

TECHNICAL ANALYSIS AS THE BASIS FOR DECISION MAKING IN STOCK INVESTMENT IN PT. BANK MESTIKA DHARMA.TBK IN THE INDONESIAN CAPITAL MARKET (DURING THE COVID PANDEMIC JANUARY 2020 - JUNE 2021)

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Abstract

This study uses a quantitative approach to making stock investment decisions using the Moving Average Convergence Divergence indicator and the Stochastic Oscillator indicator by recording sell signals and buy signals and then testing the effectiveness of buy signals and sell signals from the two indicators. This research will be analyzed using the investing.com chart analysis platform. Based on research that has been conducted by researchers, it can be concluded that: 1. From graphic analysis at PT Bank Mestika Dharma Tbk, the Stochastic Oscillator indicator provides a total of 65 signals consisting of 35 buy signals and 30 sell signals while the MACD indicator provides 19 signals consisting of 10 bell signals and 9 sell signals from. 2. The Stochastic Oscillator indicator provides a better level of accuracy with an accuracy rate of 68%, while the MACD indicator has an accuracy rate of 58%. 3. The Stochastic Oscillator indicator has proven to be superior for analyzing stocks with a sideways trend, as experienced by PT Bank Mestika Dharma Tbk during the current economic crisis.

Keywords: *Sechnical analysis Stochastic Oscillator, MACD.*

1. INTRODUCTION

Investing in the Capital Market requires sufficient knowledge, experience and business sense to analyze which stocks to buy, which to sell and which to keep. These things can affect the level of profit earned and also the risks that will be borne by an investor. The return received by investors can be in the form of the difference between the selling price and the purchase price which is called a capital gain and dividends which are distributed each period by the issuer. Investors will always be faced with the choice to sell or buy shares. This decision must be made carefully so as not to cause losses to investors or have an impact on reducing the returns to be received. Apart from being careful, investors must also be quick and responsive in reading the market situation, so that the profits obtained are optimal. When investing, traders use methods they believe are accurate and can be accounted for, with the aim of outperforming the market. For most traders, the most important thing is how to take advantage of information on the trend of changes in stock prices with the aim of making profits in a very short time, not for long-term investments. Therefore, these traders are competing to find a method that they think is the most correct and superior.

To perform a stock valuation, there are two analyzes that can be performed, namely fundamental analysis and technical analysis. Fundamental analysis is carried out by projecting the expected dividends and earnings of a company and then discounting them with the expected rate of return by investors. Or in other words, fundamental analysis is a way of assessing the stock market price by looking at the company's financial performance. While technical analysis is based on stock

price movement data in the past so that it can be predicted in the future. With this approach, analysts will try to predict shifts in supply and demand in the short term. The barometer used is how much profit is generated from the change, so this analysis requires relatively short time compared to the fundamental approach (Halim, 2015). Each method has its advantages and disadvantages, so no method can be considered the most correct and superior method that can be applied to all situations.

Technical analysis users are usually referred to as chartists, because in carrying out their analysis they use charts of stock movements and trading volumes. Technical analysis has a philosophy that analysts can find patterns of stock price movements in the past. Through observation, these patterns are used to determine current or future stock price movements. Generally, technical analysis is widely used by investors who want to take short-term profits (Harwaningrum, 2016). In technical analysis itself, there are many methods that can be used to analyze stock prices such as Moving Average, Stochastic Oscillator, Moving Average Convergence Divergence (MACD), Relative Strength Index (RSI), Momentum, Williams% R and many more. Several previous studies examining technical analysis as a basis for making investment decisions include Saputra et al (2019), Mutmainah and Sulasmitari (2017), Roy & Hermuningsih (2016), Asthri, Topowijono & Sulasmiyati (2016), Pujiati (2013), Tilehnouei and Shivaraj (2013), Prabhata (2012). These studies prove that technical analysis indicators such as Stochastic Oscillator, Relative Strength Index, Moving Average Convergence Divergence, and Buy and Hold, etc. can be used properly as indicators in determining stock investment decisions. The difference between these studies is the indicators used and the objects studied.

In this study, the researcher wanted to examine investment decisions in PT Bank Mestika Dharma Tbk using the Stochastic Oscillator as an indicator of technical analysis. The Stochastic Oscillator is an indicator developed by George C. Lane in the late 1950s, with the aim of measuring the saturation level of a market that has buy and sell signals. The Stochastic Oscillator analysis consists of two lines, namely the %K line and the %D line. The %K line illustrates the relative position, as well as the closing price against the highest and lowest price ranges in the observation period. Meanwhile, the %D line is a trigger line which is a simple moving average of the %K line which indicates that the %D line is a line made to identify the direction of movement of the %K line (Hartanto, et al. 2014). Moving Average Convergence Divergence or commonly known as MACD was first introduced by Gerald Appel in the 1960s. MACD is an indicator of technical analysis that uses two Exponential Moving Averages (EMA) to indicate overbought or oversold conditions that fluctuate above and below the zero line. The reason for choosing the Stochastic Oscillator indicator with the Moving Average Convergence Divergence (MACD) is because this indicator is a popular indicator among technical analysis traders. The use of this method is relatively easier by reading the graphs it produces, so ordinary people who are just trying to invest are very suitable to start with.

2. IMPLEMENTATION METHOD

2.1 Types of Research

This study uses a quantitative approach to making stock investment decisions using the Moving Average Convergence Divergence indicator and the Stochastic Oscillator indicator by recording sell signals and buy signals and then testing the effectiveness of buy signals and sell

signals from the two indicators. This research will be analyzed using the investing.com chart analysis platform.

2.2 Sample and Research Data

The sample is part of the population that is considered to represent the population to be studied. The population in this study is all data on the stock market price of PT Bank Mestika Dharma Tbk since its listing on the Indonesia Stock Exchange (IDX). Then the sampling in this study was carried out using a nonprobability sampling technique, namely the purposive sampling method with the sample criteria being PT Bank Mestika Dharma Tbk stock price data during the COVID-19 pandemic case in China up to the date of the study. The data used in this research is secondary data. The secondary data used in the study were the daily closing price of the stock during the study period and the daily stock movement charts during the observation period. The observation period was carried out on 1 January 2020 – 30 June 2021 or equal to 362 days, this was determined because researchers wanted to know how stock investment decisions were made during the COVID-19 pandemic, from the beginning of the emergence of the COVID 19 case in January 2020 until now. The secondary data used in this study were obtained from the Indonesia Stock Exchange which is documented in www.idx.co.id, Yahoo! Finance, and investing.com.

2.3 Variable Operational Definitions

There are 2 variables in this study, namely buy/sell signals using the Moving Average Convergence Divergence indicator (X1) and buy/sell signals using the Stochastic Oscillator indicator (X2).

Table 1 Variable Operational Definition

No	Variable	Definition
1.	MACD Buy/Sell Signals (X1)	Buy/sell signals are generated using the Moving Average Convergence Divergence indicator. The intersection between the signal line and the MACD line.
2.	Stochastic Oscillator Buy/Sell Signals (X2)	Buy/sell signals are generated using the Stochastic Oscillator indicator. A sell signal is obtained when the %K and %D lines are above 80, and a sell signal is when the %K and %D lines are below 20.

1. Buy/sell signals generated using the Moving Average Convergence Divergence indicator are obtained from the intersection of the signal line and the MACD line. The MACD line is obtained by calculating the difference between the twenty-six (26) period Exponential Moving Average and the twelve (12) period Exponential Moving Average (EMA 26 – EMA 12). The signal line is obtained using a Nine (9) period Exponential Moving Average (EMA 9). The use of this period is in accordance with the provisions used by the inventor of this indicator and is still widely used by technical analysts in the market today.
2. Buy/sell signals are generated using the Stochastic Oscillator indicator. A sell signal is obtained when the %K and %D lines are above 80, and a sell signal is when the %K and %D lines are below 20. The following formula is used to calculate the %K and %D lines:

$$\%K = \frac{(C-LN)}{(HN-LN)} \times 100$$

$$%D = \text{Simple Moving Average 3 Periode dari } \%K$$

Where:

C: Closing Price

LN : The most pricelower than the lowest price in N periods

HN : Pricethe highest of the highest price in N periods

The number of periods used in this study is 14 periods, this is in accordance with the standard used by the inventor of the Stochastic Oscillator indicator, and this number of periods is also the number of periods most often used by traders, so it is considered still relevant today.

2.4 Data Analysis Methods

This research was conducted by performing graphical analysis using the Moving Average Convergence Divergence and Stochastic Oscillator indicators with the following steps:

1. Looking for data on the closing price of shares of PT Bank Mestika Dharma Tbk for the period January 1 2020 to June 30 2021 via the finance.yahoo.com site.
2. Processing data through the investing.com platform, by conducting analysis using the Moving Average Convergence Divergence and Stochastic Oscillator indicators.
3. Determine sell signals and buy signals by performing graphical analysis using the Moving Average Convergence Divergence and Stochastic Oscillator indicators.
4. Determine the true signal and false signal from the results of chart analysis using the Moving Average Convergence Divergence and Stochastic Oscillator indicators. True signal if a buy signal is followed by an increase in stock prices or a bullish trend and/or if a sell signal is followed by a decline in stock prices or a bearish trend. False signal if the buy signal is not followed by an increase in the stock price or a bullish trend and/or if the sell signal is not followed by a decrease in the stock price or a bearish trend.
5. Analyze the effectiveness of the two indicators Moving Average Convergence Divergence and Stochastic Oscillator by comparing the percentage of true signals from each indicator.

3. RESULTS AND DISCUSSION

3.1 Descriptive Statistics

From the data obtained, descriptive statistical tests were then carried out with the aim of providing an overview of the data in terms of the maximum, minimum, average, and standard deviation values. The results of descriptive statistical tests are presented in Table 4.1 below.

Table 2 Descriptive Statistics

	N	Means	Median	std. Deviation	Minimum	Maximum	Percentiles		
							25	50	75
Stock price	362	1541,12	1450.00	371.10	1070	2810	1374	1450	1580

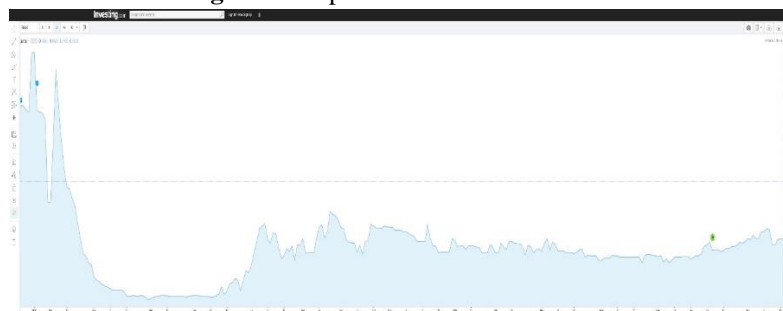
Source: Results processed by researchers (2021)

Based on the results of descriptive statistical analysis, it can be seen that of the 362 data used in this study, the average share price of PT Bank Mestika Dharma Tbk is IDR 1,485.3 with a minimum value range of IDR 1,070 and a maximum value of IDR 2,810. The median of these data is IDR 1,450, then the first quartile is IDR 1,374 and the third quartile is IDR 1,580. The standard deviation of 371.10 is greater than the mean (mean), which means that the stock price distribution of PT Bank Mestika Dharma Tbk is quite volatile. The highest price was formed in early January 2020, to be precise on January 2 and 6 2020 of IDR 2,810. Early January is the initial period of the COVID-19 pandemic in China and has not yet entered Indonesia, However, investors seem to have started to be wary of the economic impact that might be caused by the pandemic globally so that investors see it as a risk that could threaten economic conditions in Indonesia. After that, the share price of PT Bank Mestika Tbk began to decline sharply along with the falling price of the Jakarta Composite Index (IHSG). Until finally the lowest price occurred on April 30 2020 with a market price of IDR 1,070. This lowest price occurred after the first case of COVID-19 was found in March 2020 and began to spread thereafter. After that, the share price of PT Bank Mestika Tbk began to decline sharply along with the falling price of the Jakarta Composite Index (IHSG). Until finally the lowest price occurred on April 30 2020 with a market price of IDR 1,070. This lowest price occurred after the first case of COVID-19 was found in March 2020 and began to spread thereafter. After that, the share price of PT Bank Mestika Tbk began to decline sharply along with the falling price of the Jakarta Composite Index (IHSG). Until finally the lowest price occurred on April 30 2020 with a market price of IDR 1,070. This lowest price occurred after the first case of COVID-19 was found in March 2020 and began to spread thereafter.

3.2 Graphical Analysis of the share price of PT Bank Mestika Dharma Tbk

Graphic analysis in this study was carried out using the investing.com platform. To carry out a graphical analysis using this platform researchers can enter the website "investing.com" - then type the code "BBMD" or "PT Bank Mestika Dharma Tbk" on the search engine, then click "Chart" so that a display will be obtained as shown in Figure 3 below.

Figure 3 Graph of BBMD Stock Market Prices



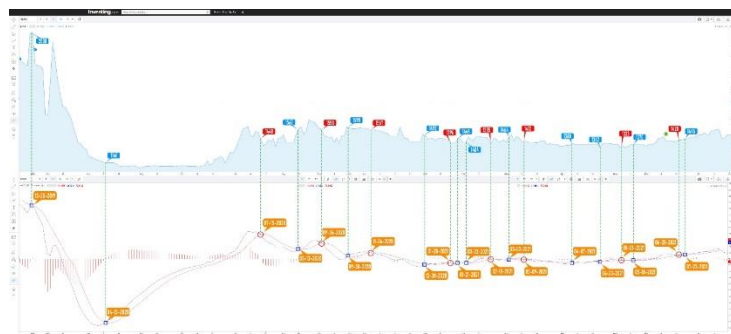
Source: investing.com (reworked by researchers, 2021)

Then to do the analysis, you can add indicators by clicking the "Indicators" menu, then selecting "MACD" for the Moving Average Convergence Divergence indicator and selecting "Stochastic" for the Stochastic Oscillator indicator.

3.3 Analysis Using the Moving Average Convergence Divergence Indicator

The results of graphical analysis using the Moving Average Convergence Divergence indicator can be seen in Figure 4 below.

Figure 4 Graph Analysis of BBMD Stock Prices Using the MACD Indicator



Source: Investing.com (re-processed by researchers, 2021)

From Figure 4 it can be seen that from the intersection of the Moving Average Convergence Divergence Line (MACD Line), which is represented by the blue line, and the Signal Line, which is represented by the red line, there are 19 signals, both sell signals and buy signals, for PT Bank Mestika Dharma Tbk in the period January 2020 to June 30 2021. Of the 19 signals, 10 of them are buy signals, namely when the MACD line crosses above the signal line, and the remaining 9 are sell signals, namely when the MACD line crosses below the signal line. In the first quarter of 2020 there was a sell signal, namely on January 5 2020, the share price of PT Bank Mestika Dharma Tbk was formed at IDR 2,810. The MACD indicator shows the intersection between the MACD line and the signal line, where the MACD line crosses below the signal line, which indicates a sell signal for shares of PT Bank Mestika Tbk. In the second quarter of 2020 there was a buy signal for PT Bank Mestika Dharma Tbk shares, namely on April 13 2020, PT Bank Mestika Dharma Tbk's share price was IDR 1,140. The MACD indicator shows the intersection between the MACD line and the signal line, where the MACD line crosses above the signal line. This indicates a buy signal for the shares of PT Bank Mestika Tbk.

In the third quarter of 2020, there were two sell signals and two buy signals for PT Bank Mestika Dharma TBK's shares, namely a sell signal on July 15 2020 with a share price of IDR 1,440. and on September 4 2020, with a share price of IDR 1,570. Then a buy signal on August 13 2020 with a share price of IDR 1,500. and on September 30 2020, where the share price of PT Bank Mestika Dharma Tbk was formed at IDR 1,600. Then in the 4th quarter of 2020. The MACD indicator indicated that there was a sell signal on November 24 2020, the share price of PT Bank Mestika Dharma Tbk was formed at IDR 1,560. and one buy signal on December 30 2020, where the share price of PT Bank Mestika Dharma Tbk was at the level of IDR 1,500 at the end of 2020.

Then in the first quarter of 2021 there were 6 buy signals for PT Bank Mestika Tbk shares, namely a sell signal on January 20 2021, with the share price at the level of IDR 1,400. Then a buy signal on January 21, 2021, with the share price at IDR 1,400. Then the buy signal was 3 February 2021, where the share price for PT Bank Mestika Dharma Tbk was formed at IDR 1,400. Then on February 18, 2021, a sell signal with the share price of PT Bank Mestika Dharma Tbk at the level of IDR 1,445. After that, on March 2, 2021, a buy signal with the share price of PT Bank Mestika Dharma Tbk was formed at Rp. 1,465. And finally, on March 9 2021, a sell signal for PT Bank Mestika Dharma Tbk's share price was formed at IDR 1,415.

In the second quarter of 2021 there were 5 signals, namely 3 buy signals on 7 April 2021, 23 April 2021 and 18 May 2021; and 2 sell signals on May 5, 2021 and June 20, 2022. On April 7,

2021 the share price was at IDR 1,360. On April 23, 2021, PT's share price was at IDR 1,330. And on May 18, 2021 the share price was at the level of IDR 1,370. On May 5, 2021, the share price of PT Bank Mestika Dharma Tbk was formed at IDR 1,335. On June 20, 2021, the share price was at IDR 1,415.

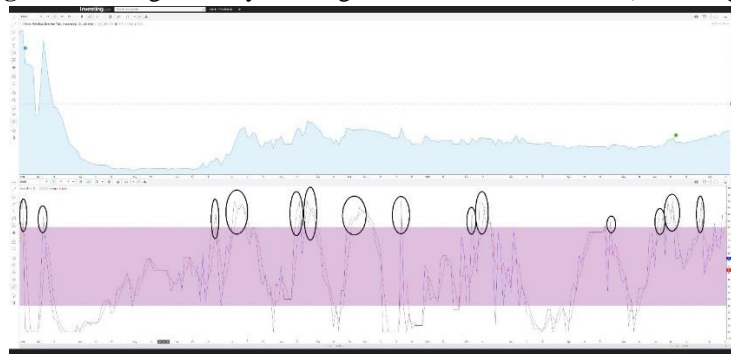
3.4 Analysis Using the Stochastic Oscillator Indicator

There are two ways to determine sell and buy signals using the Stochastic Oscillator indicator.

1. By looking at the intersection between the %K line and the upper limit (80%) and lower limit (20%). If the %K line exceeds the 80% limit ($%K > 80%$), then this indicates that the shares of PT Bank Mestika Dharma Tbk are in an Overbought position or the purchase is larger than the sale of these shares so that the price will tend to rise, but at a certain point the shares will experience a reversal or reverse direction, this indicates a bearish trend so this is a sell signal for investors. Conversely, if the %K line crosses the 20% line ($%K < 20%$), then this will indicate that the share price of PT Bank Mestika Dharma Tbk is in an oversold position or the sale is greater than the purchase of the shares so that the price will tend to fall to a certain point where the stock will experience a reversal or reverse so that it shows a bullish trend.
2. By looking at the intersection between the %K line which is represented by the blue line and the %D line which is represented by the red line which is in the range of 20% - 80%.

The results of the analysis using the Stochastic Oscillator indicator can be seen in Figures 2, 3 and 4.

Figure 5 Sell signal analysis using the Stochastic Oscillator (Overbought)



Source: Investing.com (re-processed by researchers, 2021)

From Figure 5 it can be seen that there are 14 points of intersection between the %K line and the 80% upper limit. The %K line that exceeds the 80% limit can be said to be overbought or a saturation point in buying shares, so the stock price is expected to reverse to a bearish trend. The 14 points can be used as a sell signal for PT Bank Mestika Dharma Tbk investors.

PT Bank Mestika Dharma Tbk's overbought stock data is presented in table 3 below.

Table 3 Data on overbought shares of PT Bank Mestika Dharma Tbk

No	Date	Stock price	Information
1	03-Jan-20	2810	Overbought
2	05-Mar-20	2690	Overbought
3	22-Jun-20	1190	Overbought

TECHNICAL ANALYSIS AS THE BASIS FOR DECISION MAKING IN STOCK INVESTMENT IN PT. BANK MESTIKA DHARMA.TBK IN THE INDONESIAN CAPITAL MARKET (DURING THE COVID PANDEMIC JANUARY 2020 - JUNE 2021)

Tika Denisa Simanjuntak, Isfenti Sadalia, Nisrul Irawati

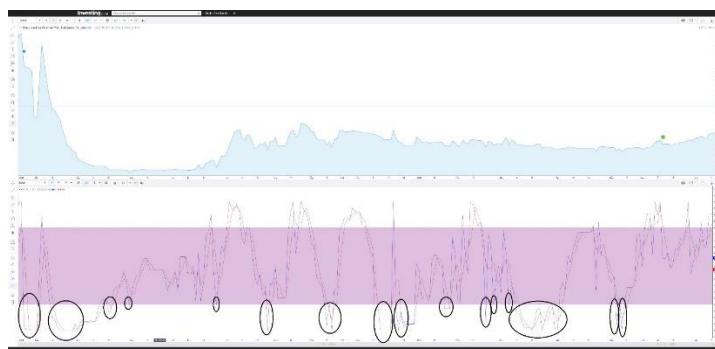
4	01-Jul-20	1310	Overbought
5	13-Aug-20	1500	Overbought
6	24-Aug-20	1550	Overbought
7	30-Sep-20	1600	Overbought
8	14-Dec-20	1480	Overbought
9	03-Feb-21	1400	Overbought
10	09-Feb-21	1425	Overbought
11	26-Apr-21	1380	Overbought
12	03-Jun-21	1370	Overbought
13	09-Jun-21	1450	Overbought
14	25-Jun-21	1455	Overbought

Source: Results processed by researchers (2021)

From table 3 it can be seen that PT Bank Mestika Tbk was overbought 14 times during the period January 2020 to June 2021. The highest overbought point occurred on January 3 2020 with the stock market price at that time of IDR 2,810, then the lowest overbought point occurred on June 22, 2020 at a price of IDR 1,190.

PT Bank Mestika Dharma Tbk's oversold stock data is presented in table 4.2 below.

Figure 6 Sell signal analysis using the Stochastic Oscillator (Oversold)



Source: Investing.com (re-processed by researchers, 2021)

From Figure 6 it can be seen that there are 16 points of intersection between the %K line and the lower limit of 20%. The %K line that exceeds the lower limit of 20% ($%K < 20%$) can be said to be oversold or a saturation point in selling shares, so that the stock price is expected will reverse to a bullish trend. The 16 points can be used as a sell signal for PT Bank Mestika Dharma Tbk investors.

Table 4 Data on oversold shares of PT Bank Mestika Dharma Tbk

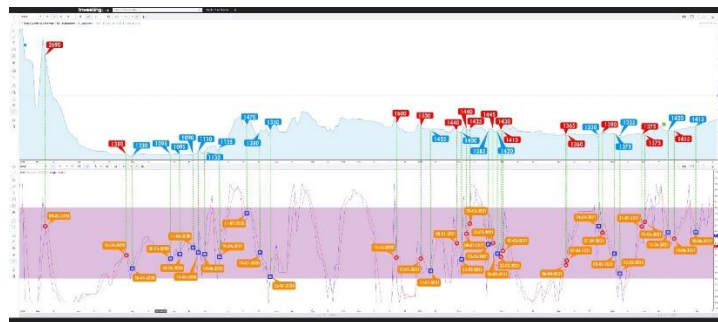
No	Date	Stock price	Information
1	07-Jan-20	2400	Oversold
2	12-Mar-20	2000	Oversold
3	17-Apr-20	1130	Oversold
4	30-Apr-20	1070	Oversold
5	25-Jun-20	1135	Oversold
6	23-Jul-20	1450	Oversold
7	10-Sep-20	1470	Oversold

8	02-Dec-20	1550	Oversold
9	16-Dec-20	1500	Oversold
10	20-Jan-21	1400	Oversold
11	18-Feb-21	1445	Oversold
12	24-Feb-21	1400	Oversold
13	04-Mar-21	1420	Oversold
14	08-Mar-21	1460	Oversold
15	04-May-21	1380	Oversold
16	08-May-21	1330	Oversold

Source: Results processed by researchers (2021)

From table 4 it can be seen that PT Bank Mestika Tbk was oversold 16 times during the period January 2020 to June 2021. The highest oversold point occurred on January 7 2020 with the stock market price at that time of IDR 2,400, then the lowest oversold point occurred on April 30, 2020 at a price level of IDR 1,070.

Figure 7 Graph Analysis of BBMD Stock Prices Using the Stochastic Oscillator Indicator



Source: Investing.com (re-processed by researchers, 2021)

3.4 Effectiveness of the Moving Average Convergence Divergence and Stochastic Oscillator indicators

The signals given by the MACD or Stochastic Oscillator indicators, both sell signals and buy signals, are not always accurate. In some cases these two indicators can provide the right signal, but it is not uncommon for this indicator to give an incorrect signal. The right signal (true signal) can be identified if the signal given is followed by price movements or price trends that match the signal given. A sell signal is followed by a decline in the stock price or a downward (bearish) trend of the stock, and/or a buy signal followed by an increase in the stock price or an increase (bullish) in the stock price.

3.4.1 The Effectiveness of the Moving Average Convergence Divergence Indicator

Graphical analysis regarding the accuracy of the Moving Average Convergence Divergence indicator as a tool to show buy signals and sell signals for PT Bank Mestika Dharma Tbk shares can be seen in table 4.4 below.

Table 5 Effectiveness of the Moving Average Convergence Divergence Indicator

No	Date	Stock price	Signal	Trends to follow	Information
1	05-Jan-20	2810	Sell	Bearish	TrueSignal
2	13-Apr-20	1140	Buy	bullish	TrueSignal

TECHNICAL ANALYSIS AS THE BASIS FOR DECISION MAKING IN STOCK INVESTMENT IN PT. BANK MESTIKA DHARMA.TBK IN THE INDONESIAN CAPITAL MARKET (DURING THE COVID PANDEMIC JANUARY 2020 - JUNE 2021)

Tika Denisa Simanjuntak, Isfenti Sadalia, Nisrul Irawati

3	15-Jul-20	1440	Sell	Bearish	TrueSignal
4	13-Aug-20	1500	Buy	bullish	TrueSignal
5	04-Sep-20	1570	Sell	Bearish	TrueSignal
6	30-Sep-20	1600	Buy	Bearish	False Signals
7	24-Nov-20	1560	Sell	Bearish	TrueSignal
8	30-Dec-20	1500	Buy	Bearish	False Signals
9	20-Jan-21	1400	Sell	Sideways	False Signals
10	21-Jan-21	1400	Buy	Bearish	False Signals
11	03-Feb-21	1400	Buy	bullish	TrueSignal
12	18-Feb-21	1445	Sell	bullish	False Signals
13	02-Mar-21	1465	Buy	bullish	TrueSignal
14	09-Mar-21	1415	Sell	Bearish	TrueSignal
15	07-Apr-21	1360	Buy	Bearish	False Signals
16	23-Apr-21	1330	Buy	bullish	TrueSignal
17	05-May-21	1335	Sell	bullish	False Signals
18	18-May-21	1370	Buy	bullish	TrueSignal
19	20-Jun-21	1415	Sell	bullish	False Signals

Source: Results processed by researchers (2021)

From table 5 it can be seen that the MACD indicator gives 19 signals consisting of 10 buy signals and 9 sell signals. Of the 10 buy signals, 6 of them gave accurate buy signals and the remaining 4 gave inaccurate buy signals. Then from 9 sell signals, there are 5 sell signals that are accurate and 4 sell signals that are inaccurate. So in total there are 11 accurate signals and 9 inaccurate signals out of 19 signals obtained from the analysis of PT Bank Mestika Dharma Tbk's stock price using the MACD indicator. A buy signal followed by an increase in price or an upward price trend occurred at a buy signal on April 13 2020, August 13 2020, February 3 2021, March 2 2021, April 23 2021 and May 18 2021. Then the rest are false signals or buy signals that are not followed by an increase or a stock price trend that tends to rise.

On April 13, 2020, the share price of PT Bank Mestika Dharma Tbk was IDR 1,140. The MACD indicator shows the intersection between the MACD line and the signal line, where the MACD line crosses above the signal line. This indicates a buy signal for the shares of PT Bank Mestika Tbk. Even though at first the share price was relatively flat as a result of the COVID-19 pandemic which started to spread to Indonesia, from mid-June 2020 to early July 2020 the share price of PT Bank Mestika Dharma Tbk gradually rose again and experienced a trend of quite significant price increases until it reached a price of IDR 1,605 on 8 July 2020. Then the next buy signal is a buy signal on August 13 2020, the share price of PT Bank Mestika Dharma Tbk is IDR 1,500 per share. The MACD indicator shows a buy signal, where the MACD line crosses above the signal line. This buy signal was followed by an upward trend in share prices, where the highest price was reached on August 18, 2020 with a share price of IDR 1,690.

The next buy signal can be seen on 3 February 2021. The MACD indicator shows the intersection between the MACD line and the signal line, where the MACD line crosses above the signal line which indicates a buy signal for PT Bank Mestika Tbk shares. The share price of PT Bank Mestika Dharma Tbk at that time was IDR 1,400. This signal was followed by an upward trend in share prices as well, where on the first day after the signal, namely February 4, 2021, the share price opened at Rp. 1,400 and then closed at the highest price, namely Rp. 1,470.

Then the next buy signal can be observed on March 2, 2021, the share price of PT Bank Mestika Dharma Tbk is formed at IDR 1,465. The MACD indicator shows the intersection between the MACD line and the signal line, where the MACD line crosses above indicating a buy signal for PT Bank Mestika Tbk shares. This signal was followed by an upward trend in share prices as well,

where on the first day after the signal, namely March 3, 2021, the share price opened at Rp. 1,480 and then closed at the highest price, namely Rp. 1,500

On April 23, 2021, the MACD indicator showed a buy signal, where the MACD line crossed above indicating a buy signal for shares of PT Bank Mestika Tbk. PT Bank Mestika Dharma Tbk's share price was formed at IDR 1,330. This buy signal was followed by an increasing trend in share prices, where the highest price was reached on April 28, 2021 with a share price of IDR 1,390. The last buy signal occurred on May 18 2021, the share price for PT Bank Mestika Dharma Tbk was formed at IDR 1,370. The MACD indicator shows the intersection between the MACD line and the signal line, where the MACD line crosses above indicating a buy signal for PT Bank Mestika Tbk shares. This buy signal was followed by an upward trend in share prices, where the highest price was reached on May 24, 2021 with a share price of IDR 1,375.

From the results of the graphical analysis, it is known that the true signal or sell signal was followed by a decline in price or a downward trend in the price movement of PT Bank Mestika Dharma Tbk's shares occurred on January 5 2020, July 15 2020, September 4 2020, November 24 2020, March 9 2021. In addition, this signal is categorized as a false signal because a sell signal is not followed by a price decline or a downward trend in stock price movements. The first sell signal occurred on January 5 2020, the MACD indicator shows the intersection between the MACD line and the signal line, where the MACD line crosses below the signal line, which indicates a sell signal for PT Bank Mestika Tbk shares. PT Bank Mestika Dharma Tbk's share price was formed at Rp. 2,810, which continued to decline drastically until it reached its lowest point at Rp. 1,070 on April 30, 2020.

The second sell signal occurred on July 15 2020, the share price of PT Bank Mestika Dharma Tbk was formed at IDR 1,440. The MACD indicator shows the MACD line crossing below the signal line. The market responded well to this signal so that the price continued to fall to the level of IDR 1,350 on 24 July 2020. The third sell signal occurred on September 4 2020, the MACD indicator shows the intersection between the MACD line and the signal line, where the MACD line crosses downwards indicating a sell signal for PT Bank Mestika Tbk shares. This signal was well received by the market, this is indicated by the share price of PT Bank Mestika Dharma Tbk which was formed at Rp. 1,570 gradually decreasing to a price of Rp. 1,390 on September 18 2020.

The next sell signal occurred on November 24 2020 at a price of IDR 1,560, the MACD indicator shows the MACD line crossing downwards which indicates a sell signal for PT Bank Mestika Tbk shares. This signal was also responded well by the market. This can be seen from the trend of PT Bank Mestika Dharma Tbk's share price which has continued to decline after November 24 2020. The last sell signal occurred on March 9 2021, the share price of PT Bank Mestika Dharma Tbk was formed at Rp. 1,415. The MACD indicator shows the intersection between the MACD line and the signal line, where the MACD line crosses downwards indicating a sell signal for PT Bank Mestika Tbk shares. This signal was then followed by a downward trend in PT Bank Mestika Dharma Tbk's share price movement.

3.4.2 Stochastic Oscillator Indicator Effectiveness

Graphical analysis regarding the accuracy of the Stochastic Oscillator indicator as a tool to show buy and sell signals for PT Bank Mestika Dharma Tbk shares can be seen in table 4.5 below.

TECHNICAL ANALYSIS AS THE BASIS FOR DECISION MAKING IN STOCK INVESTMENT IN PT. BANK MESTIKA DHARMA.TBK IN THE INDONESIAN CAPITAL MARKET (DURING THE COVID PANDEMIC JANUARY 2020 - JUNE 2021)

Tika Denisa Simanjuntak, Isfenti Sadalia, Nisrul Irawati

Table 6 Stochastic Oscillator Indicator Signal Accuracy

No	Date	Stock price	Signal	Trends to follow	Information
1	03-Jan-20	2810	Sell	Bearish	TrueSignal
2	07-Jan-20	2400	Buy	bullish	TrueSignal
3	05-Mar-20	2690	Sell	Bearish	TrueSignal
4	09-Mar-20	2690	Sell	Bearish	TrueSignal
5	12-Mar-20	2000	Buy	Bearish	False signal
6	17-Apr-20	1130	Buy	Sideways	False signal
7	28-Apr-20	1380	Sell	Bearish	TrueSignal
8	30-Apr-20	1330	Buy	bullish	TrueSignal
9	30-Apr-20	1070	Buy	Sideways	False signal
10	28-May-20	1095	Buy	Sideways	False Signals
11	04-Jun-20	1095	Buy	Sideways	False Signals
12	11-Jun-20	1090	Buy	bullish	TrueSignal
13	15-Jun-20	1110	Buy	bullish	TrueSignal
14	18-Jun-20	1130	Buy	bullish	TrueSignal
15	22-Jun-20	1190	Sell	Bearish	TrueSignal
16	25-Jun-20	1135	Buy	bullish	TrueSignal
17	25-Jun-20	1135	Buy	bullish	TrueSignal
18	01-Jul-20	1310	Sell	bullish	False signal
19	11-Jul-20	1470	Buy	bullish	TrueSignal
20	19-Jul-20	1380	Buy	bullish	TrueSignal
21	23-Jul-20	1450	Buy	Bearish	False signal
22	25-Jul-20	1350	Buy	bullish	TrueSignal
23	13-Aug-20	1500	Sell	Bearish	TrueSignal
24	24-Aug-20	1550	Sell	Bearish	TrueSignal
25	10-Sep-20	1470	Buy	bullish	TrueSignal
26	30-Sep-20	1600	Sell	Bearish	TrueSignal
27	02-Dec-20	1550	Buy	bullish	TrueSignal
28	14-Dec-20	1480	Sell	Bearish	TrueSignal
29	15-Dec-20	1600	Sell	Bearish	TrueSignal
30	16-Dec-20	1500	Buy	bullish	TrueSignal
31	03-Jan-21	1500	Sell	Bearish	TrueSignal
32	11-Jan-21	1425	Buy	bullish	TrueSignal
33	20-Jan-21	1400	Buy	bullish	TrueSignal
34	28-Jan-21	1440	Sell	Bearish	TrueSignal
35	03-Feb-21	1400	Buy	bullish	TrueSignal
36	03-Feb-21	1400	Sell	Bearish	TrueSignal
37	08-Feb-21	1440	Sell	Bearish	TrueSignal
38	09-Feb-21	1425	Sell	Bearish	TrueSignal
39	09-Feb-21	1425	Sell	Bearish	TrueSignal
40	18-Feb-21	1445	Buy	bullish	TrueSignal
41	20-Feb-21	1385	Buy	bullish	TrueSignal
42	23-Feb-21	1445	Sell	Bearish	TrueSignal
43	24-Feb-21	1400	Buy	bullish	TrueSignal
44	25-Feb-21	1420	Buy	bullish	TrueSignal
45	28-Feb-21	1430	Sell	Bearish	TrueSignal
46	01-Mar-21	1410	Sell	bullish	False Signals
47	04-Mar-21	1420	Buy	bullish	TrueSignal
48	08-Mar-21	1460	Buy	Bearish	False signal
49	06-Apr-21	1365	Sell	Sideways	False Signals

50	07-Apr-21	1360	Sell	bullish	False Signals
51	24-Apr-21	1330	Buy	bullish	TrueSignal
52	26-Apr-21	1380	Sell	Sideways	False signal
53	27-Apr-21	1390	Sell	Bearish	TrueSignal
54	03-May-21	1375	Buy	Bearish	False Signals
55	04-May-21	1380	Buy	Bearish	False signal
56	05-May-21	1335	Buy	Bearish	False Signals
57	08-May-21	1330	Buy	bullish	TrueSignal
58	31-May-21	1375	Sell	Bearish	TrueSignal
59	01-Jun-21	1375	Sell	bullish	False Signals
60	03-Jun-21	1370	Sell	bullish	False signal
61	09-Jun-21	1450	Sell	bullish	False signal
62	15-Jun-21	1420	Buy	Bearish	False Signals
63	18-Jun-21	1415	Sell	bullish	False Signals
64	20-Jun-21	1415	Buy	bullish	TrueSignal
65	25-Jun-21	1455	Sell	bullish	False signal

Source: Results processed by researchers (2021)

From table 6 it can be seen that the Stochastic Oscillator indicator gives 65 signals consisting of 35 buy signals and 30 sell signals. Of the 35 buy signals, 24 of them gave accurate buy signals and the remaining 11 gave inaccurate buy signals. Then out of 30 sell signals, there are 20 accurate sell signals and 10 inaccurate sell signals. So in total there are 44 accurate signals and 21 inaccurate signals out of 65 signals obtained from the analysis of PT Bank Mestika Dharma Tbk's stock price using the Stochastic Oscillator indicator. A buy signal followed by an increase in price or an upward price trend occurred at a buy signal on April 30 2020, June 11 2020, June 15 2020, June 18 2020, June 25 2020, July 11 2020, July 19 2020, July 25 2020, January 11, 2021, February 3, 2021, February 20, 2021, February 25, 2021, April 24, 2021, June 20, 2021. Meanwhile, the rest are buy signals that are not followed by price increases or rising price trends (false signals).

The first buy signal occurred on April 30, 2020, when the %K line crossed above the %D line. This signal was well received by stock market participants, this can be seen from the market response on the following trading day, May 4 2020, the stock price opened up at Rp. 1,075 from the previous closing price of Rp. 1,070, and closed at Rp. 1 080. The second buy signal occurred on June 11 2020 at a price of IDR 1,090, then the market responded so that the price rose to IDR 1,100 on the next trading day. The third buy signal occurred on June 15 2020 at the price of PT Bank Mestika Dharma Tbk's shares at IDR 1,110, then this signal was also followed by a price increase on the following trading day to IDR 1,165. The fourth buy signal occurred on June 18, 2020 at a price of IDR 1,130. This signal was also followed by a gradual increase in the share price of PT Bank Mestika Dharma Tbk, until it finally touched IDR 1,220 on 23 June 2020. The fifth buy signal occurred on 25 June 2020 at a price of IDR 1,135. This signal was followed by an upward trend in PT Bank Mestika Dharma Tbk's share price reaching IDR 1,605 on 7 July 2020. The next buy signal occurred on 11 July 2020 at PT Bank Mestika Dharma's share price of IDR 1,470. This signal was followed by a price increase on the next trading day where the price opened at IDR 1,500 and closed at IDR 1,540. Then the next buy signal occurred on July 19 2020 at a price of IDR 1,380. This signal was followed by an increase in the share price of PT Bank Mestika Dharma Tbk, reaching IDR 1,420 on the following trading day. The next buy signal occurred on July 25 2020 at the PT Bank Mestika Dharma share price of IDR 1,350.

This signal was followed by a price increase on the next trading day where the price opened at IDR 1,350 and closed at IDR 1,460. Then the next buy signal occurred on January 11, 2021 at a price of IDR 1,425. This signal was followed by an increase in PT Bank Mestika Dharma Tbk's

share price reaching IDR 1,450 on the following trading day. The next buy signal occurred on February 3, 2021 at a price of IDR 1,400. This signal was followed by an increase in PT Bank Mestika Dharma Tbk's share price reaching IDR 1,470 on the next trading day. Then the next buy signal occurred on February 20, 2021 at a price of IDR 1,385. This signal was followed by an increase in PT Bank Mestika Dharma Tbk's share price up to IDR 1.455 on the next trading day. Furthermore, the signal can be seen on 25 February 2021 at a price of IDR 1,420. This signal was followed by an increase in PT Bank Mestika Dharma Tbk's share price reaching IDR 1,430 on the following trading day. Then the next buy signal occurred on April 24, 2021 at a price of IDR 1,330. This signal was followed by an increase in PT Bank Mestika Dharma Tbk's share price reaching IDR 1,385 on the following trading day. The last buy signal occurred on June 20, 2021 at a price of IDR 1,415. This signal was followed by an increase in PT Bank Mestika Dharma Tbk's share price reaching IDR 1,430 on the following trading day. This signal was followed by an increase in PT Bank Mestika Dharma Tbk's share price reaching IDR 1,430 on the following trading day. Then the next buy signal occurred on April 24, 2021 at a price of IDR 1,330.

This signal was followed by an increase in PT Bank Mestika Dharma Tbk's share price reaching IDR 1,385 on the following trading day. The last buy signal occurred on June 20, 2021 at a price of IDR 1,415. This signal was followed by an increase in PT Bank Mestika Dharma Tbk's share price reaching IDR 1,430 on the following trading day. This signal was followed by an increase in PT Bank Mestika Dharma Tbk's share price reaching IDR 1,430 on the following trading day. Then the next buy signal occurred on April 24, 2021 at a price of IDR 1,330. This signal was followed by an increase in PT Bank Mestika Dharma Tbk's share price reaching IDR 1,385 on the following trading day. The last buy signal occurred on June 20, 2021 at a price of IDR 1,415. This signal was followed by an increase in PT Bank Mestika Dharma Tbk's share price reaching IDR 1,430 on the following trading day. The last buy signal occurred on June 20, 2021 at a price of IDR 1,415. This signal was followed by an increase in PT Bank Mestika Dharma Tbk's share price reaching IDR 1,430 on the following trading day. The last buy signal occurred on June 20, 2021 at a price of IDR 1,415. This signal was followed by an increase in PT Bank Mestika Dharma Tbk's share price reaching IDR 1,430 on the following trading day.

A sell signal followed by a decrease in price or a downward trend in the movement of PT Bank Mestika Dharma Tbk's share price occurred on March 9 2020, April 28 2020, December 15 2020, January 3 2021, January 28 2021, February 8 2021, February 23 2021, February 28 2021, April 27 2021, May 31 2021. The first sell signal occurred on March 9, 2020 at a price of IDR 2,690. This signal was followed by a trend of a significant decline in the share price of PT Bank Mestika Dharma Tbk. This may have been caused by news of the entry and outbreak of COVID-19 in Indonesia in March 2020. The second sell signal occurred on April 28, 2020. This sell signal was followed by a decline in the share price on the following trading days, where the price fell to IDR 1.070 on 30 April 2020. The third sell signal occurred on 15 December 2020, where the share price of PT Bank Mestika Dharma Tbk was formed at IDR 1,600. This signal was followed by a significant downward trend in prices where the share price fell by IDR 200 to IDR 1,400 on December 21, 2020. The fourth sell signal occurred on January 3, 2021.

The share price as of January 3, 2021 was IDR 1.500 then gradually decreased until it reached IDR 1,425 on 11 January 2021. The fifth sell signal can be seen on 28 January 2021. The market price is at the level of IDR 1,440 then drops to IDR 1,400 on 2 February 2021. The sixth sell signal occurs on February 8, 2021. The market price was at IDR 1,440 and then fell to IDR

1,425 on the next trading day. The seventh sell signal occurred on February 23, 2021, where the market price was at the level of Rp. 1,445 and then fell to Rp. 1,420 on February 25, 2021. The eighth sell signal can be seen on February 28, 2020. The stock market price is at Rp. 1,430 then decreased to IDR 1,410 on March 1, 2021. Next, the ninth sell signal can be seen on April 27, 2021. The market price is at IDR 1.

3.5 Analysis and Discussion

From the graphical analysis that has been done, the researcher is able to obtain data regarding buy signals and sell signals obtained by using the two indicators, namely the Moving Average Convergence Divergence and the Stochastic Oscillator. From these data it can then be compared which data has a better level of effectiveness when used to analyze stocks in a market that is being affected by a crisis so that the trend of stock movements tends to be flat or sideways.

Table 7 Comparison of MACD and Stochastic Oscillator Effectiveness

	MACD		Stochastic Oscillator	
	Amount	%	Amount	%
TrueSignal	11	58%	44	68%
False Signals	8	42%	21	32%
Total	19	100%	65	100%

Source: Results processed by researchers (2021)

From table 7 it can be seen that in total, the Stochastic Oscillator indicator provides a greater number of signals on the price movements of PT Bank Mestika Dharma Tbk, which has a downward trend at the beginning of the pandemic then moves relatively flat or sideways. The Stochastic Oscillator indicator provides a total of 65 signals consisting of 35 buy signals and 30 sell signals while the MACD indicator provides 19 signals consisting of 10 buy signals and 9 sell signals. Judging from its effectiveness, the Stochastic Oscillator indicator provides a better level of accuracy where out of the 65 signals given, 68% are true signals or of the 65 signals given if executed properly, there are 44 signals which will provide opportunities for better returns for investors. As for the MACD indicator, its accuracy is 58%, of which 19 of the 19 signals given are true signals.

Table 8 Effectiveness of MACD vs Stochastic (Buy Signal)

	Buy Signal		Stochastic Oscillator	
	MACD Amount	%	Amount	%
TrueSignal	6	60%	24	69%
False Signals	4	40%	11	31%
Total	10	100%	35	100%

From the data in table 8 it can be said that of the 35 buy signals obtained from chart analysis using the Stochastic Oscillator indicator, 24 of them are true signals or in other words the accuracy level for the buy signals is 69%. As for MACD itself, its accuracy rate is only 60%.

Table 9 Effectiveness of MACD vs Stochastic (Sell Signals)

	Sell Signal MACD		Stochastic Oscillator	
	Amount	%	Amount	%
TrueSignal	5	56%	20	67%
False Signals	4	44%	10	33%
Total	9	100%	30	100%

Almost the same for sell signals, from the data in table 4.8 it can be concluded that the accuracy level of the Stochastic Oscillator indicator is 67% or 20 of the 30 signals given are true signals. This means that when the indicator shows a sell signal, it will be followed by a decrease in price or a bearish trend. For the MACD indicator, the accuracy of the sell signal given is 56%. For a trader who buys and sells stocks daily and invests in stocks that move sideways, of course the Stochastic Oscillator indicator will be superior or suitable to use compared to MACD. This is because in terms of quantity the Stochastic Oscillator indicator provides more information to be processed by investors and of course the level of accuracy of the signals provided is also relatively better based on the results of the researchers' observations.

4. CONCLUSION

Based on research that has been conducted by researchers, it can be concluded that:

- 1 From graphic analysis at PT Bank Mestika Dharma Tbk, the Stochastic Oscillator indicator provides a total of 65 signals consisting of 35 buy signals and 30 sell signals while the MACD indicator provides 19 signals consisting of 10 bell signals and 9 sell signals from
- 2 The Stochastic Oscillator indicator provides a better level of accuracy with an accuracy rate of 68%, while the MACD indicator has an accuracy rate of 58%.
- 3 The Stochastic Oscillator indicator has proven to be superior for analyzing stocks with a sideways trend, as experienced by PT Bank Mestika Dharma Tbk during the current economic crisis.

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