

# Technical Analysis to Determine Signal Lines in Sharia Stock Trading: Case in Indonesia Sharia Stock Market

Yoga Surahman Priatmojo\*, Shinta Permata Sari\*\*

\*Accounting Departement, Faculty of Economic and Business, Universitas Muhammadiyah Surakarta  
\*\* Accounting Departement, Faculty of Economic and Business, Universitas Muhammadiyah Surakarta

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**Abstract** – The Sharia investment market is currently increasing and investors are concerned because it does not have advantages. There are many reasons why people are getting concerned about the Sharia investment, not only because investment does not have usury practice, maysir, and gharar, or because this investment is not focused on the investors' profits only, but also because its principles do not contradict with the prevailing Islamic value. This means that sharia investment is convenient to the investors especially in Indonesia where the majority of the citizens are mostly Muslims, which is all forms of transaction carried out based on sharia principles, including investing. This makes it easier for Indonesian people to invest following sharia elements. Investing with sharia principles emphasizes ethical and moral values and can reduce mispricing. This study uses a sharia stock index as a research sample and wants to see the effect of using technical analysis in providing confirmation signals on sharia stocks. The signal line will combine with the indicators in technical analysis to provide a confirmation signal for the stock price movement. It is quantitative research. The population in this study is the companies listed on the Indonesia Sharia Stock Exchange. The sample of this study are companies listed on the Jakarta Islamic Index 30 (JII30) from 2016-2019 using a purposive sampling technique. There are 47 companies that fulfilled the criteria as the samples in this research. The type of analysis method used is multinomial logistic regression. The results show that the Stochastic Oscillator (SO), Moving Average Convergence Divergence (MACD), Relative Strength Index (RSI), and Bollinger Band (BB) indicator has a statistical effect on the signal line.

**Index Terms** – signal line, sharia stocks, moving average convergence divergence, stochastic oscillator, relative strength index, bollinger band.

## I. INTRODUCTION

In general, people invest to get a higher return. It is evident that investors often chase the rise or fall of stock prices in the real world, and it has become the most important issue for market participants to predict future stock prices (Ni, Cheng, et al., 2020). Public perception of investment decisions does not need to have a strong analytical basis. The fact is that decision-making needs to be analyzed to consider the factors that occur. Two types of analysis are usually used in stocks, namely fundamental analysis and technical analysis. Fundamental analysis is a factor calculation, such as the economic factors of a country, and economic policies, both macro, and micro. The fundamental analysis approach relates to the company underlying its stock or not the real company's stock (Agarwal et al., 2017; Anbalagan & Maheswari, 2015; Göçken et al., 2016). Technical analysis is a method of evaluating stocks, commodities, or securities by analyzing the statistics generated by past market activities to predict future price movements (Ong, 2016).

There are several indicators or test tools that can be used to perform technical analysis on stocks. The test equipment used is usually an oscillator. In this study, the oscillator indicators used are the Stochastic Oscillator, Moving Average Convergence Divergence, Relative Strength Index, and Bollinger Band. First, the Stochastic Oscillator is an indicator that shows the location of the last closing price compared to the lowest or highest price range during a certain period (Wira, 2014). The Stochastic Oscillator (SO) is almost similar to the RSI indicator. The difference is that the SO indicator has two lines of analysis tools. Second, Moving Average Convergence Divergence (MACD) is a momentum indicator. This indicator tries to predict the stock market trends by comparing the short-term and long-term trends (Nti et al., 2020). Third, the Relative Strength Index (RSI) is an oscillator used in technical analysis of its function to show price strength by comparing the rise and fall movement of a stock price (Wilder, 1978). Fourth, the Bollinger Band (BB) is a technical analysis indicator in which there are three lines to create a zone in decision-making. The zone includes stock price movements and comparative volatility as well as the relative price in a one-time analysis (Syamsir, 2004). Thus, the four oscillator indicators can help in deciding whether a stock should be bought, sold, or held until the determined time.

Incorporating sharia principles in investment decisions is considered a differentiating factor, as well as encouraging performance on sharia shares (Ahmed, 2018; Al-Khazali et al., 2014; Reddy et al., 2017; Walkshäusl & Lobe, 2012). In terms of risk, and result, of co-movement, Sharia stock, especially in Indonesia, is considered that profitable from diversification (Majdoub et al., 2016; Qoyum et al., 2021; Sherif & Lusyana, 2017). It is known that the majority of Indonesian people are Muslims, although they are still lagging behind Malaysia when it comes to Islamic financial fundamentals. However, as the number of needs and investment potential increases as one of the largest Muslim populations in the world, the opportunities to develop Islamic investment are higher. This can be seen in research on the use of technical analysis on the Jakarta Islamic Index (JII) stock, which is still rarely found. Technical analysis research is one of the most interesting and challenging topics to be discussed. It is because of the attractiveness of the stock price chart that is formed that it becomes challenging to predict which direction the next stock will move. Many investors assume that technical analysis cannot provide certainty in predicting the company's price movement. However, technical analysis can be accepted as a logical method of making a profit in the capital market (Prasetyo et al., 2019).

## II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

### Dow Theory

The Dow theory explains that the stock price has presented all the information in the financial market. The purpose of the Dow theory is to identify long-term trends in stock prices. There are two indicators in the Dow theory, namely the Dow Jones Industrial Average (DJIA) and the Dow Jones Transportation Average (DJTA). DJIA is the key indicator of trend-making, while DJTA is a confirmation signal of acceptance or rejection (Maretha & Prasetya, 2021). The trend is a Dow theory that is different from the common trend in society. There are three types of trends in the Dow theory, namely the main trend, the middle trend, and the minor trend. The main trend is the stock price movement over a long period. Usually, a long period can be six months up to one year or maybe it can be more than one year. This main trend movement has three phases, namely the accumulation phase, the public participation phase, and the distribution phase (Sitinjak et al., 2014). The second trend is the middle trend, formed by short-term stock price movements. This period has a three-week to the three-month range. The last trend is the minor trend, which is the daily movement and includes a smaller stock price movement compared with the main trend or the middle trend. This usual period is seen in a period of fewer than three weeks. Thus, the investors already know the trend that occurs in the stock market, then combined with the DJTA to make a confirmation decision to accept or reject.

### Signal Lines

The success factor in making decisions is that an investor can be sensitive to signals that appear in stock movements. Signal lines are used in technical indicators, especially oscillators, which are combined with indicators in technical analysis to produce information that investors can take advantage of. In this case, testing

the signal line against technical analysis indicators can give affect whether the information can be used for decision making. The Stochastic Oscillator (SO) is an indicator to show the momentum towards stock price movement so that the signal indication appears. Some studies indicate that stochastic oscillator indicators significantly can get the profit investors in the sharia market (Prabhata, 2012). The use of trading signals emitted by the Stochastic Oscillator (SO) indicator can provide better performance in predicting stock prices (Ni, Cheng, et al., 2020). The SO indicator can be able to confirm the signal and increase its effectiveness (Nickolaevich et al., 2020). Based on the description above, the hypothesis is formulated as follows:

**H1 : Stochastic Oscillator Indicator affect the signal line.**

Moving Average Convergence Divergence (MACD) is a momentum indicator based on stock prices (Santoso & Sukamulja, 2018). MACD will produce signals that can be used for decision-making. In this case, the MACD uses only 2 intersecting lines. Research by (Prasetyo et al., 2019) showed that the use of the MACD indicator can provide optimal benefits. Then, the result by (Chong & Ng, 2008) shows that the MACD indicator has predictability. The Moving Average Convergence Divergence indicator can provide accurate results and it can be used as a reference to determine the signal (Asthri et al., 2016). According to the description above, the hypothesis is formulated as follows:

**H2 : Moving Average Convergence Divergence Indicator affects the signal line.**

The Relative Strength Index (RSI) is an oscillator used in technical analysis to show price strength by comparing the price movement of an increase and a decrease (Rosyidah & Hafi, 2021). The RSI indicator will show whether the stock price is saturated or not or moving sideways. The result of the study by (Shalini et al., 2019) showed that although the RSI can provide signals, it still has a risk since the number of false signals produced is quite high. RSI can provide signal information that is accurate enough so that it can give benefit to investors (Utami & Gunarsih, 2018). The Relative Strength Index indicator can provide better performance in investment decision-making (Santoso & Sukamulja, 2018). Based on the description above, the hypothesis can be formulated as follows:

**H3 : Relative Strenght Index indicator affects the signal line**

The Bollinger Band (BB) indicator is used to obtain information on the forwarding of the trend direction and the stock price amount of volatility through the Bollinger Band (Roy, 2016). The BB indicator will form 3 zones. The research result (Firdaus, 2021) showed that BB can have a positive effect on the signal line. The Bollinger Band indicator can be able to confirm signals that appear to make a profit (Ni, Day, et al., 2020). The Bollinger Band indicator can produce signals used by investors to make decisions(Mafula Choitrotul, 2015). According to the description above, the hypothesis can be formulated as follows:

**H4 : Bollinger Band indicator affects the signal line.**

### III. RESEARCH METHOD

#### Population and Samples

The population used in this study was the companies that are listed on the Indonesia Stock Exchange. Meanwhile, the samples in this study were companies included in the Jakarta Islamic Index 30. The purposive sampling technique by setting certain criteria was used to obtain the samples. Data collection was accessed by [www.idx.com](http://www.idx.com) and [tradingview.com](http://tradingview.com). The selected sample criteria are (1) Companies included in the Jakarta Islamic Index, (2) Companies included in Jakarta Islamic Index 30 from 2016 to 2019, and (3) Companies that have complete charts from 2016 to 2019.

Jakarta Islamic Index (JII) was chosen as the research sample because the listed companies have met several requirements such as good stock capitalization and liquidation so that investors can analyze these stocks. This country with a developing economy has the potential for a sharia stock market whose market capitalization share reached 51.55% at the end of 2019 (OJK, 2018). Data collection was taken from June to November of each year. The selection data from June to November was due to reduce the phenomenon that influenced the company's stock movement.

**Variable Measurement**

The dependent variable in this research is the signal line. It was measured using a nominal scale of 1 to 3. Nominal 1 represents buying, nominal 2 represents selling, and nominal 3 represents holding. The signal line numbering has no basis yet in explaining this term. The signal line is expected to help with decision-making for an investor. The independent variables in this study are Stochastic Oscillator (SO), Moving Average Convergence Divergence (MACD), Relative Strength Index (RSI), and Bollinger Band (BB).

1. Stochastic Oscillator in technical analysis was measured by looking at a scale of 0-100. In this case, the 80-100 area can be stated as overbought, the 0-20 area can be stated as oversold, and the middle area of 20-80 can be stated as neutral or the stock price moves sideways. The usual Stochastic Oscillator indicator standard used is 14, 5, and 3. This would reduce the false signals in the stock movements.
2. Moving Average Convergence Divergence in stock analysis is technically measured by the intersection of the signal lines and MACD indicator lines. The line setting standard of MACD used in this research was 12, 26, and 9. With such a standard-setting price fluctuation becomes more sensitive.
3. Relative Strength Index in stock analysis was technically measured by the intersection of signal lines if the RSI lines were above 70%, then the stock was overbought and if the RSI lines were below 30%, then it was oversold. Similarly, if the indicator line moved between 30%-70%, the stock experienced sideways.
4. Bollinger Band in stock analysis was technically measured by entering the setting in the indicator (20, 2). Those settings indicated the standard values of  $n = 20$  and  $k = 2$  which would get the Bollinger band value.

**IV. RESULT AND DISCUSSION**

Table 1 is a descriptive statistical analysis that describes the variables

<b>Variable</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Standard Deviation</b>
GS	188	1.00	3.00	1.8245	.74291
SO	188	-81.64	446.41	.9787	64.51729
MACD	188	-3795.00	2533.00	33.6596	569.81861
RSI	188	-44.10	40.63	-.3843	21.36966
BB	188	-1.36	1.28	.0112	.72041

The signal line as the dependent variable calculated on a nominal scale of 1 to 3 has a mean value of 1.8245 with a standard deviation of 0.74291. Meanwhile, each independent variable has a mean value from the Stochastic Oscillator (SO) of as much as 0.9787 with a standard deviation of 64.517729. The mean value of the Moving Average Convergence Divergence (MACD) is 33.6596 with a standard deviation of 569.81861. The mean Relative Strength Index (RSI) value is -0.3843 with a standard deviation of 21.36966. The mean Bollinger Band (BB) value is 0.0112 with a standard deviation of 0.72041.

Statistical testing in this study used multi-nominal logistic regression. The estimation parameters in the multi-nominal logistic regression test for the buy decision were compared with the hold decisions, the influential indicators were Moving Average Convergence Divergence and Bollinger Band because the p-value was less than 0.05. As for the sell decision compared to the hold decision, the influential indicators were the Stochastic Oscillator and Relative Strength Index because the p-value was less than 0.05. The equation on the estimation parameter formed to MACD and BB produced the statement that if there was no significant increase in the value against the Moving Average Convergence Divergence (MACD) and Bollinger Band (BB), so the probability of the investor deciding to buy was higher than the hold decision. The higher increase in the MACD indicator value, the higher probability of buying. Concerning the exp (B) to buy, it was explained that the MACD indicator has a

probability of 1.003 times higher compared to other indicators. Meanwhile, the higher the value of the BB indicator value, the higher the probability of buying. Looking at the value of exp (B) to buy, it was explained that the BB indicator has a probability of 40.195 times more precise than other indicators. The accuracy of the classification in each category was the Buy 65 observations, the Sell category as much 75 observations, and the Hold category as much 16 observations. The model accuracy obtained was 83.0%.

Table 2 likelihood ratio test

Effect	Model Fitting Criteria	Likelihood Ratio Test		
	-2 Log-Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	164.794	30.020	2	.000
SO	157.313	22.539	2	.000
MACD	143.264	8.490	2	.014
RSI	146.232	11.457	2	.003
BB	149.203	14.428	2	.001

Based on the data produced by the fitting information model, it can be concluded that the inclusion of an independent variable into a multi-nomial regression model showed the best results. The sustainability test (goodness of fit) of the form model gives the result that the data entered matched or followed the multi-nominal regression model. It meant that the model could describe the data. The feasibility of the model by looking at Cox and Snell showed that the value of 0,752. The value indicated that the data diversity of the free variables could explain the data diversity of the response variable by as much as 75.2%. Meanwhile, the rest was explained by the other free variables that exist outside the model. The partial test showed significant values for all variables smaller than alpha 5% or less than 0,05. From these results, it can be concluded that the Moving Average Convergence Divergence, Stochastic Oscillator, Relative Strength Index, and Bollinger Band are statistically significantly influential on the signal line. Thus, the hypothesis which stated that MACD, SO, RSI and BB affect the signal line is accepted. This result proved that these indicators of oscillators can provide information on buy, sell and hold signals. The results of this study are in line with research from Monika dan Yusniar (2020) which showed the results that MACD and RSI could provide accurate signals in the decision-making. Research by Firdaus (2021) showed that the BB and RSI combination could help to provide signals so that the decisions taken can be accurate. In this case, it means that the indicators respond well to the signals that appear. A stock investor cannot only look at the volume of transactions, but the stock price is also below or above or even just look at the consistency of a company for decision-making, so there is a need for analysis in this case technical analysis that is assisted by indicators to assist in decision making. Therefore, the MACD, SO, RSI, and BB indicators affect the signal lines.

## V. CONCLUSION

The selection of the sharia market to determine the effect of technical analysis has a positive impact on investors in the form of decision information. In this case, it will provide a positive trend for the outside world to look at the sharia market and also provide interest for the Indonesian people, which of course are dominated by Muslims to invest in the sharia market. The result of technical analysis use on a nominal scale in companies listed on the Jakarta Islamic Index 30 from 2016 to 2019 found that the use of SO, MACD, RSI, and BB indicators statistically has a significant effect on the signal line. Through the results of all such indicators that can exert a significant influence, an investor cannot ignore the fundamental analysis in decisions. In decision-making, it is better to combine the company's fundamental analysis with the technical analysis formed therefore the decisions taken can provide appropriate and accurate results.

In this research process, it is not separated from limitations, so there needs to be an improvement for further researchers. The limitations in this study show that there has no reference to the signal line consisting of buy, sell, and hold measured by a nominal scale (1,2,3) so researchers only look at the test results that provide the best results. Suggestions for the further researchers, they can test other indicators from the technical analysis therefore they can find out their influence. This study was conducted from 2016-2019 and only observed in the months of June to November each year. In the future, it may observe the phenomena of the months in each year or use the latest year because, in 2020-2021, covid-19 pandemic condition hit Indonesia and may affect the stock price movements.

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#### AUTHOR

**First Author** – Yoga Surahman Priatmojo, Universitas Muhammadiyah Surakarta, [b200180198@student.ums.ac.id](mailto:b200180198@student.ums.ac.id).

**Second Author** – Shinta Permata Sari, Universitas Muhammadiyah Surakarta. [sps274@ums.ac.id](mailto:sps274@ums.ac.id).

**Correspondence Author** – Shinta Permata Sari, Universitas Muhammadiyah Surakarta. [sps274@ums.ac.id](mailto:sps274@ums.ac.id).