

Testing the Effect of Technical Analysis Strategies on Achieving Abnormal Return: Evidence from Egyptian Stock Market

Osama El Ansary¹ & Mona Atuea²

¹ Faculty of Commerce. Cairo University. Giza. Egypt

² Ministry of Finance. Cairo. Egypt

Correspondence: Mona Atuea, Ministry of Finance, Cairo, Egypt.

Received: February 7, 2017

Accepted: February 21, 2017

Online Published: February 28, 2017

doi:10.5430/afr.v6n2p26

URL: <https://doi.org/10.5430/afr.v6n2p26>

Abstract

This study examined the effect of using inter and exit signals of three of the most common used technical analysis strategies on achieving abnormal return compared with the buy and hold strategy in the Egyptian security market. The tests were done using data for short term, relatively long term, during bull and bear market. Using bootstrap methodology and wilcoxon/mann-whitney test for daily closing prices during the period from 1-1-1998 to 14-1-2016, the results indicated that; First, market timing with technical analysis yields more return and reduces risk in general. Second, short term investing is not recommended at all, as it is less profitable even than bear market period. Third, in long term and during bull market technical analysis is more profitable than short term. Fourth, technical analysis importance have been reduced during the last few years due to the effect of the Egyptian revolution on the security market. As for investors, they should use technical analysis trading rules to determine when to enter and exit the market, so that they can improve their investment decisions, as it leads to achieve abnormal return and reduces risk more than buy and hold strategy in all cases, while pay more attention for the current and political events than before.

Keywords: Technical analysis, Market timing, Abnormal return, Bull market, Bootstrap methodology, Egyptian Security Market

1. Introduction

Return predictability has been a controversial issue that has started and still exist in western finance societies for about sixty years. This debate is important to the economists and has lead to a large amount of research being directed to this field. For a long time academics used to see that returns are not forecasted as if it is forecasted, other market investors would sure know about this forecasting feature and benefit it away. In reality a huge amount of investing all over the world is based upon believes that, value could be increased by using technical analysis strategies. Now academics admit the idea that returns is predictable to somewhat: while, most believe it is not available to achieve profits from this.

This study investigates the relationship between using technical analysis rules and achieving abnormal profits in the Egyptian security market, choosing Egyptian security market is due to differences between Egypt and the other emerging and developed countries in legal and political systems, country factors, market structure and development degree which make Egypt a unique opportunity to investigate.

The objectives of this research could be stated as follow, to determine whether technical analysis strategies yields more return than buy-and-hold strategy for short term, relatively long term trading, during bull and bear market, besides, to help in evaluating whether investing in the Egyptian exchange market is mainly based on information or noise based, also, to present recommendations for the individual investors, institutional investors, mutual fund managers, portfolio managers, technical analysts and brokerage companies

The contribution of this study to literature is that; first, to the best of our knowledge; it is the first study performed using Egyptian stocks data that compare the performance of technical analysis strategies to a real data of buy and hold return (which is a year holding period for short term and a two year holding period for long term, bull and bear market) and doesn't use risk free rate as a measure for naïve buy and hold method, which make the results of the study more realistic and valuable. Second, this is the first study that uses two statistical methods (bootstrap and Wilcoxon/ Mann- Whitney test) for analyzing the data of the Egyptian stock market which verify the results of the

study. Third, this is the first study that compares the performance of technical analysis strategies in short term, long term, bull market and bear market in the Egyptian exchange market. Fourth, this is the first study that indicates the effect of the political events on the Egyptian security market through comparing the performance of market timing strategies before and after the Egyptian revolution.

This research has its limitations which are; first, the study is performed using the data of the Egyptian stock market only and don't use data of any emerging or developed market due to time constraints. Second, only 27 of 30 companies of the EGX 30 Index were investigated and no other companies were tested due to data availability. Third, the timeframe of the study is only from 1/1/1998 to 14/1/2016 due to data availability.

This study proceeds as follow, first section is an introduction, second section provides literature review, third section details research methodology, section four displays Hypothesis Testing Results, section five concludes the main results, sixth and final section presents recommendations and future research.

2. Literature Review

2.1 Importance of Technical Analysis

Nison (1991) mentioned that the importance of market timing with technical analysis is five-fold.

First, the main concern for fundamental analysis is to provide an evaluation of the supply/demand situations, overpriced and underpriced securities, price learning's ratios, statistics for economy, and so on, the psychological factor is not included in the analysis, and financial markets are subject at times, to a wide scope, by emotional factors. A little of psychology can be reflected into a pound of facts and actions. As John Manyard Keynes mentioned, there is nothing as dangerous as an objective trading strategy in a subjective community. Technical analysis rules and indicators represent a unique method to show the subjective (emotional) composition in every market.

Second, technical analysts are also represents a significant part of disciplined investment. Discipline aids in mitigating the thoughts of all investors, in specific, emotional part. Once investors have fund in a security or portfolio, emotions is the driver and rationality and objective view are just riders. To proof that, have a try with paper investing, after that, have a try investing using your private money, soon you can see how thorough the counterproductive sides of feeling so tensioned and worry change the method that you invest and look to the market often in proportion to the money invested. Technical analysts can put rationality back into the driver's seat. So, they have tools and indicators to determine enter and exit signals, to specify risk-return ratio, or stop-out level. Through employing technical analysis strategies, investor promotes a risk and money management methodology for investing. So, it can be inferred from the previous discussion that technical analysts help markets to reach for objectivity.

The famous investor Jesse Livermore Nison (1991) mentioned that investor could watch the overall market objectively if he or she watches it at a space. Technical analysts help traders sit back to have a real view for the markets.

Third, watching the technical analysts has its importance even if traders do not completely think in their benefit. The reason is that, sometimes, the technical analysts are playing the main factor for some markets movement. As they may be markets directing element, they have to be monitored.

Fourth, random walk adherents believe that the price assigned by the market for specific security has no effect on its price the next day. In reality, the academics perspective neglects a known fact-investor, which is that, investors consider security price from any day to the following and building their decisions according to historical prices. So, investors' response do affect price, but price as a same affects investors' decisions. So, price itself is important part in analyzing markets. Participants who may neglect technical analysts don't consider for that important issue.

Fifth, prices movement is so easy and direct obtainable way of watching the whole market supply-demand relationship. Even though there may be fundamental-related information not yet published to the public traders but investor could anticipate that it is reflected in securities prices. Insiders whom posses more information about market directing factors will often perform buying or selling transactions until market price represent the private information's. This information, sometimes, may be reflected after the event happen. So, market price should represent all accessible information, regardless it is available to the general investors or to a select few (insiders).

2.2 Technical Analysis Rationale

Stevens (2002) argued that why should investor depend mainly on analyzing charts that show past and current price and volume data, besides technical indicators or formulas that employ some exact data? The causes are mentioned in notes of the security market, which first observed by Charles Dow and could be summarized as follow:

1. Efficient market. By time, market prices already represent all information that could be available about a stock or security and its expected performance. The mechanism of the market is highly effective at discounting whatever can lead prices. Even unpredictable events, such as appearance of new competitions, legality or finance related crisis, a firm acquisition, the death of a founder, and so forth are rapidly priced and reflected into the security. Even unpublished (not yet known) fundamental elements, for example a huge earnings decline, are rarely known or predicted by all participants; participants who have more information mostly start acting upon the private knowledge, and market volumes begins to increase rapidly. Here the matter is not mainly about private information available only to firm insiders. There are traders, participants and analysts outside a firm or an industry who see and predict changes coming, through intelligent observations and professional analytical tools.

2. Trends. Any news about a firms' security or its future performance that are represented in the security price will be represented in a price move or tendency to raise or fall. Trends are classified into up trends, down trends, and sideways also, or what is named trendless pattern, sideways movement is the third trend likelihood, for instance, a security goes through 40 and 50 multiple times. A trend is the performance of a body in movement staying in movement until an equivalent countervailing force changes it.

3. Reoccurrence. Price movements happen and repeated in patterns that are most of time can be forecasted. The idea behind pattern reoccurring is that history repeats itself. So, when there is a large amount of security available for sale (supply) before at 50 and that selling action lead to a change in prices, it might well be the case again when the security reaches that price again. If it doesn't, that indicates another thing also, as demand was this time high enough to absorb selling.

2.3 Theoretical Background

For a long time, it has been believed that security price move according to random walk hypothesis (RWH), random walk assumes that next price couldn't be forecasted by watching historical price, this idea has been introduced for the first time by Louis Bachelier (1900 cited in Kirkpatrick & Dahlquist, 2007) in his Phd thesis. Lo and Mackinlay (1988 cited in Kirkpatrick & Dahlquist, 2007) developed a simplified mathematical model to prove the nonrandomness of security price. They perform a more advanced survey of previous studies. While doing this survey, they discovered that many authors (Larson, 1960; Alexander, 1961; Osborne, 1962; Cootner, 1962) and others had also proved that the random walk in securities prices does not exist in real markets Kirkpatrick and Dahlquist (2007).

Besides, it has been believed for time that markets reactions to coming information is vulnerable to efficient market hypothesis (EMH), which appeared in the 1960s from Eugene Fama's Ph.D. dissertation mention that, security prices for any specific point, completely represent all accessible information. The imply of this hypothesis is that, the market price of a security is a fair estimation of its intrinsic value, thus no trading method can be employed to beat the markets Kirkpatrick and Dahlquist (2007).

In real practice, there are a large number of anomalies that puts EMH in question, among those are: the profitability of technical analysis strategies, lag relation between volume and returns, calendar effect like time of the day, day of the week effect, time of the month, turn of the year and short term momentum.

Emerging markets are arguably subjected for nonsynchronous which is documented when lower liquid levels and low volume level are dominated in a market, also investors in emerging markets respond slower and more gradually to coming news comparing with developed markets, in addition, emerging markets are characterized by both high volatility and high persistence in a security return comparing with developed markets, which represent holes in EMH and indicate the likelihood of some market inefficiencies that may present chances for realizing abnormal return to traders Hallett (2012).

One of the popular researches on the topic of market timing with technical analysis was the study of Lo and MacKinlay (1988) which explained an argument against the known study of Fama (1970) that market price completely represent all accessible information and ended by producing discussions for the formations of the idea of relatively efficient market, which refers to avoid comparing any market and their inefficiency with "frictionless-ideal" markets, and instead, participants have to pay attention to the changing levels of efficiency that occur inside the market Hallett (2012).

2.4 Empirical Studies

A study performed by Caginalp and Laurent (1998) tested the forecasting ability of candlestick pattern through employing two sets of data, that include daily prices of all S&P 500 stocks and used non-parametric test between the period from 1992-1996.

They found that using candlestick technique resulted in tripling of the initial fund during a one-year period.

In Madrid Stock Exchange, Rodriguez et al (1999) conducted a study to determine whether some market timing strategies of technical analysis could forecast securities prices directions, for that end, they used daily data for general index of the Madrid Stock Exchange (IGBM) during the period from 1966 to 1997 and applied bootstrapping methodology, AR (1), GARCH and GARCH-M to test fixed-length-moving-average, variable-length-moving-average and trading-range-break-out rules.

They found that market timing strategies provide buy signals that generate high return than sell signals. The study suggested that, technical analysis has the ability to predict prices movement, besides, return generated from buy signals are less volatile than return following sell signal, therefore, the findings represent strong evidence for the profitability of simple technical analysis strategies.

Another study by Tian et al (2002) investigated whether some strategies of market timing techniques could forecast security price direction and abnormal return in U.S equity market and China security market.

They studied 412 rules in U.S equity market and Chinese market using daily closing price for DJIA, 'A'(SHA) and 'B' (SHB) indices during the period 1926-2000 for DJIA and the period 1992-2000 for 'A' (SHA) and 'B' (SHB).

They tested variable-length-moving-averages strategies, fixed-length-moving-averages strategies and trading-range-break-out strategies and found that for the period before 1991, some strategies of market timing techniques involve declining predicting ability for U.S equity index, for the period 1992-2000, there is no proof at all to support market timing predicting ability in U.S equity index and that these simple rules failed to perform better than buy and hold method, in Chinese indices, the findings provide a support for the technical strategies to predict stock price movements and allowing trader to make possible excess profits.

Using data of exchange rates, Luke (2003) studied the profitability of head-and-shoulder technical analysis pattern, for the US dollar, the German Mark, the British Pound, the Swiss Franken and the Japanese Yen during the period that ranged from 3/1/1973-6/3/1999 according data availability for each currency.

The results that were found are generally negative: Return to head and shoulders are not significantly positive.

In China, Li and Chen (2004) examined the usefulness of technical analysis, they used daily closing price for the 39 stocks listed in Shenzhen Stock Exchange(SZSE) and for the aggregate SZSE index over the period from 1994 to 2002 and applied AR(1) model.

The result of the study provide a very weak proof supporting the return forecasting using technical trading rules and also challenges the view of market inefficiencies for Chinese security market.

In U.S security market, Chandrashekar (2005) examined the most commonly used technical trading rules.

The study used daily series of NYSE, AMEX, and NASDAQ indices during the periods that ranged from 1963 to 2002 and tested moving average rules with lags by applying bootstrapping methodology, EGARCH(1,1) and GARCH-M(1,1).

The results of the study indicated that returns to technical trading strategies do vary according to firm size; for large stocks, technical trading strategies don't earn abnormal returns better than buy and hold method; regarding small stocks, technical trading strategies can achieve abnormal average return per month of 1.7%.

The findings indicate that, the good performance of market timing rules falls apparently as organization size increases, which supports the result reached by Blume et al. (1994) that market timing techniques is more suitable for smaller securities than for larger securities.

The profitability of technical analysis using daily return data for four indices: DJIA, S&P 500, NASDAQ composite, and Russel 2000 from 1989 through 2002 were examined by Hsu and Kuan (2005). They construct 7846 trading rules from five types of market timing strategies; filter rules, moving average, support-and-resistance, channel break-outs and on-balance volume averages, they also tested professional trader's rules; learning strategies, vote strategies and position changeable rules.

The study applied White's Reality Check and found that, the profitability of simple market timing strategies and trader's rules is proven and statistically significant for the sample of relatively-young markets (NASDAQ composite and Russel 2000) but not for those mature markets (DJIA and S&P 500) and that these strategies provide excess return than buy and hold method. They also discovered that trader's rules have the ability to increase the returns of simple strategies and provide significant returns more than unprofitable simple strategies.

In Indian equity market, Sundhar and Kakani (2006) studied the profits of market timing techniques through employing simple moving average and displaced moving average technical strategies during the years 1991-2005.

The study used daily closing price on aggregate level for S&P CNX Nifty and BSE Sensex for individual stocks.

They applied regression model and found that using moving average and displaced moving average were successful and extra normal returns can be earned using two strategies which they consider a proof against weak form efficiency of Indian equity market.

A good study by Marshall et al (2007) tested the profits of technical analysis techniques for candlestick technical analysis in the US equity market. They used individual stock data for those firms that were listed in the DJIA during the period 1/1/1992-31/12/2002. The study applied bootstrap methodology, random walk, autoregressive process of order one AR(1), GARCH-M and EGARCH null models and reached to a conclusion that candlestick method are not profitable in general when tested on large US stocks, neither bull or bear candlestick single lines patterns generate enter or exist signals that are beneficial than would be achieved by mere chances and building investing decisions only on those strategies don't appear to be profitable.

In eight Asian-Pacific equity markets Linto (2007) tested the performance of nine market timing strategies. The study used daily closing price for the stock market indices of Australia, Bombay Stock Exchange (BSE) in India, Jakarta in Indonesia, Korea Composite Stock Price Index (KOSPI), Nikkei in Japan, Hang Seng in Hong Kong, Straits in Singapore and Taiwan Stock Exchange (TSE) in Taiwan.

The study examined moving average and trading range break-out for periods ranged from 1987 to 2005. The study found that on average, the profits can be generated by market timing strategies in Bombay, Hong Kong, Indonesia, Korea, Singapore and Taiwan and that buy signals can contain relevant trading information, also, the annualized profits from these market timing strategies is higher than simple buy and hold method.

The findings of the research agree with the argument that some of the Asia- pacific markets are not informationally efficient.

Another study by Marshall et al (2008) investigated the profitability of the old famous market timing technique; candlestick in Japanese equity market during the 1975-2004 time horizon using daily price data for the largest 100 stocks that were included on Tokyo Stock Exchange.

They applied bootstrap methodology and adopt four process for stock prices; random walk, autoregressive process of order one AR(1), GARCH-M and EGARCH.

They found that Japanese candlestick charting doesn't achieve profits in either, 30 year horizon, in three 10 year sub-period or during bull and bear market.

A research by Marshall et al (2009) tested whether moving average and trading- range-break-out technical trading rules are profitable on U.S securities with certain size, liquidity and industry features.

They used data of all securities included in NYSE and NASDAQ market during the time 1990-to 2004 and applied bootstrap methodology, autoregressive process of order one AR(1), GARCH-M and EGARCH.

They found that, the tested strategies don't achieve profits when tested on most of the securities, the market timing strategies achieve more profits on smaller illiquid securities, while this finding were not strongly supported, there were no relation between a company's industry and technical analysis profits, also, technical analysis rules do produce statistical significant high returns for long term investing decisions, besides, the returns seem to be greater than the transactions cost.

A study to assess whether investors could trade a security actively to outperform a naive trading method in the U.S stock market was performed by Coe and Laosethakul (2010). The study employed four market timing strategies which are, the arithmetic moving average, the relative strength index, the stochastic oscillator and its moving average on the securities that comprise S&P 100, NASDAQ 100 and S&P Midcap 400 indices during the period 2000-2009, a horizon of time that witnessed bull and bear market cycle.

The results were found to be discouraging to these strategies, in that no specific market timing strategy beats long term buy and hold method.

In Mexican security market Gomez et al (2010) investigated four market timing strategies.

The study tested moving average, relative strength index, moving average divergence and stop and reversal rules during the period 1988-2009 by employing daily closing prices of the Mexican Stock Index (IPC).

The results of the study indicated that moving average and relative strength index have predictive power of the Mexican security market and that these rules can generate more profits than buy-and-hold method which shed doubt about the efficiency of Mexican security market.

In ten emerging foreign exchange markets, Kuang et al (2010) studied the profitability of market timing strategies during the periods that ranged from 1994-2007 according to data availability. They tested simple trading rules, charting rules and complex rules; the final number of rules was 25988 and applied superior predictive ability (SPA) test, step M test and step wise SPA test.

They found hundreds to thousands of the rules seems to be profitable, but most of all these profits disappear when data snooping bias is considered, they reached to a comprehensive conclusion that the profits of market timing rules are unrealistic which they considered a rare proof against the efficiencies of emerging foreign exchange markets.

Also, Isakov and Merti (2011) performed a study to investigate the profitability of market timing techniques and to test the ability of technical analysis to forecast short term trend on S&P 500 index during the period 1990-2008. The study applied new market timing test based on simulation to test moving averages computed over a long interval and a short interval.

The study found that using complex trading strategies leads to profitable results, in that they yield compounded profit from 274% to 572% comparing with buy and hold method that produce only 90%, and indicated that technical analysis strategies generates high profits when signals are provided over long horizons, also, complex moving average strategies has the ability to discover and obtain advantages of long-term market directions, which, they represent a challenge to the efficient market hypothesis.

A unique research by Marshall et al (2011) tested the profitability of market timing techniques in 23 developed and 26 emerging markets that make up the Morgan Stanley Capital Market Index (MSCI) during the period 2001-2007. They studied 5000 trading rules from four different families, filter rules, moving averages rules, channel break-out and support and resistance rule and applied bootstrap techniques (that was introduced by Brock et al (1992) and that was introduced by Sullivan et al (1999)).

They conclude that market timing techniques performance is better in emerging markets than in developed markets.

In 34 emerging indices, Pauwels et al (2011) investigated the effectiveness of technical trading rule. The strategies performance was calculated by utilizing White's Reality Check superior predictive ability test.

They found that market timing strategies don't have the ability to perform better than naïve buy and hold strategy, there were significant profits from using trading strategies in 4 of 34 tested markets; also, there were a proof that market timing strategies is generating more profits during crisis periods.

In Taiwan Stock Exchange, Shiu and Lu (2011) investigated the forecasting ability of one the widely famous market timing strategies, candlesticks, using two-day patterns. The study used daily data of price and volume for 69 electronic stocks through ten years from 1998-2007 and applied quantile regression model. They indicated that, harami pattern involve information for short term price directions based on supply and demand in Taiwan security Market, as the harami signals are positively significant .

Also, in western context; Lu and Chen (2013) investigated whether an old Japanese trading technique candlestick can function using data of the stocks listed in FTSE 100, DAX 40 and CAC 30 from the period 2-1-2003 to 31-10-2012, they employed bootstrap methodology and developed a vector approach to categorize a wider variety of two-day pattern. They found that, first; the candlestick method has predictive power and can generate value for investors in the three main European stock markets. Second, the direct comparisons between the three markets carried out in this study reveal that candlestick charting would need to be used differently in each of these markets. Third, the global financial crisis reduced the efficacy of candlestick patterns in these markets. And finally they considered that the result is against the efficient market hypothesis.

Recently, Abbad et al (2014) examined the ability of market timing strategies to forecast future prices in Amman Stock Exchange. The study used daily closing price for the general index of Amman stock market from 2000-2007 and tested moving average rules. The findings indicated that market timing strategies of moving average generate profitable buy and sell signals and suggested that market timing techniques have the ability to predict prices directions; also, return following buy signals are more profitable than return following sell signals.

Pauwels et al (2011) argued that the early users of technical analysis may be able to achieve profitable results, but after publication, superior performance will not persist, in other words technical analysis is self-destructive, and they

indicated that this viewpoint is in support of Lo's adaptive market hypothesis, which stated that market efficiency has to be seen as an evolutionary process.

From previous presentation of the empirical studies it can be inferred that;

- Technical analysis topic has been broadly tested in both developed and emerging markets.
- Some studies tested whether technical analysis profits are positive or not, while others, tested whether technical analysis could perform better and lead to achieve abnormal return compared with naïve buy and hold strategy or not.
- Many technical analysis strategies were tested both mathematical and chart rules.
- Of the mathematical strategies, moving average based techniques are the most tested.
- Of the chart strategies, head and shoulders and candlesticks are the most tested.
- Different horizons were employed for testing technical analysis strategies, short term, long term, during bull market, during bear market and subsamples were also employed.
- Of the many statistical methods that were employed for testing technical analysis strategies bootstrap methodology is the widely used and best fit for these tests.

No conclusive evidence has been reached yet regarding the usefulness of technical analysis, even though, it can be inferred that technical analysis has its advantages over naïve buy and hold passive strategy and leads to achieve abnormal return specially in emerging markets.

3. Research Methodology

3.1 The Sample

The research sample consists of 27 companies listed in EGX 30 Index according to data availability from 1998 to 2015. Choice of EGX 30 companies is due to it includes the highest liquid and active thirty companies.

Many authors e.g. Marshall et al. (2006) mention that it is worthless to achieve returns to market timing rules on small, illiquid securities if it is not be available to achieve returns that are economically significant.

3.2 Data

The study data set is daily closing price for each stock. These data were collected from Egyptian security market and Mubasher Company.

The research covered the period from 1/1/1998 to 14/1/2016, as it witnessed the beginning of introducing electronic system in the Egyptian security market. Sub periods were considered before and after the Egyptian revolution to shed light on the effect of political events on the Egyptian security market.

Choosing data issue is of importance to examination of market timing techniques. Firstly, chosen data must be traded in reality as they are tested.

Secondly, also, a critical issue is that, the study data are from securities of enough liquidity to enable market investors to achieve meaningful profits. The liquidity is of importance to perform a test of market timing strategies. Technical analysts believe that it represents whole market psychology. So, it is less useful for trading illiquid securities whose prices are more subject to changes by as little as one market investor.

Finally, it is statistically recommended that theories are tested on data that are unlike those on which they were developed. This ascertains that the theories are not only applied on the one data set.

The study data set was chosen to be sure that data snooping bias is minimized. Data snooping bias could happen in case the same data set that is used to develop a theory is used to examine and verify the same theory Marshall et al (2007).

The reason behind using daily data is its many advantages which Pisedtasalasai and Gunasekarage (2007) mentioned:

- Short term data are more suitable to investigate causality relationships between return and other variables.
- Time series variations in conditional volatility appear to be much weaker for long term returns.

MetaStock, Matlab and E-views software were employed for data analysis.

3.3 Statistical Methods

3.3.1 Bootstrapping Methodology

In accordance with the research of Marshall et al (2007) a bootstrapping method has been applied, this procedure has advantages is many, Firstly, it is unlike t-statistics, that bootstrap method could account for well known behavior of securities return data such as skewness and leptokurtosis. Secondly, the bootstrap methodology is robust in its ability to accommodate for non-normality, autocorrelation, and conditional heteroskedasticity. Thirdly, it allows the estimation of standard deviations and confidence interval for the estimators. Fourthly, it enables simulating distributions of trading rules returns by any specified model. Fifthly, bootstrapping methodology has the added advantage of being able to be used to calculate the riskiness of the different technical analysis strategies.

The essence of standard bootstrapping methodology could be described as follows, think of the simple problem where a DGP (a statistical model), ρ provides a random sample $X = \{X_1, \dots, X_n\}$ of size n . Assume we need to examine the sampling distribution of an estimator θ of some unknown parameter θ . Commonly, θ is one specific trait of the DGP ρ and $\theta = \theta(X)$ is a statistics function of the random sample X . Knowing of $L(\theta(X))$, the sampling distribution of $\theta(X)$, is exactly we want to evaluate the bias, the standard deviation of $\theta(X)$ and to derive bounds of confidence intervals of any needed level for θ Shimizu (2010).

With the exception of few simple problems (like estimating the mean and the variance of a normal model) the sampling distribution $L(\theta(X))$ is unknown and the asymptotic approximations are not available. The objective of the bootstrapping methodology is to present an approximation of this distribution which will be easy to get by employing Monte-Carlo approximations. Considering regularity circumstances the only thing that will be needed to execute the bootstrapping method is a consistent estimator of the DGP ρ Shimizu (2010).

In this research, Matlab software was used to calculate:

-Bootstrapped average return for the three trading rules in short term, long term, bull market, bear market and bootstrapped average return for buy and hold method to indicate whether market timing rules in short term, long term, bull market and bear market yields more return compared with naïve buy and hold method.

-Bootstrapped standard deviation for the three trading rules in short term, long term, bull market, bear market and bootstrapped standard deviation for naïve buy and hold strategy to indicate whether technical analysis rules in short term, long term, bull market and bear market which strategy is more or less risky against naïve buy and hold strategy.

3.3.2 Wilcoxon/Mann-Whitney Test

To verify the findings, the analysis for long term period was repeated using Wilcoxon/Mann-Whitney test.

The results of this analysis indicates which trading rule is better against buy and hold method and the significance level, so the analysis is done using data of return from the three strategies versus the return from passive buy and hold strategy.

E-views software was used to perform this analysis.

3.4 The Trading Strategies that is Tested

- Relative strength index (RSI) is one of technical indicators that are widely employed in the technical analysis of securities markets. It is utilized to indicate the recent and historical strengths or weaknesses of a security or market upon on the closing prices of the last recently investing period Anonymous (2011).
- Stochastic oscillator (K) is one of the momentum indicators that utilize support and resistance levels. The term stochastic reflects the place of a recent price in proportion to its price range over a period of time. This technique tries to forecast price turning points by comparing the closing price of a security to its price range Anonymous (2011).
- Money flow index (MFI) is an oscillator that is calculated for an N-day period, ranging from 0 to 100, representing money flow on raising periods as a percentage of the total of rising and falling periods. Money flow in technical analysis is typical price multiplied by volume; some kind of approximation to the value of a period's investing Anonymous (2011).

3.5 Buy and Hold Strategy (BH)

Buy-and hold method is the naïve simple trading strategy that buys a diversified stock market index and holds it. This strategy assumes that traders would maintain a security if it has probable tradeoff with the risk degree the security contains. So the traders make their own opinion on whether a security is worth holding, without referring to

technical analysis to determine inter and exit point or fundamental analysis to evaluate the financial status of their investments and whether these securities are overpriced or underpriced.

3.6 Research Hypotheses

- Hypothesis one: There is a statistically significant relationship between using technical analysis strategies and improving return in short term more than buy and hold strategy.
- Hypothesis two: There is a statistically significant relationship between using technical analysis strategies and improving return in long term more than buy and hold strategy.
- Hypothesis three: There is a statistically significant relationship between using technical analysis strategies and improving return in bull market more than buy and hold strategy.
- Hypothesis four: There is a statistically significant relationship between using technical analysis strategies and improving return in bear market more than buy and hold strategy.

4. Hypothesis Testing Results

4.1 Testing Hypothesis One

The first hypothesis stated that: There is a statistically significant relationship between using technical analysis strategies and improving return in short term more than buy and hold strategy.

Bootstrap methodology was used to explore the relationship between return from using passive buy and hold strategy as dependent variable and return from using technical analysis trading rules as independent variable in short term using 10 days period.

Using RSI strategy inter and exit signals to the market, relative strength index yields more return comparing to buy and hold in 20 companies and the risk is less than buy and hold strategy in 21 companies, table 1, indicates these results.

As for k strategy, it can be inferred from table 2, that stochastic oscillator return is higher than buy and hold in 22 companies and the risk of stochastic oscillator is less than buy and hold strategy in 18 companies.

Regarding MFI market timing strategy, table 3, shows that Money flow index return is better in 19 companies and the risk is less than buy and hold method in 18 companies.

The previous analysis reveals that, the performance of the three strategies are nearly the same in terms of generating higher return and reducing risk in short term compared with buy and hold strategy; however, it could be noticed that the performance of K (stochastic oscillator) is somewhat better than RSI (relative strength index) and MFI (money flow index) in terms of generating higher return in 22 companies and the that the performance of RSI (relative strength index) is better in terms of reducing risk in 21 companies.

From the above analysis it can be inferred that in short term technical analysis is better than buy and hold in terms of high return and low risk, so the first hypothesis of the study is accepted.

Table 1. Bootstrapping Results for RSI Strategy in Short Term

Company	× RSI	× BH	σ RSI	σ BH
Arab Cotton Ginning	-0.006	0.225	-0.203**	0.15
Abu Dhabi Islamic Bank	0.0077*	0.0668	0.0010**	0.0017
Ajwa	-0.0581*	-0.4995	0.0727	-0.5001
Middle Egypt Flour Mills	-0.1428	0.1138	-0.0329**	0.1008
CIB	-0.0324*	-0.2737	-0.424**	-0.3547
Eastern Co	0.0374*	-0.0477	0.0485	-0.0525
Gemma	0.0678*	-0.2702	-0.8810**	-0.2498
Egyptian Financial&Industrial	-0.1927	-0.0897	-0.1715**	-0.1638
Kima	-0.2265*	-0.8406	-0.2073**	-0.4406
El Kahera Housing	0.0067*	-0.0188	-0.0187**	-0.1512
Al Shams Housing	0.0568*	0.0471	0.0657**	0.0826
ICON	-0.0996*	-0.2097	-0.0922	-0.2111
Egyptian Starch & Glucose	-0.1121*	-0.3335	-0.291**	-0.2887
Ezz Steel	-0.1704	-0.1345	-0.0869	-0.1898
Giza General Contracting	0.063*	-0.4493	-0.783**	-0.2222
General Co for Silos & Storage	0.048*	0.033	0.0401**	0.0566
Heliopolis Housing	0.1908*	0.0091	-0.0828**	0.0046
EFG Hermes	0.0653*	-0.5669	-0.772**	-0.4265
Egyptian Iron & Steel	-0.1229*	-0.1562	-0.0993	-0.1806
Kabo	0.13*	0.029	0.1296**	0.2617
Misr Chemical Industries	0.2859*	0.2145	-0.3814**	0.3223
Madinet Nasr Housing	0.0147	0.0671	0.0185**	0.0595
SODIC	0.1942*	0.1157	0.1396**	0.2217
Oriental Weavers	0.1708	0.2274	0.2697**	0.3363
Suez Cement	0.2686	0.2831	0.1847**	0.3101
United Arab Stevedoring	-0.0825*	-0.4137	-0.2042	-0.4071
Elsaheed Contracting	-0.4551*	-0.2633	-0.497**	-0.1744

*Refers to high average of RSI than BH

** Refers to low standard deviations of RSI than BH

- × RSI: represents the bootstrapped average of RSI in short term.
- × BH: represents the bootstrapped average of BH in short term.
- σ RSI: represents the bootstrapped standard deviation of RSI in short term.
- σ BH: represents the bootstrapped standard deviation of BH in short term.

Source: prepared by the authors.

Table 2. Bootstrapping Results for k Strategy in Short Term

Company	$\times K$	$\times BH$	σK	σBH
Arab Cotton Ginning	-0.05	0.225	-0.04**	0.15
Abu Dhabi Islamic Bank	0.0677*	0.0668	-0.003**	0.0017
Ajwa	-0.0981*	-0.4995	0.4527	-0.5001
Middle Egypt Flour Mills	-0.2428	0.1138	-0.3329**	0.1008
CIB	-0.0752*	-0.2737	-0.064	-0.3547
Eastern Co	0.0474*	-0.0477	-0.385**	-0.0525
Gemma	0.2278*	-0.2702	-0.3321**	-0.2498
Egyptian Financial&Industrial	0.1027*	-0.0897	0.1015	-0.1638
Kima	0.2005*	-0.8406	-0.6621**	-0.4406
El Kahera Housing	0.0667*	-0.0188	0.0228	-0.1512
Al Shams Housing	0.0568*	0.0471	0.07757**	0.0826
ICON	-0.2996	-0.2097	-0.1922	-0.2111
Egyptian Starch & Glucose	0.2121*	-0.3335	0.1301	-0.2887
Ezz Steel	-0.2604	-0.1345	-0.6469**	-0.1898
Giza General Contracting	0.263*	-0.4493	-0.2283**	-0.2222
General Co for Silos & Storage	0.088*	0.033	0.0501**	0.0566
Heliopolis Housing	0.1668*	0.0091	-0.0448**	0.0046
EFG Hermes	0.1653*	-0.5669	0.1162	-0.4265
Egyptian Iron & Steel	-0.2529	-0.1562	-0.1693	-0.1806
Kabo	0.0967*	0.029	-0.3096**	0.2617
Misir Chemical Industries	0.4459*	0.2145	0.2214**	0.3223
Madinet Nasr Housing	0.0737*	0.0671	0.0155**	0.0595
SODIC	0.3542*	0.1157	-0.4396**	0.2217
Oriental Weavers	0.263*	0.2274	0.1597**	0.3363
Suez Cement	0.3486*	0.2831	-0.5547**	0.3101
United Arab Stevedoring	0.0725*	-0.4137	0.1042	-0.4071
Elsaeed Contracting	0.1551*	-0.2633	-0.297**	-0.1744

*Refers to high average of k than BH. **Refers to low standard deviation of K than BH.

- $\times k$: represents the bootstrapped average of k in short term.
- $\times BH$: represents the bootstrapped average of BH in short term.
- σk : represents the bootstrapped standard deviation of k in short term.
- σBH : represents the bootstrapped standard deviation of BH in short term.

Source: prepared by the authors.

Table 3. Bootstrapping Results for MFI Strategy in Short Term

Company	×MFI	×BH	σ MFI	σ BH
Arab Cotton Ginning	-0.023	0.225	-0.01**	0.15
Abu Dhabi Islamic Bank	0.0947*	0.0668	-0.033**	0.0017
Ajwa	-0.0711*	-0.4995	0.4827	-0.5001
Middle Egypt Flour Mills	-0.2158	0.1138	-0.3029**	0.1008
CIB	-0.0482*	-0.2737	-0.434**	-0.3547
Eastern Co	0.0744*	-0.0477	-0.0985**	-0.0525
Gemma	0.2548*	-0.2702	-0.3621**	-0.2498
Egyptian Financial&Industrial	0.1297*	-0.0897	0.0905	-0.1638
Kima	0.1905*	-0.8406	0.1956	-0.4406
El Kahera Housing	0.0567*	-0.0188	-0.18**	-0.1512
Al Shams Housing	0.0368	0.0471	0.06657**	0.0826
ICON	-0.3096	-0.2097	-0.2032	-0.2111
Egyptian Starch & Glucose	0.2021*	-0.3335	-0.3191**	-0.2887
Ezz Steel	-0.2704	-0.1345	-0.1479	-0.1898
Giza General Contracting	0.253*	-0.4493	0.2083	-0.2222
General Co for Silos & Storage	-0.002	0.033	0.0401**	0.0566
Heliopolis Housing	0.1968*	0.0091	0.0038**	0.0046
EFG Hermes	0.1953*	-0.5669	0.1362	-0.4265
Egyptian Iron & Steel	-0.2229	-0.1562	-0.1493	-0.1806
Kabo	0.1267*	0.029	-0.3296**	0.2617
Misr Chemical Industries	0.4759*	0.2145	0.2414**	0.3223
Madinet Nasr Housing	0.0337	0.0671	0.0355**	0.0595
SODIC	0.3842*	0.1157	-0.4596**	0.2217
Oriental Weavers	0.293*	0.2274	0.2797**	0.3363
Suez Cement	0.3786*	0.2831	-0.5747**	0.3101
United Arab Stevedoring	0.1025*	-0.4137	0.1242	-0.4071
Elsaeed Contracting	0.1851*	-0.2633	-0.317**	-0.1744

*Refers to high average of MFI than BH. ** Refers to low standard deviations of MFI than BH.

- ×MFI: represents the bootstrapped average of MFI in short term.
- ×BH: represents the bootstrapped average of BH in short term.
- σ MFI: represents the bootstrapped standard deviation of MFI in short term.
- σ BH: represents the bootstrapped standard deviation of BH in short term.

Source: prepared by the authors.

4.2 Testing Hypothesis Two

The second hypothesis stated that: There is a statistically significant relationship between using technical analysis strategies and improving return in long term more than buy and hold strategy.

Bootstrap methodology was used to explore the relationship between return from using passive buy and hold strategy as dependent variable and return from using technical analysis trading rules as independent variable in long term using 100 days period.

Using RSI strategy, return is better than buy and hold in 24 companies and the risk is less in 18 companies.

For k strategy, return is higher than buy and hold in 24 companies and the risk of stochastic oscillator is less than buy and hold method in 19 companies.

Regarding MFI, return is better than buy and hold in 24 companies and the risk are less than buy and hold method in 18 companies.

The previous analysis shows that, the performance of the three strategies are nearly the same in terms of generating higher return and reducing risk in long term compared with buy and hold strategy; although we can notice that the performance of K (stochastic oscillator) is somewhat better than RSI (relative strength index) and MFI (money flow index) in terms of reducing risk in 19 companies.

when the analysis was repeated using Wilcoxon/Mann-Whitney test; it turns out that, using relative strength index strategy is better than buy and hold method for 20 companies as shown in table 4, stochastic oscillator method is better than buy and hold method for 19 companies and money flow index strategy is better than buy and hold method for 18 companies, while the results are not significant.

Upon these results, technical analysis improves return and reduces risk in long term, so the second hypothesis of the study is accepted.

Note: tables for this hypothesis results and the following hypotheses are available upon request.

Table 4. Wilcoxon/Mann-Whitney Results for RSI Strategy

Company	Best Strategy	Value	Probability
Abu Dhabi Islamic Bank	RSI	0.312822	0.5083
Arab Cotton Ginning	RSI	0.889096	0.537
Ajwa	RSI	.732847	0.7831
Middle Egypt Flour Mills	RSI	.362876	0.2259
CIB	Hold	1.666835	0.8977
Eastern Co	RSI	0.637896	0.8898
Gemma	RSI	0.145813	0.98441
Egyptian Financial&Industrial	RSI	0.55032	0.5467
Kima	RSI	0.374906	0.8921
El Kahera Housing	RSI	0.674813	0.3262
Al Shams Housing	Hold	0.46533	0.8532
ICON	Hold	1.2579	0.4892
Egyptian Starch & Glucose	RSI	.554532	0.6873
Ezz Steel	Hold	0.661511	0.1128
Giza General Contracting	RSI	0.654209	0.5429
General Co for Silos & Storage	RSI	.7535247	0.8521
Heliopolis Housing	RSI	0.2394	1.008
EFG Hermes	Hold	0.906246	0.1189
Egyptian Iron & Steel	RSI	.835412	0.2547
Kabo	RSI	0.686658	0.97409
Misr Chemical Industries	RSI	0.103022	0.6654
Madinet Nasr Housing	RSI	0.007574	0.6252
SODIC	Hold	0.788302	0.8286
Oriental Weavers	RSI	.882835	0.15687
Suez Cement	RSI	.867954	0.34212
United Arab Stevedoring	RSI	0.656209	0.5439
Elsaeed Contracting	Hold	0.258404	0.76548

Source: prepared by the authors.

4.3 Testing Hypothesis Three

The third hypothesis stated that: There is a statistically significant relationship between using technical analysis strategies and improving return in bull market more than buy and hold strategy.

Bootstrap methodology was used to explore the relationship between return from using passive buy and hold strategy as dependent variable and return from using technical analysis trading rules as independent variable in bull market.

In bull market and using RSI strategy, returns is higher than buy and hold method for 21 companies and the risk of relative strength index is less than buy and hold method in 12 companies.

For k strategy, return is higher than buy and hold in 22 companies and the risk of stochastic oscillator is less than buy and hold method in 16 companies.

Also using MFI strategy during bull market, it turns out that money flow index return is higher than buy and hold in 21 companies and the risk is less than buy and hold method in 16 companies.

The above analysis shows that, the performance of the three strategies are nearly the same in terms of generating higher return and reducing risk during bull market compared with buy and hold strategy; but we can notice that the performance of K (stochastic oscillator) and MFI (money flow index) is better than RSI (relative strength index) in terms of reducing risk.

The previous results indicate that technical analysis is better than buy and hold during bull market, so the third hypothesis of the study is accepted.

4.4 Testing Hypothesis Four

The fourth hypothesis stated that: There is a statistically significant relationship between using technical analysis strategies and improving return in bear market more than buy and hold strategy.

Bootstrap methodology was used to explore the relationship between return from using passive buy and hold method as dependent variable and return from using technical analysis trading rules as independent variable in bear market.

During bear market and using RSI strategy, returns is higher than buy and hold method for 23 companies and the risk of relative strength index is less than buy and hold method in 13 companies.

For k strategy, return is higher than buy and hold in 23 companies and the risk of stochastic oscillator is less than buy and hold method in 12 companies.

Regarding MFI strategy, return is better in 22 companies and the risks is less than buy and hold method in 24 companies.

The previous analysis shows that, the performance of the three strategies are nearly the same in terms of generating higher return and reducing risk during bear market compared with buy and hold strategy; but we can notice that the performance of MFI (money flow index) is better than K (stochastic oscillator) and RSI (relative strength index) in terms of reducing risk in 24 companies.

Based on these results, technical analysis performs better than buy and hold method in bear market, so the fourth hypothesis of the study is accepted.

4.5 The Performance of Technical Analysis versus Buy and Hold before and after the Egyptian Revolution

Further analysis using sub periods before the political events of the Egyptian revolution and after the Egyptian revolution were done to shed more light on the Egyptian security market and the results revealed that:

4.5.1 Before the Egyptian Revolution

Using RSI strategy, return is higher than buy and hold method for 25 companies and the risk of relative strength index is less than buy and hold strategy in 16 companies.

For k strategy, stochastic oscillator return is higher than buy and hold in 24 companies and the risk of stochastic oscillator is less than buy and hold method in 16 companies.

Regarding MFI strategy, return is better in 23 companies and the risks is less than buy and hold method in 15 companies.

The previous analysis reveals that, the performance of the three strategies are nearly the same in terms of generating higher return and reducing risk before the Egyptian Revolution compared with buy and hold strategy; but we can notice that the performance of RSI (relative strength index) is somewhat better than K (stochastic oscillator) and MFI (money flow index) in terms of generating higher return in 25 companies.

4.5.2 After the Egyptian Revolution

Using RSI strategy, returns is higher than buy and holds strategy for 18 companies and the risk of relative strength index is less than buy and hold method in 13 companies.

Also using k strategy, stochastic oscillator returns is higher than buy and hold in 18 companies and the risk of stochastic oscillator is less than buy and hold method in 15 companies.

The same for MFI strategy, return is better in 17 companies and the risks are less than buy and hold method in 18 companies.

The previous analysis reveals that, the performance of the three strategies are nearly the same in terms of generating higher return and reducing risk after the Egyptian Revolution compared with buy and hold strategy; but we can notice that the performance of MFI (money flow index) is somewhat better than RSI (relative strength index) and K (stochastic oscillator) and in terms of reducing risk in 18 companies.

5. Conclusion

First, in accordance with many previous studies performed using emerging market data (for example, Rodriguez et al (1999), Sundhar and Kakani (2006), Linto (2007)), technical analysis is more profitable than buy and hold strategy in short term, long term, bull market, bear market, before the Egyptian revolution and after the Egyptian revolution.

Second, unlike previous studies that document the higher performance of price-volume based strategies than price based strategies; it turns out that in the Egyptian exchange market there is no difference in performance for the MFI strategy over RSI and K in terms of generating higher returns and reducing risk which ascertain the results reached by other research concluded that the role of volume in the Egyptian stock market is weak which considered as a sign of noise trading.

Third, while the performance of the three strategies is almost the same; RSI is somewhat less risky in short term and MFI is somewhat less risky during bear market and after the Egyptian revolution.

Fourth, short term investing in the Egyptian Stock Market using both technical analysis and buy and hold strategy yields less return and accompanied by high risk compared with long term investing, investing during bull market and even during bear market, so it is not recommended at all.

Fifth, as short term return using both technical analysis and buy and hold method in the Egyptian stock market is lower than the return during bear market; it is another indicator that trading in the Egyptian security market is characterized by noise trading and not informationally based.

Sixth, long term investing in the Egyptian Stock Market using both technical analysis and buy and hold strategy leads to achieve higher return and lower levels of risk specially during bull market, while technical analysis still better than buy and hold strategy, so using enter and exit signals generated by technical analysis during bull market for investing in long term is the best choice for investors.

Seventh, it is better for investors to consider market cycle while making their investment decisions and reduce the amount of investment in the stock market during bear market period.

Eighth, as it turned out that after the Egyptian revolution technical analysis importance has been reduced compared with the time before Egyptian revolution, it is recommended for investors to keep an eye on political and current events while making their investment decisions and to use fundamental analysis to improve their choices.

6. Recommendations and Future Research

6.1 Recommendations

It is recommended for individual investors, institutional investors, mutual fund managers, portfolio managers, brokerage companies and technical analysts to:

- 1- Pay attention for enter and exit signals of technical analysis while making investment decisions as it achieves abnormal return accompanied by low risk.
- 2- Choosing longer time periods for investing in the Egyptian stock market.
- 3- Avoid Short term investing in the Egyptian Security Market as it characterized by low return and very high degree of risk.
- 4- Pay attention to the market cycle, as bull market is characterized by high return, so investors could allocate more money during bull market.

- 5- Avoid investing during bear as it characterized by low return.
- 6- Keep an eye on current events to improve investment decisions.
- 7- Consider the difference between the Egyptian security market and other emerging markets in terms of late response to new information and noise trading.
- 8- Take into consideration the results of such studies.

6.2 Future Research

- 1- Conducting this research again using other technical analysis methods specially chart techniques.
- 2- Conducting this research again using other time periods.
- 3- Conducting this research again using medium companies for example the companies of EGX50 Index.
- 4- Conducting this research again using Superior Predictive Ability test.
- 5- Conducting this research again using portfolio data instead of individual stocks and compare the results with this study.

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Appendix

Table 1. Companies' Names

Company Name	Code
Arab Cotton Ginning	ADIB
Abu Dhabi Islamic Bank	ACGC
Ajwa	AJWA
Middle Egypt Flour Mills	CEFM
CIB	COMI
Eastern Co	EAST
Gemma	ECAP
Egyptian Financial&Industrial	EFIC
Kima	EGCH
El Kahera Housing	ELKA
Al Shams Housing	ELSH
ICON	ENGC
Egyptian Starch & Glucose	ESGI
Ezz Steel	ESRS
Giza General Contracting	GGCC
General Co for Silos & Storage	GSSC
Heliopolis Housing	HELI
EFG Hermes	HRHO
Egyptian Iron & Steel	IRON
Kabo	KABO
Misr Chemical Industries	MICH
Madinet Nasr Housing	MNHD
SODIC	OCDI
Oriental Weavers	ORWE
Suez Cement	SUCE
United Arab Stevedoring	UASG
Elsaeed Contracting	UEGC

Source: prepared by the authors.