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**Article**

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## FINANCIAL ECONOMICS | RESEARCH ARTICLE

# Predicting movement of stock of “Y” using Sutte Indicator

Ansari Saleh Ahmar<sup>1\*</sup>, Abdul Rahman<sup>2</sup>, Andi Nurani Mangkawani Arifin<sup>2</sup> and Alfatih Abqary Ahmar<sup>3</sup>

**Abstract:** The aim of this study is to apply technical analysis Sutte Indicator at stock market that will assist in the decision-making process in investment to buy or sell stocks. This study took data from Stock of “Y” which listed in the NasdaqGS from the period 18 May 2012 to 30 August 2016. The performance of the Sutte Indicator can be checked with comparison with Moving Average Convergence/Divergence and Simple Moving Average. For comparison of the reliability of prediction, we can use the mean absolute percentage error, mean absolute deviation, and mean of square error.

**Subjects:** Mathematical Finance; Quantitative Finance; Statistics for Business, Finance & Economics; Economics, Finance, Business & Industry

**Keyword:** predicting of stock; stock market; Sutte Indicator; technical analysis

### 1. Introduction

Nowadays a lot of circulating of the various types of investments, for example, deposits, purchase of land, and capital markets or usually related stock occur. The majority of people often practice investment is the asset management activities to cultivate the value of property in the future. Investment is an answer to the market’s uncertainty so by investing in the field of property will minimize the risk. Investment is putting money into the financial scheme, shares or property in the hope of achieving a profit. Devote (one’s time or energy) to obtain results with valuable results. (In Invest) informal: buy (product) that is useful to refund the cost (Hwang & Cheng, 2010).

One investment that is often made that investment in stocks. Investments in stocks had been discussed by many researchers including change in stock price di US (Barro, 1990); pattern in



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### PUBLIC INTEREST STATEMENT

Capabilities to know the movement of stock and market conditions are required for an investor in stock trading. Both of these capabilities are very important for an investor in order to obtain maximum profit and minimum losses. If an investor does not have this capability then the investor will suffer losses due to his ignorance regarding the movement of stocks and market conditions. In predicting stocks, Sutte Indicator uses two graphs that will show when it is the right time to make a purchase or sale of stock. From this chart, it will also give a signal (buy or sell) to investors in order to obtain maximum profit with minimum losses. The result of this research is that Sutte Indicator can be used as a reference in predicting stock movement, and if it is compared to other indicator methods, Sutte Indicator has better level of reliability.

abnormal returns (Polk & Sapienza, 2009); Capital Investments and Stock Return (Titman, John Wei, & Xie, 2004); and Rates of Return on Investments in Common Stocks (Fisher & Lorie, 1964).

For simplicity in stocks trading is developing the name of technical analysis. Technical analysis was first introduced by J. Welles Wilder in 1978 (Chan, Fu, Lee, & Wong, 2014) and carried out on indicators stocks. Indicators on the stock is a mathematical calculation process is performed on the stock price in the past and are useful in anticipating changes in prices (Achellis, 2001). A technical indicator is an analysis of previous price movements to predict the future price movements. Technical indicators are related to the stock movement chart. The main component of the formation on stock movement chart consists of five parts; they are opening price, the highest price, the lowest price, the closing price, and the volume of transactions (Ahmar 2017). There is some technical analysis e.g. Moving average (Han, Yang, & Zhou, 2013), Stochastic, MACD, and Bollinger bands (Nithya & Thamizhchelvan, 2014), Relative Strength Index (RSI) (Abbey & Doukas, 2012), and Sutte Indicator (Ahmar, 2017).

Technical analysis is directed to predict the safety of the price. Neely and Weller (2011) revealed that technical analysis is the use of past price movements and other market data, such as volume, to assist the decision-making process on trade in asset markets. Furthermore, 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).

Many researchers have examined technical analysis. Vasiliou, Eriotis, and Papathanasiou (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. 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. Mengoli (2004) showed that the trading approach comprised valuable momentum for the Italian stock market and proposed the importance of behavioral theory to help explain the profitability of technical trading. Loh (2007) compared academicians' use of the technical trading rules with the practitioner approach for five Asian countries. Zhu and Zhou (2009) studied the usefulness of moving the average rule of asset allocation view using data S & P 500 in 1926–2004. McKenzie (2007) tested the rules of technical trading for 17 markets of selected developing countries and concluded that there were no regular trading rules that can generate sufficient forecasting accuracy. Metghalchi, Chang, and Garza-Gomez (2011) studied the profitability of technical trading rules based on nine favorite technical indicators. And finally Lai, Chen, and Huang (2010) analyzed the technical analysis with the psychological bias for Taiwan's stock market and gave the disposition, the information cascade, and the effect of retaining and that each has a particular influence on trading signals.

Recently, Ahmar (2017) has developed a new technical analysis e.g. Sutte Indicator. Sutte Indicator was developed by considering the opening and the closing price, the highest price as well as the lowest price on the stock. Core indicators used in Sutte Indicator 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 are looking for the suitable stock to buy and sell. This figure is intended to provide a signal to investors to get maximum profit with minimal losses.

## 2. Methods

This study aims at implementing a technical analysis indicator of Sutte in stock trading that could be of assistance in the investment decision-making process which is to buy or sell shares. The object of this study is the stock list in NasdaqGS. 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 to facilitate the reading process of stock price movement.

### 3. Research data

The data of this research taken from the stock of “Y” that is listed in NasdaqGS the period of 5 April 2001 until 20 September 2016 and there was no stock split during that time. Facebook Inc. 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 Yahoo Finance Website (<https://finance.yahoo.com>). This stock was chosen in this study because this stock is a stock engaged in the field of Social Media. Trading of shares in the field of Social Media is a trade that sometimes goes up sometimes down depending on the popularity of the media in the world. And stock trading in the Social Media field is an interesting stock trading to discuss because almost everyone uses social media.

### 4. Data analysis

The author of this paper proposed the technical analysis indicators of Sutte (SUTTE) as the primary 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 method of Sutte indicators. However, the following formula showed the comparison of the SMA and MACD to Sutte formula as follows.

**Sutte Indicator** (Ahmar, 2015):

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

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

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

where,  $C_k$  = 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  $k$ ,  $\text{Sutte}\%L$  = The lowest limit price of Sutte Indicator,  $\text{Sutte}\%H$  = The highest limit price indicator of Sutte Indicator, and  $\text{Sutte-Pred}$  = Stock prediction price using Sutte Indicator.

**Simple Moving Average (SMA)** (Gencay & Stengos, 1998):

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

where,  $C_{t-1}$  = Closing stock price at the at the time  $t - 1$ , and  $N$  = the number of day.

**Moving Average Convergence/Divergence (MACD)** (Panyagometh & Soonsap, 2012):

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

$$\text{EMA}_t = \alpha(C_t) + (1 - \alpha)\text{EMA}_{t-1}; \quad \alpha = \frac{2}{N + 1}$$

where,  $C$  = Stock market price,  $C_t$  = Stock closing price at the time  $t$ , and  $N$  = 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):

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)

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

where,  $y_t$  = stock price at the day- $t$ ,  $\hat{y}_t$  = Stock prediction day of the day- $t$ ,  $t$  = time, and  $n$  = Number of data.

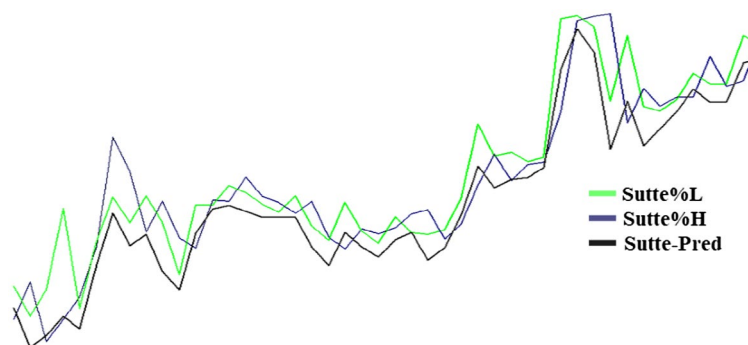
### 5. Results and discussion

Stock observed in this study is stock of “Y.” This stock most often increases stock prices. The technical analysis and indicators Sutte Simple Moving Average are used to analyze the stock of “Y.”

Figure 1 shows that SUTTE is more predictive, it is indicated by 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). This comparison is used to see the level of reliability of the prediction.

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

**Figure 1. Main chart of Sutte Indicator.**



**Table 1. Comparison of reliability level of SUTTE, SMA, and MACD**

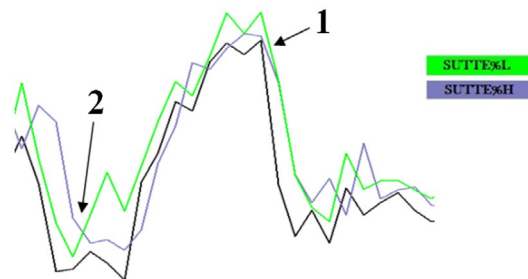
Indicator	MSE	MAD	MAPE
SUTTE	1,385	0,832	2,685
SMA	2,590	1,090	3,518
MACD	14,670	2,952	9,542

Also, 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 motion image of stocks, SUTTE link between SUTTE%L and SUTTE%H. If the curve SUTTE%L is above the curve SUTTE%H in an extended period then it indicates that the stock price will increase (indicate signal to buy) and vice versa if the curve is above SUTTE%H of SUTTE%L curve then the stock price will decrease (indicate signal to sell). Increases and decreases in share prices are usually marked by the intersection of the curve SUTTE%L and SUTTE%H.

In Figure 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 to avoid massive losses. In Figure 2, we can 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, the investor can take a decision to buy of stock.

From Figure 3, there are indications to buy in long time on 26 July 2016 and 25 August 2016. And also, there are indications to sell in short time on 02 August 2016 and in long time on 08 September 2016.

**Figure 2. Illustration of prediction of Sutte Indicator.**



**Figure 3. Stock of Y in 22 July 2016 until 20 September 2016 period.**



## 6. Conclusion

Based on the discussion and analysis in the previous section, it can be concluded that Sutte Indicators are preferable 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 “Y.”

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