Technical Analysis: Exploring MACD in the Lebanese Stock Market

4 authors:

Ale J. Hejase
Lebanese American University
49 PUBLICATIONS **76** CITATIONS

SEE PROFILE

Ruba Srour
Islamic University of Lebanon
1 PUBLICATION **0** CITATIONS

SEE PROFILE

Hussin Jose Hejase
Al Maaref University
187 PUBLICATIONS **161** CITATIONS

SEE PROFILE

Joumana Younis
Islamic University of Lebanon
1 PUBLICATION **0** CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:

Project Preparing for Accreditation View project

Project Al Maaref University Governance Screening Card V.2.0 View project

Technical Analysis: Exploring MACD in the Lebanese Stock Market

Ale J. Hejase[1], Ruba M. Srour[1], Hussin J. Hejase[2*], Joumana Younis[1]

[1]School of Business, Islamic University of Lebanon, Beirut, Lebanon.

[2]Faculty of Business Administration, Al Maaref University, Beirut, Lebanon.

Abstract

The stock markets have shown a great growth in the financial world that required traders to deal with many quantitative methods to analyze markets in order to predict commodities' future prices. This study assesses the effect of technical analysis on the Lebanese stock markets by using a tool known as the Moving Average Convergence/Divergence (MACD) oscillator that explores how MACD can be utilized to optimize profits in the Lebanese stock exchange, during the trading process. The study is performed on closing prices of shares of six Lebanese banks and a real estate company, over a time period extending from the beginning of the year 2004 till the end of the year 2014. Results are meant to indicate whether MACD is able to optimize profits and forecast the Lebanese stock prices. It is concluded that the application of MACD in the decision making process for investing in the Lebanese stock market does not significantly contribute to the maximization of profitability on investments.

Keywords: Technical Analysis; MACD; Lebanon; Lebanese Stock Market; BSE; ROI.

1. Introduction

The attractiveness of the stock markets has been greatly growing in most countries, and Lebanon is no exception. In fact, trading shares occurs in the stock exchange houses, which represent regulated marketplaces for financial securities such as bonds and funds. Lebanese stocks are administrated by the Beirut Stock Exchange market (BSE) (Beirut Stock Exchange, 2017); the only official market in Lebanon. The BSE is the type of market where financial instruments, obligations or claims can be traded. In the BSE, market securities can be *primary* whereby the securities are issued for the first time to raise the capital of the issuers who receive the money earned from buying the stock/bond, or *secondary* where the securities have already been traded.

The most salient debate between experts is whether to use technical analysis or fundamental analysis as a method to predict price changes in the future. Fundamental analysts tend to underestimate the capabilities of technical analysis in predicting future prices to achieve high profits. Some authors such as Schwager (1999, p. 3)**,** believe that both approaches may succeed; actually, in his book "*Getting Started in Technical Analysis*" he states that it is possible to benefit from using both methods (each one alone), or even from using a hybrid approach of the two methods. Currently, Constable (2016) contends that "fundamental analysts' and technical analysts' methods haven't overlapped, though they now seem to be converging" (Para 2).

According to the Open Computing Facility at the University of California, Berkeley (2016), "Technical analysis and fundamental analysis are the two main schools of thought in the financial markets. Technical analysis looks at the price movement of a security and uses this data to predict its future price movements. Fundamental analysis, on the other hand, looks at economic factors, known as fundamentals" (Para 12).

Fundamental analysis is a technique used to predict the future prices of a stock or any other security in order to achieve higher trading profits. It is based on examining the basic strengths that affect the success of the economy, industry groups and companies. Special attention is given to the financial data to analyze and evaluate the present and future growth of

the economy. This may involve, examining a specific industry in order to identify supply and demand forces of the products or services. As a matter of fact, for companies, fundamental analysis may involve analyzing financial data, management, competition and the business concept itself (Suresh, 2013; Constable, 2016). Furthermore, "fundamental analysis of companies involves breaking down how firms operate, how they generate cash and what are the economics of the industry in which they compete," says George Goudelias, head of leveraged finance at Park Ridge, N.J.-based SEIX Investment Advisors LLC (cited in Constable, 2016, Para 3).

Accepting that 90% of the Wall Street security analysts consider themselves fundamentalists, Malkiel (1973; cited in Royston, 2011, p. 24) states some fundamental analysis flaws:

- There might be incorrect information or analysis.

- The analyst's estimation might end up as a false one.

- The market might not be corrected as estimated, making no price change.

- Even with correct facts, a security analyst might not translate these facts into accurate future earnings' estimates.

- The owned security price might still go down even after getting both correct facts and estimates. That's a major problem.

Based on the perception that people would make the same mistakes they have made in the past, Pring (1985) explains that the recurrence of people's actions regarding the stock market would allow technical analysts to identify the key juncture points which lead to the formation of the basis of technical analysis.

Achelis (2000) and Person (2004) define technical analysis (TA) as the art of using price charts as primary tools to study security prices. Khan (2006) asserts that technical analysis doesn't directly consider the influence of earnings, financial statements, industry, environment, and input securities' prices; instead, TA assumes that the current price of a security holds all of the aforementioned information. Edwards, Magee, and Bassetti (2013) describe TA as the science of documenting (usually graphically) a certain stock's trading history (price changes, volume of transactions, etc…) and then deducing this stock's future trend.

Different researchers have studied the position of TA as primary tool to study security prices. Frankel and Rose (1995), Taylor (1995), and later on Sarno and Taylor (2001) assert, through their surveys, the importance of technical analysis (TA) and its powerful results in predicting price changes of a stock. These surveys show the significance of the behavior of foreign exchange stock prices and prove the importance of technical analysis in understanding the gap that fundamental analysts couldn't explain in a stock return behavior. Moreover, Gehrig & Menkhoff (2003) were able to show that TA charting is more preferred when trying to predict prices for short time horizons. Menkhoff and Taylor (2007) present an extensive reading of the literature on the nature and the use of technical analysis in the foreign exchange markets that allows one to draw up a set of stylized facts concerning TA's nature and use. Much later, Hejase, El Houkayem and Hejase (2016) used the Moving Average and Relative Strength Index (RSI) variants to assess the capabilities of TA against the efficient market hypothesis represented by a Buy/Hold strategy; results show that TA in general and Moving Average in particular is able to outperform the Buy/Hold model.

The current study uses a well-known TA tool known as the Moving Average Convergence/Divergence (MACD) oscillator. Developed by Gerald Appel (2003), the MACD uses two exponential moving averages: one of order twelve and another of order twenty six. The stock closing prices are used to determine the two exponential moving averages; then, the MACD signal is calculated by obtaining the difference between the two aforementioned exponential moving averages (Murphy, 1999).

In what relates to this research, Chong, Ng, and Liew (2014) have proved the significance of technical analysis and subsequently the significance of the MACD. Claiming that MACD was proven to be a valuable trading tool in the 1980s, the work of Chong et al. checked the MACD performance over the buy-and-hold strategy in the stock markets of five countries from the Organization for Economic Co-operation and Development (OECD), where significant profitable returns were identified.

There have been different ongoing projects related to MACD research around the globe. Using the 60-year data of the London Stock Exchange FT30 Index, Chong and Ng (2008) found that the MACD rules can generate returns higher than the buy-and-hold strategy in most of their treated cases (p. 1111).

Moreover, Rosillo, De la Fuente and Brugos (2013, p. 1548) tried to examine the result of the application of the Moving Average Convergence Divergence indicator, among others, in order to check if a greater profitability may be achieved in the companies of the Spanish Continuous Market from 1986 to 2009. The net total benefits for said period generated by the application of MACD to the Telefonica Company came to be 2.48%, which is a modest profitability for the period under consideration. Similarly, Steven Gold (2015, p. 19) tried to compare the relative performance of the MACD indicator based on the average rate of return of the portfolio as an important measure of the overall success of this

indicator. He concluded that for the MACD indicator, operating alone in the year 2014 and considering the data on all firms in the DOW for that year, the average holding period return (HPR) is 0.715%, while for 2013 the HPR is 0.99%. These returns are not encouraging, but they present a significant improvement when the volume indicators are included.

Furthermore, the research of Vidotto, Tonissi Migliato and Zambon (2009) aim to assess the effectiveness of the use of the MACD indicator to specify the moment to purchase and sell stocks and analyze the profitability gained in five companies selected at random from a total of ninety companies in the Bovespa New Market (The Bovespa Index - Portuguese: Índice Bovespa - is an index of about 50 stocks that are traded on the São Paulo Stock, Mercantile & Futures Exchange). The results show that the cumulative average return of the five companies is of 26.7% against a cumulative average return of 0.90% during 2006, taking as a reference the valorization of the Ibovespa exchange in that year (p. 292). In another work performed within the Serbian stock market, the MACD indicator was used once again to confirm a trend direction and give the first signals of trend weakening in the Belgrade Stock Market common share index, i.e. the Belexline trend from the beginning of March 2006 to the end of March, 2009 (Radović, 2010, p. 130).

Also, testing the MACD indicators on the movements of Bombay Stock Exchange (BSE) Sensex and National Stock Exchange (NSE) Nifty during 1997-2010, it was found that their returns could not outperform buy-and-hold returns (Subramanian & Balakrishnan, 2014).

In fact, the idea of this present study emerged from the aforementioned successes and failures of applying the MACD oscillator. Therefore, the current study is considered to be one of those infrequent studies realized in the Middle East and North Africa (MENA) region especially after recalling that some researchers believe that investors in Asia are more into gambling than into studying and analyzing the markets (Kim & Nofsinger, 2008).

2. Objectives of the Study

The main objective of this research is to explore how MACD can be utilized to optimize profits while trading in the Lebanese stock exchange.

The MACD technical analysis indicator is utilized to identify the movements (upward and downward) of stock prices within the traded sector, including the estimation of the corresponding market profits. Similarly, the study aims at analyzing the MACD price charts and their rules in order to predict the future behavior of a set of selected Lebanese banking stocks.

3. Research Methodology

The data of shares used correspond to the stocks of six Lebanese banks and one real estate corporation, from the year 2004 till the end of 2014. This data was kindly provided by the Deputy Director of the Beirut Stock Exchange, Mr. Youssef Sadek. The used data are adjusted to include transaction costs and are processed to obtain trading results under two trading mechanisms: a buy-and hold strategy and the MACD indicator. The return on investment results from each mechanism are logged into the "Statistical Product and Service Solutions" (SPSS) program in order to test if the MACD outcomes are significantly more profitable than those of the buy-and-hold strategy. In fact, under SPSS a "Paired Sample T-test" (Hejase & Hejase, 2013) is performed in order to identify the superlative method which exhibits the larger mean profitability.

3.1 Determining MACD and Signal Lines

MACD is an indicator that usually uses two exponential moving averages of order twelve and twenty six. The MACD indicator calculations are based on the Exponential Moving Average (EMA) of the closing prices. The EMA is defined as:

$$\mathbf{EMA}_t = \mathbf{EMA}_{t-1} + \frac{2}{n+1} \times (\mathbf{ActualPrice}_t - \mathbf{EMA}_{t-1}) \qquad (1)$$

Where, EMA_t is the exponential moving average at time t, and n is the number of periods for the EMA.

The MACD is constructed based on the moving averages. It is calculated by subtracting the longer 26 periods-exponential moving average from the shorter 12 periods EMA. Thus, for a 12 days EMA, one gets:

$$\mathbf{EMA}_t = \mathbf{EMA}_{t-1} + \mathbf{0.154} \times (\mathbf{ActualPrice}_t - \mathbf{EMA}_{t-1}) \qquad (2)$$

Similarly, for the EMA of order 26, the formula would be:

$$\mathbf{EMA}_t = \mathbf{EMA}_{t-1} + \mathbf{0.0741} \times (\mathbf{ActualPrice}_t - \mathbf{EMA}_{t-1}) \qquad (3)$$

The exponential moving averages of Equations 2 and 3 are named for convenience $EMA_t(12)$ and $EMA_t(26)$ respectively. Thus, the MACD line is calculated as:

$$MACD_t \ = \ EMA_t \ (12) \ - \ EMA_t \ (26) \tag{4}$$

In addition, there is a signal line needed in order to generate the purchase and sale orders of MACD, which is calculated as the exponential moving average of order 9 applied to the obtained $MACD_t$ data of Equation 4:

$$Signal \ line_t \ = \ EMA(9) \ of \ the \ MACD_t \ obtained \ data \tag{5}$$

3.2 Determining Buy/ Sell Orders

With the lines ($MACD_t$ and Signal $line_t$) having been obtained, a very simple tool like Microsoft Excel® may be used to display the difference between their values at different time instants in order to generate the "buy" or "sell" signals. A "buy" signal is generated when the MACD crosses the Signal line from below ($MACD_t$ value is higher than the Signal $line_t$ value), while a "sell" signal is generated when the MACD crosses the Signal line from above ($MACD_t$ value is less than the Signal $line_t$ value).

Three different strategies were tried and followed prior to considering the aforementioned generated "buy/sell" signals. The main reason behind these added strategies is to avoid any false signals by filtering the results. These strategies are:

A. The Three Signals Strategy:

 This strategy directs the software or decision maker to execute a "buy" motion only if there have been three consecutive "buy" signals (on three consecutive days). Likewise, a "sell" motion is only executed after observing three repeated "sell" signals on three consecutive days.

B. The Margin of Safety Strategy:

Instead of waiting for the sequence of three consecutive repeated signals in order to perform the "buy" or "sell" transaction, a trader can perform the transaction after considering a 3% margin of safety. That is, when the $MACD_t$ value exceeds the Signal $line_t$ value by more than 0.03, the buy order may be executed. Likewise, when the $MACD_t$ value gets more than 0.03 below the Signal $line_t$ value; then, the recommendation would be to "sell". Accordingly, the "buy" motion triggers when:

$$MACD_t \ > \ (1 + 0.03)Signal \ line_t$$

And the "sell" decision motion triggers when:

$$MACD_t \ < \ (1 + 0.03)Signal \ line_t$$

C. The MACD-R2 Strategy:

This third strategy is proposed due to the fact that the application of the two aforementioned strategies did not contribute significantly to the reduction of false signals. In fact, the two strategies generated "buy/sell" signals that were misleading by executing transactions that could be avoided in order to improve profitability. A typical limited profitability scenario is when taking a "sell" decision to make a 5% profit; then, to the upward move of prices indicate an additional 9% profit, the result is a 5% profit position and the loss of the opportunity to make a higher profit

This MACD-R2 strategy aims to overcome the weaknesses of the first two strategies by adding another condition in order to enhance their profitability performance (Huang & Kim, 2016). The strategy proposes to consider a minimum difference between the MACD line and the Signal line after waiting for the three consecutive "buy/sell" signals. This minimum difference can be 0.005, 0.011 or 0.035.

Concisely, after generating three consecutive similar signal ("buy" or "sell"), the following condition is considered under a tolerance "T" equal to 0.005, 0.011 or 0.035:

$$\frac{(MACD_t - Signal \ line_t)}{Closing \ Price_t} > T$$

If this condition is true, then the trader may go forward and take the position, else, the transaction should be neglected.

3.3 Executing the Transactions

The execution of the three strategies to generate the "buy/sell" signals has been accomplished under the condition that any "buy" order must be supplemented with cash. Similarly, any "sell" order must be accompanied with the presence of shares.

Note that the number of bought shares is calculated by dividing the amount of money available (the paid amount of money) by the closing price. Likewise, the amount to get in cash is calculated by multiplying the number of sold shares by the day's closing price.

3.4 The Profitability Results

The task to get the profitability results related to net "buy/sell" transactions is straightforward. It is simply calculated by subtracting the end of period amount in cash from the initial invested amount. Typically, a negative result indicates a loss while a positive outcome indicates a profit.

The return on investment (ROI) rate evaluates the financial consequences of an investment and offers information on the amount of profits or losses resulting from such investments. ROI is calculated by dividing the end result over the initial available amount in cash. The use of such an approach was ratified in the study of Kabajeh, Al Nu'aimat, and Dahmash (2012).

3.5 Transaction Costs

For each occurring transaction, a commission fee must be deducted from the original payment. The Beirut Stock Exchange's website states that for every over-the-counter transaction, there is a commission fee that varies between 3‰ to 7.5‰. The fee used in this study is considered to be 0.3% and is deducted from each transaction. The initial cash that is introduced to initialize the stock market transactions and thereafter every buying or selling occurrence is exposed to commission deductions. In fact, the transaction commissions and expenses are considered by multiplying the cash amount of any transaction by 1-0.3% = 0.997.

3.6 Buy-and-Hold Strategy

The classical non-technical analysis "buy-and-hold" trading strategy is the benchmark used to test the effectiveness of the MACD technical analysis. This strategy simply means buying stocks at the beginning of the period then selling them at the end of the period. Profits/losses and ROI are then calculated and transaction costs are deducted. In the current study, the "buy-and-hold" strategy has been performed over the 10 years period, for every single year, and on a monthly basis.

4. Results

The return on investment (ROI) ratio evaluates the efficiency of an investment which is calculated by dividing the net profit (after taxes) over the total paid in the capital (Kabajeh, Al-Nu'aimat, & Dahmash, 2012). The ROI of each of the three aforementioned strategies (i.e. three signals on three consecutive days, 3% margin after MACD and MACD-R2) applied to some of the BSE stocks data is calculated in order to compare the profitability of these methods. ROI is calculated by dividing the end result over the initial available amount in cash. Table 1 displays the ROIs for the data of Bank Audi (AUSR) from the year 2005 till 2014 under the five proposed trading strategies and the "buy-and-hold" approach.

Table 1: The ROI's for Bank Audi Stocks under the Different Proposed Strategies						
Year/ Method	**ROI**					
	3 Signals	**3% Margin**	**Buy/Hold**	**0.5% R2**	**1.1% R2**	**3.5% R2**
2005	0.6469	0.6266	**1.4680**	0.2774	0.0882	0.0882
2006	0.2143	0.4002	**-0.0767**	0.2988	0.4193	0.4193
2007	0.1996	0.0832	**0.3628**	0.2234	0.0297	0.0297
2008	-0.3228	-0.3277	**-0.2990**	-0.1434	0.0554	0.0554
2009	0.4501	0.3918	**0.6651**	0.4505	0.0981	0.0981
2010	-0.0024	-0.0894	**0.0112**	0.0348	0.0028	0.0028
2011	-0.1550	-0.2127	**-0.3733**	-0.0573	-0.0089	-0.0089
2012	0.1452	-0.1556	**0.1152**	0.1058	0.0621	0.0621
2013	0.0487	0.0009	**0.0318**	0.0254	0.0795	0.0795
2014	-0.0168	-0.0420	**-0.0139**	-0.0092	-0.0092	-0.0092
ROI over Years	1.2665	0.1670	**1.6763**	1.3359	0.7706	0.7706

In order to compare the MACD ROI outcomes of Table 1, a paired sample t-test is used to identify whether the differences in the return on investment (ROI) of a certain MACD trading strategy compared with the "buy-and-hold" strategy have zero means.

Table 2 presents the paired sample t-test output generated after comparing the "buy-and-hold" approach with an MACD trading strategy (MACD-R2 with 3.5% minimum difference). The data corresponds to the yearly ROIs of the stocks corresponding to the banks and Solidere B (a total of 60 ROI's), together with their corresponding "buy-and-hold" counter parts.

Table 2: Paired samples t-test output								
	Paired Differences					**t**	**df**	**Sig. (2-tailed)**
	Mean	**Std. Deviation**	**Std. Error Mean**	**95% Confidence Interval of the Difference**				
				Lower	**Upper**			
Buy/Hold - 3.5% R2	.19175	.62654	.08089	.02990	.35360	2.371	59	.021

The resultant significance of 0.021 implies rejecting that there exists a significant difference between the MACD-3.5% R2 method and the "buy-and-hold" method. In fact, the mean of the 60 ROI's under the "buy/hold" strategy is 0.2495 while it is under the MACD-3.5% R2 0.0577; this reveals that the mean of the ROIs of the "buy-and-hold" is significantly greater than that of the MACD-3.5% R2 strategy, indicating that the "buy-and-hold" method outperforms the MACD-3.5% R2 method when all data under hand is included.

Each of the aforementioned BSE stock is considered separately in order to compare its trading under an MACD strategy and the "buy/hold" approach. However, to be more realistic, 0.3% transaction commissions and expenses are considered as per the policies of BSE bureau.

4.1 Bank Audi Stock (AUSR) with Commission

The monthly (110 months) ROIs corresponding to Bank Audi (AUSR), have been calculated after deducting the transaction costs and are compared to the ROIs resulting from the "buy/hold" approach. Table 3 shows the outcomes of the comparisons, where all of the p-values show that there is no significant differences between the MACD and "buy/hold" results. This result simply implies that the MACD strategies do not outperform the "buy-and-hold" attitude.

Table 3: Bank Audi (AUSR) Paired Sample Test								
	Paired Differences					**t**	**df**	**Sig. (2-tailed)**
	Mean	**Std. Deviation**	**Std. Error Mean**	**95% Confidence Interval of the Difference**				
				Lower	**Upper**			
Signals – Buy/Hold	.0033927	.0466054	.0044437	-.0054144	.0121999	.763	109	.447
Margin – Buy/Hold	-.0022227	.0467063	.0044533	-.0110490	.0066035	-.499	109	.619
R2.0.5 – Buy/Hold	.0016636	.0533328	.0050851	-.0084148	.0117421	.327	109	.744
R2.1.1 – Buy/Hold	-.0002882	.0546561	.0052113	-.0106167	.0100404	-.055	109	.956
R.2.3.5 – Buy/Hold	.0088027	.1091880	.0104107	-.0118309	.0294363	.846	109	.400

4.2 BLOM Bank Stock Trading with Commissions

The paired sample t-test for the 132 ROIs corresponding to BLOM Bank's trading data after deducting the commission on every transaction provides similar results as those presented for Bank Audi in Table 3. As a matter of fact, Table 4 demonstrates that all the comparison p-values indicate no significant difference between the MACD strategies and the "buy/hold" attitude. Certainly, for this stock, there are no significant differences in ROIs between the "buy and hold" strategy and the MACD techniques.

Table 4: BLOM Bank Paired Sample Test								
	Paired Differences					**t**	**df**	**Sig. (2-tailed)**
	Mean	**Std. Deviation**	**Std. Error Mean**	**95% Confidence Interval of the Difference**				
				Lower	**Upper**			
Signals – Buy/Hold	.0014803	.0367635	.0031999	-.0048498	.0078104	.463	131	.644
Margin – Buy/Hold	-.0021932	.0392191	.0034136	-.0089461	.0045597	-.642	131	.522
R2.0.5 – Buy/Hold	.0014871	.0380051	.0033079	-.0050567	.0080310	.450	131	.654
R2.1.1 – Buy/Hold	-.0054697	.0848806	.0073879	-.0200847	.0091453	-.740	131	.460
R2.3.5 – Buy/Hold	-.0054697	.0848806	.0073879	-.0200847	.0091453	-.740	131	.460

4.3 Byblos Bank Stock with Trading Commissions

The same procedure that has been executed on Bank Audi and BLOM Bank was performed on the data from Byblos Bank. Once again, the monthly 133 ROIs have been calculated after deducting the transaction costs for the "buy/hold" attitude and the MACD different strategies. Table 5 shows that the p-values that resulted from the comparison tests indicate no significant differences between the MACD and "buy/hold" results, implying that the MACD techniques do not outperform the "buy-and-hold" method.

Table 5: Byblos Bank Paired Sample Test								
	Paired Differences					**t**	**df**	**Sig. (2-tailed)**
	Mean	**Std. Deviation**	**Std. Error Mean**	**95% Confidence Interval of the Difference**				
				Lower	**Upper**			
Signals – Buy/Hold	.0036511	.0420642	.0036474	-.0035638	.0108661	1.001	132	.319
Margin – Buy/Hold	-.0024466	.0434227	.0037652	-.0098946	.0050014	-.650	132	.517
R2.0.5 – Buy/Hold	.0050248	.0447927	.0038840	-.0026582	.0127078	1.294	132	.198
R2.1.1 – Buy/Hold	.0061947	.0481121	.0041719	-.0020576	.0144471	1.485	132	.140
R2.3.5 – Buy/Hold	.0061947	.0481121	.0041719	-.0020576	.0144471	1.485	132	.140

4.4 Solidere B Stock Including Trading Commissions

Having failed to achieve positive results in favor of the MACD strategies when stocks from the banking sector are considered, it was decided to move into a real estate stock. Solidere B is selected and the ROI results for 134 months have been calculated for both "buy/hold" and MACD strategies after deducting the transactions' commissions. Table 6 shows that all the p-value of the comparison tests point towards an insignificant difference between the mean of the "buy-and-hold" and the MACD methods, indicating that MACD strategies once again do not outperform the "buy-and-hold" approach.

Table 6: Solidere B Paired Sample Test								
	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Signals – Buy/Hold	.0070955	.0857621	.0074087	-.0075586	.0217497	.958	133	.340
Margin – Buy/Hold	-.0090187	.0750708	.0064851	-.0218460	.0038087	-1.391	133	.167
R2.0.5 – Buy/Hold	.0075313	.0895138	.0077328	-.0077639	.0228266	.974	133	.332
R2.1.1 – Buy/Hold	.0088328	.0894032	.0077233	-.0064435	.0241091	1.144	133	.255
R2.3.5 – Buy/Hold	.0088328	.0894032	.0077233	-.0064435	.0241091	1.144	133	.255

5. Discussion

The main salient result of the present study is that applying the MACD indicator to the main BSE stocks does not lead to preferring its techniques over the "buy-and-hold" approach. In fact, the current study aims at exploring if the MACD technical analysis tool is able to drive the Lebanese stocks trader into higher profitability levels. Unfortunately, for the Lebanese stock market, the results are discouraging, even though many studies abroad for other stock markets have reported promising results (Chong & Ng, 2008), (Chong, Ng, & Liew, 2014), (Rosillo, de la Fuente, & Brugos, 2013), (Radović, 2010), (Gold, 2015), and (Vidotto, Tonissi Migliato, & Zambon, 2009).

The Lebanese stocks considered in the present study share the same breakdown with that of the Bombay Stock Exchange (BSE) Sensex and National Stock Exchange (NSE) Nifty when the MACD techniques are applied; the results could not outperform the "buy-and-hold" strategy (Subramanian & Balakrishnan, 2014). Moreover, another TA tool, mainly "Bollinger Bands" is reported to provide discouraging profitability outcomes when applied to the Lebanese stocks (Hashem, 2015). These two failures (MACD and Bollinger Bands) might shed light on the ineffectiveness of applying technical analysis on Lebanese stocks.

Du Plessis (2012) experienced a failure in the MACD indicator in the South African equities market. Du Plessis concluded that MACD is effective for preventing losses but ineffective as an investment strategy. He suggested that as South African markets are not more active than the share market, MACD is more successful in active markets. His opinion is based on noticing that MACD perform better in active markets. Moreover, active markets have large and frequent volume of transactions, and trading does not affect prices even when it occurs in large quantities.

Du Plessis's concept (2012) could be convincing concerning the Lebanese securities because the main failure of technical analysis could be a reason of less liquid securities. Illiquid securities mean that there are inactive buyers and sellers, with light competition to fill transactions. This activity widens the spread between the 'bid and ask' prices of stocks. El Hokayem (2015) declares that technical analysis could be unsuccessful in the Lebanese securities due to the Lebanese Central Bank intervention in the financial markets, thus affecting the prices in the Lebanese Stock Exchange due to low liquidity in Lebanese securities. El Hokayem declares that prices can be easily manipulated because the Lebanese Stock Exchange Market is known to be a small inactive market.

A possible explanation of the failure of MACD techniques when applied to Lebanese stocks is that the tested shares or the period under study might not be proper for MACD. In fact, there could be other TA methods that could be used to test these securities. Specifically, MACD could be useful if used in combination with some other TA approach.

Furthermore, it is worth mentioning that even though the current study has used a diversified data set of shares that covers more than ten-years, the gamut involved is considered limited and unable to cover the whole Lebanese stock market behavior. On the long run, the MACD dynamic trades do not make sense since their potential profits are less than the static "buy-hold" approach. In the present case, the analyst is to be flexible; he/she can't stick to definitions and rules. He/she ought to be open minded and flexible to market changes, and "let the market talk".

6. Acknowledgements

References

[1] Achelis, S. B. (2000). Technical Analysis from A to Z. New York: Equis International.

[2] Appel, G. (2003, Summer). Become Your Own Technical Analyst: How to Identify Significant Market Turning Points Using the Moving Average Convergence-Divergence Indicator or MACD. Journal of Wealth Management, 6(1), 27-36.

[3] Beirut Stock Exchange. (2017). BSE. Retrieved January 2, 2017, from http://www.bse.com.lb/

[4] Cheung, Y.-W., Chinn, M., & Pascual, A. (2005). Empirical Exchange Rate Models of the Nineties: Are Any Fit to Survive? Journal of International Money and Finance, 1150–1175.

[5] Chong, T. T.-L., & Ng, W.-K. (2008, Nov 15). Technical analysis and the London stock exchange: testing the MACD and RSI rules using the FT30. Applied Economics Letters, 15(14), 1111-1114. doi:10.1080/13504850600993598

[6] Chong, T.-L., Ng, W.-K., & Liew, V.-S. (2014). Revisiting the Performance of MACD and RSI Oscillators. Journal of Risk and Financial Management.

[7] Constable, Simon (2016, September 5). Fundamental vs. Technical Stock Analysts. Retrieved January 7, 2017, fromhttp://www.wsj.com/articles/fundamental-vs-technical-stock-analysts-1473127202

[8] Du Plessis, A. W. (2012). The Effectiveness of a Technical Analysis strategy versus a Buy-and_hold strategy on the FTSE/JSE Top 40 Index shares of the JSE Ltd: The case of the Moving Average Convergence Divergence Indicator. Johannesburg: University of Johannesburg.

[9] Edwards, R., Magee, J., & Bassetti, W. (2013). Technical Analysis of Stock Trends Tenth Edition. Danvers: Taylor & Francis Group, LLC

[10] El Hokayem, J. (2015, December 9). Capital Market Conference. Beirut.

[11] Frankel, J. A., & Rose, A. (1995). Empirical research on nominal exchange rates, in: Gene Grossmann and Kenneth Rogoff (eds). Amsterdam, North-Holland: Handbook of International Economics.

[12] Gehrig, T., & Menkhoff, L. (2003). Technical Analysis in Foreign Exchange –The Workhorse Gains Further Ground. London.

[13] Gold, S. (2015). The Viability of Six Popular Technical Analysis Trading Rules in Determining Effective Buy and Sell Signals: MACD, AROON, RSI, SO, OBV, and ADL. Journal of Applied Financial Research, 2, 8-29.

[14] Hashem, Z. (2015). Lebanese Stock Market. Explaining Technical Analysis, Bollinger Band Methodology. Tyre: Islamic University of Lebanon.

[15] Hejase, Ale J., El-Hokayem, Jihad S., & Hejase, Hussin J. (2016). Technical analysis in practice: Exploring Lebanese stock market. International Journal of Business and Management Research, 9(1), 28-43.

[16] Hejase, A., & Hejase, H. (2013). Research Methods A Practical Approach for Business Students Second Edition. Philadelphia, PA: MasadirInc.

[17] Huang, B., & Kim, Y. (2016). A Test of MACD Trading Strategy. Canada: Simon Fraser University Library.

[18] Kabajeh, M. A., Al-Nu'aimat, S. M., & Dahmash, F. N. (2012). The Relationship between the ROA, ROE and ROI Ratios with Jordanian Insurance Public Companies Market Share Prices. International Journal of Humanities and Social Science. Vol. 2 No. 11, 115-120.

[19] Khan, M. N. (2006). Technical Analysis Plain and Simple, Second Edition. Charting the Markets in Your Language. New Jersy: Pearson Education, Inc.

[20] Kim, K., & Nofsinger, J. (2008). Behavioral finance in Asia. Pacific-Basin Finance Journal, 1–7.

[21] Malkiel, B. (1973). A Random Walk Down Wall Street. United States: W. W. Norton & Company.

[22] Marrs, J. (2000). Rule by Secrecy. New York: Harpercollins.

[23] Menkhoff, L., & Taylor, M. P. (2007, December). The Obstinate Passion of Foreign Exchange Professionals: Technical Analysis. Journal of Economic Literature, XLV, 936-972.

[24] Murphy, J. J. (1999). Technical Analysis of the Financial Markets. New York: Printice Hall Direct, Inc.

[25] Open Computing Facility. (2016). Technical Analysis: Introduction. Open Computing Facility, University of California, Berkeley. Retrieved December 12, 2016, from https://www.ocf.berkeley.edu/~jml/decal/techanalysis.pdf

[26] Person, J.L. (2004). A Complete Guide to Technical Trading Tactics. Hoboken, New Jersey: John Wiley & Sons.

[27] Pring, M. J. (1985). Technical Analysis Explained. The Successful Investor's Guide to Spotting Investment Trends and Turning Points. McGraw Hill.

[28] Radović, M. (2010, March). SERBIAN STOCK MARKET TREND ANALYSIS FROM 1st March, 2006 TO 31st March, 2009. Economic Themes, 48(1), 117-130.

[29] Rosillo, R., de la Fuente, D., & Brugos, J. (2013, April). Applied Economics, 45(12), 1541-1550. doi:10.1080/00036846.2011.631894.

[30] Royston, Guy (2011, November 9). Assessing a quantitative approach to tactical asset allocation. (MBA Thesis). Gordon Institute of Business Science, University of Pretoria, South Africa.

[31] Sarno, L., & Taylor, M. (2002). The Economics of Exchange Rates. Cambridge: Cambridge and New York: Cambridge University Press.

[32] Sarno, L., & Taylor, M. P. (2001). The microstructure of the foreign exchange market: a selective survey of the literature. Princeton, New Jersey: International Economics Section, Princeton University.

[33] Schwager, J. D. (1998). Getting Started in Technical Analysis. New York: John Wiley and Sons, Inc.

[34] Subramanian, V., & Balakrishnan, K. P. (2014, Jan). Efficacy of Refined MACD Indicators: Evidence from Indian Stock Markets. IUP Journal of Applied Finance, 20(1), 76-91.

[35] Suresh. (2013). A Study on Fundamental and Technical Analysis. International Journal of Marketing, Financial Services & Management Research, 2(5). Retrieved from http://www.indianresearchjournals.com

[36] Taylor, M. P. (1995). The economics of exchange rates. Journal of Economic Literature, 13-47.

[37] Vidotto, R. S., Tonissi Migliato, A. L., & Zambon, A. C. (2009, April-June). O Moving Average Convergence-Divergence como Ferramenta para a Decisão de Investimentos no Mercado de Ações. RAC - Revista de Administração Contemporânea, 13(2), 291-309.