



**T.C. İSTANBUL TİCARET
ÜNİVERSİTESİ**

**DIŞ TİCARET ENSTİTÜSÜ
WORKING PAPER SERIES**

Tartışma Metinleri

WPS NO/ 44/ 2016-06

TECHNICAL ANALYSIS: TESTING MACD WITH USING BIST30 INDEX

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Özet

Teknik analiz metodu 18. Yüzyılın sonlarına doğru hisse senetleri hakkında finansal bilgilerin kısıtlı olması ve piyasalarda bulunan mevcut bilgilerin de güvenilir olmamasından dolayı, hisse senetlerinin nasıl hareket ettiklerini öğrenmek ve böylece fiyatların gelecekte nasıl oluşabileceğine dair tahminde bulunabilmek amacıyla ortaya çıkmıştır. Bu çalışmada ilk olarak sermaye piyasalarında bir analiz metodu olan teknik analiz metodu ve alt başlıkları genel olarak açıklanmış, sonraki süreçte teknik analiz metodunda kullanılan ve bu çalışmanın son kısmında test edilen MACD indikatörünün açıklamasına yer verilmiştir. Son bölümde MACD indikatörü ile ilgili olarak bir uygulama yapılmıştır. Uygulamada, BIST30 endeksine dahil olan 24 adet hisse senedinin getirisi 01.01.2011 ve 31.12.2015 tarih aralığında hesaplanmış ve hisse senedi getirileri sadece MACD göstergesinin ürettiği al ve sat sinyalleri kullanılarak yapılan alım-satımlardan elde edilen getiri ile karşılaştırılmıştır. Yapılan çalışmanın sonucunda birkaç hisse senedi dışında MACD göstergesi kullanılarak yapılan alım-satımlarda hisse performanslarından daha az getiri elde edildiği saptanmıştır.

Anahtar Kelimeler: Teknik Analiz, MACD

Abstract

Towards the end of the eighteenth century the financial information about stocks was scarce and the available information was generally unreliable. Thus technical analysis method due to these factors has emerged to understand the price movements of stocks and by this way to forecast the future prices of stocks. In this study technical analysis method, its subheads and MACD indicator are shortly explained. Last part contains an application about MACD indicator. In this practice, 24 stock returns included in BIST30 index is calculated between dates 01.01.2011 and 31.12.2015 and results are compared with the returns which is produced buying and sell signals by MACD indicator. As a conclusion of the study it is obtained that except for a few stocks MACD returns is less than the stock returns.

Keywords: Technical Analysis, MACD

Introduction

At the present time the information and data can be reached easily and their number is infinite however infinite information and data cause chaos among investors. Most of the investors take their buy and sell decisions from hearsay or the movement of market prices, the news and the comments affect their decisions. To avoid this kind of chaos there is two common methods to evaluate the stocks. First one is fundamental analysis and second one is technical analysis.

Fundamental analysis requires many factors both financial statement analysis of companies and sectoral and macro-economic analysis. Thus due to the number and scope of the data, fundamental analysis requires a considerable degree of financial knowledge and time. On the other hand technical analysis states that every data is already reflected in prices and therefore technical analysis seems the examination of market prices is enough to evaluate a stock. Rather than analyzing the infinite number of data focusing only the prices provides a significant advantage in terms of technical analysis to make quick decisions.

Nevertheless technical analysis is still a complex analysis method. Because using technical analysis correctly and objective takes months or even years. Most of the investors don't know technical analysis in a detailed way and in the strict sense. Their emotions affect their decisions and they get late to take correct decisions in the correct time.

Therefore the main purpose of this study is to transform technical analysis to a very simple method with using the buy and sell signals of Moving Convergence and Divergence (MACD) indicator and to conclude can higher profit be obtained or not as compared to stock returns.

1. Technical Analysis

Technical analysis is a graphically examination of past price movements to predict the future direction of capital market instruments. Therefore technical analysis is used to interpret the future trend of prices and to make sell or buy decisions.² Technical analysis is based on graphical analysis, for this reason technical analysts are called as chartists too.

Technical analysis has mainly 3 subheads. These are trend analysis, formations and indicators.

² Dilaysu Çınar, Technical Analysis Method for Stock Valuation: An Application in the Istanbul Stock Exchange, Retrieved February 2, 2016, **master's thesis**, Dokuz Eylül University, 2011, p. 38

1.1. Trend Analysis

Trends are divided into three both in terms of direction and time. In terms of direction trends are divided as an uptrend, downtrend and sideways trend. In terms of time trends are divided as primary, secondary and minor trend.

Trend classification in the way of direction:³

- An upward trend or in other words an uptrend consists of higher peaks and higher bottoms. Each new peak point is higher than the last peak point. And each bottom point is higher than the last bottom point. Furthermore when an uptrend is seen in markets, it is named as ‘bullish market’.
- Downtrend is the opposite trend of an uptrend. At the downtrend selling pressure is higher than the buying desire thus prices fall continuously. Downtrend is known as “bear market” among the investors. To draw a downtrend at least two peak points are needed. In addition at a downtrend declining bottoms and declining peaks are seen.
- Sideways trend is a trend which price movements fluctuate at a certain price range. There is a horizontal price movement and this is called congestion period on the market. At sideways trend demand and supply are equal. In addition horizontal price movement shows the market as uncertain. Furthermore sideways trend is named as “trendless”.

Trend classification in the way of time:⁴

- The primary trend lasts generally more than a year or at least a year. At prevailing primary trend obvious price corrections are seen.
- These price corrections during a primary trend are called as secondary trends and it continues at least 3 weeks and at most 3 months.
- The smallest trends are called as minor trends. These trends are the corrections of secondary trends and they are in the same direction of primary trends.

³ Dilaysu Çınar, op. cit., p. 60

⁴ Radukic & Radovic, Long Term Trend Analysis in the Capital Market – The Case of Serbia, **Journal of Central Banking Theory and Practice**, 2014, p. 5-18, from <http://www.cbcbg.me/repec/cbk/journal/vol3no3-1.pdf>, (Retrieved February 6, 2016), p 8

1.2. Formations

Price formations are the precise pictures which have foresight value and they are divided into two. These are reversal formations and continuation formations.

Main reversal formations are head and shoulders and inverse head and shoulders, double top and double bottom formations. Main continuation formations are rectangles, triangles, flags and pennants, falling wedges and rising wedges formations.

1.3. Indicators

Indicators are tools which should be used as an aid to trends. That's why placing too much importance on indicators instead of trends would be mistake and would let missing the major trends. On the other hand indicators are calculated by moving averages of prices.

There are three ways when the indicator is most useful. These three ways are used for most types of indicators.⁵

1. The indicator is most useful when it reaches its extremities or in other words in its extreme areas. Most of the indicators have extreme areas which signal overbought and oversold areas. In such cases indicators warn technical analysts the current trend is outrageous and the direction of the current trend will change.
2. The second most useful way is finding the divergence between the indicator and the price movements. For instance if the price makes new bottoms on the contrary the indicator doesn't, it is a signal that prices will begin rising. If the price makes new highs on the contrary the indicator doesn't, the indicator says the rising trend will end and a downward trend will begin.
3. Using the crossing of the zero or midpoints as a buy or sell signal is the last most useful way.

2. Moving Average Convergence and Divergence (MACD)

The Moving Average Convergence/Divergence (MACD) indicator was constructed by Gerald Appel and MACD indicates buy and sell signals based on two moving averages of prices.

⁵ John J. Murphy, **Technical Analysis of the Financial Markets**, New York Institute of Finance, 1999, p.227

Finding the correct time of entering to the market and exiting from the market is the most important question for technical analysts.⁶

MACD is constructed by a longer time moving average and a shorter time moving average. Most of the technical analysts use 12 day moving average for the fast line and 26 day moving average for the slow line. A positive MACD, in other words a bullish market is seen when the fast MACD line is above than the slow MACD line. When the slow MACD line is above than the fast MACD line, it is assumed that a bearish market is seen.⁷

On the other hand MACD has zero line. Crossing the zero line by slow MACD is assumed buy or sell signal. Crossing up the zero line is assumed as buy signal and crossing down the zero line is assumed as sell signal.



Figure 1: Moving Average and Convergence

Figure 1 represents monthly MACD and buy/sell signals. As it can be seen that on the monthly MACD signals don't come at the peaks or at the depths. However when the signal comes, it is powerful and reliable signal that trend will continue. Thus longer time period is stronger signal. Shorter time period is more insecure alert.

⁶ Subramanian & Balakrishnan, Efficacy of Refined MACD Indicators: Evidence from Indian Stock Markets, **IUP Journal of Applied Finance**, 2014 Vol. 20 Issue 1, p76-91, from <http://eds.a.ebscohost.com/eds/pdfviewer/pdfviewer?vid=3&sid=9491a753-189c-47aa-8cc5-455ce7bdc8f4%40sessionmgr4003&hid=4110>, (Retrieved February 5, 2016), p.78

⁷ Bramesh Bhandari, Trading Stocks with MACD, **In: Futures (Cedar Falls, Iowa)**, 2011, Vol. 40 Issue 12, p32-35, from <http://eds.b.ebscohost.com/eds/pdfviewer/pdfviewer?vid=3&sid=4fbb4cce-7322-4f49-9176-8b42123c2ab9%40sessionmgr102&hid=120> (Retrieved February 5, 2016), p.32

3. Testing MACD with Using BIST30 Index

3.1. Purpose of the Study

Moving Average Convergence and Divergence indicator is one of the most used and most popular indicator in technical analysis method to take buy or sell decisions. Therefore the main purpose of this study is to test buy and sell signals of MACD and compare the MACD returns with stocks returns to see whether higher profit can be obtained or not by using MACD as compared to Buy and Hold strategy.

3.2. Content of the Study

The stocks included BIST30 Index are being changed quarterly. In other words some stocks are taken into BIST30 Index and some stocks are removed from BIST30 Index quarterly.

Therefore in this study stocks which were traded permanently at BIST30 Index during the period between 01.01.2011 and 31.12.2015, are tested. Totally 24 stocks are tested and total period of tested data is 5 years long.

Company names within the study content and their stock codes are shown in the following table.

Table 1: Stock Codes and Company Names

| | STOCK CODE | COMPANY NAME |
|----|------------|-----------------------------------|
| 1 | AKBNK | AKBANK |
| 2 | ARCLK | ARÇELİK |
| 3 | BIMAS | BİM BİRLEŞİK MAĞAZALAR A.Ş. |
| 4 | EKGYO | EMLAK KONUT GAYRİMENKUL YAT. ORT. |
| 5 | ENKAI | ENKA İNŞAAT VE SANAYİ A.Ş. |
| 6 | EREGL | EREĞLİ DEMİR ÇELİK |
| 7 | FROTO | FORD OTOMOTİV SANAYİ |
| 8 | GARAN | T. GARANTİ BANKASI |
| 9 | HALKB | T. HALK BANKASI A.Ş. |
| 10 | ISCTR | T. İŞ BANKASI |
| 11 | KCHOL | KOÇ HOLDİNG |
| 12 | KOZAL | KOZA ALTIN İŞLETMELERİ A.Ş. |

(Table 1: Continue)

| | | |
|----|-------|------------------------------------|
| 13 | KRDMD | KARDEMİR D GRUBU |
| 14 | PETKM | PETKİM A.Ş. |
| 15 | SAHOL | HACI ÖMER SABANCI HOLDİNG |
| 16 | SISE | T. ŞİŞE VE CAM FABRİKALARI A.Ş. |
| 17 | TAVHL | TAV HAVALİMANLARI A.Ş. |
| 18 | TCELL | TURKCELL İLETİŞİM HİZMETLERİ A.Ş. |
| 19 | THYAO | TÜRK HAVA YOLLARI A.Ş. |
| 20 | TOASO | TOFAŞ TÜRK OTOMOTİV FABRİKASI A.Ş. |
| 21 | TTKOM | TÜRK TELEKOMÜNİKASYON A.Ş. |
| 22 | TUPRS | TÜPRAŞ TÜRKİYE PETROL A.Ş. |
| 23 | VAKBN | TÜRKİYE VAKIFLAR BANKASI |
| 24 | YKBNK | YAPI VE KREDİ BANKASI A.Ş. |

3.3. Method and Assumptions of the Study

The methods of this study are listed as follows:

- ‘Matriks Veri Terminali’ program and System Tester application is used to test the data in this study.
- The tested data is in daily period because daily period is the most used time period.
- Both two methods of MACD is tested.

The assumptions of this study are listed as follows:

- Generally brokerage firms take 0,06-0,08 commission rate and investment banks take 0,16-0,18 commission rate for any trade. Thus it is assumed that 0,1% commission rate is paid for all purchase and sale transactions.
- It is assumed that in every buy signal, the purchase is made with the all capital and in every sell signal, the sale is made with the all capital.
- All positions are closed at the last trading day of tested time.
- Buy and sell signals are taken on the closing price of days. It is assumed that when sell signal came, the sale is made on the same day’s closing price and when buy signal came, the purchase is made on the same day’s closing price.

3.4. Evaluation of Findings

MACD(1) returns shows how much returns were occurred by testing the sell and buy signals of crossing MACD line and MACD Trigger line and MACD(2) returns shows how much returns were occurred by testing the sell and buy signals of crossing MACD line and zero line.

Table 2: The Results between the Years 2011 and 2015

| STOCK CODE | 01.01.2011 OPENING PRICE | 31.12.2015 CLOSING PRICE | STOCK RETURNS | MACD(1) RETURNS | The Difference | MACD(2) RETURNS | The Difference |
|----------------------------|--------------------------------|--------------------------------|------------------|--------------------|-------------------|--------------------|-------------------|
| AKBNK | 7,94 | 6,7 | -15,62% | -44,54% | -28,92% | 4,40% | 20,02% |
| ARCLK | 6,29 | 13,97 | 122,10% | 133,11% | 11,01% | 7,59% | -114,51% |
| BIMAS | 24 | 51,35 | 113,96% | -17,09% | -131,05% | -16,08% | -130,04% |
| EKGYO | 1,72 | 2,6 | 51,16% | 3,22% | -47,94% | 22,51% | -28,65% |
| ENKAI | 2,87 | 4,52 | 57,49% | 20,07% | -37,42% | -14,66% | -72,15% |
| EREGL | 1,63 | 3,04 | 86,50% | 52,50% | -34,00% | 35,70% | -50,80% |
| FROTO | 9,9 | 30,28 | 205,86% | 78,86% | -127,00% | 107,93% | -97,93% |
| GARAN | 7,24 | 7,12 | -1,66% | -28,09% | -26,43% | -7,87% | -6,21% |
| HALKB | 11,93 | 10,39 | -12,91% | -16,17% | -3,26% | 6,87% | 19,78% |
| ISCTR | 4,84 | 4,6 | -4,96% | -13,07% | -8,11% | 36,27% | 41,23% |
| KCHOL | 6,5 | 10,93 | 68,15% | 54,07% | -14,08% | 56,92% | -11,23% |
| KOZAL | 17,4 | 12,28 | -29,43% | -53,18% | -23,75% | 16,50% | 45,93% |
| KRDMD | 0,51 | 1,09 | 113,73% | 32,09% | -81,64% | 167,99% | 54,26% |
| PETKM | 1,52 | 3,06 | 101,32% | 11,67% | -89,65% | 67,87% | -33,45% |
| SAHOL | 6,78 | 8,28 | 22,12% | 1,36% | -20,76% | 38,54% | 16,42% |
| SISE | 1,6 | 3,19 | 99,38% | 135,67% | 36,30% | -0,85% | -100,23% |
| TAVHL | 6,59 | 18,19 | 176,02% | -50,04% | -226,06% | -23,54% | -199,56% |
| TCELL | 9,16 | 9,9 | 8,08% | -34,66% | -42,74% | -18,64% | -26,72% |
| THYAO | 3,86 | 7,39 | 91,45% | 52,62% | -38,83% | 73,63% | -17,82% |
| TOASO | 5,85 | 18,95 | 223,93% | 76,24% | -147,69% | 59,03% | -164,90% |
| TTKOM | 4,58 | 5,46 | 19,21% | 53,16% | 33,95% | -13,57% | -32,78% |
| TUPRS | 29,78 | 69,6 | 133,71% | -2,32% | -136,03% | 7,32% | -126,39% |
| VAKBN | 3,8 | 3,83 | 0,79% | -7,49% | -8,28% | 64,79% | 64,00% |
| YKBNK | 4,61 | 3,29 | -28,63% | 13,74% | 42,37% | -10,42% | 18,21% |
| | | | | | | | |
| AVERAGE RETURNS | | | 66,74% | 18,82% | -47,92% | 27,84% | -38,90% |

MACD (1): Crossing MACD line and MACD Trigger line

MACD (2): Crossing MACD line and zero line

When the results is examined, it can be seen that there is positive difference between MACD (1) and stock returns in only 4 stocks. These are ARCLK, SISE, TTKOM and YKBNK. However there is negative difference between MACD (1) and stock returns in 20 stocks.

AKBNK, HALKB, ISCTR, KOZA, KRDMD, SAHOL, VAKBN and YKBNK have positive difference between MACD (2) and stock returns. Surprisingly all banks besides GARAN have positive difference between MACD (2) and stock returns. The reason of it is that in tested 5 years all tested bank returns are negative. In addition there is negative difference in 16 stocks between MACD (2) and stock returns.

When the average returns of stocks, MACD (1) and MACD (2) is examined, it can be seen that both two methods of MACD represented very lower performance than stocks.

Between 2011 and 2015 years the average returns of stocks is at 66,74%, the average returns of MACD (1) is at 18,82% and lastly the average returns of MACD (2) is at 27,84%.

The Findings and Conclusion

In this study both methods of MACD indicator's buy and sell signals were simulated with using the past data and MACD returns were compared with stock returns. Stocks that have been placed in BIST-30 Index have been used in this study. 24 stocks were measured between 01.01.2011 and 31.12.2015.

In tested 5 years, MACD average performance occurred very lower than the average performance of stocks. Thus it is understood that with using the sell and buy signals of MACD higher profit can not be obtained as compared to buy and hold strategy. That's why technical analysts should not use only the signals of MACD as a primary tool to take buy and sell decisions.

Nevertheless positive points should also be clarified in this study. In tested 5 years the returns of MACD (1) in stocks that ARCLK, SISE, TTKOM and YKBNK, are higher than the returns of stocks. And in tested 5 years the returns of MACD (2) in stocks that AKBNK, HALKB, ISCTR, KOZA, KRDMD, SAHOL, VAKBN and YKBNK, are higher than the returns of stocks.

For conclusion, getting a higher return than stock returns with using MACD has failed. Even though, successful results might be achieved on future studies with comparing returns and testing different indicators.

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