

The Effectiveness of RSI and MACD in Determining Buy and Sell Signals

Nurhikma Nurhikma^{1*}, Wa Ode Rayyani²

Universitas Muhammadiyah Makassar, Makassar, Indonesia^{1,2}

nurhikmahimah061004@gmail.com^{1*}, waode.rayyani@unismuh.ac.id²



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Abstract

Purpose: This study analyzes the effectiveness of Relative Strength Index (RSI) and Moving Average Convergence Divergence (MACD) in generating buy and sell signals for five mining stocks on the Indonesia Stock Exchange.

Methodology: This research uses a quantitative descriptive and verificative approach with secondary data consisting of daily historical prices and RSI, MACD, Signal Line, and Histogram values from the Indonesia Stock Exchange and TradingView.

Results: Both RSI and MACD detected price reversal points, with differing accuracy and timing across the five stocks. RSI produced more frequent, earlier signals identifying overbought and oversold conditions, while MACD produced fewer but more reliable signals confirming medium term trend changes during periods of strong momentum.

Conclusions: MACD is relatively more effective than RSI for determining buy and sell signals on mining stocks, generating more consistent signals during trending markets, while RSI performs better as a complementary indicator confirming overbought or oversold conditions before entry or exit.

Limitations: This study is limited to five mining stocks and one period, relying only on RSI and MACD without other indicators, so findings may not generalize.

Contributions: These findings offer practical insight for investors selecting technical indicators for entry and exit timing in the Indonesian mining sector, and an empirical basis for research combining technical and fundamental analysis.

Keywords: *Buy and Sell Signal, MACD, Mining Stocks, RSI, Technical Analysis*

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1. Introduction

The capital market is one investment instrument investors may choose to achieve their investment objectives. One of the most frequently traded instruments in the capital market is common stock. Stock is an attractive field of investment because it offers a high potential return alongside high risk, a relationship commonly referred to as high risk high return (Firdaus, 2021). Fundamentally, a shareholder is a part owner of a company. Sound analysis is therefore required to select and decide on ownership of a particular company or stock, and reliable, accurate analysis is needed as a basis for decision making. In addition, stock selection should also be grounded in the investor's own risk profile (Firdaus, 2021).

In equity investing, the terms buy, sell, and hold are commonly used to describe an investor's position toward a stock. To determine which of these actions is appropriate, an investor needs an analytical tool, and two broad techniques are typically used, namely technical analysis and fundamental analysis. Technical analysis relies on the historical price data of a chosen stock, while fundamental analysis relies on calculations derived from financial statements, supported by other factors such as news concerning the company. Understanding which method is most appropriate for equity investing in the capital market, particularly within the mining sector, matters because the resulting indicators can then be used as considerations in stock investment decision making ([Pramono et al., 2013](#)).

Stock investment can generate returns in the form of dividends, meaning the portion of company profit distributed to shareholders, and capital gain, meaning the profit arising from the difference between purchase price and selling price. The process of selecting a suitable coal mining stock for investment is fairly rigorous given the large number of companies listed on the Indonesia Stock Exchange ([Risaldi et al., 2024](#)). Technical analysis is a method that relies on historical market data such as price information. In analyzing stocks, two main approaches are commonly used, namely the fundamental approach and the technical approach ([Herlambang, 2024](#)). Building on prior research findings and existing arguments, this study centers its focus on the technical approach as applied to the mining sector.

To determine buy and sell signals, this research uses technical analysis together with the Moving Average Convergence Divergence (MACD) indicator as a tool for analyzing stock price movement through charts. The chart type used is the candlestick chart, since this chart is comparatively easier to read than other chart types ([Juliyana & Fauji, 2018](#)). In addition, the Stochastic Relative Strength Index (Stochastic RSI) is a momentum indicator that combines two well known technical indicators, namely the Relative Strength Index (RSI) and the Stochastic Oscillator. Stochastic RSI is designed to provide a more precise and sensitive RSI reading by measuring the RSI level relative to its range over a given period. This allows traders to identify potential overbought or oversold market conditions and adjust their trading strategy accordingly ([Kurniawan & Ramadhani, 2024](#)).

This research aims to analyze the price movement pattern of five leading coal mining issuers, namely DSSA (PT Dian Swastatika Sentosa Tbk), BYAN (PT Bayan Resources Tbk), ADRO (PT Alamtri Resources Indonesia Tbk), ITMG (PT Indo Tambangraya Megah Tbk), and AADI (PT Adaro Andalan Indonesia Tbk), using a range of technical indicators. Through indicators such as trend analysis, MACD, and Stochastic RSI, this research seeks to provide insight into market trends and profitability potential amid the uncertainty that characterizes the coal market. These findings are expected to serve as a reference for investors and stakeholders in formulating strategy and making optimal investment decisions within the Indonesian mining industry.

This inquiry is also motivated by a broader debate within the technical analysis literature over whether momentum oscillators such as RSI genuinely add value beyond simple trend following tools such as MACD, or whether their relative usefulness depends heavily on the volatility and trend character of the underlying asset. Evidence from the cryptocurrency market, for instance, shows that RSI signals alone can expose traders to considerable risk when used without complementary confirmation, yet still outperform a naive buy and hold benchmark under the right conditions ([Zatwarnicki et al., 2023](#)). Similarly, comparative work on MACD based strategies in the United States equity market finds that the win rate of a MACD only strategy often falls below fifty percent, but improves meaningfully once combined with other momentum indicators such as RSI ([Chio, 2022](#)). These mixed findings across different asset classes and market conditions underscore the practical value of directly testing both indicators, individually and in combination, on a specific and economically important segment of the Indonesian market, namely coal mining stocks, whose price behavior is shaped by highly volatile global commodity cycles.

2. Literature Review and Hypotheses Development

2.1 Stock

According to [Aryawati et al. \(2022\)](#), a stock is a security representing an individual's or entity's ownership interest in a company. Stock is defined as a security issued by a limited liability company or an entity organized as a permanent issuer. Stock ownership indicates that a person holds a portion of ownership over a company. Accordingly, when an investor purchases stock, that investor automatically becomes one of the company's owners, referred to as a shareholder ([Syach & Mardiani, 2025](#)). Stock is one capital market instrument widely sought by investors because of its potential to deliver a high rate of return. In general, stock can be understood as evidence of ownership or capital participation held by an individual or legal entity in a limited liability company ([Syach & Mardiani, 2025](#)).

2.2 Technical Analysis

According to [Tannadi \(2019\)](#), technical analysis is defined as analysis performed on past stock price movement in order to consider future prices. This analysis arises from a belief that history tends to repeat itself ([Syach & Mardiani, 2025](#)). Technical analysis is analysis of price movement, or the observation of price movement occurring second by second and day by day over a given period, displayed in the form of a chart or diagram ([Prabhata, 2012](#)).

It can be concluded that technical analysis is a method used to analyze statistical data on past stock price movement in order to predict future stock price trends, whether an increase, a decrease, or a sideways movement, with the primary aim of generating profit from stock trading activity. Several chart types are commonly used in stock technical analysis. A bar chart is a chart depicting the highest, lowest, opening, and closing prices within a given period, displaying a vertical line connecting the highest and lowest prices; a bar chart is highly effective for presenting large volumes of data because of its relatively compact and easily interpretable form ([Syach & Mardiani, 2025](#)). A candlestick chart is a type of price chart visualized to resemble a candle shape; a falling price movement is depicted with a red candlestick, while a rising price movement is marked with a black or green candlestick, and this chart type is frequently used by analysts to read stock price movement over a given period ([Syach & Mardiani, 2025](#)).

2.3 Moving Average Convergence Divergence (MACD)

The MACD indicator is a momentum indicator based on stock price. MACD is classified as a lagging indicator, meaning an indicator that produces a buy or sell signal somewhat late. MACD was created by Gerald Appel in the 1960s, a publisher of *Systems and Forecasts* ([Santoso & Sukamulja, 2022](#)). What must be observed are the buy and sell signals: if the MACD line crosses above the signal line, a buy signal is formed, commonly referred to as a golden cross, whereas if the MACD line crosses below the signal line, a sell signal is formed, commonly referred to as a dead cross.

The MACD calculation is expressed through the following three formulas. $MACD = EMA_{12} \text{ minus } EMA_{26}$, $Signal = EMA_9 \text{ of } MACD$, $Histogram = MACD \text{ minus } Signal$. The number 12 refers to the period used to calculate the shorter or faster moving average, known as the 12 period Exponential Moving Average. The number 26 refers to the period used to calculate the longer or slower moving average, known as the 26 period Exponential Moving Average. The number 9 refers to the averaging period applied to the MACD line itself in order to derive the signal line. In plain terms, the MACD line captures the gap between a fast and a slow moving average of price, the signal line smooths that gap further to make crossovers easier to detect, and the histogram visualizes the distance between the MACD line and the signal line, expanding when momentum strengthens and contracting as momentum fades ahead of a potential crossover ([Coe & Laosethakul, 2021](#)).

According to [Bangsa \(2024\)](#), MACD is also referred to as a lagging indicator, meaning a stock indicator that follows price after a trend has begun, or is late by nature. Because of this lagging characteristic, investors often end up buying a stock at too high a price at the moment the MACD indicator shows a golden cross. A leading indicator, by contrast, provides a signal before a new trend occurs, with the drawback that a false trend may occur, meaning the stock price does not actually

reverse upward or downward ([Santoso & Sukamulja, 2022](#)). This tension between lagging reliability and leading timeliness recurs throughout the broader international literature on trend following indicators, with research on Dow Jones and BRICS markets similarly finding that moving average based trading rules can outperform a buy and hold benchmark in some periods and underperform it in others, depending on whether the underlying market is genuinely trending or merely oscillating within a range ([Wu, Zhang, & Liu, 2023](#)).

2.4 Relative Strength Index (RSI)

The RSI is an analytical tool that measures the speed of increase and decrease in stock price movement. The RSI indicator can provide information on whether the market price is already overbought or oversold. The RSI indicator carries a value ranging from 1 to 100. According to [Wira \(2014\)](#), if the RSI line sits above 70%, the stock is considered overbought, whereas if the line sits below 30%, the stock is considered oversold ([Monika & Yusniar, 2020](#)). A conceptual review of RSI as a trend identification tool similarly emphasizes that the indicator's core value lies in signaling exhaustion in price momentum, though its reliability depends heavily on the chosen lookback period and on the broader trend context within which it is applied ([Panigrahi et al., 2021](#)).

2.5 Conceptual Framework

The conceptual framework of this research positions MACD (X_1) and Stochastic RSI (X_2) as independent variables whose accuracy in generating buy and sell signals is examined in relation to the buy and sell signal outcome (Y), both individually, represented by H_1 and H_2 , and jointly, represented by H_3 .

2.6 Hypothesis Development

Research on the effectiveness of technical analysis indicators, particularly Moving Average Convergence Divergence (MACD) and Relative Strength Index (RSI), has been conducted extensively across various sectors and stock indices on the Indonesia Stock Exchange, yet the results obtained remain mixed and have not extensively addressed the coal mining sector in the most recent period.

[Monika and Yusniar \(2020\)](#) examined the accuracy of the MACD and RSI indicators on six stocks included in the Jakarta Islamic Index, namely ADRO, BSDE, KLBFI, PTPP, SMRA, and WIKA, over the 2016 to 2018 period. Using the Mann-Whitney difference test, [Monika and Yusniar \(2020\)](#) found no significant difference between the price generated by MACD and RSI signals and the nearest closing price of the stock, so both indicators were deemed accurate as a guide for investment decision making. This study also showed that RSI produced a higher number of signals and higher average return compared to MACD, suggesting RSI is more reactive to stock price movement. This finding aligns with the results of [Asthri et al. \(2016\)](#), who found the MACD indicator accurate for determining buy and sell signals in the food and beverage sector, as well as [Raditya et al. \(2013\)](#), who demonstrated MACD's accuracy in determining price trends across six LQ45 member stocks.

In a similar vein, [Rosyidah and Hafi \(2021\)](#) performed technical analysis using MACD, RSI, Stochastic Oscillator, and a buy and hold strategy on BTPS stock, a member of JII30, during the Covid-19 pandemic period from March to October 2020. [Rosyidah and Hafi \(2021\)](#) concluded that all three technical indicators consistently produced buy signals in April and May 2020, and investors who followed those signals earned twice the return on invested capital by November 2020. This research reinforces the evidence that combining several technical indicators can complement one another in confirming price reversal momentum, particularly under highly fluctuating market conditions.

[Herlambang et al. \(2024\)](#) extended this line of inquiry to the energy sector stocks included in the LQ45 index, namely ADRO, AKRA, ITMG, PGAS, and PTBA, over the 2021 to 2023 period. Using a one sample t-test, [Herlambang et al. \(2024\)](#) demonstrated that the average success rate of MACD signals was 86.73% and RSI was 87.45%, both statistically significant above 50% (p equals 0.000), so both indicators were deemed reliable for use on energy sector stocks. However, this research also found that RSI carried a larger standard deviation, or risk level, than MACD, meaning that although RSI produced a slightly higher success rate, this indicator also carried greater risk. This finding reinforces earlier research by [Haanurat et al. \(2022\)](#), who found that MACD maintained a consistent

accuracy level both before and during the Covid-19 pandemic, as well as [Khairudin et al. \(2022\)](#), who found RSI reliable as a market timing strategy for individual investors. Even so, not all research supports the effectiveness of these two indicators; [Suryanto \(2021\)](#), for instance, found that MACD and RSI carried no significant meaning in determining buy and sell signals in banking sector stocks, and [Nor \(2014\)](#) similarly found MACD generally performed poorly on the Australian stock exchange, though RSI showed a slight profit potential.

Within another sub sector, [Juliyana and Fauji \(2018\)](#) examined MACD accuracy across five property and real estate sub sector companies, namely BIKA, DMAS, MMLP, PPRO, and TARA, over the 2015 to 2017 period. Through a paired sample t-test, [Juliyana and Fauji \(2018\)](#) concluded that no significant difference existed between buy and sell signals before and after MACD formation, so the MACD indicator was deemed accurate and usable as a guide for investment decision making. This result also supports the findings of [Pramono et al. \(2013\)](#), who tested the combination of MACD, RSI, Stochastic Oscillator, and buy and hold on LQ45 banking sector stocks, although [Pramono et al. \(2013\)](#) instead concluded that a buy and hold strategy produced more stable returns than signals from technical indicators alone.

International evidence broadly corroborates this mixed picture. A comparative study of MACD based trading strategies in the United States equity market found that a MACD only strategy achieved a win rate below fifty percent, though performance improved substantially once MACD was combined with complementary momentum indicators such as the Money Flow Index and RSI ([Chio, 2022](#)). Comparable research on RSI applied to cryptocurrency markets similarly found that RSI signals alone involve considerable risk, yet still hold credible potential relative to a traditional buy and hold benchmark when used within a disciplined backtesting framework ([Zatwarnicki et al., 2023](#)). Broader work comparing manufacturing sector stocks within the LQ45 index using Moving Average, MACD, and RSI together likewise found each indicator carrying complementary strengths, reinforcing the argument that no single indicator dominates across all sectors and market conditions ([Hasan et al., 2024](#)). Similarly, research comparing MACD and Stochastic Oscillator signal accuracy before and after signal formation found measurable differences in investor decision outcomes depending on which indicator combination was applied ([Nurcahyo & Susliyanti, 2024](#)).

Based on the review above, it is evident that prior research has tested MACD and RSI across various sectors, including sharia banking ([Monika & Yusniar, 2020](#); [Rosyidah & Hafi, 2021](#)), energy ([Herlambang et al., 2024](#)), and property and real estate ([Juliyana & Fauji, 2018](#)), with results generally supporting the accuracy of both indicators, although several other studies ([Suryanto, 2021](#); [Nor, 2014](#)) show contradictory results. However, research specifically examining the combination of MACD and Stochastic RSI on coal mining sector stocks, particularly during a recent period marked by global commodity price volatility, remains very limited. This research gap is what this study seeks to fill, by analyzing the signal accuracy of MACD and Stochastic RSI across five leading coal issuers on the Indonesia Stock Exchange, namely DSSA, BYAN, ADRO, ITMG, and AADI. Based on the literature review and the research gap described above, the hypotheses developed for this research are as follows.

H₁: Moving Average Convergence Divergenceis (MACD) accurate in determining buy and sell signals on coal mining sector stocks

H₂: Stochastic Relative Strength Index (RSI) is accurate in determining buy and sell signals on coal mining sector stocks

H₃: Moving Average Convergence Divergenceis (MACD) and stochastic Relative Strength Index (RSI) jointly are accurate in determining buy and sell signals on coal mining sector stocks

3. Research Methodology

3.1 Research Design

This research uses a quantitative approach with descriptive and verificative methods. Secondary data are sourced from the Indonesia Stock Exchange and TradingView. Historical research is critical

research into past conditions, developments, and experience, carefully weighing the validity of historical sources and the interpretation drawn from such sources; the purpose of historical research is to arrive at a conclusion regarding the cause, impact, or development of a past event that can be used to explain present circumstances and anticipate future ones ([Candra et al., 2021](#)). The descriptive method involves fact finding with accurate interpretation; descriptive research examines problems within society along with the customs prevailing within it and within particular situations, including the relationships among activities, attitudes, viewpoints, and ongoing processes and the influence of a given phenomenon. Descriptive research is a method that seeks to describe the object or subject under study exactly as it is ([Samsu, 2017](#)).

3.2 Population and Sample

The population consists of all mining sector companies listed on the Indonesia Stock Exchange. The sample was selected through purposive sampling, namely DSSA, ADRO, BYAN, ITMG, and AADI.

3.3 Data Type and Source

The data used consist of Open, High, Low, and Close prices sourced from the Indonesia Stock Exchange, along with RSI, MACD, Signal Line, and Histogram indicator values sourced from TradingView for the research period.

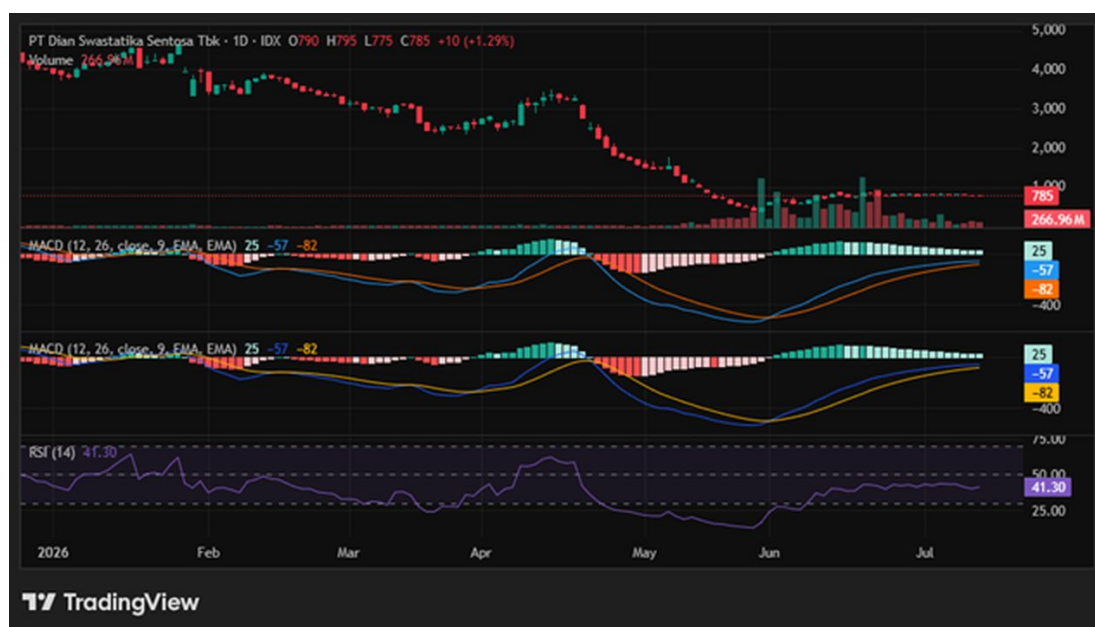


Figure 1. Example of MACD and RSI chart formation

Figure 1 illustrates how the MACD line, signal line, and histogram are plotted beneath the candlestick price chart, together with the RSI oscillator scaled between 0 and 100, allowing the researcher to visually cross reference price action against both indicators at each point in the observation period. Data were collected through documentation by downloading historical data from the Indonesia Stock Exchange and TradingView, which was then compiled in Microsoft Excel. The independent variables consist of RSI and MACD, while the dependent variable is the buy and sell signal.

4. Results and Discussions

4.1 Determination of Buy and Sell Signals Using MACD and RSI Indicators



Figure 2. DSSA stock price movement based on MACD and RSI indicators

Figure 2 displays the daily candlestick chart of DSSA alongside its MACD and RSI overlays across the observation period, illustrating the sharp decline followed by a partial rebound described in the analysis below.

Table 1. Return by method

No	Stock Name	MACD	RSI Method	Buy and Hold
1	DSSA	+81.71%	+36.97%	-75.16%
2	BYAN	+3.00%	+11.39%	-7.25%
3	ADRO	-7.46%	+1.70%	-3.63%
4	ITMG	+0.77%	-6.61%	-12.5%
5	AADI	-9.10%	-13.49%	-21.77%

Table 1 presents the cumulative return generated by each of the three strategies, namely MACD signal based trading, RSI signal based trading, and a passive buy and hold approach, across the five sampled mining stocks. The return calculation on Table 1 shows that DSSA experienced a very sharp price decline, moving from 3,160 to 785, or approximately negative 75%, over the observation period, such that a Buy and Hold strategy suffered a substantial loss, whereas signal based strategies using MACD and RSI succeeded in avoiding most of that decline by exiting the position before the price fell further, which explains their considerably better return. For the other stocks, namely ADRO, ITMG, and AADI, prices were relatively more stable, so the difference between methods was smaller. The number of transaction signals formed during the period were as follows: DSSA generated one MACD signal and one RSI signal, AADI generated three MACD signals and one RSI signal, BYAN generated two MACD signals and one RSI signal, ITMG generated two MACD signals and one RSI signal, and ADRO generated four MACD signals and one RSI signal.

4.2 Stock Level Analysis Based on Table 1

The DSSA displays the most extreme pattern among the five stocks. Price fell from 3,160 to a low of 432 on May 26, 2026, before rebounding to 785 by the end of the period, a peak to trough decline, or maximum drawdown, of approximately negative 87%, with the highest daily volatility among the sample at roughly 8.2%. This pattern reflects a free fall followed by a sharp rebound.

Buy and Hold (negative 75.16%) proved highly disadvantageous, since an investor holding the position from beginning to end still absorbed a large decline despite the rebound from the lowest point. MACD (positive 81.71%) performed best on this stock: because the downward trend persisted over a long and directionally consistent period, the trend following MACD signal helped keep the investor out of the market during the decline phase, then re entered as momentum turned upward toward the end of the period. RSI (positive 36.97%) was also positive, having successfully captured the oversold phase near the turning point, though it underperformed MACD because RSI signals tend to be faster and noisier on a stock with such a long trend. For stocks with a strong trend and high volatility such as DSSA, a trend following strategy such as MACD proves considerably superior to both Buy and Hold and RSI.

The BYAN was relatively more stable, moving within a range of 9,525 to 13,200 with daily volatility of roughly 4%. Buy and Hold (negative 7.25%) incurred a slight loss because the ending price was lower than the starting price. RSI (positive 11.39%) performed best, indicating that BYAN's price movement tends to be mean reverting, oscillating back and forth within a range, so that RSI's overbought and oversold signals proved fairly effective at capturing short term price swings. MACD (positive 3.00%) was positive but considerably smaller than RSI, since BYAN's trend was not sufficiently long or directional to be optimized by a trend following indicator. BYAN is therefore better suited to an RSI based swing trading strategy rather than a long term trend strategy.

The ADRO is the most stable stock in this group, with the second lowest daily volatility at roughly 2.4% and the smallest maximum drawdown at negative 16.5%. Buy and Hold (negative 3.63%) was nearly flat, reflecting a gently sloping price movement. RSI (positive 1.70%) was slightly positive. MACD (negative 7.46%) actually lost money and represents the only case in which MACD underperformed Buy and Hold. This occurred because ADRO generated a relatively high number of signals, four transactions, on a stock whose movement was relatively flat and directionless, such that MACD signals became whipsaws, meaning repeated false reversals that increased the cost of entering and exiting positions. On low volatility stocks without a clear trend, MACD therefore risks producing false signals that reduce return relative to a passive strategy.

The ITMG moved within a moderate downtrend, from 26,650 toward a low of 21,800 on June 9, before rising slightly to 23,300. Buy and Hold (negative 12.57%) suffered the largest loss among the three methods for this stock. MACD (positive 0.77%) was nearly break even, performing slightly better because it avoided part of the trend decline. RSI (negative 6.61%) still incurred a loss but performed better than Buy and Hold, indicating that RSI signals helped reduce exposure during the price decline even though it was not as effective as MACD. Both active strategies, MACD and RSI, outperformed Buy and Hold, indicating that active strategies perform better when a stock is in a moderate downtrend.

The AADI experienced a fairly deep downtrend, from 10,450 to a low of 7,450 on June 8, with a maximum drawdown of negative 35.8%. Buy and Hold (negative 21.77%) suffered the largest loss. MACD (negative 9.10%) still lost money, but considerably less than Buy and Hold, meaning MACD succeeded in limiting the loss even though it did not entirely avoid it, with three transactions formed, suggesting some signals were not perfectly timed. RSI (negative 13.49%) produced the second worst result, indicating that RSI's oversold signal arrived late within such a persistent downtrend. All three methods incurred losses on this stock because AADI's downtrend was fairly strong and consistent, but MACD remained the most defensive, with the smallest loss among the three.

4.3 Synthesis Across the Five Stocks

Read together, these five case level analyses point toward a consistent underlying pattern: the relative performance of MACD versus RSI is not fixed but depends heavily on whether a given stock is genuinely trending or instead oscillating within a stable range. On stocks exhibiting a strong, directionally persistent trend, whether upward as in the DSSA rebound or downward as in ITMG and AADI, MACD's trend following logic allows it either to capture large gains or to limit losses more effectively than a static Buy and Hold position. On stocks exhibiting range bound, mean reverting

behavior, as illustrated by BYAN, RSI's oscillator logic proves more effective at capturing short term price swings, while MACD risks generating whipsaw signals that erode return, as clearly illustrated by ADRO. This pattern is broadly consistent with international evidence showing that trend following indicators such as MACD tend to outperform in persistently trending markets while performing poorly in flat or choppy conditions, and that oscillator based indicators such as RSI tend to show the reverse pattern ([Chio, 2022](#); [Panigrahi, Vachhani, & Chaudhury, 2021](#)). It also reinforces the broader argument in the technical analysis literature that no single indicator dominates uniformly across all market conditions, and that indicator selection should instead be matched to the volatility and trend characteristics of the specific stock under consideration ([Hasan, Nurhasanah, & Santoso, 2024](#)).

4.4 Practical Implications for Signal Based Trading in the Mining Sector

The stock level findings summarized above carry several practical implications worth drawing out explicitly. First, the transaction count reported for each stock, ranging from a single MACD signal on DSSA to four MACD signals on ADRO, suggests that signal frequency itself can serve as an early warning about whether a given indicator is well matched to a particular stock. A trend following indicator such as MACD that generates very few signals over an observation period is likely operating on a stock with a persistent, low noise trend, precisely the condition under which MACD tends to perform best. Conversely, when MACD begins generating frequent signals within a relatively short window, as observed with ADRO, this is itself diagnostic evidence that the underlying price series lacks the directional persistence that trend following logic requires, and that a trader relying on MACD alone in that context should expect elevated transaction costs and whipsaw losses.

Second, the consistent outperformance of RSI on BYAN, the one stock in the sample exhibiting genuinely mean reverting behavior, illustrates why a purely trend following framework is insufficient for a five stock portfolio spanning heterogeneous price dynamics even within a single commodity sub sector. Coal mining stocks are often assumed to move together given their shared exposure to global coal prices, yet the divergence in trend character observed here, from DSSA's dramatic single directional collapse and rebound to BYAN's range bound oscillation, demonstrates that company specific factors, such as differences in production cost structure, hedging policy, or debt exposure, can meaningfully decouple individual stock price behavior from the broader commodity cycle. This reinforces the practical recommendation that investors evaluate the trend character of each stock individually before selecting an indicator, rather than applying a single indicator uniformly across an entire sector.

Third, the fact that MACD outperformed Buy and Hold on four of the five sampled stocks, yet underperformed on ADRO, illustrates a broader statistical point relevant to how these findings should be interpreted. A sample of five stocks, however carefully selected, cannot support strong claims about the population level superiority of one indicator over another; what it can support is a more modest, practically useful claim, namely that the accuracy of any single technical indicator is conditional on the trend and volatility regime of the specific stock being traded, a claim well supported by the broader international technical analysis literature reviewed in this study ([Chio, 2022](#); [Sun & Glabadanidis, 2022](#)). For an individual investor holding a concentrated position in one or two coal mining stocks rather than a diversified basket, this conditional framing matters considerably more than an average result computed across the full sample, since the specific trend character of the stock actually held will determine whether MACD or RSI is the more appropriate tool. This reinforces the argument, well documented in the broader momentum and technical trading literature, that the profitability of any single trend based or oscillator based rule tends to be regime dependent rather than persistent across all market conditions, a conclusion echoed in recent reviews of momentum based trading performance across developed and emerging markets ([Wiest, 2023](#)).

5. Conclusions

5.1 Conclusion

In general, technical indicator based strategies, MACD and RSI, outperformed Buy and Hold on four of the five stocks, namely DSSA, BYAN, ITMG, and AADI, particularly on stocks with a clear price trend and high volatility. An exception occurred with ADRO, where relatively flat price movement

caused the MACD signal to produce a whipsaw that proved disadvantageous. This finding supports the argument that the effectiveness of technical analysis, MACD and RSI, depends on the volatility characteristics and trend strength of each individual stock rather than applying uniformly across all market conditions.

5.2 Research Limitations

This research carries several limitations that warrant attention. First, the research uses only five coal mining sector stocks, namely DSSA, ADRO, BYAN, ITMG, and AADI, so the results obtained may not be generalizable to stocks in other sectors or to non coal mining stocks. Second, the observation period used is relatively short, from April 13 to July 10, 2026, approximately three months, so it has not been able to capture the effectiveness of the MACD and RSI indicators over the long term or across various market cycles, whether bullish, bearish, or sideways, in a comprehensive manner. Third, this research focuses only on two technical indicators, MACD and RSI (Stochastic RSI), without considering other technical indicators such as Bollinger Bands, Stochastic Oscillator, or volume based indicators, so it has not captured a comprehensive picture of technical analysis effectiveness in general. Fourth, the return calculation in this research has not accounted for transaction costs, such as broker fees, taxes, and slippage, nor has it been tested for statistical significance, so the return comparison across methods remains descriptive rather than confirmed as statistically significant. Finally, this research uses only daily price data and has not tested the effectiveness of both indicators on other timeframes such as weekly or intraday data, nor does it consider fundamental factors or market sentiment that also influence coal mining stock price movement.

5.3 Suggestion and Directions for Future Study

Based on these findings and limitations, future research is encouraged to broaden the sample to include more stocks from various mining sub sectors or other sectors, and to extend the observation period to cover a range of market conditions, whether bullish, bearish, or sideways. Future research is also encouraged to add other technical indicators, such as Bollinger Bands, Stochastic Oscillator, or volume based indicators, as a comparison or complement to MACD and RSI, and to test the statistical significance of return differences across methods while accounting for transaction costs so that the results more closely approximate real investment conditions. In addition, future research could combine technical analysis with fundamental analysis or market sentiment, such as news, policy, and global coal commodity price movement, to obtain a more comprehensive basis for investment decision making. Testing across various timeframes, weekly and intraday, along with out of sample testing, is also recommended to more deeply measure the consistency and reliability of MACD and RSI signals. For investors, it is recommended not to rely on a single indicator alone but instead to match indicator choice to the characteristics of the targeted stock, with MACD more suitable for stocks exhibiting a strong trend and RSI more suitable for stocks moving within a range, or mean reverting.

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Author Contributions

NN contributed to conceptualization, methodology, data collection, formal analysis, writing of the original draft. WOR contributed to supervision, validation, review and editing of the manuscript, project administration.

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