Sutte Indicator: A Technical Indicator in Stock Market

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ABSTRACT

This study aims at development of the technical indicator in Stock Market as Sutte indicator. Sutte indicator in stock trading that will assist in the investment decision-making process which is to buy or sell stocks. This study took data from PT. Astra Agro Lestari Tbk. Which is listed in the Indonesia stock exchange in the period of 5 April 2001 - 20 September 2016. To find out the performance of Sutte indicator, two other technical analysis are used as a comparison, they are simple moving average (SMA) and moving average convergence/divergence (MACD). The mean of square error (MSE), mean absolute deviation (MAD), and mean absolute percentage error (MAPE) are used to find out a comparison of the level of reliability in predicting the stock data. The results of this study are Sutte indicator could be used as a reference in predicting stock movements. Sutte indicator have a better level of reliability compared to two other indicators method SMA and MACD based on the MSE, MAD and MAPE.

Keywords: Stock Market, Sutte Indicator, Technical Analysis
JEL Classifications: C58 D53

1. INTRODUCTION

Stock trading is an economic activity that requires high accuracy. If an investor is lack of understanding on stock market, certainly, she/he will experience significant losses and might become insolvent. In stock trading, the investors are required to know the movement direction of the stock price and market conditions. Both of these are very important in order to get maximum profit and minimum risky. Usually, an investor uses technical indicators to detect stock movement. A technical indicator is an analysis of previous price movements to predict the upcoming price movements. Technical indicators are related to the stock movement chart. The main component of the formation on stock movement chart consists of 5 components; they are opening price, the highest price, the lowest price, the closing price, and the volume of transactions. An indicator in technical analysis consists of two categories, that is lagging and leading indicators. Lagging indicators are commonly used for measuring trends and leading indicators are generally used for overbought or oversold. Several types of technical indicators are the Stochastic, MACD and Bollinger bands (Nithya and Thamizhchelvan, 2014), moving average (Han et al., 2013), and relative strength index (Abbey and Doukas, 2012).

Nowadays, there are many traders who are experts mastering the technical analysis and even have been able to modify the technical indicators. Technical analysis is directed to predict the safety of the price. The price at which buyers and sellers set a collective agreement which is regarded as a matter of right, weighty and reveals all the factors, rational and irrational, quantitative and non-quantitative, and the only picture that should be considered (Suresh, 2013). Furthermore, Neely and Weller (2011) revealed that technical analysis is the use of past price movements and/or other market data, such as volume, to assist the decision making process on trade in asset markets. This decision is usually obtained by applying a few simple rules on share price history.

Many researchers have examined the technical analysis. Pring (1991) showed that technical analysis aims at identifying trend reversals in the early stages and rising trend until the confidence level indicates that the trend has reversed. Taylor and Allen (1992) showed the value of technical analysis for leaders of foreign currency dealers. Murphy (1999) studied about market action through the use of charts for the purpose of forecasting upcoming price. Mengoli (2004) showed that the trading approach comprises valuable momentum for the Italian stock

market and proposed the importance of behavioral theory to help explain the profitability of technical trading. Vasiliou et al. (2006) used the rules of the moving average and the moving average convergence divergence for the Athens stock market and these rules provide strong support for selected technical strategy. Loh (2007) compared the technical trading rules are used by academicians with the practitioner approach for five Asian countries. Lento (2007) examined the profitability of some technical trading rules are selected against B and H strategy for eight Asia-Pacific stock markets. Li and Wang (2007) used the mover of average rule and trading for Class A and B of China stock and documents to support the profitability of technical trading for Class B stocks, but not Class A stock. McKenzie (2007) tested the rules of technical trading for 17 markets of selected developing countries and concluded that there was no systematic trading rules can generate sufficient forecasting accuracy. Zhou and Zhou (2009) studied the usefulness of moving the average rule of asset allocation view using data S and P 500 in 1926-2004. Lai et al. (2010) analyzed the technical analysis with psychological bias for Taiwan's stock market and give the disposition, the information cascade, and the effect of retaining and each has a certain influence on trading signals. And lastly by Metghalchi et al. (2012), they studied the profitability of technical trading rules based on 9 popular technical indicators.

On the stock market, stock movements are unstable, sometimes suddenly ascended and suddenly dropped. The movement of stock is usually detected using technical indicators. Many indicators developed by researchers in the field of economics. However, sometimes the indicator does not correspond to a particular stock. Therefore, a new technical indicator developed, that is Sutte indicators that are projected to accommodate the above problem. Sutte indicators developed by considering the opening and the closing price, the highest price as well as the lowest price on the stock. Basic indicators used in Sutte indicators is the modified moving average indicator by considering the stock price at the time of opening, closing, highest and lowest. Sutte indicator could form two graphs that show when stocks looking for suitable stock to buy and sell. This graph is intended to provide a signal to investors to get maximum profit with minimal losses.

2. RESEARCH METHOD

This study aims at implementing a technical analysis indicator of Sutte in stock trading that could be assistance in the investment decision-making process which is to buy or sell stocks. The object of this study is stock list in LQ45 listed by the Indonesia stock exchange (BEI). The analysis is done by looking at the movement of the stock price. Stages of the analysis carried out, namely:
1. Analysis of the stock price movement and transaction volume.
2. Analysis and interpretation of the graph using Sutte indicator in order to facilitate the reading process of stock price movement.

The data of this research taken from PT. Astra Agro Lestari Tbk. (AALI) that is listed in BEI.

3. RESEARCH DATA

The data used in this paper is the stock price data from the LQ45 list in the period of 5 April 2001 - 20 September 2016 and there was no a stock split during that period. PT. AALI. Experienced no stock split on opening and closing price, the highest as well as the lowest price. The stock price data used are derived from the same period, i.e., from 5 April 2001 until 20 September 2016 obtained from the daily official quota of BEI and http://finance.yahoo.com website.

3.1. Data Analysis

We proposed the technical analysis indicators of Sutte (SUTTE) as the main tool to analyze and predict stock prices and as a comparison of two other technical analyses. Instead of using the formula of technical analysis simple moving average (SMA) and moving average convergence/divergence (MACD), this research proposes the formula of Sutte indicators. However, the following formula showed the comparison of the SMA and MACD to Sutte formula as follows.

3.2. Sutte Indicator

$$SUTTE\%L = \frac{C_k + C_{k-1}}{2} + C_k - L_k$$

$$SUTTE\%H = \frac{C_k + C_{k-1}}{2} + H_k - C_k$$

$$SUTTE\text{-}PRED = \frac{SUTTE\%L + SUTTE\%H}{2}$$

Notes:
C_k = Closing stock price for the day of k.
C_{k-1} = Closing stock price for the day of k−1.
L_k = The lowest stock price for the day of k.
H_k = The highest stock price for the day of k.
SUTTE%L = The lowest limit price of Sutte indicator.
SUTTE%H = The highest limit price indicator of Sutte indicator.
SUTTE-PRED = Stock prediction price using Sutte indicator.

3.2.1. SMA (Gencay and Stengos, 1998)

$$SMA = \frac{1}{n} \sum_{i=0}^{n-1} C_{t-1}$$

Notes:
C_{t-1} = Closing stock price at the at the time t−1.
N = The number of day.

3.2.2. MACD (Panyagometh and Soonsap, 2012)

$$MACD = EMA_{short}(12\text{-}C) - EMA_{long}(26\text{-}C)$$

$$EMA_t = \alpha(C_t) + (1-\alpha)EMA_{t-1}; \alpha = \frac{2}{N+1}$$

Notes:
C = Stock market price.
C_t = Stock closing price at the time t.
N = Number of day.

To find out the comparison of the reliability level to predict the stock data, a comparison could be conducted using mean of square error (MSE), mean absolute deviation (MAD), and mean absolute percentage error (MAPE). The formula of each level of reliability as follows (Minitab, 2016).

3.2.3. MSE

$$\frac{\sum\limits_{t=1}^{n}\left|y_t - \hat{y}_t\right|^2}{n}$$

3.2.4. MAD

$$\frac{\sum\limits_{t=1}^{n}\left|y_t - \hat{y}_t\right|}{n}$$

3.2.5. MAPE

$$\frac{\sum\limits_{t=1}^{n}\left|\dfrac{(y_t - \hat{y}_t)}{y_t}\right|}{n} \times 100, \left(y_t \neq 0\right)$$

Notes:
y_t = Stock price at the day-t.
$\hat{y}_t$ = Stock prediction day of the day-t.
t = Time.
n = Number of data.

3.3. Software of the Data Analysis
In this study, the application of data processing and data analysis used in this paper is the Microsoft Office Excel 2007, and Ami Broker version 5.70 to analyze the technical indicators.

4. RESULTS AND DISCUSSIONS

Stock observed in this study is AALI. This stock is most often increase stock prices. The technical analysis and indicators Sutte SMA used to analyze the AALI stock. The results of the main graph chart for Sutte indicators and SMA can be seen in Figure 1.

The Figure 1 shows that SUTTE is more predictive than the SMA, it is shown on the indicator value of each analysis correlated with price. It can also be compared by using analysis of reliability using MSE, MAD and MAPE (Table 1).

From Table 1, it appears that from all levels of reliability tested (MSE, MAD and MAPE), Sutte indicator has a good level of reliability compared with SMA and MACD. In the sense that the

Table 1: Comparison of reliability level of SUTTE, SMA, and MACD

Indicator	MSE	MAD	MAPE
SUTTE	121946.369	201.329	36.746
SMA	227016.351	281.514	51.382
MACD	1582877.408	784.149	143.122

MACD: Moving average convergence/divergence, SMA: Simple moving average, MAD: Mean absolute deviation, MAPE: Mean absolute percentage error

Figure 1: Main chart (a) Sutte indicator, (b) simple moving average
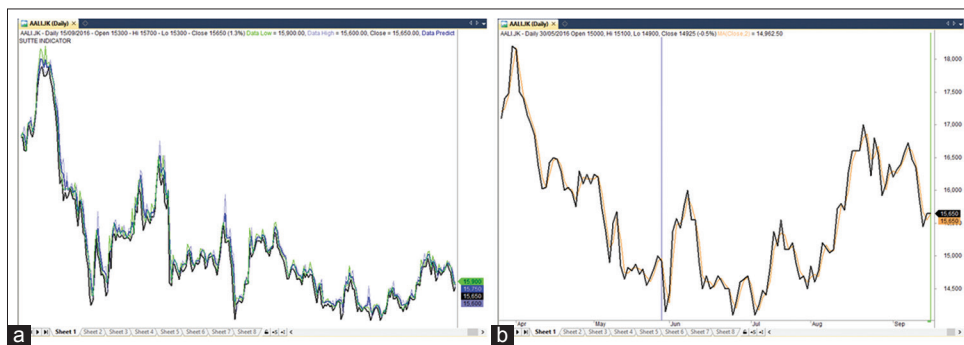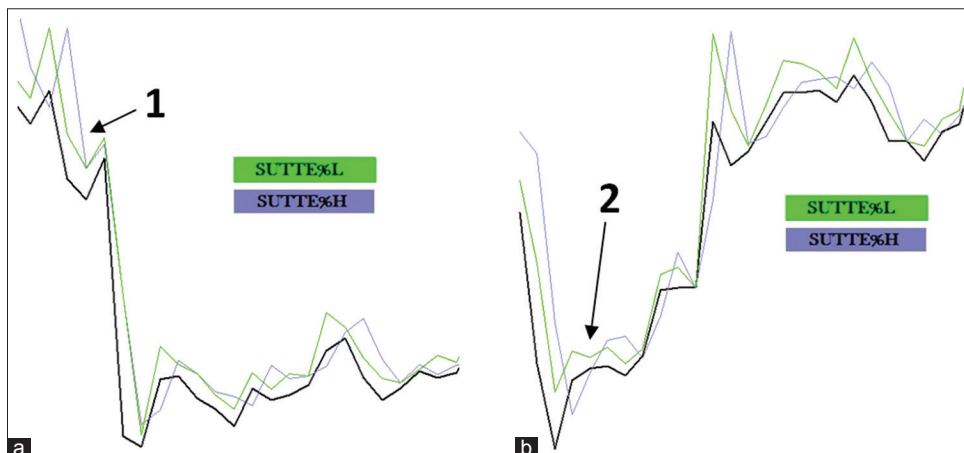

Figure 2: (a) Stock movement AALI on October 27, 2015 - January 27, 2016, (b) stock movement of AALI February 24, 2016 - March 30, 2016

prediction accuracy rate in predicting, the Sutte indicators can be used as a reference.

In addition, Sutte indicator also has three types of predictive, namely SUTTE%L, SUTTE%H, and SUTTE-PRED. These three indicators are supporting each other to provide a picture of the movement of stocks. In giving the movement image of stocks, SUTTE link between SUTTE%L and SUTTE%H. If the curve SUTTE%L is above the curve SUTTE%H in a long period of time then it indicates that the stock price will increase and vice versa if the curve is above SUTTE%H SUTTE%L curve then the stock price will decline. Increases and decreases in share prices is usually marked by the intersection of the curve SUTTE%L and SUTTE%H.

Figure 2a showed that SUTTE%H and SUTTE%L intersect in (1) and SUTTE%H is above the curve SUTTE%L, it indicates that the stock price will decline. From this indication, investors may take a decision to sell its stocks in order to avoid huge losses. Similarly, Figure 2b showed that SUTTE%H and SUTTE%L intersect at (2) and SUTTE%L is above the curve SUTTE%H, it indicates that the stock price will increase. From this indication also, investor can take a decision to buy stock.

5. CONCLUSION

Based on the discussion and analysis in the previous section, it can be concluded that Sutte indicators is preferable to predict stock movements. When compared with other indicators method (SMA and MACD) from MSE, MAD and MAPE, Sutte indicators have a better level of reliability.

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