

Predicting Movement of Stock of Apple Inc. using Sutte Indicator

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ABSTRACT: The purpose of this study is to apply technical analysis e.g. Sutte Indicator in Stock Market that will assist in the investment decision-making process to buy or sell of stocks. This study took data from Apple Inc. which listed in the NasdaqGS in the period of 1 January 2008 to 26 September 2016. Performance of the Sutte Indicator can be see with comparison with other technical analysis e.g. Simple Moving Average (SMA) and Moving Average Convergence/Divergence (MACD). Comparasion of reliability of prediction from Sutte Indicator, SMA, and MACD using the mean of square error (MSE), mean absolute deviation (MAD), and mean absolute percentage error (MAPE).

KEYWORDS: Apple Inc., Stock Market, Sutte Indicator, Technical Analysis.

1. INTRODUCTION

Stock trading is an economic activity that requires high accuracy in its application. In stock trading, there are many methods used to obtain the maximum benefit. From many methods used sometimes there are methods that do not provide maximum benefit and sometimes even disadvantages. Stock trading is related to the condition of the country where the company's stock are. For example Astra Agro Lestari (AALI) is in Indonesia, in the event of a crisis in Indonesia, it will potentially lead to stock price of Astra Agro Lestari will be down drastically. To see the movement of a stock is going through a time up trend or down trend then used the name technical indicator. Technical indicators related to the stock movement chart. The main component of the formation of the stock movement chart consists of 5 component of price is open, high, low, close, and volume of transactions.

There are several types of indicators including: Stochastic, MACD and Bollinger Bands [1], Moving Avarage [2], and Relative Strength Index (RSI) [3]. This research will use a new indicator developed by Ahmar [4] i.e. Sutte Indicator (SUTTE). Sutte Indicator is technical indicators developed by considering the stock price at the time of opening, closing, highest and lowest. Sutte Indicator will form two graphs that show stocks when looking for suitable stock buy and when to sell. This graph is intended to provide a signal to investors to get maximum profit with minimal losses. In predicting stock, Sutte indicators will be compared with other technical analysis is Simple Moving Average (SMA) dan Moving Average Convergence/Divergence (MACD). The formula SUTTE, SMA and MACD are presented as follows.

Sutte Indicator :

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

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

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

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 Indikator

Sutte-Pred = stock prediction price using Sutte Indicator

Simple Moving Average (SMA) [5]:

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

Notes :

C_{t-1} = Closing stock price at the at the time t-1

N = the number of day.

Moving Average Convergence/Divergence (MACD) [6]:

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

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

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 [7]:

Mean of Square Error (MSE)

$$\frac{\sum_{t=1}^n |y_t - \hat{y}_t|^2}{n}$$

Mean Absolute Deviation (MAD)

$$\frac{\sum_{t=1}^n |y_t - \hat{y}_t|}{n}$$

Mean Absolute Percentage Error (MAPE)

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

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

2. METHOD

This research aims to implementation of technical analysis of Sutte Indicator to predicting the movement of stock of Apple In c. The stock price data used from 1 January 2008 to 26 September 2016, obtained from the website <http://finance.yahoo.com>. Tools used in this research that Microsoft Office Excel 2007 and AmiBroker version 5.70.

3. RESULT AND DISCUSSION

Stocks will be observed in this study is stock of Facebook Inc. Facebook is the most popular social media now and can be regarded as the top social media category. As a popular social media will certainly gain a glance from some investors that resulted in an increase in its stock. Stock of Facebook Inc. in this study will be conducted using technical analysis process i.e. SUTTE, SMA and MACD. The results of the main graph chart for Sutte Indicators and SMA can be seen in Figure 1 below.

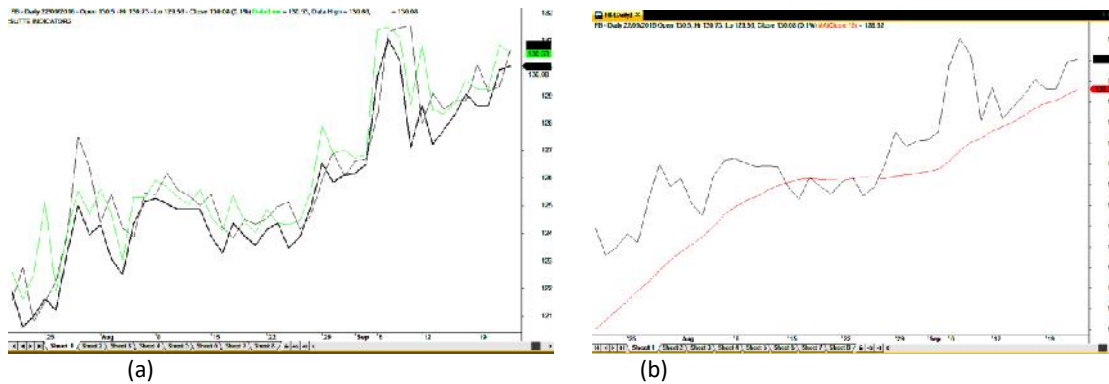


Fig. 1. Main Chart (a) Sutte Indikator, (b) Simple Moving Average

From Fig. 1. above shows that SUTTE more productive if it compared with SMA, it is shown on the indicator of each analysis correlated with price.

These three indicators are supporting each other to provide a view of the movement of stocks. In giving the view of the movement of stocks, SUTTE associate between SUTTE% L and SUTTE%H. If the curve of SUTTE% L is above the curve of SUTTE%H in a long period of time then it indicates that the stock price will increase and vice versa if the curve of SUTTE%H is above curve of SUTTE%L then the stock price will decline. Increases and decreases in stock prices is usually marked by the intersection of the curve of SUTTE%L and SUTTE%H.

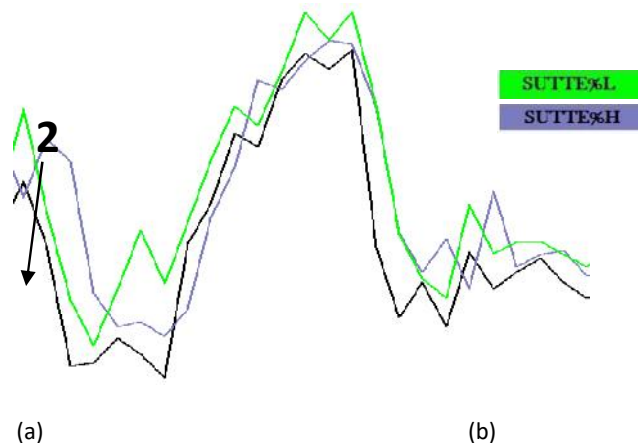


Fig. 2. Movement of Stock of Facebook Inc. 26 September 2014 – 10 November 2014

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

To test the reliability about predicting, then used a reliability analysis i.e. MSE, MAD and MAPE, it shown in table 1.

Table 1. Comparison of Reliability of SUTTE, SMA, dan MACD

Indicator	MSE	MAD	MAPE
SUTTE	1,385	0,832	2,685
SMA	2,590	1,090	3,518
MACD	14,670	2,952	9,542

From table 1, it appears that from all levels of reliability tested i.e. MSE, MAD and MAPE, Sutte Indicator has a good level of reliability in predicting the movement of stock of Facebook Inc. if compared with the SMA and MACD. In the sense that the prediction accuracy rate in predicting the Sutte Indicators can be used as a reference.

4. CONCLUSION

Based on the discussion and analysis in the previous section, it can be concluded that Sutte Indicators referable to predicting of movements in stock. If compared with other indicators method (SMA and MACD) from MSE, MAD and MAPE type of reliability then Sutte Indicator have a better level of reliability in predicting the movement of stocks of Facebook Inc.

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