

Dedicated to

My Parents

Abstract

The current dissertation is undertaken to analyze technical analysis, its indicators and their profitability and feasibility. This dissertation gives the basics idea of technical analysis and how it works and helps the investors in generating profits. It also shows how to use charts for technical analysis. In the analysis part it focuses on one of the most popular indicator called Moving Average Convergence Divergence (MACD) and applies it in different stock exchanges to examine whether it works in all or not. The objective of this dissertation is to provide investors with a clearer view of where to use Moving Average Convergence Divergence (MACD).

This dissertation analyses performance of Moving Average Convergence Divergence in five different stock markets. These stock markets include Bombay Stock Exchange, Athens Stock Exchange, New York Stock Exchange, Dubai Financial Market, Abu Dhabi Stock Exchange and Australian Stock Exchange.

The conclusion of this dissertation was that Moving Average Convergence Divergence was able to work at its best where the economy was not going through any kind of crisis. In other words efficient markets where as it was not able to generate much profit in economy like Greece which is suffering from European Debt Crisis. In Middle Eastern markets it was not able to perform well at all.

At the end of this paper investors can easily make out where they can use MACD and where they need to use fundamental analysis or other technical indicators.

Declaration

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma of a university or other institute of higher learning, except where due acknowledgement is made in the text of the report.

Zayd Pandit

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Sincerely,

Zayd Pandit

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Chapter One

This chapter includes introduction to research papers and providing a brief background about technical analysis and its indicators. In addition to this the dissertation also provides the rationale behind this research and whom it's going to benefit. In the end this chapter will clearly describe the objective and a short conclusion.

(1.1) Introduction

These days investors and traders are using different technical indicators in the financial markets to make money. Some combine two or more technical indicators and some combine technical analysis and fundamental analysis. All this is done with a sole purpose of making money and minimizing risk. Earlier investors used to rely on fundamentals of the company and their decision was based on these fundamentals. Since the introduction of technical analysis many traders or investors have shifted from fundamentals to technical analysis. Technical analysis has helped a lot of traders and investors in making money. Technical Analysis can be defined as the practice of studying the stock market's past in an attempt to predict its future is known as Technical Analysis. It helps in forecasting future financial price movements.

Technical analysis is like weather forecasting, which does not result in absolute prediction about the future trend. Anticipation of what will happen to prices in future is where technical analysis comes handy.

Pring (2002) has given a definition for technical analysis:

“The technical approach to investment is essentially a reflection of the idea that prices move in trends that are determined by the changing attitudes of investors towards a variety of economic, monetary, political and psychological forces. The art of technical analysis, for it is an art, is to identify a trend reversal at a relatively early stage and ride on that trend until the weight of the evidence shows or proves that the trend has reversed.”

(1.2) Two Categories

Technical Analysis vs. Fundamental Analysis

As discussed earlier there are two main categories or school of thoughts in the financial markets. We already know that technical analysis focuses on movements of prices of securities and predict future prices using this data. On the contrary economic factors are used by fundamental analysts. These factors are called Fundamentals. Next section highlights the differences between technical analysis and fundamental analysis.

Technical Analysis - Charts vs. Fundamental Analysis- Financial Statements

Both of these schools of thoughts approach securities from two different perspectives. First, the technical analysis uses charts and patterns to predict the future on the other

hand fundamental analysis depend on financial statements for predicting the direction of future price movements.

Fundamental analysis relies on financial statements like balance sheet, income statement and cash flow statement to determine the value of a company. It's very helpful for making investment decisions as in if the stock price is below the intrinsic value it means it's a good investment. But on the whole fundamental analysis goes beyond only financial statements. On the other hand technical analysts believe stock price contains all the information including the fundamentals of a company. And all this information can be found in charts. Fundamental analysis approach has a long-term analysis as compared to technical analysis. In case of technical analysis the period of analysis can be from days to weeks and months in short the period is relatively small. Fundamental analysis period is mostly over number of years. Both of these schools of thoughts differ in terms of time periods because of their different styles of investment for which they are made. In case of fundamental analysis a company's value takes times to get reflected in the market. If there is a rise in the prices, the gain cannot be realized until the correct stock price is reflected in the market. This type of investment is popularly known as value investment and it works on the assumption that short-term market is incorrect. It believes that price of a stock with the passage of time corrects itself. The passage of time in this case can represent several numbers of years. Fundamentalists' work on numbers and its analysis are released after a long period of time. As we all know earning per share changes mostly after financial statements are submitted which most of the times quarterly not on daily basis like price and volume. It can also be said that fundamentals are general

characters of a business. As we know the data, which the fundamentalists use for analysis takes a lot of time to generate as compared to price and volume, used by technicians and because of this reason fundamental analysis has long time frame.

(1.3) Research Importance and Outline

Technical analysis portrays the real picture of the Stock Market with the help of charts and graphs. It helps the investors in identifying the trends and patterns. It also helps the investors in avoiding the bad investments. To be a successful trader one needs to understand the trends and patterns. Technical analysis is a great tool for forecasting future prices and short-term trends. The trader or the investor needs to do a bit of research about the market and then apply technical analysis so that he can make the most of it. One of the most important indicators of technical analysis is Moving Average Convergence Divergence (MACD). This dissertation will help the investors in selecting the right markets for applying (MACD) indicator.

The rationale behind this dissertation is to comprehend the previous studies and researches that have been done by various scholars in the past on technical analysis and its indicators. There are many studies done in the past on technical analysis and its indicators. In the beginning I will be collecting different research papers on technical analysis, its indicators and their profitability. I will be giving my own brief conclusion for each of studies and in the end will provide a small summary of all the conclusions. This paper will also apply Moving Average Convergence Divergence indicator to various stock exchanges to check whether it works in each of them or not. This dissertation uses excel and stock charts software to generate charts and analyze the moment of the prices.

The purpose behind this is to verify whether MACD indicator works in different market conditions or not. Many research papers have tried to check the feasibility of indicators in a single financial market. This paper will try to check whether MACD performs well in every condition or not. To check this MACD indicator will be tested in stock markets with different economic conditions and the Macd model will be calculating profits and will be reflecting on the charts as well.

(1.4) Research Objective

The main aim of this dissertation is to provide a clear perspective regarding the MACD to the investors and traders who want to use it in different markets with totally different economical conditions. Apart from this, this dissertation will also provide a test on various stock markets to check the profitability of Moving Averages Convergence Divergence indicator. This will help the investors or traders in deciding whether MACD is reliable or not. It will also highlight in which markets should investors rely on Macd.

As this will include both emerging markets as well as developed one it will provide a basis for the investor to select which type of market he wants to invest in. The dissertation uses data from different stock markets so its going to benefit the investors in selecting the markets around the globe and choose whether to use MADC as an indicator or not depending on the current economic condition.

(1.5) Criticism

Critics have often described technical analysis as a form of black magic. Technical analysis enjoyed mainstream credibility just few decades back. Before most of the

traders used to depend on fundamentals, but now they also have started using technical analysis. Most of the criticism is because of academic theories. One of the most important theories is Efficient Market Hypothesis. According to EMH the market price is perfect and correct and all the past trading information is present in the current price. Keeping this in mind, any kind of analyses for finding undervalued securities is just waste of time.

There are three forms of Efficient Market Hypothesis. The first form of efficient market hypothesis is the weak market hypothesis. This theory states that all the information is present in the current market price. Any kind of analysis will not be able to predict or forecast future movement of price.

Next is the second form of efficient market hypothesis known as the semi- strong which states that even fundamental analysis cannot help in finding good investment opportunities. The last and third form of efficient market hypothesis is the Strong Market Hypothesis which claims that all information is already present in the current price including past trading information and neither the technical analysis nor the fundamental analysis can provide any extra information to traders or investors. There are many academicians who believe in the weak form hypothesis; this means if technical analysis really works according to them the market is not efficient.

The next question is whether they can coexist. Technical analysis and Fundamental analysis are considered as north and south poles. Surprisingly many market participants find success when they combine fundamental analysis and technical analysis. Some analysts use technical analysis techniques for determining the best time to enter into an undervalued security but they are also using fundamentals. When

security is oversold this can be done. Right timing can improve gains when the security is oversold. Sometimes it's the other way round, technical analysts' looks for support in fundamentals to strengthen their technical analysis. Technical traders to be on the safer side reaffirm their decision by using key fundamental data. So we can say the combination of both technical analysis and fundamental analysis can provide fruitful results. Participants who are extremely devoted to one of the school of thoughts don't agree with it. But there are advantages in understanding both schools of thoughts.

(1.6) Scope of Work

The paper only uses one indicator, which is Moving Average Convergence Divergence. Even if MACD works in every market it does not mean that other indicators will also behave in the same way.

The paper will not help the investor or the trader in selecting a security. It will help in only selecting the stock market where he wants to use MACD.

(1.7) Structure of Dissertation

The Conclusion of this part of the chapter is that technical analysis is used to predict price movements and it consists of indicators and charts. This paper sheds more light on indicators, as the main focus of this paper is an indicator. MACD is one of most used and most relied on indicator is the world of technical analysis. In the proceeding chapters this study will include past studies done by others followed by analysis to test the performance of MACD in different stock markets

Chapter 2

Literature Review

(2.1) Introduction

Technical analysts claim that this technical approach helps them in generating profit from changes in psychological factors in the market. It can be better understood in this statement:

The technical approach to investment is essentially a reflection of the idea that prices move in trends, which are determined by the changing attitudes of investors towards a variety of economic, monetary, political and psychological forces. Since the technical approach is based on the theory that the price is a reflection of mass psychology in action, it attempts to forecast future price movements on the assumptions that crowd psychology moves between panic, fear, and pessimism on one hand and confidence excessive optimism, and greed on the other (Pring 1991, pp.2).

Technical Analysis can be divided into two parts charts and indicators. Indicators are calculated using the price and the volume of that particular security. Indicators help in predicting trends, volatile, momentum and flow of money. Technical indicators

provide more information regarding the supply and demand of securities. Indicators like volume act as a confirmation of the price movements and also whether the given trend will continue or not. Indicators not only help in acting as a confirmation tool but also can generate buy and sell signals.

Indicators can be further divided into two main categories Lagging and Leading indicators.

Lagging indicators are those indicators, which follow the price movements but have less predictive qualities. Examples of lagging indicators are moving averages and Bollinger bands. During the non-trending period these indicators don't work to their full potential. But during the trending periods the indicators work perfectly. The reason behind this is that the indicators focus more on trends and give less buy and sell signals. Leading indicators are stronger than lagging indicators during a sideways range or non-trending periods. Leading indicators generate a lot of buy and sell signal so it would be better to use them in markets, which are non-trending. Traders should use both the indicators while trading as leading indicators are too volatile and can force the traders to take the wrong decision.

Indicators are used to generate buy and sell signals using crossovers and divergences. Crossovers are when the indicators go through an important level or through its moving average. The signals indicate that the trend is going to change and the price of the security is also going to change. The other way indicators are used is divergences. This happens when the actual price direction and the direction of the indicators are moving in opposite directions. Divergences can be positive or negative.

In short, technical indicators provide additional information regarding the future price movements. These indicators help the traders in identifying trends, momentum, and volatility and many other such elements. Based on these indications traders are able to take decisions. Some traders use one indicator only for making decision for buying and selling decisions whereas it might be better to use indicators with chart patterns, price movements and other indicators.

(2.2) History

In this section we will discuss one of the oldest and the most popular form of technical analysis named as Dow theory. Dow Theory was introduced by Charles H. Dow in the late 1800s, everyone in financial industry from brokers, dealer, fund managers, investors to speculators use technical analysis. It was found in a survey that most of practitioners rely on technical analysis. (Billingsley and Chance 1996; Brorsen and Irwin 1987; Irwin and Brorsen 1985) and nearly half of the foreign exchange traders support the fact that technical analysis plays major factors in determining exchange rates in the short run.

On the contrary to this most academics are doubtful about technical analysis as they believe in fundamental analysis which states that markets are information efficient

and all the information is impounded in current prices.

In the last few decades many theoretical explanations for the widespread use of technical analysis have been developed based on models.(Treynor and Ferguson 1985; Brown and Jennings 1989; Grundy and Mc Nichols 1989; Blume, Easley and O Hara 1994), behavioral (or feedback) models (De Long et al. 1990a, 1991; Shleifer and Summers 1990), disequilibrium models (Beja and Goldman 1980),herding models (Froot, Scharfstein and Stein 1992), agent-based models (Schmidt 2002), and chaos theory (Clyde and Osler 1997).

This paragraph gives a brief idea about the previous studies done on technical analysis.(Donchian 1960), numerous empirical studies have tested the profitability of technical trading rules in a variety of markets for the purpose of either in covering profitable trading rules or testing market efficiency, or both. U.S and outside U.S stock markets both have been used for testing technical analysis and foreign exchange market also. Futures market is the only market where few studies have been analyzed. Before 1980 technical trading studies were used on few trading systems. In these studies net return was calculated after deducting the transactional cost of these strategies, problems related to data snooping and statistical tests was disregarded, risk was not handled adequately and test procedure was without sample verification along with parameter optimization. Technical trading studies have improved significantly after mid 1980`s.

Testing procedure now include some new few features:(1) increase in number of trading systems;(2) transactional costs and risk are used to adjust returns; (3) Out of

sample verification and parameter optimization are conducted; and (4) both conventional statistical tests as well as more sophisticated bootstrap methods were applied.

(2.3) Literature Review

Since its origin, there has not been research on technical analysis on a consistent basis. Alexander (1961 & 1964) and Fama and Blume(1966) suggested that filter rules cannot be used for investment decision to generate excessive returns. However the data used by Fama and Blume(1966) was later analyzed by Sweeney(1988) and the result was that when filter rules are applied to fifteen stocks of Dow Jones, filter rules generates excessive returns over buy and hold alternative. During 1990`s research on technical analysis increased as well as the methods for testing trading rules.

Technical Analysis is defined generally as ‘the use of past price behavior to guide trading decisions in asset market’ (Neeley, 1997:23). If we talk about taking position in foreign exchange market past exchange rates can act as a guide. Technical analysis was initially looked upon with disbelief by the economists because of their support to efficient market hypothesis (Taylor & Allen 1992). Focus of serious economic research these days is technical analysis. The purpose of this literature review is to collect evidence concerning the usage and feasibility of technical analysis. A lot of research has been done to check whether technical analysis is profitable or not. In a research work by Levich & Thomas (1993) and Neeley et al. (1997) the statistical significance of profits generated by technical analysis are determined by the used of

bootstrap approach. The conclusion of this paper is that if you follow simple technical trading rule it can help you in generating excess returns. it should be kept in mind that the approach used in this paper differs from what is generally used by analysts. In general the analysts use their own imagination, own judgment in bringing forth their predictions without following technical trading rules (Taylor & Allen, 1990). Because of this a precautionary note is seen in the conclusions of (Taylor & Allen, 1990). In that paper the authors kept a note of six technicians and their exchange rates and surveyed them. On the basis of root mean square, they found that one out of the total number of technicians were not able to outstrip on a continuous basis the predictions of an independent walk, for the exchange rate for a specific time frame. Still, the paper of Osler & Chang (1995) supports that the use of “head and shoulder” rule can be one of the approaches that may be profitable.

Technical analysis was previously used with fundamental analysis. The above research work has only considered the profitability of technical analysis in isolation. Now the question is whether profits will be generated if technical analysis is combined with trading rules based on fundamental analysis. As it can be seen Taylor and Allen (1992) in 1988 surveys were conducted amongst chief foreign exchange dealers in the London market on the use of technical analysis. Moving average or trend following systems is used by 64% of the dealers and other trading systems such as oscillators or momentum indicators were used by 40% of the dealers. Around 90% of dealers when forming their exchange rate targets for a short period used some sort of technical analysis. In addition to this, 60% of dealers consider technical analysis as important as fundamental analysis. From the above paragraph we can say many

traders and investors rely on technical analysis.

In a similar study by Menkhoff (1997) he analyzed the manner in which foreign exchange professionals like fund managers worked in Germany. The result of that analysis was that 87% of dealer gave more than 10% weightage to technical analysis in case of decision-making. Technical analysis means value on the basis of importance was 35% and similar responses from other professionals. Technical analysis played a major factor in decision making for short periods such as intraday to 6 months. Present dealers' preferred technical analysis, the way in which technical analysis was used had no relation with institutional size and the last finding was that academically chartists and fundamentalists were on the same level.

But this could be dangerous as the investors can select a wrong stock, which fundamentally would be a poor decision and could result in loss. Another research by Frankel and Froot (1990) showed that the demand for dollar can change if we switch to forecasting method in foreign exchange market. This survey was done in euro money magazine for forecasting firms. In 1978 fundamental analysis was used by nineteen forecasting firms and technical analysis by only three firms. This pattern has reversed after five years. In 1983 fundamental analysis was used by one firm and technical analysis by eight firms. In 1988 fundamental analysis was used by seven forecasting firms and technical analysis by eighteen forecasting firms.

From the above-mentioned studies we can conclude that technical analysis in last two decades has become more popular among investors and traders then fundamental analysis. Currently technical analysis is easier to use because of new software, which

are freely available.

Stressing on the profitability of technical analysis, Lento(2008) calculates returns of fifteen largest global equity markets using nine technical trading rules and Hurts statistics was used to determine whether the trading rules were profitable in markets with long term dependencies. In this paper Pearson`s correlation and OLS regression is used to check association between profitability of technical analysis with Hurts statistics. Pearson and OLS regression shows an association of $p = 26\%$ between profitability of technical trading rules and hurts statistics. Some of these markets were having low H and the technical trading rules were profitable proving that these trading use were able to use full information by processing historical prices into future signals. Correlation, regression and tabulation in this paper show that there is some association between profitability of technical trading rule and H.

Whereas Levy (1966; 1967) has tested a number of additional trading rules based on technical analysis. In some cases results are inconsistent with the theory of random walk. In particular Levy`s article, “Random Walks: Reality or Myth”(1967) he has calculated returns earned by several mechanical stock market trading rules in a period ranging from October 1960 to October 1965.

Levy uses different variations of trading rules to calculate returns earned and finds these returns in excess of returns earned by random selection policy. In light of the results Levy states: “The evidence above conclusively proves that technical stock analysis could have produced greater-than-random profitability at less-than-random risk for the 1960-1965 periods.” Keeping this in mind the theory of random walk is

proved wrong. In response to Levy's work Jensen (1967) evaluated trading models used by Levy. The results of Levy's trading rules are somewhat overstated as a result of his definition of returns on random selection policy, his assumption regarding the identity of the decision and trading price, treatment of risk differentials and his neglect of the cost of operating the rules. Levy has taken high risk portfolios during that period.

Keeping all this in mind we cannot agree with Levy because his study does not entirely explain all the results of Levy. It requires additional test to validate whether Random walk is a myth or a reality.

Testing technical analysis in futures market Griffioen (2003) tests a large set of 5350 technical trading rules on the prices of cocoa future contracts traded at two different stock exchanges CSCE and LIFFE and also on pound dollar exchange. The period was from 1983 to 1997. These rules consist of three sub sets: 1990 moving average, 2760 trading break out and 600 filter strategy. In comparison to CSCE cocoa prices these strategies perform much better for LIFFE cocoa prices. It performed much better during the period from 1983 to 1987. The results during this period are statistically significant for forecasting purpose and economically profitable. In case of CSCE cocoa prices the results were not that significant for forecasting and hence not profitable. These strategies were applied to pound/dollar exchange rate for same period and the result was statistically significant but most of them were not profitable.

The reason for difference in performance of technical trading rules in LIFFE and CSCE a cocoa future contract is the demand and supply mechanism and pound-dollar

exchange rates. Cocoa future and price level of pound dollar exchange rate were coincidentally highly correlated and this is the reason why trading rules perform better in this period. This spurious correlation led to strengthening of price trend in LIFFE cocoa future contracts in London and weakening the price trends of CSCE cocoa futures contracts in New York. The trends on LIFFE are strong enough to be identified by trading rules. In case of CSCE the trading rules are not able to identify trends. Structural break in the trend can be identified by trading rules.

The finding of Griffioen's paper is that technical analysis may identify strong trends and even identify structural break in trends, but it cannot identify the forces behind these trends. Technical analyst cannot rely on trading rules but also need to use economic fundamentals to identify forces behind these trends. In case of LIFFE the trends were caused because of demand and supply mechanism in cocoa market and pound dollar exchange rate. These forces changed direction at the trend break point. So the conclusion is that if technical analysis and fundamentals point out in the same direction then in that case technical analysis can be successful.

The next research done by Eric, Andjelic and Redzepagic (2009) sheds light on two most popular indicators of technical analysis Macd and relative volatility index (RVI). These two indicators are popular for determining trends and forecasting future stock prices. In this paper the MACD and RVI indicators are applied to stocks which are continuously traded on the financial markets of Serbia. The rationale behind this study is to find the most profitable parameters of MACD and RVI to optimize the investment strategy in the financial market. The hypothesis of this research is that MACD and RVI provides a sound basis for a sound investment strategy. In the

methodology part technical analysis is applied in financial markets. It will be using two indicators MACD and RVI. The tools used in this research for analysis and calculation part are Meta Stock and Microsoft Excel. The conclusion of this study was that MACD and RVI play a major role in optimization of investment strategy. One of the limitations of this research, which must have effected the calculation, is that the turnover of stocks on the Belgrade stock exchange is low and very less number of transactions takes place.

On the other hand Park & Irwin (2004) tests the evidence on the profitability of technical analysis. In this paper surveys and theoretical and empirical studies have been used to analyze and review technical analysis. First the paper analysis survey carried on market participants who are practicing technical analysis. The first finding of the survey is that technical analysis is widely used in future contracts and foreign exchange markets. Nearly 40% of practitioners support the fact that technical analysis plays an important part in predicting future prices in case of short periods. Theoretical models are used to present significance of profitability of technical analysis. Models like martingale model or random walk model proves that technical analysis is not profitable in high risk markets. Other models like noisy rational expectation models and behavioral models support the theory that trading strategies are profitable in a noisy market. This paper includes two empirical studies earlier and modern empirical study. Earlier studies show that technical analysis is successful in foreign exchange markets and futures markets. In case of stock markets technical analyses was not profitable before 1980. On the contrary modern studies show that till 1990 technical trading rules were able to generate economic profits in stock markets. Most of modern

studies almost 70% of them showed positive results regarding profitability of technical analysis. In spite of positive results technical analysis are subject to problems during testing procedures like data snooping, search technologies and difficulties in calculating risk and estimating transaction cost. In future, researchers should try to highlight these problems so that the work can produce conclusive evidence on profitability of technical analysis.

Similarly Kuan (2005) has used White's reality check and Hansen's SPA test to reexamine profitability of technical analysis. These tests correct the preconceptions of data snooping. In this paper studies technical trading rules in depth not only including simple technical trading rules but also investors strategies. In this paper these strategies and rules have been tested with four main indices. The first finding of these tests was that significant profitable technical trading rules and strategies exist in markets like NASDAQ composite and Russell 2000, but mature markets like DJIA and S&P 500. The other finding of this paper is that investor strategies are able to increase profits of simple rules and there is a chance that investor strategies can generate profits from failed simple rules.

Rodrigues,Rivero,Felix(2000) tries to forecast from NN and SNN predictors and transform the forecast into simple technical rules in which positive returns and negative returns were executed for long and short positions respectively. The same strategy is applied to nine currencies participating in ERM and exchange rates are used with the Deutschemark for 1 January 1978-31December 1994. Technical trading rules are derived from nearest neighbor nonlinear predictor. The profitability of these rules are evaluated against the linear moving average trading rules, keeping in mind

both the interest rate and transaction cost. The mean annual total return is used to measure the profitability and eight out of nine times the nonlinear approach outperforms the linear moving average approach. In these cases the mean annual total return is different from zero. Trading rules based on nonlinear predictor generates the highest returns in 8 out of 9 cases. Ideal profit and Sharpe ratio is used to assess the economic value of predictors. Using nonlinear predictors as trading rules gives us the highest value for both profitability measures.

In the next research Marshall ,Cahan, Cahan (2008) has selected 49 developed and emerging market indices which are included in Morgan Stanley capital index (MSCI) and investigates profitability of technical trading rules in them. Trading rules from four rule families in excess of 5000 technical trading rules on each market have been used. With the help of these results we can prove whether or not technical analysis work around the globe or not. Emerging markets do not follow a random walk and there is evidence about it and some authors in the past have documented profits with the help of technical analysis. But these profits are inconsistent. This paper doesn't focus on historical period for profitability but on recent times to ensure profitability.

In isolation many technical trading rules are profitable, however there is no proper evidence that technical trading rules work successfully in emerging markets, these markets are said to be information inefficient. But technical analysis can be used for other investments. All the technical rules are not profitable. But the 5000 trading rules are not successful except when used in isolation.

Again stressing on the profitability Lento (2009) checks the profitability of combine

single approach to technical analysis on S&P 500 data set which is information efficient and robust. In addition, nine trading rules and their profitability was also tested. Here profitability means returns in excess of buy and hold strategy. In case of individual trading rules combine single approach on average improves profitability. Combined single approach outperforms buy and hold strategy before taking the transactional cost into account. In some cases because of transactional cost profitability was eliminated. If there is no profit remaining after the transactional cost still technical analysis information can be used by a statistical investor to reallocate his assets using that information. Hence technical analysis can be of economic significance.

This study supports the results of the previous research done by Lento & Gradojevic (2007) and Lento (2008). In both the studies CSA was profitable. This study also proves that when we combine different signals, more powerful and effective trading technique is created. The result of this study gives a healthy support to CSA and its profitability. It's quite different than the original CSA because it uses the most efficient market index for a period of 59 years with approximately more than 14000 daily observations. This is why the results of this paper are the most robust till now. There is a need of more research work in the area of CSA like which trading rules are more successful.

Similarly Rodriguez,Rivero,Felix(1999) investigates the forecasting power of technical trading rules. For evaluating the forecasting power of technical rules this

paper uses General Index of Madrid stock Exchange daily data for the period of 31 years from 1966-1997. The findings of this paper are that technical analysis indicates buy signals that generate higher return on a constant basis in comparison with the sell signals. This supports the statement that technical analysis has forecasting power. One more interesting thing is that returns generated with the help of buy signals are less volatile than returns from sell signals. This means there are nonlinearities present in the data of Madrid Stock Exchange. There are negative returns generated by sell signals. Other models of finance like GAARCH and GAARCH-M are not able to generate any of these signals. Their adequacy is checked by combining bootstrap method and technical trading rules. These models fail to predict both returns as well as volatility.

As its clear that period is too long so to just to verify the results the period is divided into sub periods and the results for sub periods are no different. Thus it's clear that results of this paper support profitability of technical analysis. But still the returns are not that high, so if we deduct transaction cost and brokerage fee that cannot be considered as profit. Research on more sophisticated trading rules is needed and on their profitability to verify good profits after transaction costs and brokerage fee.

On the other hand Park and Irwin (2005) selected the data used by Lukac, Brorsen, and Irwin for investigating 12 future markets for the period of 1975-1984. But actually they started from 1978 as the first 3 years were used for optimizing trading rules. Park and Irwin have extended that data from 1975- 2003 for the same 12 future markets. These markets include highly traded agricultural commodities, metals and financials. Sample Performance of technical trading rules is measured by evaluating daily prices

for each future market from 1975 through 2003. The sample period is divided into two sub periods 1975-1984 and 1985 to 2003. The main reason behind this is confirmation and replication. First the original annual portfolios mean gross return calculated by Lukac, Brorsen and Irwin is compared with Parks and Irwin trading models gross return. Gross returns help us to measure better performances because transaction costs don't contaminate it. Annual net returns of both trading models are compared using correlation coefficient and sign consistency comparison between trading models was also checked. In the replication stage the trading model was applied to new set of data starting from 1985-2003. Keeping all the parameters in mind the sample performance was evaluated. Stationery bootstrap method was used to measure the statistical significance of technical trading rules. This minimizes the harmful effects of data snooping. Lukac, Brorsen, and Irwin had found technical trading rules to be profitable. The first sub period of 1978-1984 had generated significant economic profits in six out of 12 future markets. But in case of the latter period from 1985-2003 the same technical trading rules were not successful. The trading model was only able to generate profits for some financials like the mark and T-bills. The portfolio annual mean return of first sub period was 4.13% and it dropped to -5.82% for the second sub period.

There are 3 major reasons for technical analysis not being successful for the period from 1985-2003. The first is data snooping selection bias in previous studies the second being the structural changes in the markets and last one as suggested by Kidd and Brorsen that the use of technical analysis decreased after 1990 because the price volatility decreased and Kurtosis increased for daily price returns when the markets

were closed.

Recently Hsu, Hsu, and Kaun (2009) has used a new step wise test (the step SPA test) for large scale multiple testing problems without data snooping bias. With the help of step SPA test we can identify different trading rules, which are significant. To date researchers were using step-RC test but step- SPA test is more powerful than the step-RC test because it ignores conservative configuration. This paper tries to look for new evidence for the predictive ability of technical trading rules in both growth and emerging markets. The results of this paper are based on market indices as well as exchange-traded fund, which can be traded as low cost. So these results have a lot of information in them, which can be used. The first finding of this paper is that technical rules are able to predict U.S indices before ETF period quite powerfully. There are 269 significant rules in terms of mean return, 136 rules in terms of Sharpe ratio and 220 rules in terms of x-statistics and 230 rules in terms of studentized mean return. In some indices the evidence is weaker like the NASDAQ composite Index, Significant rules in terms of mean return are 33 and 7 significant rules in terms of Sharpe ration. There are more than hundred significant trading rules under Russell 2000 index. The presence of many significant trading rules provides a strong evidence of the predictability of index returns. On the other hand the predictability of technical trading rules is not the same for post-ETF period. The Step-SPA test obtains zero significant rules for all three U.S ETF`s.

The step-SPA test can also be applied to similar, multiple testing problems.

According to the results of this paper it's not necessary that predicting power of

technical rules will be a consequence of serial correlation in data.

Neely and Weller (2011) emphasize the importance of market efficiency in foreign exchange markets. According to the literature simple trading rules on dollar exchange rates provide risk adjusted returns for 15 years during 1970`s and 80`s. In the same period complex rules which are not studied well have generated average returns. Excess returns from technical trading rules cannot be justified by relying on adjusted risk or central bank intervention. One of the reasons for profitability can be psychological biases. For e.g. if the central bank adopts the policy of leaning against the wind this gives rise to predictable trends. Research based evidence shows that period of greatest profitability is before intervention of the central bank. Central bank intervenes to stable the market from which TTR`s generate profit. Hence interventions of Central banks are correlated with high profits for technical rules.

Using Moving Averages Han, Yang and Zhou (2011) generate investment-timing portfolio with the help of standard moving average of technical analysis and applies it to portfolios after sorting on the basis of volatility. The result of this paper performs better than the buy and hold strategy with returns which have negative risk exposures on the market factors and the Fama-French SMB and HML factors. In case of high volatility portfolios the returns are higher than CAPM and Fama and French three factor models and also higher than momentum strategy. Moving average is similar to momentum strategy but it has less correlation with momentum strategy.

This study proposes that it will be productive to continue research about profitability of technical analysis in other markets and asset markets using the cross-

sectional performance, keeping in mind the role of volatility. This model of moving average can replace momentum strategy in investment related issues in future research papers.

Again stressing on profitability Marshall, Young and Roze (2007), investigates the U.S. equity market using quantitative techniques of candlestick to check profitability. Candlestick is being used by many technicians but there is insufficient literature present to provide evidence about its profitability. Candlestick generally uses one to three days of previous data to generate a signal. It's popular among short term investors. Positions are taken up to ten days. Now candlestick technical analysis is also available in software. In this paper, candlestick analysis is applied to DJIA component stocks over a period from 1/1/1992 to 31/12/2002. Neither any unexpected bullish nor bearish signal is generated by candlestick analysis. Relying entirely on Candlestick analysis for decision making doesn't make sense. But at the same time investors should not forget that candlestick techniques compliment other market timing techniques.

On the other hand Isakov and Marti (2011), provides evidence about profitability of technical analysis. First it checks performance of complex trading rules which are based on moving averages calculated for long periods. It finds that when a signal is generated over a long period the trading rule is more profitable. It uses a test which relies on simulation to find new trading strategy which follows long term trends. In the end it uses financial leverage with trading strategies to generate signals in markets following an upward trend as it's difficult to outperform such markets only by long positions. The test for the period of 1994-2008 generated profit ranging from 274% to

572%. This was much higher than the market yield.

This paper suggests that moving averages are able to generate profits by taking advantage of long term market movements. This paper also attempts to prove efficient market hypothesis could be wrong. Most of the investors or technicians are interested in short term gains and are unaware of long term trends. Further research is still required to confirm profitability of these rules in a longer period in other markets.

(2.4) Conclusion

From this literature review it can be said that technical analysis is profitable most of the time. The tests conducted in these studies have mostly supported technical analysis as a profitable tool. These tests include the Pearson and OLS regression, Hurts statistics, Correlation, White Reality Check and Hansen's SPA test. The studies also show the popularity of technical analysis, as it has become the first choice of every trader. The next chapter will test the MACD's performance in different stock markets.

Chapter 3

Data Methodology

(3.1) Introduction

In this chapter this paper sheds light on the working of the most popular indicator of technical analysis Moving Average Convergence Divergence (MACD). In the second part it will apply macd in different stock markets using different indices. In the end a short summary with a brief conclusion will follow.

(3.2) Moving Average Convergence Divergence (MACD)

This is one of the most popular and common indicators used in technical analysis. MACD includes two exponential moving averages, which is used to measure momentum. The difference between the two moving averages plotted against Centre line is called MACD. The line at which both the moving averages are equal is known as the centerline. There is an exponential moving average of the MACD automatically drawn on the chart. This helps in measuring short-term momentum, which helps in signaling current direction of momentum.

When the short term moving average is above the long term moving average, this means there is an upward momentum and when the short term moving average is below the long term moving average it indicates a downward momentum. 26-day and 12-day exponential moving averages are commonly used for calculations. Nine day exponential moving average of MACD values is used to create the signal line. In case of volatile securities short term averages are used and vice versa for less volatile securities. Histogram is plotted against the centerline and represented by bars in MACD. A bar represents the difference between the moving average and the signal line. The higher the bars higher will be the momentum in either of the directions.

(3.3) The MACD Model

The model used in this paper is similar to how we generate MACD line and signal line along with the actual price on the chart. It generates a buy or a sell signal in terms of 1 and -1 respectively and calculates the profit wherever the signals change. These signals are generated when the signal line and Macd intersect each other. Till the next

intersection it remains on one position only and changes to other as soon as other intersection takes place. Then buy subtracting two prices it calculates the profit.

Figure 3.1



In the Figure 3.1 above we can see three main elements of MACD marked from one to three.

The black line, which has been marked 1, is also known as the fast line.

The Blue line, which has been marked as 2, is also known as the signal line.

The element marked as 3 is the MACD histogram.

MACD crossover: When the fast line crosses above the signal line it's a buy signal

and when fast line crosses below the signal line it's a sell signal. This is the most common way of using MACD.



The Figure 3.2 above describes the working of MACD. The first noticeable thing is that it's a trending market. We can see there a lot of trends prevailing in this market.

Wherever there is signal that area has been highlighted using arrows. As we can some time there are two signals or four signal together also.

Figure 3.3



In the Figure 3.3 above we can easily see which one is a buy signal and which one is a sell signal. In the next part of this chapter this paper will apply the moving average convergence and divergence to the different indices of different stock markets to check whether MACD works at the same level in all of the stock markets or not.

(3.4) Objective

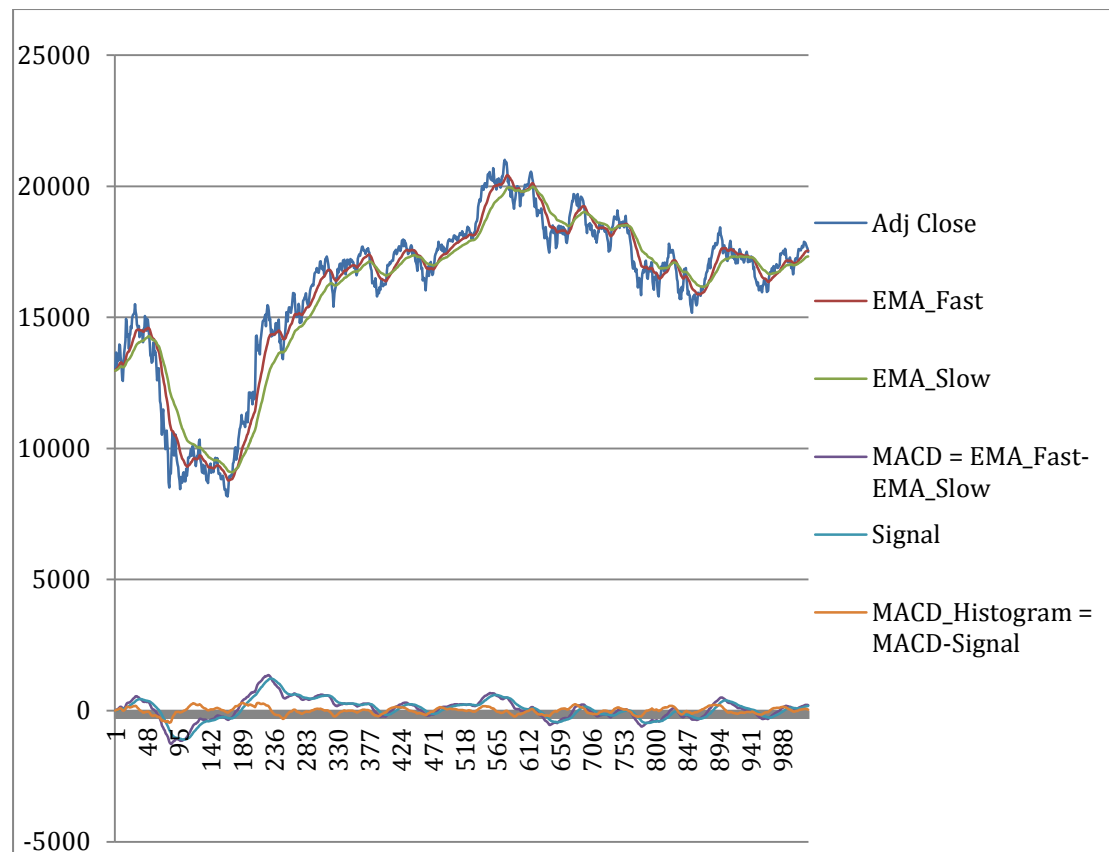
The purpose of this analysis is to highlight how MACD works in different stock exchanges around the globe and in which type of markets it should be used. It will

help the investors in selecting the markets in which MACD will be reliable or vice versa.

(3.5) Conclusive Test

This paper applies MACD in Bombay Stock Exchange using past prices of BSE Sensex from July 2008 to September 2012. The parameters used are exponential moving average days fast, exponential moving average days slow and signal line. The data has been taken from yahoo finance and applied on the model, which calculates the profit made on each transaction. The model first calculates the exponential moving averages 12 days and 26 days. Then MACD line is calculated by subtracting 12 days from 26 days EMA. Then the 9-day EMA of macd is calculated which is called the signal line. After this it calculates the MACD histogram by subtracting MACD line and signal line. In the end it also calculates the profit wherever it's possible by checking the signals generated by MACD. Figure 3.4 reflects the price moments for the Bombay stock exchange index SENSEX.

Figure 3.4



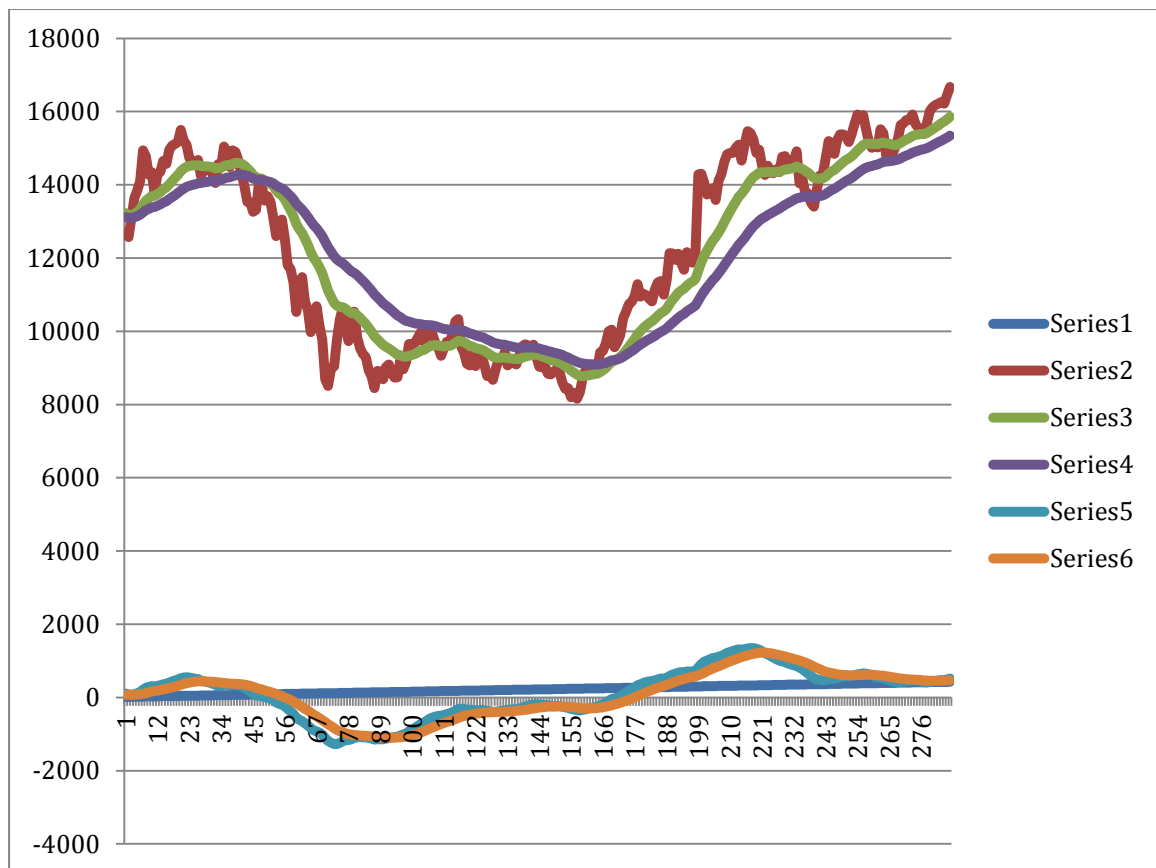
In the Figure 3.4 all the lines are labeled and the two main lines, which generate the signal, are the signal line, which is blue in color, and the MACD line which is purple in color. We can see there are a number of crossovers and these crossovers acts as signal for when to buy and when to sell. Early in this chapter this paper explains which crossover is a buy signal and which one is sell signal.

Below is the same index but the data is only for 9 months. Starting from July 2008 till March 2009. The figure 3.5 will give a clearer picture of how macd is able to generate signals for SENSEX in Bombay Stock Exchange. The blue line is the MACD line and the orange line is the signal line. In my model MACD is able generate a sell signal at fifteenth

day and its followed by a fall in the prices. On fifty- fifth days the macd generates a buy signal followed by rise is prices. As per the model calculation a profit of Rs. 841 is possible here if the investors had taken their positions as per Macd signals. As the prices keeps on following an uptrend till 103th day as the Macd line crosses over the signal line, which is a buy signal. The model calculates a profit of Rs. 5610.48. If we look further we can see on 233 days there is a change in trend as the signal line crosses over the Macd line. It's a sell signal. Here the profit calculated by the model is Rs. 5288.85.

These were some of the major signals generated by Macd for Sensex in Bombay Stock Exchange. After calculating the profit we can say that MACD is able to predict prices and trends and the investors can rely on these signals. In the Figure 3.5 below we can also notice a divergence as the MACD is showing an uptrend from day no. 103 whereas the actual is following a downtrend till day no. 153. So we can now say both crossover signals as well as divergence signals are correct.

Figure 3.5



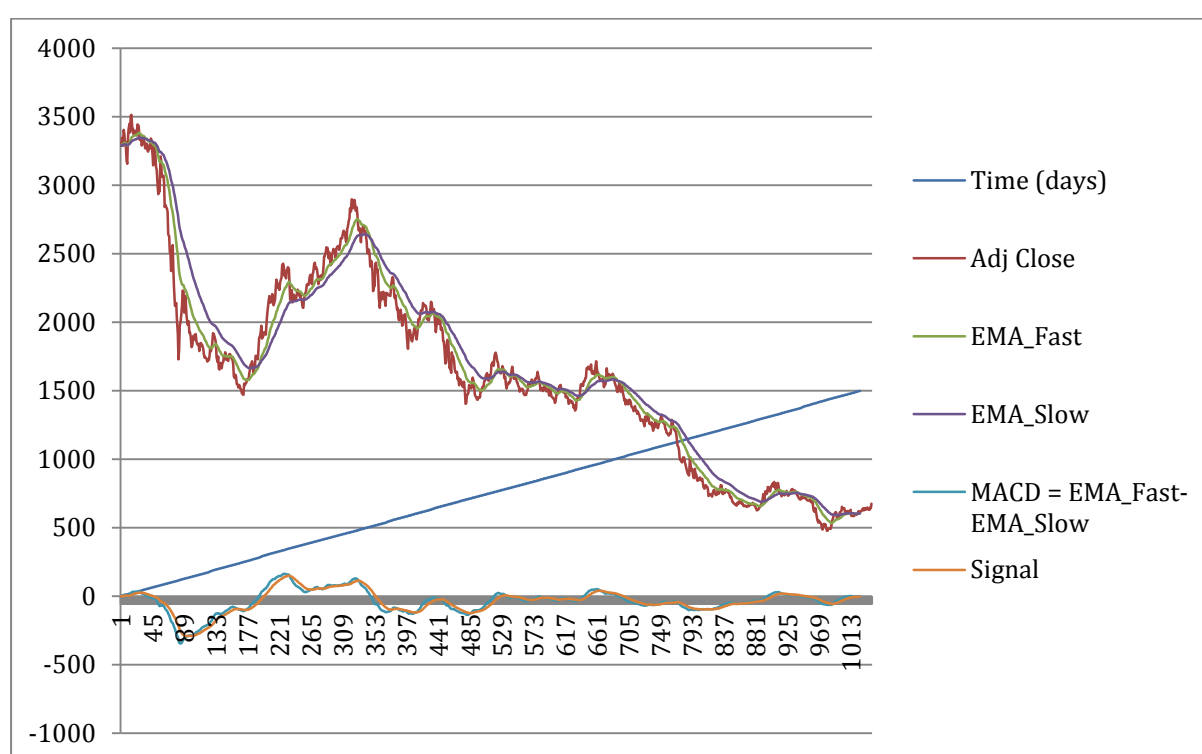
The Figure 3.1.1 below shows the calculation part of the model, which I am using to calculate profit, generated by MACD signals.

Results	
Last Cell Index	1027
Stock Price on last day	17490.81
Last Position in strategy	1
Last Opening Price	17412.96
Profit on last transaction	77.85
Total Gross Profit	6301.57

Table 3.1.1

Now we shift from the Bombay stock exchange to Athens stock exchange and we will be applying MACD to Athens Index Compos. This paper will use the same model, which was used for Sensex to check the profitability of Macd in Athens Stock Market. Data for Athens Index Compos ranges from July 2008 to Sept 2012 and is reflecting in the figure 3.6.

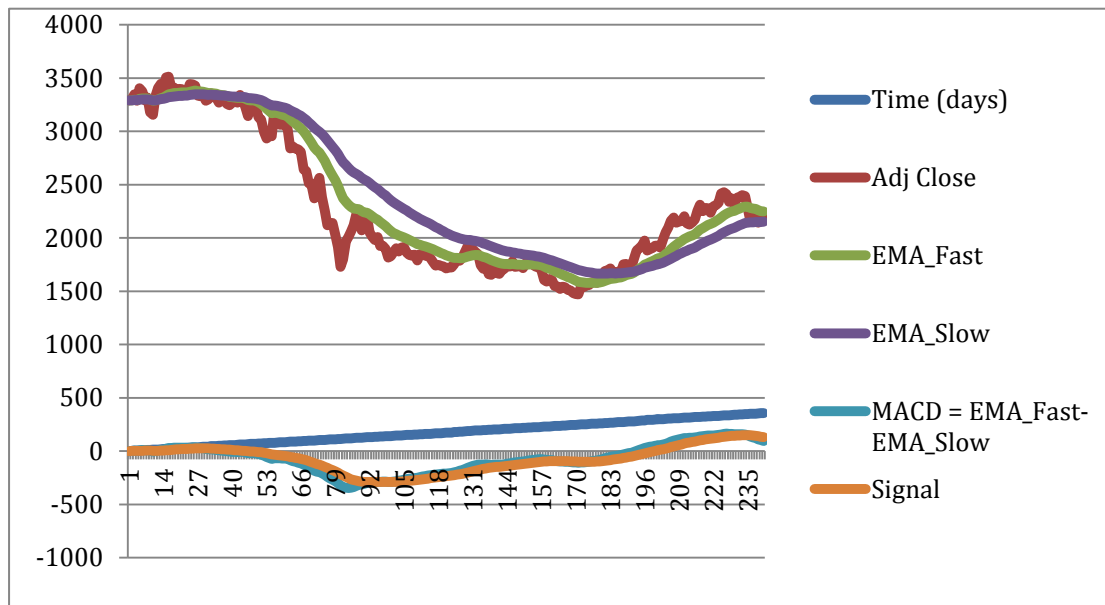
Figure 3.6



In the Figure 3.6 we can see that first signal generated by the MACD is a buy signal and it's followed by fall in prices and on ninety seventh day MACD generates a sell signal as the MACD blue line crosses above the signal orange line. As per model calculation the profit equals to EUR 1338.09. For some time the macd line and the signal line move close to each other till day no. 235. On day no. 235 the signal orange line crosses over

the Macd line and we can see in the Figure 3.6 above that price follow a downtrend after this. This is a sell signal. The profit calculated by my model is EUR 604.57. We can see that the price keeps on moving down till day no. 1013.

Figure 3.7



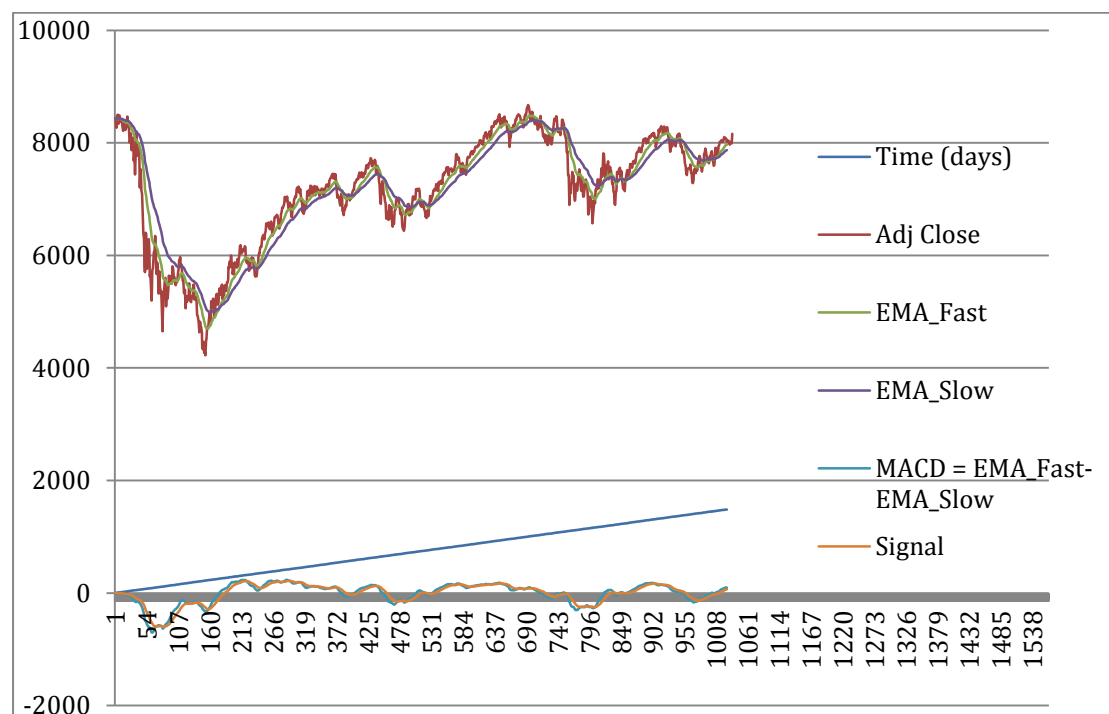
The figure below shows the calculation part of the model, which I am using to calculate the profit, generated by Macd. As we have seen in the charts as well as the profit calculated by the model the Macd was able to predict the prices and trends in the Athens Stock Market. There was no major divergence in this chart but we can notice a small divergence in the beginning of the chart. Macd is showing an uptrend from day no. 93 whereas the actual prices started an uptrend from day no. 170.

Results	
Last Cell Index	1027
Stock Price on last day	612.29
Last Position in strategy	1
Last Opening Price	580.67
Profit on last transaction	31.62
Total Gross Profit	1557.65

Table 3.1.2

After Bombay Stock Exchange and Athens Stock Exchange this paper will shift its focus to New York Stock Exchange and will apply Macd to New York Stock Exchange Composite (DJ). Figure 3.8 reflects the price moments for NYS Composite (DJ). The data used ranges from July 2008 to Sep 2012.

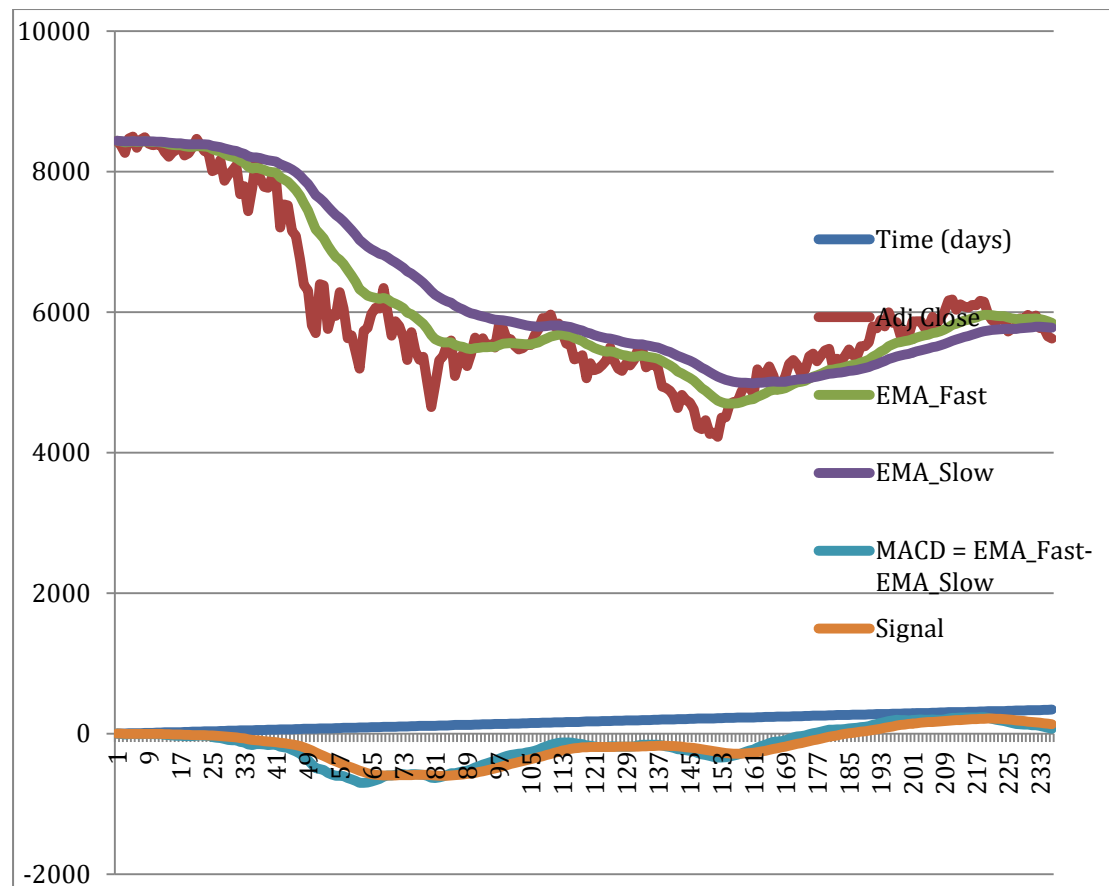
Figure 3.8



In the Figure 3.7 above we can see the price movement of NYSE Composite (DJ) and the forecasted price movement created with the help of MACD. We can see MACD which includes the Macd Line and signal line at the below of the chart. We can see there are many crossovers, which act as signals. To give a clearer picture of whether the MACD is able to forecast the future price movements I have added one more chart, which focuses on first 200 days only.

As we can see in the Figure 3.9 that the price starts from \$ 8438 and initially there was no trend. On 12th day the prices start decreasing and MACD also signals that the price will follow a downtrend as the signal line crosses above the Macd line and the gap between these two lines keep on increasing till 90th day and than starts narrowing as they cross each other on 99th day signaling a change in trend and generating a buy signal. The profit here calculated by the model equals to \$2526.73.

Figure 3.9



If we investigate further we can see the prices are following a downtrend till day no. 150 where as we can see that Macd has been showing an uptrend moment since day no. 84. This is clear case of divergence. As we can see on 157th day there is crossover as macd line crosses over the signal line signaling an uptrend and this trend continues till the end. During this trend there are many small periods where the model is able to generate profit using MACD signals, as there are small periods of downtrends.

Results	
Last Cell Index	1027
Stock Price on last day	8011.44
Last Position in strategy	1
Last Opening Price	7664.26
Profit on last transaction	347.18
Total Gross Profit	-2369.73

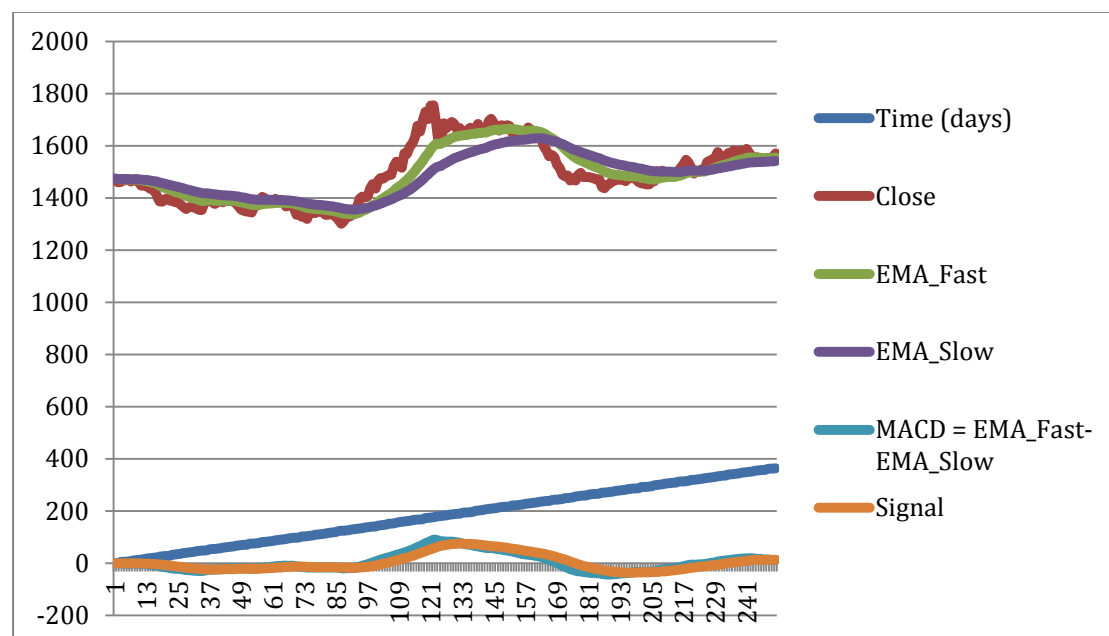
Table 3.1.3

This is the calculation part of my model. The reason behind the Total Gross Profit being in negative is because too many buy signals and less sell signals as the prices are following an uptrend for too long.

After applying the Macd in different markets this paper will apply MACD in a market, which is quite different from the rest of the world. UAE stock exchanges are relatively small as compared to stock markets of developed countries. The number of listed companies listed is low, most of them are infrequently traded and the trading volume is low. In addition to this there is a lot of insider trading, as these markets are relatively unregulated. From 2007 till 2011 the profit generated in Dubai financial market is decreasing at an alarming rate. In this part this paper will apply MACD in Dubai

Financial Market on different indices. Figure 3.10 reflects the price moments for Dubai Financial Market General Index.

Figure 3.10



As we can see in the Figure 3.10 there are no major trends as compared to other stock markets. It can be notice the Macd is able to predict when the prices are going up or down. As we can see that Macd line and signal line are moving very close to each other because the prices are changing direction quite often. There not a single clear signal like what Macd used to generate in other stock markets. Here we cannot rely on Macd if we are thinking as a long-term trader or investor. Though as short-term investors it might

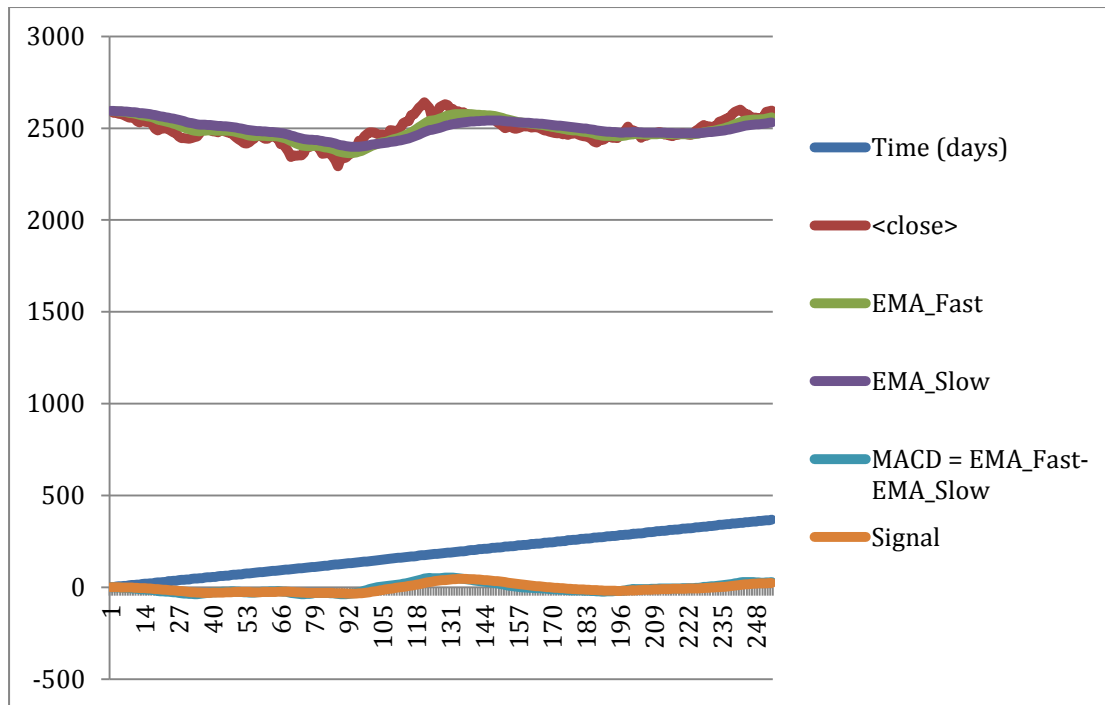
help. As we can the Macd line starts rising above the signal line on day no. 55 and the prices start rising from 80th days and one 130 day the macd line goes below the signal line and prices starts decreasing from 150th day. The Macd model calculates a profit of AED 291 if securities are bought on day 55 and sold on 130 day.

Results	
Last Cell Index	1027
Stock Price on last day	1571.26
Last Position in strategy	1
Last Opening Price	1555.58
Profit on last transaction	73.56
Total Gross Profit	484.01

Table 3.1.4

As it can be notice that Macd doesn't behave exactly the same in the Dubai Financial Market as it does in other stocks markets. The major reason for this could the trends. There are no trends in this market where as in other markets we have noticed trends do prevails. One more reason could be the lack of data as we have only 1-year data available for Dubai Financial Market General Index. Macd is able to predict future prices in this market but it will not be able to make money as it does in other stock markets especially if you are a long-term investor. So I am applying Macd to another stock market from the same country Abu Dhabi Stock Exchange. The figure 3.11 reflects the price movement of ADX index.

Figure 3.11



As we can see in this stock exchange also there are no major trends and Macd is not able to generate many signals and the signals, which are there, are not clear. Though the macd model has generated some signals but the profit generated is very low or negligible.

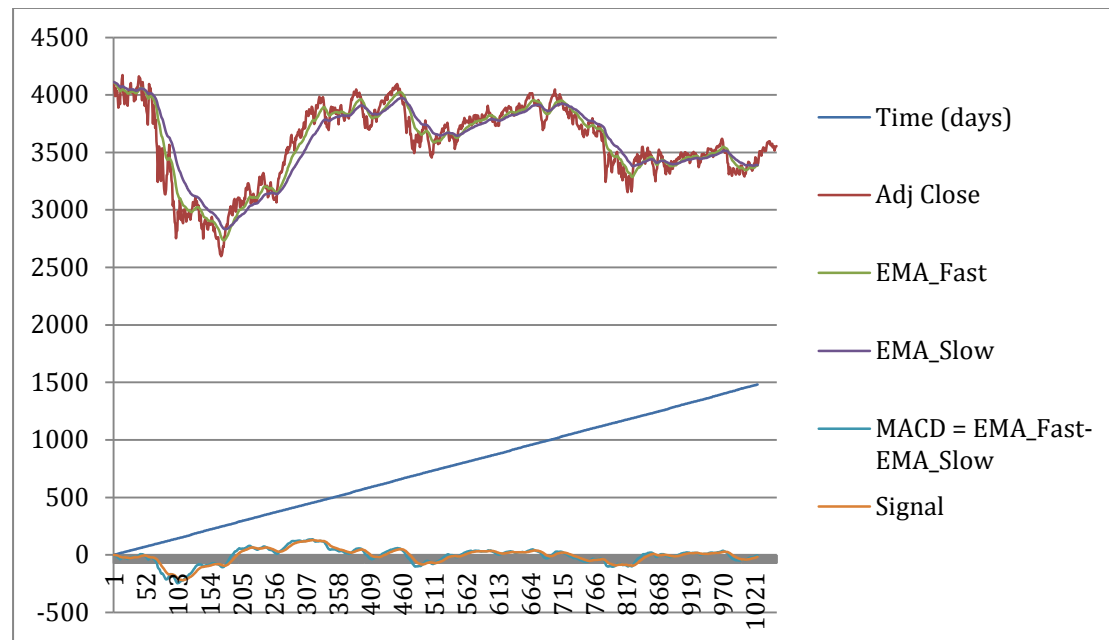
Results	
Last Cell Index	1027
Stock Price on last day	2596.73
Last Position in strategy	1
Last Opening Price	2592.64
Profit on last transaction	109.43
Total Gross Profit	131.01

Table 3.1.5

In the end this paper applies macd to Australian stock exchange using the S&P ASX 100 index. Data for S&P ASX 100 ranges from July 2008 to Aug 2012. Figure 3.12 reflects the

price moment of S&P ASX 100.

Figure 3.12

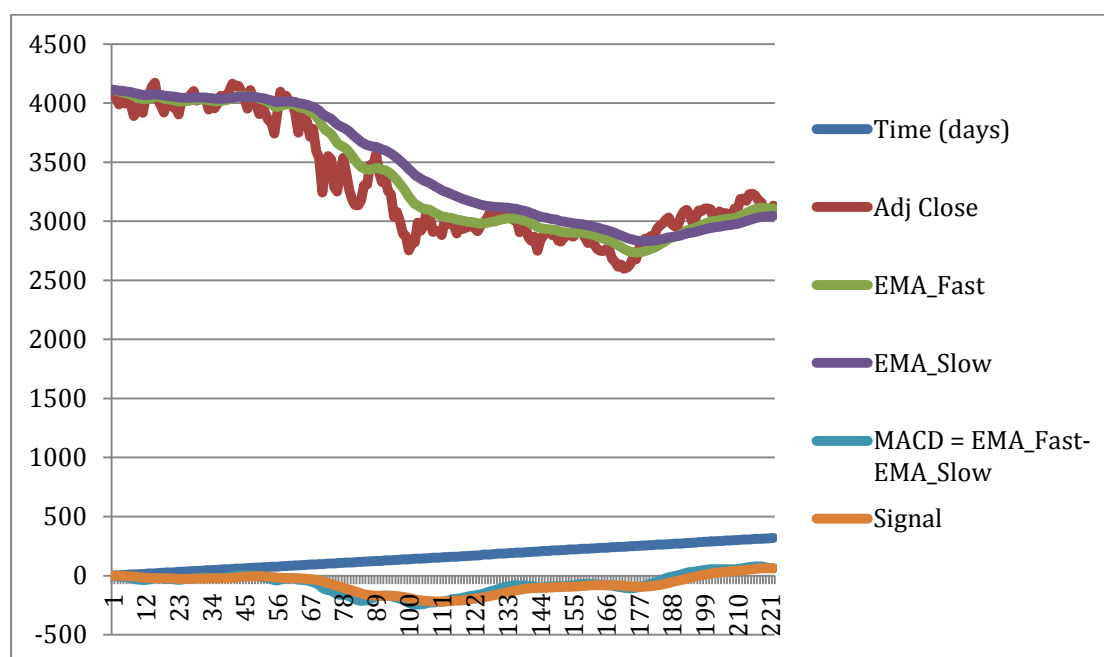


In the Figure 3.12 we can see the price starts from above AUD 4000 and continues falling till AUD 2600. On the other hand we can see that Macd is also signaling a fall in price as the signal line crosses over the Macd line and the gap between them increases that confirms the fall in price. After this the Macd signals a bullish trend as the Macd line crosses over the Signal line on 106th day and the prices start following a bullish trend from day no. 170. The Macd forecasts it well in advance. And it can be confirmed as the actual price has formed two higher highs. The Figure 3.12 below will give you a better look of price moment as it contains data for first 220 days.

The profit calculated by the model in excel shows that on day no 93 as we can see in the Figure 3.12 that gap decreases between the Macd line and the signal line and the Macd line starts crosses over the signal line. If we buy at this prices and had agreed to sell at the price, which was prevailing on day no. 51 as there was a sell signal generated by

Macd. The profit could be AUD 519. In the Figure 3.13 we can also see many more signals where profit is possible.

Figure 3.13



The Figure 3.13 above gives a more accurate picture of how the price actually moves and how macd accurately macd forecasts it. Below is the calculated profit generated by MACD in Australian Stock Exchange.

Results	
Last Cell Index	1027
Stock Price on last day	3392.4
Last Position in strategy	1

Last Opening Price	3389
Profit on last transaction	3.4
Total Gross Profit	1343.1

Table 3.1.6

(3.6) Conclusion

In this chapter we have applied Macd to different indices in different stock markets. This paper used charts and MACD excel model to check how macd performs in different stock markets. In the next chapter we will be discussing the outcome of these analyses. The analysis uses charts and profits are calculated on excel.

Chapter 4

(4.1) Conclusion

This chapter discusses the output of analysis done in the previous chapter. As we know this paper has analyzed performance of Moving Average Divergence Convergence (MACD) in different stock markets around the globe by apply MACD to different indices.

For most of the markets this dissertation uses historical data of indices ranging from 2008 to 2012. The paper uses charts and Macd model created on excel to check whether MACD is able to forecast future prices and calculates the profits also.

First the Macd is applied in Bombay Stock Exchange (BSE). The index used is Sensex and the data ranges from July 2008 to Sep-2012. It can be noticed that MACD is able to forecast prices and is able to predict changes in trends much before it happens in reality. A successful divergence signal was also noticed. As we know Indian economy is one of the emerging economies and many investors are aiming for markets in India including Bombay Stock Exchange and National Stock Exchange. Investors can depend on Macd signals, as the Macd model was able to generate profits.

After this the Macd was applied in Athens Stock Exchange using the Athens Index Compos. The historical prices for AIC range from July 2008 to Sep 2012. It can be seen in the chart that Macd was able to predict the future prices as well as change in trends but later on the price kept on following a downtrend and whenever MACD was signaling an uptrend. It was just for few days. So the investors need to be more cautious from such signals. One more thing to keep in mind is that in this period the Euro debt crisis had started and this can be the reason why the prices kept on falling and even though Macd was generating bullish signals but the MACD line was never able to stay above the signal line. Investors should not rely only on Macd in such markets where there is a crisis going on. It would be better to use more indicators like Relative Strength Index and Stochastics. These indicators can help in confirming the

signals generated by Macd.

Next in line comes the New York Stock Exchange. The paper applies Macd to NYSE using the New York Stock Exchange Composite (DJ) index. The data for NYSE composite (DJ) ranges from July 2008 to Sept 2012. In this case Macd is able to predict future prices and trends and the Macd model was able to generate profit by relying on macd signals. In this period US economy was hit by recession but still Macd works perfectly and the Macd model was able to capture profits by relying on Macd signals.

After New York Stock Exchange this paper shifts its focus to markets in the Middle East. It applies Macd to Dubai Financial Market and Abu Dhabi Stock Exchange. Macd was not able to perform in both of these markets as these markets lack trends and are more volatile than other stock markets. Investors should not rely on Macd alone in such markets. Investors should use fundamental analysis as well as technical analysis indicators so that they can minimize their losses.

Finally when applied in Australia Stock Market it was able to work perfectly as it was able to predict prices as well as change in trends and the MACD model was able capture profits by relying on signals generated by Macd. Australian economy is one of the economies, which was not affected by recession as much as it had affected other countries like USA and Russia. So we can say investors can rely on Macd when investing in economies like Australia.

To conclude we can say that MACD performs well in economies like India and Australia as the former is an emerging economy and the latter is developed economy

both the economies were not going through any kind of crisis. But as we move to European economies specially the PIGS economies, which include countries like Portugal, Italy, Greece and Spain, in this dissertation we have analyzed Athens stock market, Greece`s economy is severely affected by European Debt Crisis. Investor should not rely only on single indicators but use a couple of indicators and use fundamental analysis in selecting which stock to invest in. In NYSE Macd was able to forecast price movement but wasn`t able to generated huge profits as the U.S economy was affected by recession during this period. In Dubai Financial Market and Abu Dhabi Stock Exchange, MACD is not able to perform at all and it would be a poor decision to use Macd in such non-trending markets.

(4.2) Suggestions and Recommendations

Technical analysis can be a great tool for making money in the stock market. But ignoring the fundamental side of trading can result in loss as we can see in this dissertation that it was not able to make money in some markets.

Keeping the above statement in mind the investors or traders should consider the fundamental factors like current economic conditions for selecting a stock and then apply technical analysis to determine the entry and exit points.

In addition to this to be a successful technical analyst one needs to gain a lot of experience in the field of financial markets. Lot of training is required and one needs to be updated regarding the recent developments in the financial markets.

To be on the safer side it would be better to use a couple of technical indicator during technical analysis and Macd being a primary indicator. As we learned from this dissertation that MACD can fail also in some markets.

As we know from our analysis Macd was not able to work in Dubai Financial Markets and Abu Dhabi Stock Exchange as both are non-trending markets and the data available for both of them was not more than a year.

On the other hand investors should be careful as sometime Macd generates a false signal. To overcome such hurdles investors should wait for a confirmation signal from the other indicators.

Further study is required in this matter as this paper only includes few stock markets around the globe.

In normal conditions Macd can be used for long term trading also but its best suited for short term trading.

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