Applied Sutte Indicator Method to Predicting of Stock Movement of PT. Astra Agro Lestari Tbk. (AALI)

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Abstract. This study studies that has the aim to apply Sutte Indicator to assist the investor to make the decision-making process of buying or selling of their stocks. The data of this study obtained from Stock of PT. Astra Agro Lestari Tbk. (AALI) on Yahoo Finance website. The period of data from 5 April 2001 to 20 September 2016. To check the performance of the predicting, it compare Sutte Indicator with other technical analysis: Moving Average Convergence/Divergence (MACD) and Simple Moving Average (SMA) and the check of the reliability using the mean absolute deviation (MAD), mean of square error (MSE), and mean absolute percentage error (MAPE).

1. Introduction
Indonesia is a country that has abundant natural resource wealth. From this natural resource wealth, it can contribute significantly to the Gross Domestic Product. So it is not surprising that Indonesia is a country that is the destination of foreign trade markets, one of which is stock trading. In choosing an investment alternative that is suitable for investment objectives, steps that must be taken by the capital owner can utilize accurate and relevant information about stock projections using technical indicators.

Stock movements are related to technical indicators. There are five elements used in technical indicators, namely initial price, closing price, lowest price, highest price, and volume of transactions. Research on technical indicators has been investigated by several researchers. Taylor & Allen discusses the technical analysis to use in the foreign exchange market [1]. Ye etc. discussing new
forecasting methods by using multi-order fuzzy time series which are then compared with technical analysis, and a genetic algorithm [2]. From this research, Ye etc. forecast the NTD / USD exchange rates and the results show that the proposed model outperforms other existing models based on fuzzy time series. Boonpeng & Jeatrakul making a decision on Stock Market using One-Against-One (OAO) Neural Network and the result is the return on investment greater than the traditional analysis techniques [3]. Mishra discusses the effectiveness and benefits of trading using technical analysis using multiple regression analysis [4]. Ahmar, Rahman, Arifin, & A. Ahmar studied about the forecasting stock using Sutte Indicator [5] and Ahmar discusses the new forecasting method to predicting the movement of stocks [6][7].

2. Methods
Predicting the movement of the stock is the aims of this study. For the predicting, the authors using new technical analysis, e.g., Sutte Indicator. The object of this study is PT. Astra Agro Lestari Tbk. (AALI) From Indonesia. The data of this study using the historical price of AALI from Yahoo Finance Website from 5 April 2001 to 20 September 2016. The analysis of data using Microsoft Office Excel 2007 and Ami Broker version 5.70.

In this study, The Sutte Indicator (SUTTE) is the primary indicator to predict the movement of stocks. As a comparison, SUTTE will be compared with Moving Average Convergence/Divergence (MACD) and Simple Moving Average (SMA) methods. For the checking of the reliability of data, this study using mean of square error (MSE), mean absolute percentage error (MAPE), and mean absolute deviation (MAD).

**Sutte Indicator** [6]:

\[
\text{SUTTE} \%_L = \frac{C_k + C_{k-1}}{2} + C_k - L_k
\]

\[
\text{SUTTE} \%_H = \frac{C_k + C_{k-1}}{2} + H_k - C_k
\]

\[
\text{SUTTE} - \text{Pred} = \frac{\text{SUTTE} \%_L + \text{SUTTE} \%_H}{2}
\]

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 Indikator
- Sutte Pred = stock prediction price using Sutte Indicator

3. Result and Discussion
The AALI Stock is the object this study, the stock was chosun because the stock is a stock that often increases and decreases. This study, it will compare three technical analysis: SMA, MACD, and SUTTE. The reliability of the result of predicting can be seen in table 1.

| 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 |
From the table 1, the result shows that SUTTE is more predictive than the MACD and SMA based on the reliability level (MSE, MAD, and MAPE). The results indicate that SUTTE indicators can be used to predict the movement of AALI Stock.

Figure 1 The Main Chart (a) Simple Moving Average, (b) Sutte Indicator.
4. Conclusion
Sutte Indicator is a new technical analysis that has more accuracy rate in prediction movement of the stock is compared with another indicator (SMA and MACD), so we can conclude that Sutte indicators are preferable to predict stock movements of AALI Stock.

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