



Analysis of Investment Decisions on LQ45 Stock by Using Moving Average Convergence Divergence (MACD) and Bollinger Bands Indicators Period January 2023 – February 2025

Cynthia Java Al Maduri¹, Tri Kunawangsih Purnamaningrum², Pardomuan Sihombing³

^{1,2} Faculty of Economics and Business, Universitas Trisakti, Jakarta, Indonesia

³ Faculty of Economics and Business, Universitas Mercu Buana, Jakarta, Indonesia

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ABSTRACT

The Indonesian capital market plays a crucial role in economic growth, with the LQ45 index representing large-cap stocks with high liquidity. This study aims to evaluate the effectiveness of the Moving Average Convergence Divergence (MACD) and Bollinger Bands technical indicators in making investment decisions on stocks during the period from January 2023 to February 2025. The research method used is descriptive qualitative, with visual analysis of price movements from 11 LQ45 stocks. The findings indicate that the combination of MACD and Bollinger Bands produces fairly accurate buy and sell signals, especially when used simultaneously. These findings provide a solid foundation for investors to formulate practical and applicable strategies based on technical analysis. Furthermore, this study contributes to the literature on the reliability of technical signals in the Indonesian stock market.

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Corresponding Author:

Cynthia Java Al Maduri
Faculty of Economics and Business, Universitas Trisakti
Jakarta, Indonesia
Email: javacynthia@gmail.com

1. INTRODUCTION

The capital market has developed into one of the most important tools in the country's economy and serves as an investment venue and source of funding for businesses. The capital market is a key pillar in the financial system, providing access to capital and investment opportunities. The LQ45 Index is one of the many indices that the Indonesia Stock Exchange (IDX) in Indonesia offers to show the performance of stocks. In Indonesia, the movement of stocks in the LQ45 indicates the overall health of the capital market and the dynamics of large companies in Indonesia, the stocks in the LQ45 are a great choice for both domestic and foreign investors. A comparison of the direction of movement of JCI and LQ45 is shown here, which have almost identical trends. This can be seen in similar patterns and changes in capital market transactions that impact the JCI and 70% of the market capitalization of LQ45 stocks

[1]. With the advancement of technology and the availability of real-time data, technical analysis has become increasingly popular among investors.

According to Fama's Efficient Market Hypothesis (EMH), stock prices reflect all available information [2]. Investors can use technical indicators such as MACD and Bollinger Bands to make more informed investment decisions, even though the market is considered efficient. Diversification strategies in various industries are an important part of stock investment [3]. Diversification is one way to reduce investment risk. For investors, the main goal of investing is to achieve optimal profit or return with measured risk [4]. Stock which is one of the popular instruments is the best way to diversify assets due to its high return when compared to other types of investments. Because investors prefer to put their money into stocks rather than corporate bonds, which the growth of stocks in the global market increased in [5]. In such situations, stocks are highly sought after because they can provide high returns in a short period of time, ranging from daily, weekly, to monthly, which can reach tens to hundreds of percent. However, by obtaining high returns, investors also have a high level of risk. This high level of risk can bankrupt investors in a short period of time due to mistakes in estimating stock prices that will rise or fall. Therefore, to reduce investor risk, stock analysis is needed to determine stock prices [6]. This is due to changes in stock prices caused by changes in demand and supply. Because looking at stock prices is one way to find out whether a business is good or not [7].

Stock analysis is divided into two categories: fundamental analysis and technical analysis. Fundamental analysis studies the company's relationship with its fundamentals quantitatively and qualitatively [8]. This stock analysis technique is usually used by investors in long-term investments using company data such as financial statements. In fundamentals, financial statements are the main tool that provides deeper insight into a company's performance, operations, financial position and cash flows [9]. Technical analysis is a way to value stocks, commodities, or other securities by looking at data from previous market activity to predict future stock price movements. To be successful in giving buy and sell signals, it is crucial to choose the right indicators and understand how prices move, not to be affected by emotions, either fear that causes investors to fear losing money so they tend to sell assets faster or greed where investors pursue high returns without regard to risk [10].

As a result, research on how effective technical analysis is in predicting the stock prices of LQ45 companies is increasingly important. However, investors can rely on technical indicators to detect price movement patterns and gain a trading edge. In the Indonesian stock market both traders and investors often use two very popular indicators: MACD (Moving Average Convergence Divergence) and Bollinger Bands. Although each indicator has different features, they can work together to provide more accurate signals about when it is a good time to buy or sell stocks. MACD measures trend strength through the difference between exponential moving averages, MACD helps identify potential trend reversals, while Bollinger Bands help identify stock price uncertainty and determine support and resistance levels [11].

Unlike previous studies that used only one technical indicator or focused on one particular sector, this study combines MACD and Bollinger Bands on 11 LQ45 stocks from different sectors. For example, research [12] found that Bollinger Bands were helpful in making decisions to buy or sell stocks, but in this study there was no MACD and only sectors were used as research subjects. Another study [13] also used MACD and Bollinger Bands, but only discussed the sector and used regression as a research tool. The results of this study contradict the findings [14]. His research concluded that the MACD and RSI methods do not have a significant influence in determining buy or sell signals in the banking industry. However, according to research conducted [15], Bollinger Bands on AUD/USD and EUR/USD are still not ideal. As a result, additional studies are needed to evaluate the accuracy of this strategy in various market situations.

Investors rarely combine technical analysis indicators because they only rely on one indicator to predict. It is expected that a technical analysis combination of MACD and Bollinger Bands will provide more accurate signals in predicting trends as well as price volatility in stocks. The combination of these two methods is also expected to give more accurate signals. In the case study of businesses included in the LQ45 index, it is crucial to examine how investors can find trends and effective trading signals using various technical indicators [16]. Factors such as market sentiment, price volatility, and the impact of economic policies should be analyzed to understand how effective technical analysis is as a predictive tool. The aim is to test the accuracy of the signals generated from the combination of the two indicators and provide practical insights to investors. 11 stocks with different sectors included in the LQ45 category are BBCA, TLKM, ASII, MDKA, UNVR, GOTO, KLBF, ADRO, ACES, JSMR and SMRA.

2. METHOD

This study adopts a descriptive qualitative approach, applying technical analysis to stock price movements using MACD and Bollinger Bands indicators. Stock price data was obtained from the Trading View platform and the Indonesia Stock Exchange. Using the MACD approach, one can find buy signals and sell signals. If the MACD line (12,26) intersects the signal line (9) in the upward direction, you can buy stocks, and if the MACD line (12,26) intersects the signal line or the activating line (9) in the downward direction, you can sell MACD < signal line. [17].



Figure 1. MACD Buy Signal during Bullish market



Figure 2. MACD Sell Signal during Bearish market

Bollinger Bands consist of three lines: the upper band, lower band, and the simple moving average. A buy signal appears when the price approaches the lower band and is confirmed by a positive MACD crossover, while a sell signal appears when the price touches the upper band with a negative

MACD signal [13]. The analysis covers 11 LQ45 stocks: BBCA, TLKM, ASII, MDKA, UNVR, GOTO, KLBF, ADRO, ACES, JSMR, and SMRA.



Figure 3. Example of Bollinger Bands Indicator Display

3. RESULTS AND DISCUSSION

3.1. Analysis of BBCA, TLKM, and ASII Stocks

MACD generates buy signals when the MACD line crosses above the signal line, and sell signals when it crosses below. Bollinger Bands support these signals by detecting the position of the price relative to the upper and lower bands. BBCA stock showed high signal consistency throughout the observation period. Whenever MACD gave a buy signal, especially when BBCA price was near the lower band of the Bollinger Bands, the stock price generally moved up sustainably. This consistency indicates that BBCA, as a large-cap stock with more stable volatility, is more responsive to technical movement patterns than other stocks. Thus, the combination of MACD and Bollinger Bands on BBCA stock is able to provide highly accurate investment decision signals, especially under conditions of a strong market trend.

In contrast to BBCA, TLKM stock shows varying signal validity. The effectiveness of the indicators largely depends on the market trend conditions. When the market is in a clear trend condition, either uptrend or downtrend, the signals generated by the combination of MACD and Bollinger Bands are quite accurate. However, in a sideways market, the signals are less effective and often produce false signals. This is due to lower volatility and limited price movement, making signal interpretation less reliable. Therefore, investors who use this indicator on TLKM stocks need to pay attention to the direction of the market macro trend before making investment decisions.

Meanwhile, ASII stock showed a very strong response to this combination of indicators. One significant finding is that the buy signal becomes very valid when there is a price break below the lower band of the Bollinger Bands, followed by a crossing up of the MACD line. This event is often the first sign of a reversal, where after an oversold condition is identified, ASII's stock price tends to rebound quite sharply. This phenomenon shows that investors react quickly to oversold conditions in ASII, and that the MACD indicator is quite sensitive in detecting momentum changes in this stock. Thus, using a combination of MACD and Bollinger Bands on ASII proved to be effective in helping investors capture opportunities for price trend reversals with a high degree of accuracy.

Overall, the combination of MACD and Bollinger Bands indicators can improve the accuracy of investment decision making, but its effectiveness still depends on the characteristics of each stock as well as general market conditions. BBCA stock performs best in terms of signal consistency, TLKM needs stronger trend confirmation to improve accuracy, while ASII shows great potential in detecting price turning points, especially after an oversold phase.



Figure 4. Example of price movement chart and MACD and Bollinger Bands indicators of BBCA

3.2. Analysis of MDKA, UNVR, GOTO, and KLBF Stocks

In analyzing the GOTO and MDKA stocks, it was found that both stocks exhibited high volatility characteristics throughout the observation period. Such high volatility leads to sharp price movements in both uptrends and downtrends, making the combination of the Moving Average Convergence Divergence (MACD) and Bollinger Bands indicators a very useful tool for identifying overbought and oversold conditions. When the stock prices of GOTO and MDKA move to extremes near the upper or lower boundaries of the Bollinger Bands, accompanied by a change in direction on the MACD indicator, the resulting signals are often able to anticipate trend reversals quite effectively. However, due to high volatility, the signals generated by GOTO and MDKA stocks also require additional confirmation or caution in decision-making, as the potential for false signals remains when the market experiences rapid fluctuations in a short period of time.

In contrast, UNVR and KLBF offer different characteristics, with lower price fluctuations than GOTO and MDKA. This more stable price movement makes the combination of MACD and Bollinger Bands provide more accurate and reliable signals. For UNVR stock in particular, it was found that buy signals generated by the combination of a positive MACD (crossing up against the signal line) and a price position close to the lower band of the Bollinger Bands were often followed by a consistent increase in the stock price. This suggests that in stocks with more controlled volatility, the effectiveness of MACD and Bollinger Bands-based technical analysis is higher, with a lower risk of false signals. Similarly, in the case of KLBF, price stability supports the validity of the signals generated, so the combination of these two indicators is very useful for timing the purchase or sale of stocks with a higher level of confidence. Thus, in the context of stock volatility, it can be concluded that the combination of MACD and Bollinger Bands works effectively both on high volatile stocks such as GOTO and MDKA as well as on low volatile stocks such as UNVR and KLBF, although the analysis and risk management approach needs to be tailored to the characteristics of each stock.



Figure 5. Example of price movement chart and MACD and Bollinger Bands indicators of MDKA

3.3. Analysis of ADRO, ACES, JSMR, and SMRA Stocks

In infrastructure and property sector stocks such as JSMR and SMRA, the Moving Average Convergence Divergence (MACD) and Bollinger Bands indicators have proven to be quite effective in providing investment signals. The price movements of these stocks show a good response to technical signals, where buy confirmations often come when the MACD line crosses above the signal line, along with the price being near the lower band of the Bollinger Bands. For JSMR in particular, this phenomenon seems to be quite consistent, where every time there is a positive crossover on the MACD with the price relatively close to the lower limit of the Bollinger Bands, it is followed by a sustained increase in the share price. This suggests that the combination of both indicators is able to capture the momentum of price reversals quite accurately in infrastructure sector stocks.

Meanwhile, ADRO and ACES stocks also show excellent technical signal performance, especially when the market is forming a strong trend, either uptrend or downtrend. Under clear trend conditions, buy signals generated by MACD crossing up and confirmation of price position at the lower band proved to be often followed by significant price increases. Conversely, when the trend is weakening or moving flat, the accuracy of the signals slightly decreases, although it is still within acceptable limits for technical trading strategies. This finding emphasizes that the effectiveness of the MACD and Bollinger Bands indicators depends not only on the characteristics of individual stocks, but also on the strength of the general market trend. Stocks such as JSMR, SMRA, ADRO, and ACES exemplify how technical analysis based on a combination of these two indicators can be used effectively in investment decision-making, as long as investors are able to identify market phases and pay thorough attention to signal validation.



Figure 6. Example of price movement chart and MACD and Bollinger Bands indicators of ADRO

3.4. Indicator Performance Comparison

Stocks such as GOTO and MDKA exhibited high volatility, resulting in more frequent Bollinger Band signals. However, MACD helped filter out false signals in these highly fluctuating stocks. More stable stocks like KLBF and BBKA responded more conservatively to the indicators.

Tabel 1. Determination of Stock Criteria GOTO and MDKA

	Bullish VS Bearish (GOTO)			
	Bollingers Bands		MACD	
	TRUE	FALSE	TRUE	FALSE
14/02/2023				
14/03/2023				
24/03/2023				
27/04/2023				
25/05/2023				
30/05/2023				
14/06/2023				
29/08/2023				
21/09/2023				
01/11/2023				
08/12/2023				
30/01/2024				
05/02/2024				
06/03/2024				
24/04/2024				
31/05/2024				
28/06/2024				
24/07/2024				
06/08/2024				
09/10/2024				
03/10/2024				
15/10/2024				
28/10/2024				
18/11/2024				
13/12/2024				
03/01/2025				
30/01/2025				

	Bullish VS Bearish (MDKA)			
	Bollingers Bands		MACD	
	TRUE	FALSE	TRUE	FALSE
01/02/2023				
02/02/2023				
27/02/2023				
28/03/2023				
26/04/2023				
30/05/2023				
04/08/2023				
30/08/2023				
08/09/2023				
09/10/2023				
01/11/2023				
23/11/2023				
05/12/2023				
12/12/2023				
20/12/2023				
09/01/2024				
18/01/2024				
31/01/2024				
07/03/2024				
18/04/2024				
30/05/2024				
28/06/2024				
02/08/2024				
13/08/2024				
04/09/2024				
24/09/2024				
09/10/2024				
06/12/2024				
18/12/2024				
13/01/2025				
26/02/2025				

Tabel 2. Determination of Stock Criteria KLBF and BBKA

	Bullish VS Bearish (KLBF)			
	Bollingers Bands		MACD	
	TRUE	FALSE	TRUE	FALSE
27/01/2023				
21/02/2023				
16/03/2023				
24/05/2023				
31/03/2023				
26/04/2023				
23/05/2023				
05/06/2023				
05/08/2023				
11/08/2023				
01/09/2023				
11/09/2023				
10/10/2023				
16/10/2023				
27/10/2023				
06/11/2023				
16/11/2023				
17/12/2023				
20/02/2024				
08/03/2024				
20/03/2024				
17/04/2024				
30/04/2024				
06/05/2024				
14/06/2024				
08/07/2024				
29/08/2024				
11/10/2024				
22/11/2024				
16/12/2024				
23/12/2024				
21/01/2025				
30/02/2025				

	Bullish VS Bearish (BBKA)			
	Bollingers Bands		MACD	
	TRUE	FALSE	TRUE	FALSE
18/01/2023				
31/01/2023				
20/02/2023				
21/03/2023				
09/05/2023				
22/06/2023				
07/06/2023				
11/07/2023				
27/07/2023				
16/08/2023				
02/10/2023				
09/10/2023				
03/11/2023				
20/11/2023				
14/12/2023				
19/01/2024				
06/02/2024				
29/02/2024				
05/03/2024				
21/03/2024				
23/04/2024				
07/05/2024				
03/06/2024				
02/08/2024				
10/09/2024				
27/09/2024				
16/10/2024				
29/10/2024				
02/12/2024				
16/12/2024				
14/01/2025				
23/01/2025				
17/02/2025				
19/02/2025				

Observations indicate that using a combination of indicators is more accurate than using them individually. MACD is effective in identifying momentum and trend direction, while Bollinger Bands excel in recognizing overbought and oversold market conditions. Signals confirmed by both indicators showed a higher success rate in determining buy or sell decisions.

Tabel 3. Accuracy Rate of 11 Stocks

Stock	Total Buy & Sell Signal	Accuracy Rate	Risk & Return
BBCA	16 Buy & 18 Sell	100% True & 0% False	Rp5.075.000
TLKM	15 Buy & 15 Sell	94% True & 6% False	Rp1.745.000
ASII	14 Buy & 16 Sell	97% True & 3% False	Rp3.165.000
MDKA	14 Buy & 14 Sell	97% True & 3% False	Rp3.395.000
UNVR	14 Buy & 13 Sell	96% True & 4% False	Rp2.185.000
GOTO	12 Buy & 11 Sell	98% True & 2% False	Rp138.000
KLBF	16 Buy & 16 Sell	98% True & 2% False	Rp770.000
ADRO	15 Buy & 14 Sell	97% True & 3% False	Rp2.530.000
ACES	14 Buy & 16 Sell	98% True & 2% False	Rp1.258.000
JSMR	14 Buy & 16 Sell	98% True & 2% False	Rp4.680.000
SMRA	14 Buy & 15 Sell	95% True & 5% False	Rp650.000

3.5. Discussion of LQ45 stocks using the MACD and Bollinger Bands indicators

During the period of January 2023 to February 2025, this study will analyze the investment decisions made on LQ45 stocks using the technical indicators Bollinger Bands and MACD (Moving Average Convergence Divergence). The results show that both indicators provide signals that can help people make decisions to buy or sell something. When the MACD line cuts the signal line from bottom to top, it shows a buy signal indicating a potential price increase; conversely, when the MACD line cuts the signal line from top to bottom, it shows a sell signal. In this study, some stocks such as TLKM and BBCA showed buy signals associated with upward price movements after the signals appeared. This shows that the MACD indicator is still valid as a tool for making investment decisions. Bollinger Bands are used to measure the level of uncertainty and to find overbought or oversold situations. When the price touches or crosses the lower limit of the band, it indicates a potential bullish reversal; conversely, when the price touches the upper limit of the band, it indicates a potential decline. In some specific situations, such as UNVR stocks, the price often returns to the middle band after touching the extreme bands. This shows that the Bollinger Bands theory of shifting to the mean is correct.

The results also show that the combination of Bollinger Bands and MACD can improve signal accuracy. When both indicators give a buy signal simultaneously, the probability that the stock price will rise is greater than when only one of the indicators gives a signal. This supports the signal confirmation method in technical analysis. This finding is in line with technical analysis theory which says that we can predict future price trends by using historical price trends. Therefore, using MACD and Bollinger Bands together can help investors make better investment decisions on LQ45 stocks.

4. CONCLUSION

This study shows that the combination of MACD and Bollinger Bands indicators can be used effectively for investment decision making in LQ45 stocks. These indicators complement each other in providing buy and sell signals, depending on the volatility and stock price trend of each issuer. Their combination helps to improve decision-making accuracy and reduce the risk of false signals.

Further development prospects include applying machine-learning to improve prediction accuracy, as well as exploring the use of additional indicators such as RSI and Stochastic Oscillator. Further research can be conducted by expanding the observation period or applying quantitative methods to compare the accuracy of each indicator.

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