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COMPARISON OF BUY AND HOLD VS MACD SIGNALS, PROFIT MAXIMIZATION ON FINANCE SECTOR STOCKS

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Buy and Hold, Signal, MACD, Growth, Stock Price

Abstract

This study examines the performance of two investment strategies, the Buy & Hold strategy and the MACD strategy, using data from 20 stocks in the Indonesian capital market over a six-year period. The results show that while the Buy & Hold strategy generally generates higher returns, the MACD strategy offers more stable returns and lower losses in certain cases. Statistical analysis using the Mann-Whitney U test showed no significant difference between the two strategies, but the Buy & Hold strategy outperformed MACD by 11.2% in terms of average return, indicating that it performed better than MACD strategy.

INTRODUCTION

One of the countries with a large population and abundant natural resources is Indonesia. According to BPS estimates, there will be 278.8 million people living in Indonesia by 2023. Therefore, the Indonesian economy over the past ten (10) years has experienced a fairly good trend. Indonesia's current economic conditions can be said to be in a stable position, from the financial sector in general, as well as from the macroeconomic and fiscal-monetary side, this is reflected in the side of State revenue and the trade balance is in a good position. However, Indonesia must also remain vigilant about the impact of changing global conditions that are full of uncertainty due to geopolitical instability. So the government must continue to identify risks that might occur in the economy.

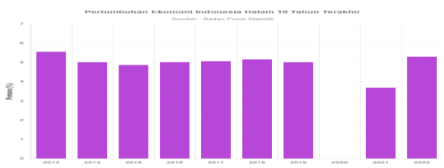
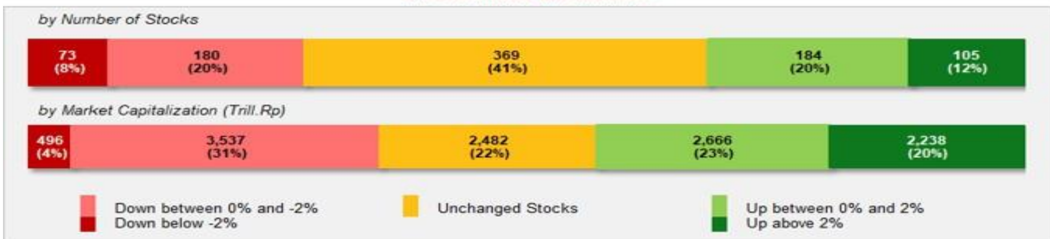


Figure 1: Graph of Indonesia's Economic Growth over the Last 10 Years Source: BPS, 2023

One of the possible risks that can arise is the risk due to the conditions of the Russia - Ukraine War which is still volatile and dynamic, which has an impact on the movement of global economic growth. Indonesia is a country with a high level of exports, where exports are the source of growth for the Indonesian economy (Lemhanas RI, 2022). In addition, the government must also pay attention to household consumption because it is related to the issue of people's purchasing power. As we all know based on a publication from Tirto.id in 2024, Indonesia has a large population, and data from the Ministry of Industry's Industrial Confidence Index (IKI) of 50.70 in October 2023 shows that although there was a decrease compared to the September 2023 period, people's purchasing power has decreased, especially in the income group below Rp 3 million. When the price of basic necessities increases, people become more frugal in consuming them.

Economic growth in a country can also be seen in terms of the development of the capital market industry in that country. The Capital Market Industry is one of the alternative choices of the community in optimizing the increase in their wealth in the form of Stock Investments. All aspects of society can be actively involved in this industry, so the development of capital market investment in Indonesia is growing rapidly. Based on the press release submitted by the Indonesia Stock Exchange in the closing session of trading in 2023, it was noted that the growth of the Indonesian capital market experienced positive growth in terms of supply and demand. In addition, the IDX also noted that the

STOCK PRICE MOVEMENT



TOP GAINERS

No.	Code	Prev.	Today	Change	%
1.	SMLE	175	236	61	34.86%
2.	ALKA	424	530	106	25.00%
3.	RONY	280	350	70	25.00%
4.	SHID	1,530	1,910	380	24.84%
5.	MAYA	228	284	56	24.56%
6.	CGAS	430	525	95	22.09%
7.	MSJA	300	346	46	15.33%
8.	NICE	525	595	70	13.33%
9.	APLI	505	560	55	10.89%
10.	MPXL	226	250	24	10.62%

TOP LOSERS

No.	Code	Prev.	Today	Change	%
1.	MREI	2,010	1,800	-210	-10.45%
2.	SIPD	1,115	1,015	-100	-8.97%
3.	LTLS	1,330	1,225	-105	-7.89%
4.	EMDE	139	129	-10	-7.19%
5.	SBMA	179	167	-12	-6.70%
6.	CYBR	198	185	-13	-6.57%
7.	PYFA	1,245	1,170	-75	-6.02%
8.	GLVA	500	470	-30	-6.00%
9.	AWAN	262	248	-14	-5.34%
10.	TPIA	4,220	4,000	-220	-5.21%

Note: Gainers/Losers rank only stocks that are included in the IDX Composite Index (exclude acceleration & watchlist stocks).

trading activity side also increased. From the supply side, there was an increase in the number of listed companies as many as 903 companies. The IDX ranks sixth among global exchanges in terms of the quantity of *Initial Public Offerings* (IPOs) and ninth in terms of the total amount of funds raised, according to the EY Global IPO Trends 2023 study. A total of IDR 126.97 trillion in bonds and IDR 54.14 trillion in fundraising proceeds, consisting of 79 stocks, 120 bond issuances, 3 ETFs, 2 EBA-SPs, and 182 structured warrants, were listed as new securities on the IDX. The biggest achievement in the history of the Indonesian capital market was the addition of 79 new listings in 2023.

In terms of Trading Activity, there was an increase in public investment interest as seen from the growth in the number of capital market investors (stock, bond and mutual fund investors) increasing from 1.85 million investors to 12.16 million investors. In particular there was an increase in stock investors, from 811 thousand to 5.25 million stock investors. The growth of the Composite Stock Price Index (CSPI) closed on December 28, 2023 at 7,303.89, 6.62% higher than the closing price of trading in 2022. On 28 December 2023, market capitalization reached a new record high of IDR 11,762 trillion, setting a new record. On May 31, 2023, 89 billion shares of the largest daily transaction volume in history was registered, setting another new record.

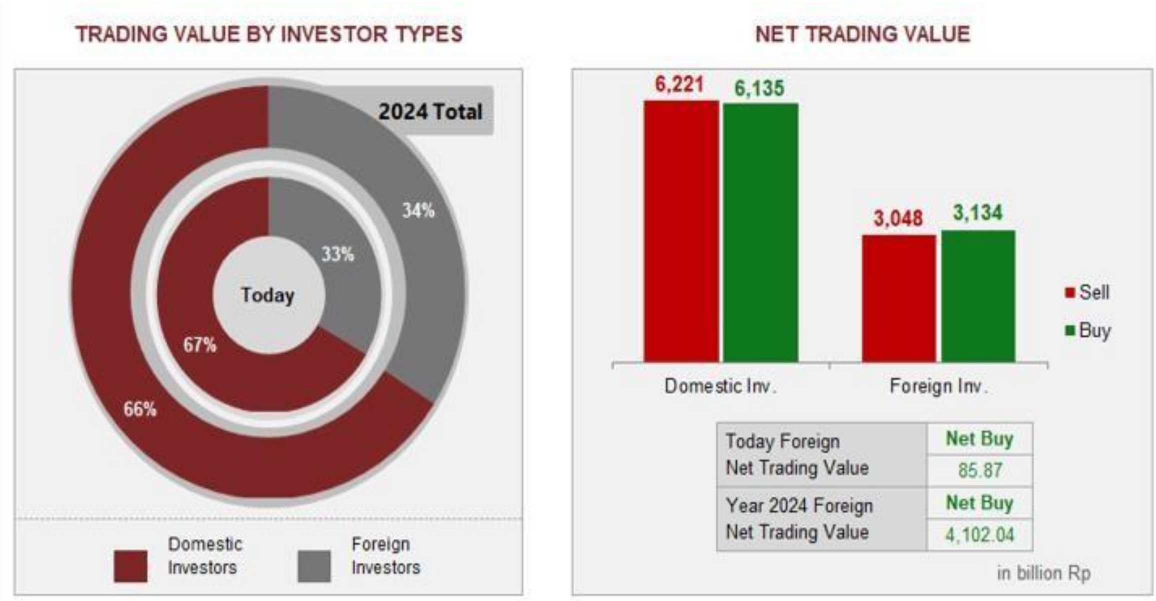


Figure 2: Trading Activity
Source : Indonesia Stock Exchange (IDX), 2023

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THEORETICAL STUDY

INDONESIAN CAPITAL MARKET

In accordance with the Law of the Republic of Indonesia Number 8 of 1995 concerning the Field of Capital Business in Part I and Article I Article 13, the definition that the field of Capital Business is an activity related to the exchange of Donations and General Protection, Public Organizations related to the Protection issued by them, as well as grounding and calling related to Protection. Share Trading is a Party that sorts out and gives a framework or possible intention to bring together offers to trade Protection from different Meetings with the full purpose of exchanging Protection between them. In the Indonesian Capital Market, there are various types of speculation that can be an option for the general public. Protection is protection, in particular liability protection, business protection, shares, bonds, liability tokens, Cooperation Units in aggregate venture contracts, Protection prospect contracts, and any subsidiary of Protection.

STOCK INDEX

A stock note is a factual measure that reflects the general value development of a collection of offerings selected based on certain models and techniques and sometimes valued. The objectives/benefits of stock indices include:

1. Measuring market sentiment,
2. Made into passive investment products such as Index Mutual Funds and Index ETFs and derivative products,
3. *Benchmark* for active portfolios,
4. Proxies for measuring and modeling *returns*, systematic risk, and risk-adjusted performance, as well as
5. Proxy for asset class in asset allocation.

Currently the IDX has 44 stock indices. One of the stock indices that will be the subject of discussion in the study is the IDX Financial Sector index (IDXFINANCE).

Stock Technical Analysis

The following two types of analysis-fundamental analysis of stocks and technical analysis of stocks-are familiar to an investor when trading stocks. In this case, investors and financial brokers with basic attributes (temporary profits) are very fond of using specialized checks. One way to predict stock movements is through this analysis. Special investigation is an approach to examine the development of stock prices utilizing factual instruments, for example, diagrams and numerical recipes. Specialized examination is an examination that displays the appearance of a stock and its future stock price post based on verifiable price development information using specific charts and markers, such as *line charts*, *bar charts*, and *candlestick* charts.

The purpose of studying any special investigation is to enable investors or *traders* to evaluate the current economic situation based on past price history, as well as provide an outline or expectation of future market developments. The purpose of studying technical analysis is to enable investors or *traders* to evaluate the current economic situation based on past price history, as well as provide an outline or expectation of future market developments. Although the use of this analysis has different objectives between investors and traders, both can use this analysis. For investors who have a long-term mindset, this analysis is used to help decide when it is the right time to Buy, Hold or Sell stocks in the long term. But for traders, this analysis serves to help them make decisions in determining stock choices that have a tendency to profit or profit in the short term.

Stock Technical Analysis Indicators

Indicators are numerical calculations applied to security prices as well as trading volumes. The result of the estimation is a value that is used to forecast future price developments. There are two types of indicators, leading and lagging. Leading indicators are clues that appear before a pattern emerges.

Leading indicators work by estimating overbought and oversold levels, concluding with the assumption that at overbought and oversold levels the price will pull back to the corresponding levels. Lagging indicators are useful when the price is moving in a pattern that is long enough, they do not give warnings of impending changes, but only determine what is affecting the price, including its rise or fall so that traders can make decisions accordingly. *Traders* are forced to buy or sell later because this indicator appears after the trend has started. Nonetheless, this delay reduces risk by placing *traders* in the right part of the market.

Investors and traders typically use at least seven of the most widely used technical analysis indicators. The indicators used in technical analysis are as follows:

1. Support and Resistance

The concepts of *support* and *resistance* in the field of stocks are used to refer to specific price levels. *Support* is a certain cost level that is considered to be the lowest within a certain period of time.

2. Moving Average

A *moving average* is a line resulting from calculating the price before today. This strategy involves calculating the average value development of a stock over a specific time span. There are many variants of moving midpoints that are used as specific investigative indicators, e.g. *Simple Moving Average* (SMA), *Weighted Moving Average* (WMA), *Exponential Moving Average* (EMA).

3. Moving Average Convergence Divergence (MACD)

Moving Average Convergence Divergence (MACD) is a very simple but useful indicator for a *trader*. The MACD indicator was first discovered by Gerard Apple in 1973 who was also a trader. This technique detects overbought and oversold by looking at the relationship between the long-term and short-term *moving averages*. There are three

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parts to this technique consisting of two lines and a histogram, namely the *Signal Line, MACD Line,* and MACD Histogram.

4. Relative Strength Index (RSI)

The *Relative Strength Index* is a particular marker applied in monetary examination, including stocks. The RSI functions as an energy limitation, specifically forecasting cost developments.

5. Stochastic

Stochastic was first created by George Lane who looked at the relationship between the last closing price and compared it to the highest and lowest prices within a certain time frame. In terms of signaling *divergence*, *oversold*, and *overbought*, this indicator at first glance looks similar to the momentum indicator and the RSi indicator.

6. Volume

Volume in a stock transaction is a marker that is able to indicate the number of trades or transactions that occur in a trading transaction. Alternatively, stock trading volume indicates the aggregate amount of cash in circulation when traded.

7. Fibonacci Retracement

Fibonacci retracement is a scientific instrument used by stock *traders* to move towards specific checks. The development of the ratio ratio in the Fibonacci series of numbers led to the creation of this indicator. The results can be used for stock trading signals.

RESEARCH METHOD

This research applies quantitative data analysis techniques through a series of statistical tests. The application of these data analysis techniques is related to the purpose of the study, which is to compare the level of profit or loss that investors may face from using active investment strategies versus passive investment strategies. The population in this research is all financial sectoral index stocks (JKFINANCE) listed on the IDX, which using purposive sampling method then obtained as many as 20 issuers listed during the period 2015 - 2020 with a total amount of data as much as 120 test data.

Moving Average Convergence Divergence

MACD, or Moving Average Convergence Divergence, is a technical indicator used in financial market analysis, particularly in stock, forex, and commodity trading. It is designed to identify changes in trend, momentum, and potential price reversals of an asset. The MACD line is calculated by subtracting the value of the short-term Exponential Moving Average (EMA) from the long-term EMA. The general formula is:

M AC DLine - EM A (12) - EM A (26)

The result of this calculation creates a line that shows the difference between the two exponential moving averages, reflecting changes in price momentum. When the MACD line crosses the signal line from bottom to top, it can be considered a bullish signal, indicating a potential reversal in the direction of the uptrend. Conversely, if the MACD line crosses the signal line from top to bottom, it can be considered a bearish signal, indicating a potential reversal in the direction of the downtrend.

Mann-Whitney U

The Mann-Whitney U test, also known as the Mann-Whitney U Test or Wilcoxon-Mann- Whitney Test, is a non-parametric statistical method used to test whether there is a significant difference between two independent groups in samples drawn from populations that may have different distributions. This method is suitable for use when the data does not meet the requirements of normal distribution. Hypothesis Formulation:

1. Hypothesis (H_0): There is no difference in median between two groups.
2. Hypothesis (H_1): There is a difference in median between two groups.

Interpretation of results:

1. If H_0 is rejected significantly, it can be concluded that there is a significant median difference between the two groups.
2. If H_1 is accepted as significant, there is not enough statistical evidence to suggest that there is a significant difference in medians between the two groups.

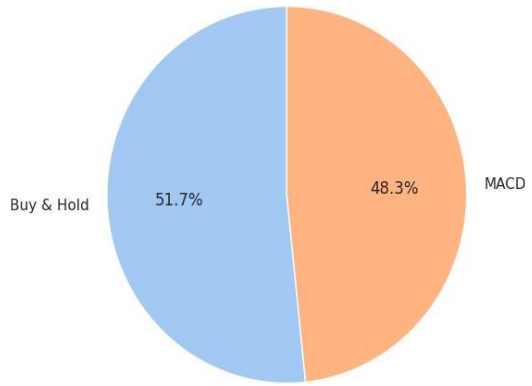
The null hypothesis (H0) in the Mann-Whitney Test states that there is no significant difference between the two groups being tested. Conversely, the alternative hypothesis (H1) states that there is a significant difference between the two groups.

RESULTS AND DISCUSSION

Stock return is a measurement of the performance of an investment in a stock over a period of time. This return is calculated by taking into account changes in stock prices and can also take into account dividend payments. The following graph shows the geometric return comparison of the 20 stocks studied using the buy and hold strategy approach versus the MACD strategy.

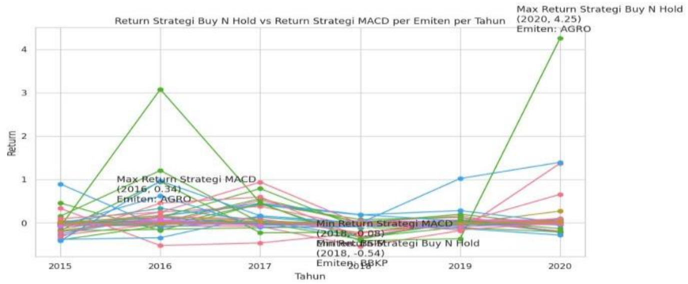
Figure 3: Comparison chart of geometric returns of buy and hold strategy and MACD strategy Source: Indonesia Stock Exchange (IDX), 2023.

Based on the geometric return comparison data of the buy and hold strategy and the MACD strategy on the stocks presented, several conclusions can be drawn, where the buy and hold strategy tends to give positive results on several stocks such as BBRI and BBCA, which shows the potential for profit in the long run. However, there are also some stocks such as INPC that produce negative returns, indicating the risks and losses that may occur if investors use the buy and hold strategy. Meanwhile, the MACD strategy also showed mixed results, with some stocks such as PNIN, BBKP, and DNAR giving positive returns. However, some stocks such as INPC had negative returns, indicating that this strategy does not always provide good results for every stock.

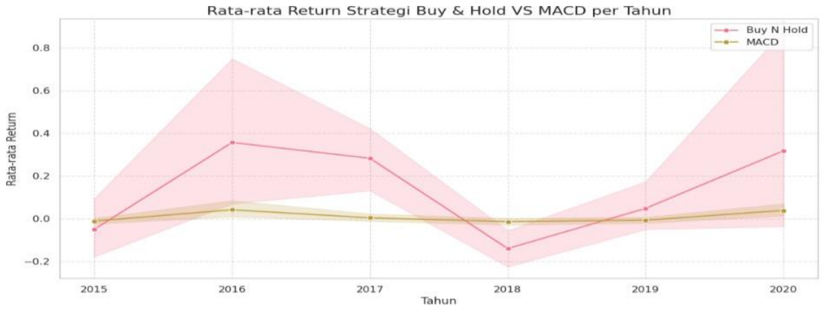


Comparison of Percentage Return of Buy & Hold VS MACD Strategy

The graph above proves that the Buy & Hold strategy is slightly more dominant in producing a higher quantity of investment returns than the MACD strategy, with a percentage of 52%. This means that by using the Buy & Hold strategy there are 63 samples of investment return data whose rate of return is superior when compared to the rate of return using the MACD strategy.

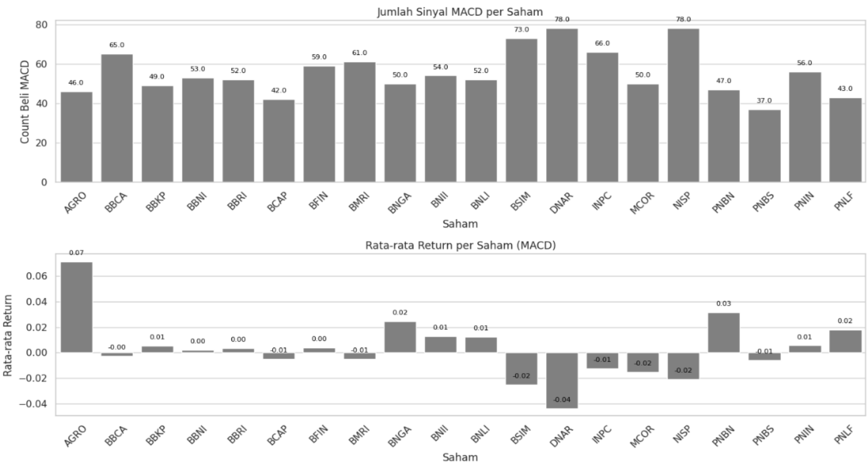


When using the Buy & Hold strategy, the AGRO issuer is the highest contributor to returns with a return rate of 425%, namely for 2020, while

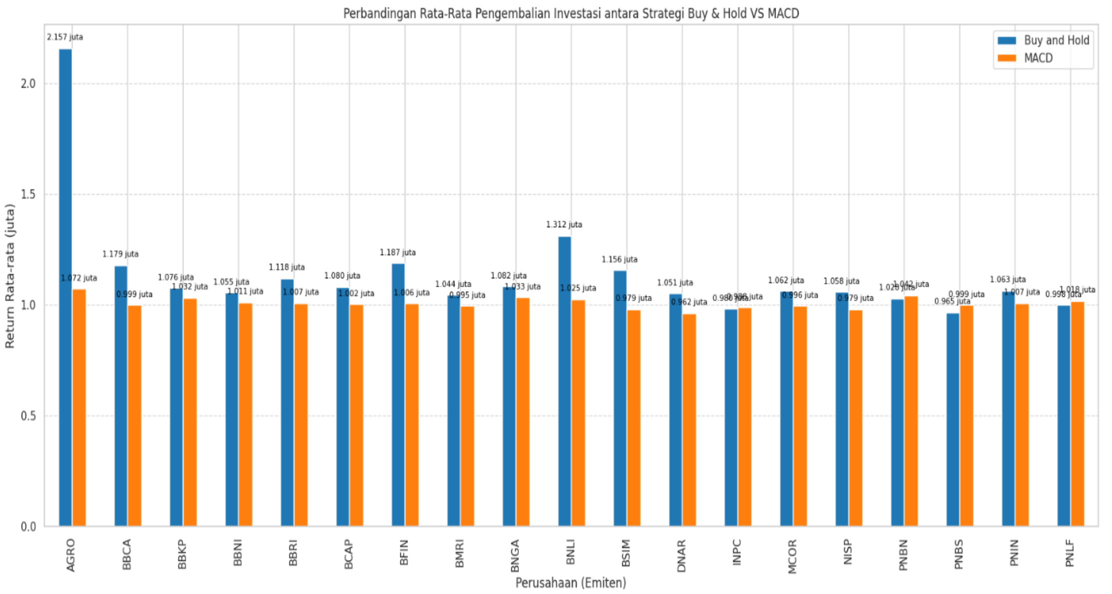


using the MACD strategy the highest return rate is only 34%, also for the AGRO issuer in 2016. This means that if investors only put their fund holdings at the beginning of 2020 and then release them at the end of that year, the profits obtained from investing with a buy & hold strategy can reach up to almost 5 times. Meanwhile, the lowest loss faced by investors was recorded at -52% when using the Buy & Hold strategy, in which case the MACD strategy proved to be slightly superior in withstanding potential investor losses with a maximum loss rate of only -8.2%.

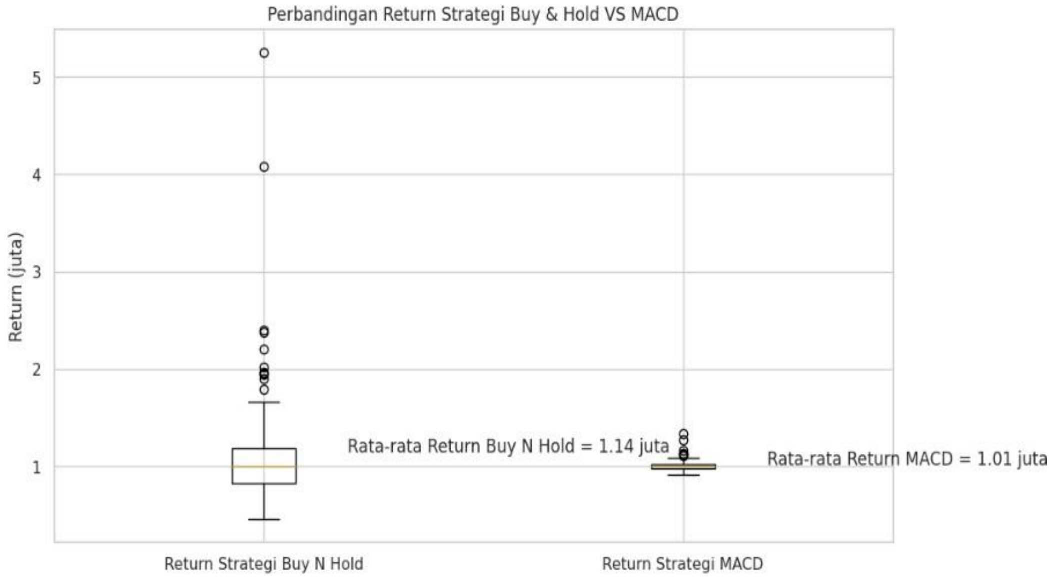
For the annual period, the chart shows that investors' returns tend to be more volatile when using the buy & hold strategy, while the MACD strategy provides fairly stable returns throughout the 6-year analysis period. During this period, the buy & hold strategy proved to be superior in terms of providing profits to investors above the MACD strategy's rate of return, namely for 4 periods, namely in 2016, 2017, 2019 and 2020. While on the other hand, the MACD strategy only proved to be able to excel for 2 periods, namely in 2015 and 2018.



In the MACD strategy, the number of buy & sell signals generated for each stock was different during the analysis period, where DNAR and NISP issuers were identified with 78 buy & sell signals, AGRO with 46 buy & hold signals, BSIM with 73 buy & hold signals, and so on. However, from the aspect of investment returns, it is evident that DNAR and NISP have negative average returns of -4% and -2% respectively, even though both have the highest number of buy & hold signals identified among all issuers. Meanwhile, AGRO during the analysis period was identified as having the highest return on investment of all issuers with 7%. This phenomenon indirectly proves that technical strategies in investment, especially MACD, have more or less provided false signals that have proven to be less than optimal in providing potential profits to investors.



The graph illustrates a comparison of the level of investor profits from both investment strategies, namely when investors put funds of Rp. 1,000,000.00 in each issuer analyzed during the 6-year observation period. The highest profit is identified for AGRO issuers where when investors apply the buy & hold investment strategy, the realized profit during the analysis period is worth Rp. 2,157,000.00 or means there has been a growth in value of Rp. 1,157,000.00. Meanwhile, when using the MACD strategy on the same issuer, the realization of investor profits was identified at Rp. 1,072,000.00 or with an increase of only 6% when compared to the buy & hold strategy. However, the chart also proves that there is a significant advantage of the MACD strategy when compared to the buy & hold strategy, namely for issuers such as INPC, PNBN, PNBS and PNLF. Even for some issuers, the MACD strategy is also proven to be able to increase the value of investment above the initial proxy when the buy & hold strategy shows the opposite.



Furthermore, by applying the mann whitney u test, the test results show a test probability level of 0.85 which means that there is no significant difference between the rate of return with the buy & hold strategy versus the MACD strategy, or in other words, rejecting the null hypothesis of this study. However, although there is no significant difference between the rates of return of the two strategies, the relative difference value between the 2 groups of strategies is calculated at - 0.112, which means that when using the MACD strategy, an investor will have a lower rate of return, which is 11.2% lower than the buy & hold strategy. This is evident from the boxplot graph which shows that the average MACD rate of return when compared to the buy & hold strategy has a negative difference of Rp. 130,000.00.

CONCLUSIONS AND SUGGESTIONS

Conclusion

1. No single strategy consistently delivers positive results for every stock, but on average the buy and hold strategy is better able to generate higher returns than the MACD strategy.
2. The buy and hold strategy has a slightly higher dominance in generating the quantity of investment returns. Overall, about 52% of the 63 data samples showed the superiority of the buy and hold strategy over the MACD strategy.
3. The buy and hold strategy had a maximum potential loss of -52%, while the MACD strategy proved to be slightly better with a maximum loss rate of only -8.2%. This suggests that the MACD strategy can be more effective in containing potential losses.
4. The Mann-Whitney U test shows that there is no significant difference between the rate of return with the buy and hold strategy versus the MACD strategy. However, the relative difference values show that the MACD strategy returns tend to be lower.

Suggestion

1. The success of the strategy depends on the characteristics and market behavior of each stock.
2. Investors need to carefully consider market conditions, trends and other factors before choosing an investment strategy.
3. While a buy and hold strategy tends to deliver higher returns overall, it is still important to diversify a portfolio. By owning a variety of stocks from different sectors, investors can reduce stock-specific risks and increase the portfolio's resilience to market fluctuations.

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