THE USES OF OSCILLATOR INDICATORS ANALYZING CHANGES IN FINANCIAL INSTRUMENTS TRADING

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ABSTRAK

Dalam analisis teknikal, para pelaku pasar menggunakan analisis grafik untuk mengidentifikasi perubahan dalam permintaan dan penawaran terhadap perdagangan instrumen keuangan. Metode ini digunakan untuk membantu para analis dalam meramalkan harga, merumuskan strategi perdagangan, dan membuat keputusan terhadap semua transaksi pasar. Salah satu indikator yang sering digunakan dalam analisis tersebut adalah momentum atau oskilator. Momentum terdiri dari tiga indikator, yaitu Relative Strength Index (RSI), Stochastic Oscillator dan Moving Average Convergence Divergence (MACD). Hasil penelitian dengan menggunakan data dari Bursa Efek Jakarta menunjukkan bahwa ketepatan prediksi sinyal RSI, Stochastic Oscillators dan MACD sangat akurat. Meskipun penelitian tersebut masih mengandung berbagai kelemahan, namun hasilnya dapat digunakan para investor sebagai pertimbangan dalam menentukan strategi transaksi mereka. Penelitian ini diharapkan dapat mendorong para peneliti lain untuk melakukan studi lebih lanjut tentang keakuratan indikator-indikator tersebut, sehingga hasilnya dapat lebih menyempurnakan hasil penelitian yang sudah ada.

Keyword: *indicators, RSI, Stochastic, MACD, Jakarta Stock Exchange.*

INTRODUCTION

The availability of historical price data via specialised electronic data sources, such as Reuters or those sources available on the Internet, technical analysis is a tool that can be used by all market participants. Despite its complexity, technical analysis is now no longer a tool only for investment experts. Market participants use charts and analytical tools to identify changes in supply and demand for traded financial instruments. These methods assist them in forecasting prices, formulating trading strategies, and making decisions for all market transactions.

In technical analysis, an analyst identifies the price movement pattern before constructing charts. Market players use a variety of indicators, which are derived from charting methods, to confirm or reinforce their trading strategies. Technical analysis is concerned with what has actually happened in the martket, rather than what should happen. Many markets use technical analysis in conjunction with fundamental analysis to determine their trading strategies.

Many indicators are currently in use; some are easy to use while others involve complex mathematical calculations that have been developed by market practitioners. It is important to recognize that different indicators could be better suited for different types of market instruments. It would be incorrect to use a single

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indicator in isolation. Indicators which are used in fast-moving commodity future markets will not necessarily be as successful in the more long-term equity markets or those used for stock indices. It is also worth noting that as the power of computing techniques constantly improves and as market expands, so too does the number of indicators- either new or adaptations of existing techniques (Reuters, 1999).

Over the years, technicians have developed many different indicators which attempt to measure the velocity of price movements, both up and down (Pring, 1999). These oscillators can be banded together under one "momentum." Momentum is one of the most frequently used techniques in technical analysis. This study shows the uses of price data from the Jakarta Stock Exchange (JSX) in constructing three most commonly used momentum or oscillators; Relative Strength Index (RSI), Stochastic Oscillator, and Moving Average Convergence Divergence (MACD).

RELATIVE STRENGTH INDEX

Relative Strength Index is currently utilized in most markets. J. Welles Wilder, Jr. developed the use of RSI indicators with price bar charts of individual stocks, commodities and stock indices. The RSI compares the indicator of an instrument with its own historical market performance. The RSI should be used in conjunction with price movement charts but not with other indicators of the same type, for example: stochastic. RSI values lie in a range from zero to a hundred. These values are used to indicate the following (Reuters, 1999):

a. Overbought/oversold
A line that is drawn above 70/80 signals a condition where an instrument is considered to be overbought. This in turn indicates a sign to exercise caution in buying at that level. Furthermore, a line at 30/20 or below signals a condition where an in-

strument is oversold. This indicates a hint that one must exert careful thought before selling.

b. Tops and bottoms
A top may be indicated when a RSI peak is above the 80/70 level followed by a down-turn; similarly a bottom may be indicated by a RSI below the 30/20 level followed by an up-turn. The RSI analysis provides only part of the information and support needed for market confidence that a top/bottom has been formed.

c. Patterns
Typical patterns such as head and shoulders, tops/bottoms and pennants may be more obvious in RSI charts than in price charts.

d. Divergence
Divergence between price action and RSI is often considered as a strong indication of a market turning point. Thus in an up-trend, price action makes new highs in comparison with the previous peak but the RSI indicator fails to reach and surpass the equivalent of its previous high point.
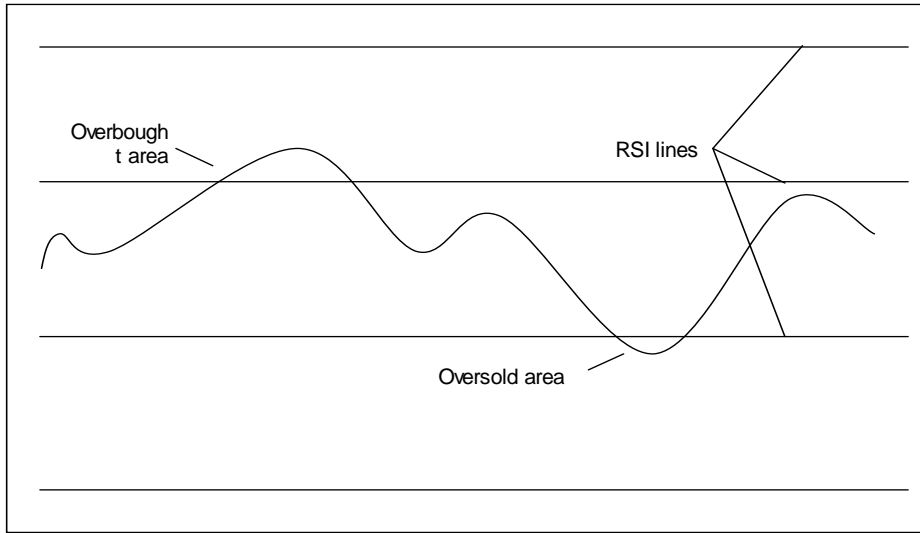
RSI is calculated as follows (Meyers, 1992,) :

$$RSI \ = \ 100 - \frac{100}{1+RS}$$

Where:

$$RSI \ = \ \frac{\text{Average of N period's up closes}}{\text{Average of N period's down closes}}$$

N = Number of periods used in the calculation

One technique is to vary the level of the overbought/oversold lines according to whether the market is in a up or down trend. For example, in an up-trending chart, the lines may be drawn at 80 and 40, whereas in a down-trending chart they may be drawn at 60 and 20.

Susanto and Sabardi (2001) used a six months price movement data of the Jakarta Stock Exchange in constructing the RSI chart (see Figure 1 below). The result of the study suggests the accuracy of buying and selling signals derived from RSI lines.

Figure 1. BCA was one of analysis' results
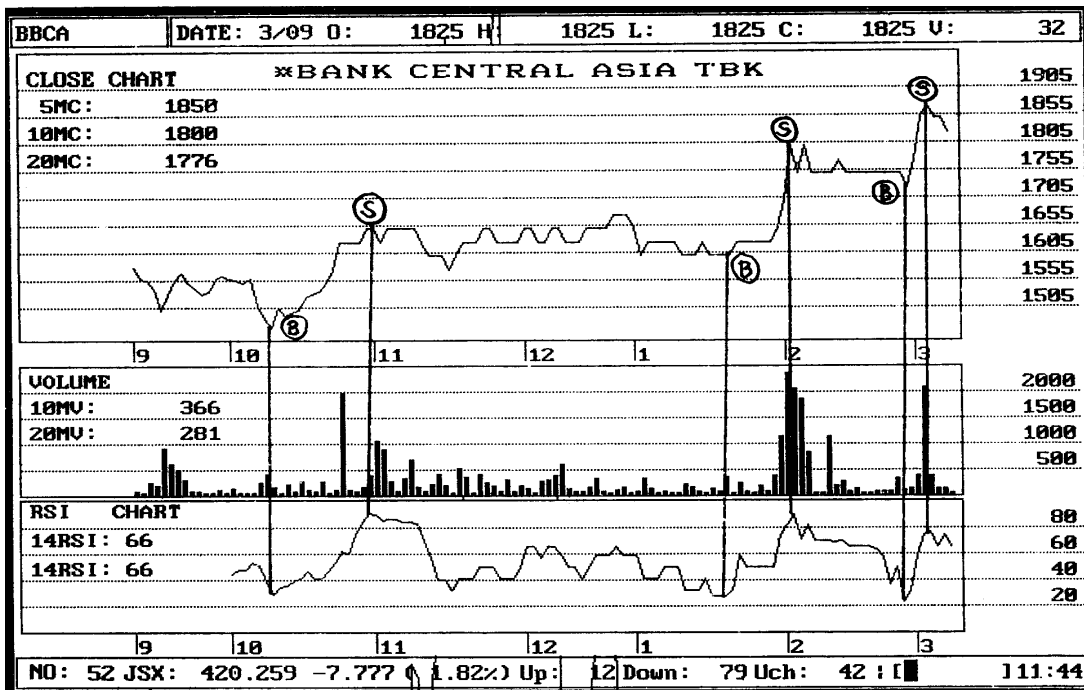
The first buying signal appeared around Rp1.500; on early October 2000, then the price increased. The first selling signal occurred at Rp1.655; at the end of October 2000, then the price decreased. The next buying signal occurred at Rp1.605; in the mid of January 2001, and the next selling signal appeared at Rp1.805; on early February 2001, then the price decreased. The next buying signal was at Rp1.725; at the end of February 2001, while the last selling signal was at Rp1.875; on early March 2001.

STOCHASTIC OSCILLATORS

The Stochastic (probabilistic) indicator gained a lot of popularity in the 1980, probably because of its simple, deliberate style which, on the face of it, appears to offer profitable and easy-to-follow signals (Pring, 1999, page 211). Stochastic oscillators originated as an engineering analytical technique and were adapted by the US analyst George C. Lane as a way of indicating overbought/oversold conditions using a simple % scale (Reuter, 1999, page 100). A key use of the indicator is to look for divergence between the stochastic lines and that of the instrument price itself. This information can be used to reinforce buy/sell trading decisions.

Stochastic is a price velocity technique based on the theory that as price increases, closing price has a tendency to be even closer to the highs for the period. Similarly, as prices move lower, closing prices tend to be more closer to the lows the period (Meyers, 1992, page 191). The stochastic analysis is available in two forms - **fast** and **slow**. Fast stochastic use two oscillating lines which are shown in different colors in charting applications or as solid or broken lines in publications. The raw value or %K line (solid line) is shown on a chart with a scale 0 – 100. The other line, shown on the same chart, is a simple moving average of %K and is called the %D line (broken line). The formula for calculating stochastic is as follow (Meyers, 1992, page 191):

$$\%K = \frac{(C-L)}{(H-L)} \times 100$$

where:
%K is stochastics.
C   is the latest closing price.
L   is the low price during the last N periods.
H   is the high price during the last N periods.
N   can be any number of periods.

As for the RSI indicator, stochastics are used to identify potentially overbought/oversold situations. Divergence between the stochastics' performance and that of the underlying price action is very important. Overbought conditions are generally considered to be occurring when the lines move over 70/80%; oversold is considered to be occuring when the lines move below 30/20%.

By far the most commonly used value for

%D = the 3 period simple moving average and **Slow D is the 3 period simple moving average of %D**.

The fact that a market is indicated as overbought should not be seen necessarily as a selling signal or an indication of an imminent trend reversal. In any strong trending market, overbought/oversold conditions can exist for a considerable period of time. One of the most powerful signals that stochastics can deliver is that of divergence. However, the key to the successful use of stochastics is to use them in association with other indicators/analyses to indicate when a market is grossly overbought/oversold.

Susanto and Sabardi have also completed the research of Stochastic Oscillators in the Jakarta Stock Exchange for 6 months. The result of the research showed the accuracy of buying and selling signals derived from Stochastic lines (Susanto and Sabardi, 2002). The figure below was one of the examples of the study results.

Overbought region

% K line - solid
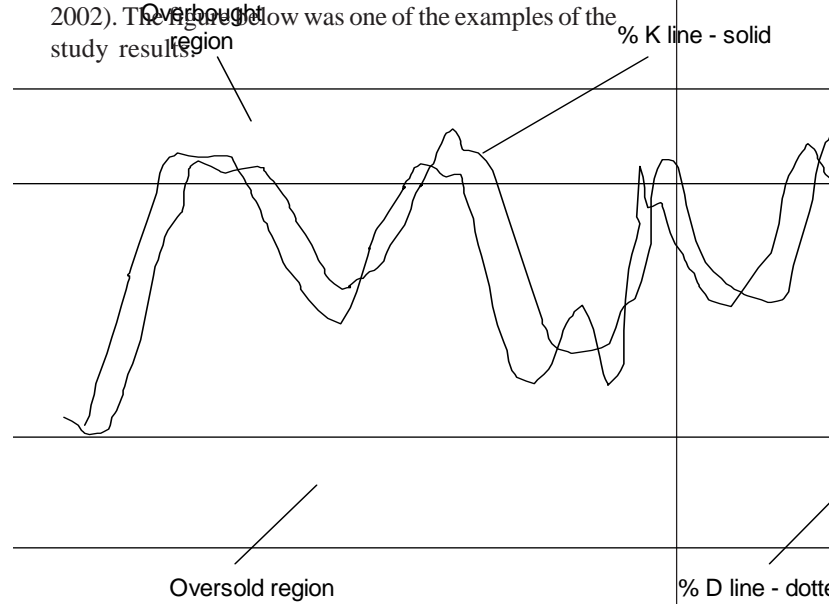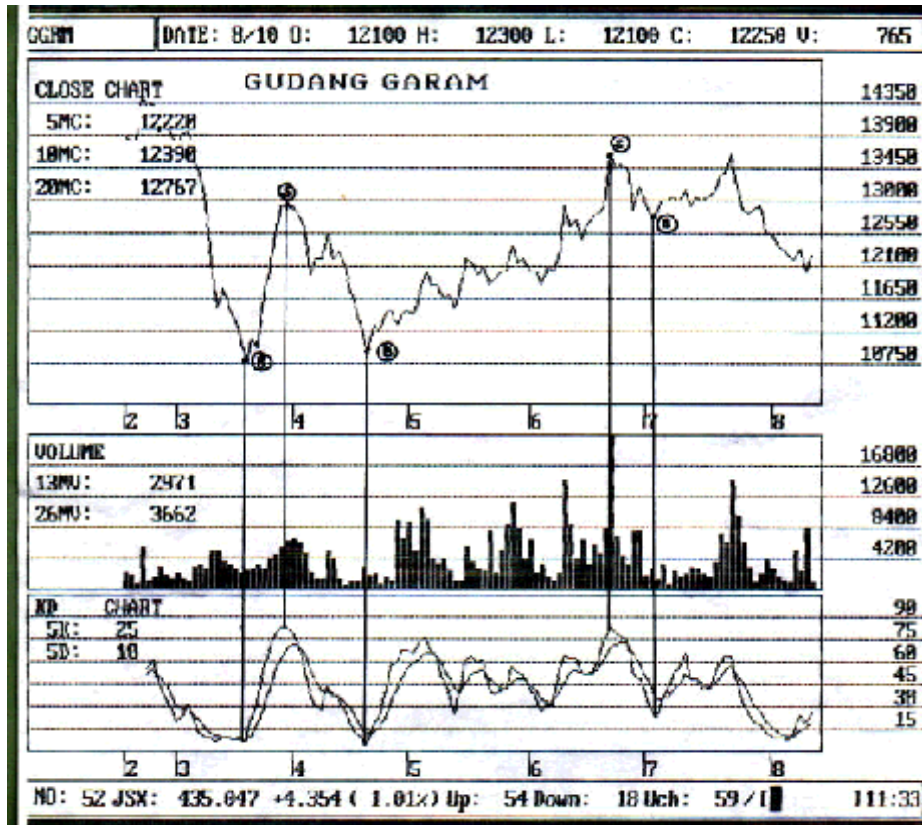
Oversold region

% D line - dotte

Figure 2: Gudang Garam was one of analysis' results

The first buying signal appeared at Rp10,750; in the mid of March 2001, then the price increased. The first selling signal occurred at Rp13,000; at the end of March, then the price decreased. The next buying signal was around Rp11,000; in the mid of April 2001, and the next selling signal was at Rp13,600; in the mid of June 2001, then the price decreased. The last buying signal occurred at Rp12,800; and then the price increased.

MOVING AVERAGE CONVERGENCE DIVERGENCE

The moving average convergence divergence (MACD) oscillator indicator was devised by Gerald Appel as a technique to signal trend changes and indicate trend direction. It was originally designed to observe the stock market's 26 and 13- week cycles (Reuter, 1999,
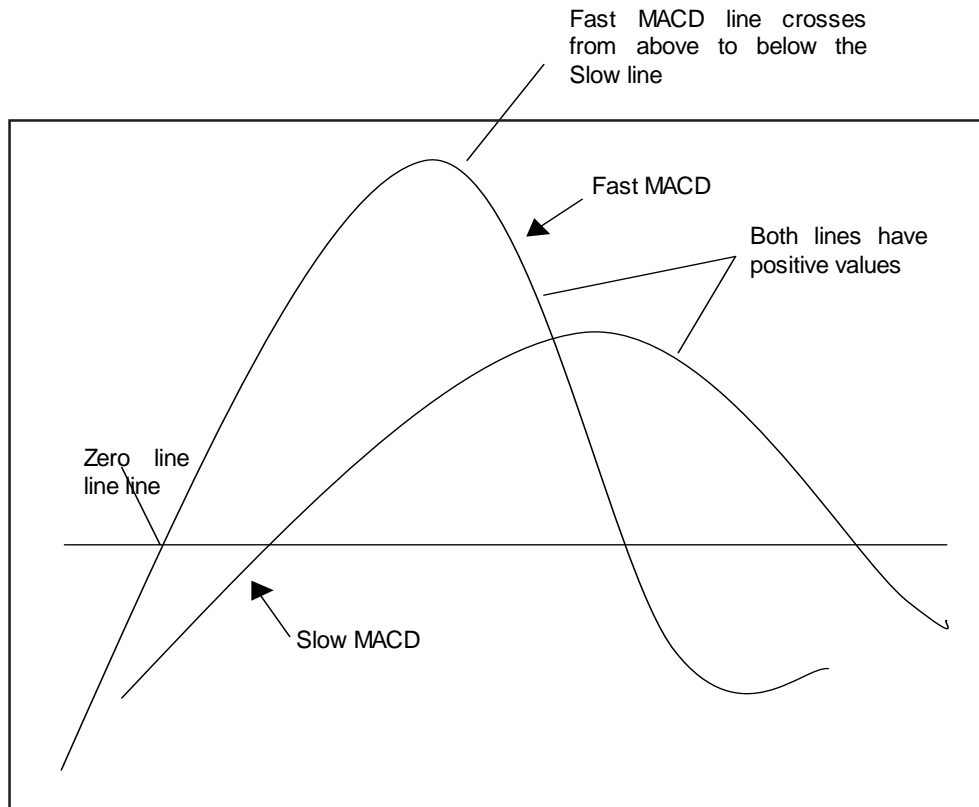
page 104). The first line is usually displayed as a solid line and is called the **Fast MACD line** or plot. This line is the difference between a short and long moving average of the price – usually with smoothing factors equivalent to 12/13 and 26 period exponential moving average (EMA) being used. The second line is often displayed as a dotted line, or a line of different color in charting application, and is called the **Slow MACD** or **signal** line. This line is an exponential moving average of the Fast MACD line. It is usually used to see a smoothing factor equivalent to 9 periods used in the EMA
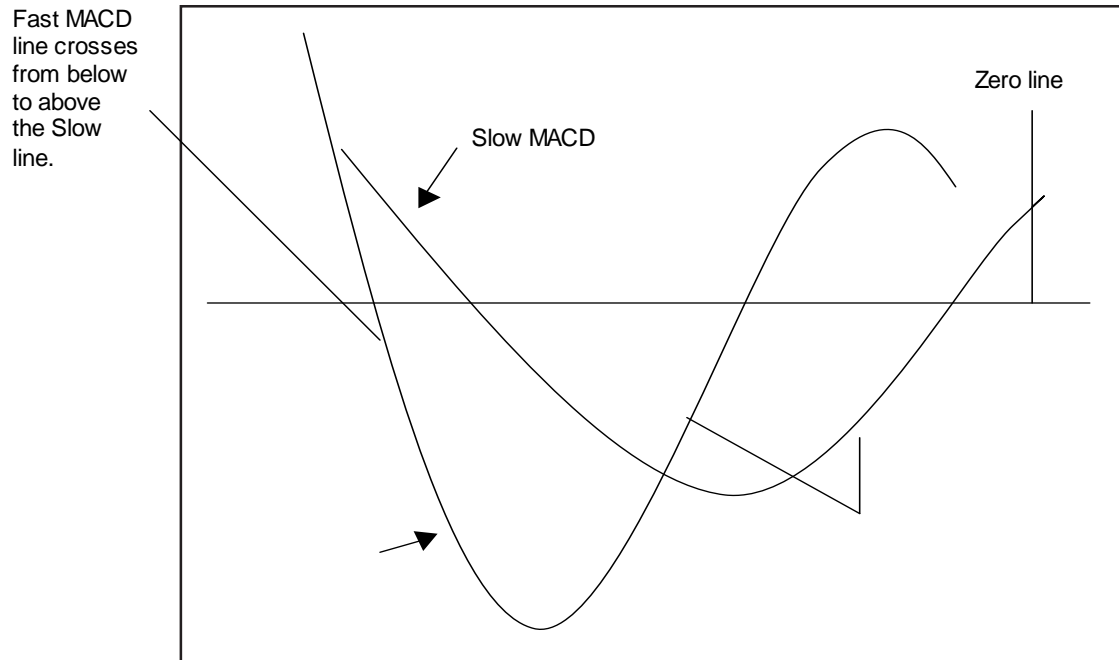
In common with moving average, MACD is used to determine buy/sell signals and to detect trend changes. A sell signal is indicated when the Fast MACD line crosses from above to below the signal line when both have positive values. The higher point above the

zero line from which this crossover occurs, the stronger the signal. Crossovers which occur with negative values should be ignored. A buy signal is indicated when the Fast MACD line crosses from below to above the signal line when both have negative values. The

further below the zero line from which this crossover occurs, the stronger the signal.

$$\text{Smoothing factor} = \frac{2}{N+1}$$

Fast MACD line crosses from above to below the Slow line

Fast MACD

Both lines have positive values

Zero line
line line

Slow MACD

Fast MACD
line crosses
from below
to above
the Slow
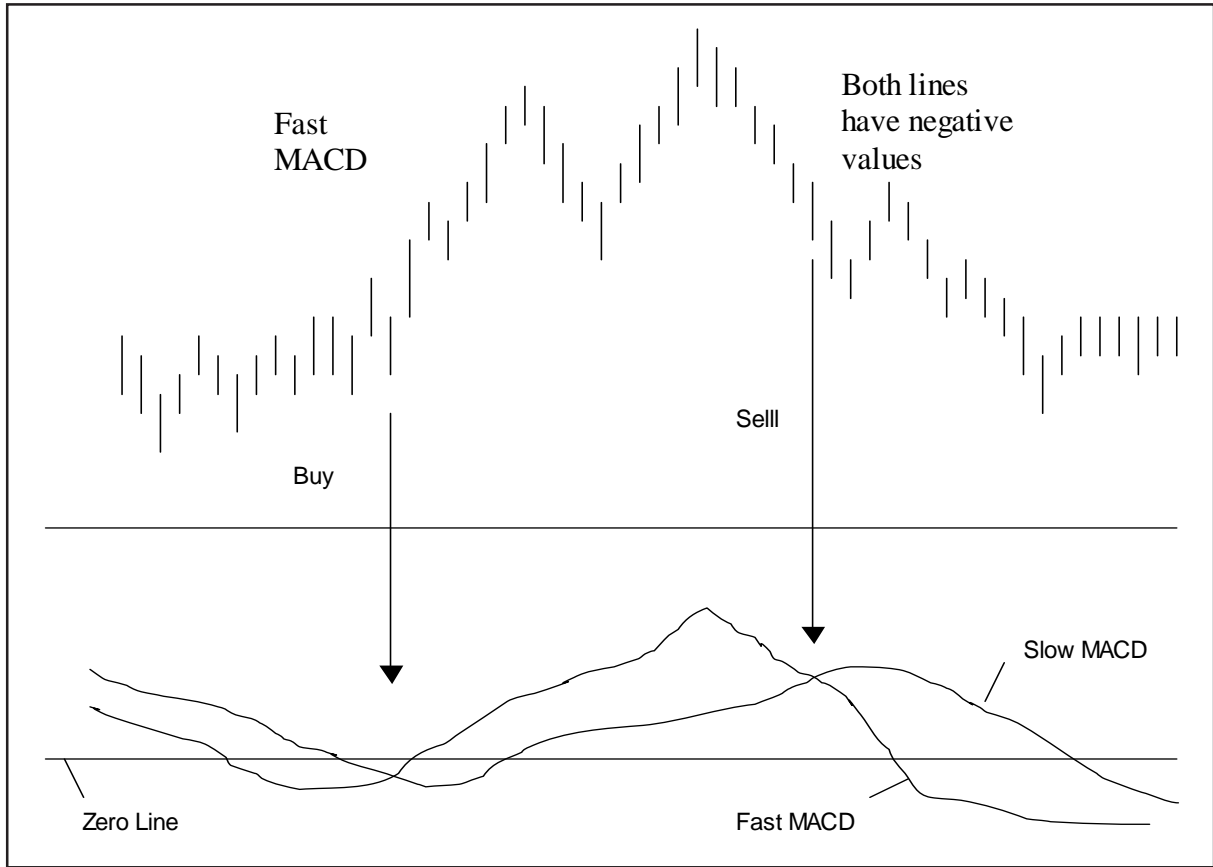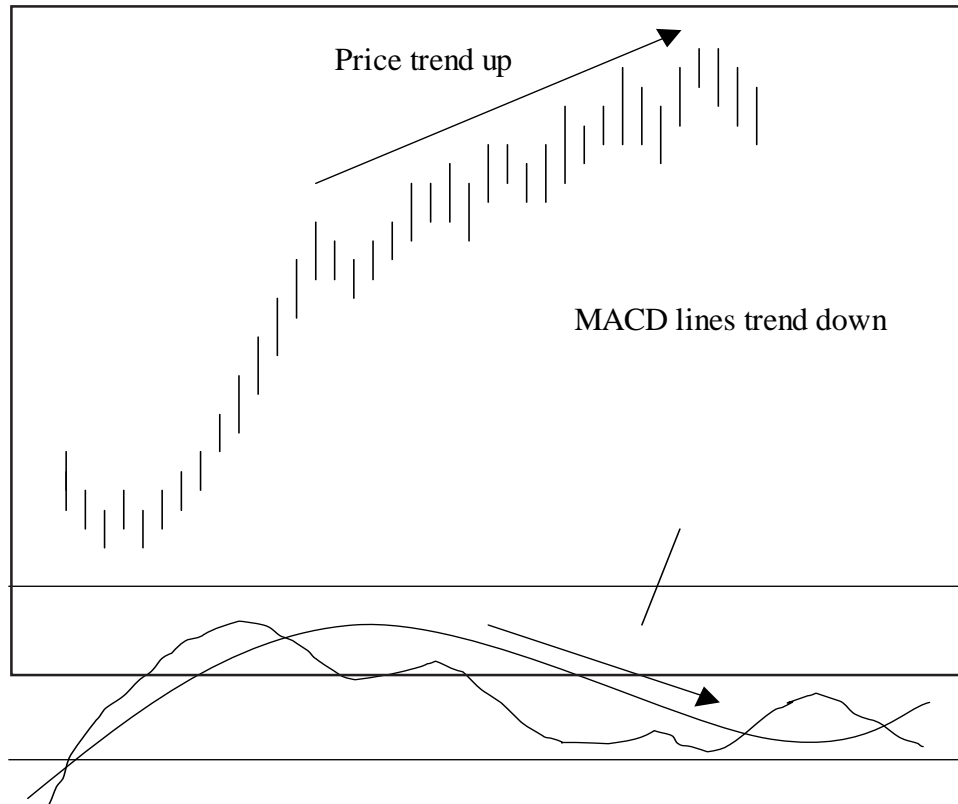line.

Zero line

Slow MACD

Successive highest highs (or lowest lows) of market prices are compared with highest highs (or lowest lows) of MACD when plotted in forest graph form. If there is a divergence in the trend between price ac-

tion of the instrument and that of the MACD forest graph, then this is considered as a good indicator of a possible trend reversal.

Fast
MACD

Both lines
have negative
values

Selll

Buy

Slow MACD

Zero Line   Fast MACD

Price trend up

MACD lines trend down

Sabardi (2000) investigated MACD in the Jakarta Stock Exchange over the period of November 1999 – April 2000, by using the daily data collected for the Real Time Information (RTI). He found that the buying and selling signals of the MACD line cross-over results from 49 stocks, which were examined to determine that the buying and selling time of the stocks were all accurate. Although the result of the study showed that the accuracy of MACD signal's prediction was very high, it still had a weakness because the data was used only in a limited period (6 month). Therefore, the same study using data in a different period was needed to support or to improve that research. Figure below was one of the examples of the study:

Figure 3: <u>TELKOM</u> was one of the analysis' results
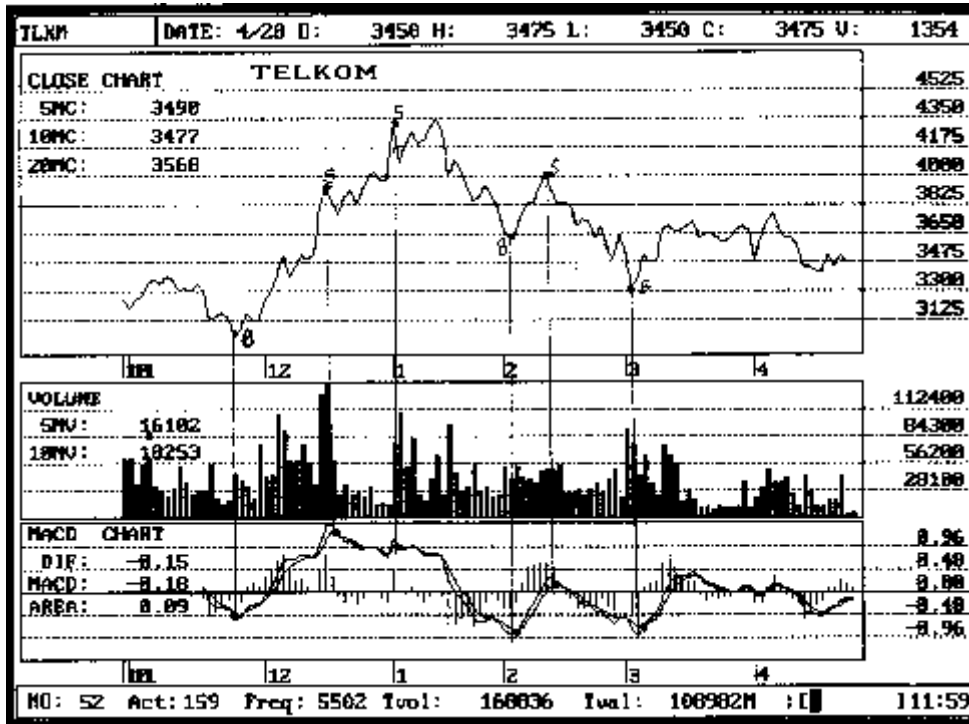
TELKOM

Buying signal (B) occured at Rp3,050,- in last December of 1999, then the price increased. Selling signal (S) occured at Rp3,900,- in mid December 1999 and at Rp4,350,- in early January 2000, then the price decreased. The next buying signal (B) occurred at Rp3,650,- in early February 2000, and the selling signal at Rp4,000,- in mid February 2000. The following buying signal occurred at Rp3,300,- on early March 2000, and then the price increased.

CONCLUSION

It is not necessary to be able to precisely predict the future in order to be able to make a trading profit. One of the greatest problems facing a trader is learning when to take profit from a successful trade and when to exit a trade which is in decline. What is important is the ability to be able to combine these indicators in order to determine the direction of prices and to drive tactics within a trading strategy. However, investors should be careful to not only use a single indicator in isolation, which would be a mistake.

The three indicators have proved their accuracy in predicting stock price movement. Therefore, the use of those three indicators is suggested in stock transactions. Although it cannot guarantee at 100% accuracy, those three indicators can be used as a guideline to buy the stocks with inexpensive prices and to sell the stocks with expensive prices. At least, by using those three indicators, the stock tradings can be optimally implemented.

These studies have limitation in data usage, which were found in an approximate period of 6 months. Therefore, we have not been able to generalize the results from data in other periods. In conclusion, these research models need to be replicated further by using different periods of data, so that we could get information that would either support or improve these studies.

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