfolio

As a result of investigating the winning stock portfolio of the Indonesian Shariah stock index, it found that there was an overreaction abnormality when comparing the observation period 1, that is, the 6-month formation period and the test period from March 2nd 2020 to August 28th 2020, and the testing period is from August 31st 2020 to February 26th 2021. Observation 2 is the 6-month comparison between the formation period from January 4th 2021 until 2nd July 2021 and the testing period start from 5th July 2021 to December 31st 2021. Meanwhile, observation 3, a comparison in 1 year starting from March 2 2020 – February 26 2021 for the formation period, and March 1 2021 – March 2 2022 for the testing period. These results show that the winner's stock portfolio in this study reacts to an efficient market through a price reversal at the 5% significance level. Investors are believed to have overreacted during Observation 1, Observation 2, and Observation 3. This is due to the effect of heuristic behavior on the winner's stock portfolio. This is due to investors believe the company will generate positive returns, and overconfidence causes them to exaggerate the predictions made by them. Judging by these key results, investors can use the results of this study as a basis for consideration when making investment decisions that a price reversal could occur at any time. The overreaction anomaly has been proven to occur, allowing investors to adopt a contrarian strategy of buying and selling portfolios of loser stocks at a loss when price reversals occur (Kaluge and Kinesti, 2022).

4. Underreaction on loser stock portfolio

Findings on the loser portfolio of the Indonesian Shariah stock index show that there is an under-reacting anomaly in observation periods 1, 2, and 3, i.e., a comparison of the 6-month base period and the 2020 and 2021 test periods. is shown. Also, a comparison of the one-year formation period and test period. Meanwhile, the survey was conducted from March 2 2020 – March 2 2022. These results show that a 5% significance level loss stock portfolio in this study counteracts an efficient market by experiencing a price reversal. Investors are misled by underestimating the stock portfolio that suffers losses due to the effects of the heuristic behavior during observation period 1, observation 2, and observation 3. This is because investors make their quotes using their first guesses, resulting in an underreaction anomaly. Judging by these key results, investors can use the results of this study as a basis for consideration when making investment decisions that a price reversal could occur at any time. Evidence that the underreaction anomaly exists allows investors to adopt a momentum strategy of buying a portfolio of losing stocks when they lose and selling when a price reversal occurs (Kaluge and Kinesti, 2022).

CONCLUSION

The following conclusion can be drawn from the data analysis and testing results used in the preceding chapter to demonstrate the existence of overreaction and underreaction anomalies are as follows: (1) The winner's stock portfolio exhibits an overreaction anomaly in observations 1, 2, and 3 demonstrating that the average abnormal return in the formation period is higher than the testing period; (2) The loser stock portfolio exhibits an underreaction anomaly in the first, second, and third observation periods, which demonstrates that the test period's average abnormal return is higher than the formation period's average abnormal return.

In this research, the formation of winner and loser stock portfolios is done by calculating and sorting the cumulative abnormal return (CAR) from the highest value to the lowest value. 1/3 of the highest CAR value will be categorized as a winner stock portfolio, while 1/3 of the lowest CAR value will be categorized as a loser stock portfolio.

There is an overreaction anomaly in the winner stock portfolio in observation period 1, observation 2 and observation 3 indicating that the average abnormal return in the formation period is higher than the testing period. There is an underreaction anomaly in the loser stock portfolio in the three observation periods, namely observation 1, observation 2 and observation 3 which shows that the average abnormal return for the test period is higher than the formation period.

Based on the results of the investigation, we can propose to carry out additional research to raise the stock index under investigation for both all current stock indices and all stocks listed on the Indonesia Stock Exchange. Similarly, these large studies can use longer time frames to look for over- and under-reacting anomalies, such as those that occurred before, during, and after the Covid-19 pandemic. It is also recommended to use additional computational techniques such as market models and mean adjusted models.

LIMITATIONS

This study has research limitations that can be taken into consideration for further research, as follows: 1. Extending study period, since this study only uses phenomena during the Covid-19 pandemic; 2. This study only uses the market adjusted model as a calculation method; 3. Further research might expand the stock index to be examined both for all existing stock indexes and for all stocks listed on the Indonesian Stock Exchange, 4. Moreover, further research can use a longer period of time to see any overreaction and underreaction anomalies such as before, during and after the Covid-19 pandemic; 5. In addition, other calculation methods such as the market model and the mean adjusted model can be implemented.

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