# TECHNICAL ANALYSIS OF EFFICIENT MARKET HYPOTHESIS IN A FRONTIER MARKET

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***Abstract:***

*This paper focuses on identifying the major financial indicators or ratios that play a crucial role in determining the prices of the securities. Also the volatility of the prices of securities on the basis of previous performance of the companies will help us to understand the applicability of efficient market hypothesis in our emerging financial market. The scope of this paper is to investigate the weak form of market efficiency in the Karachi stock exchange. This paper will help the investors in making transaction in the securities after careful technical and fundamental analysis if the volatility pattern exists in the securities return and is consistent with the previous year's return and available financial information.*

***Key words:*** *efficient market, technical analysis, financial information*

## 1. Introduction

The concept of efficient market hypothesis has been prevalent for the decades and the financial community makes its investment decision on it. According to efficient market hypothesis concept, the prices of the securities fully reflect all available information and it is not possible to predict the future returns on these securities based on any previous financial information or performance of these stocks. Fama (1991) was one of the major proponents of the efficient market hypothesis and his work mainly contributed to the literature. There are three types of efficient markets, weak efficient form, semi strong form and strong form efficient markets. Weak efficient form reflects all publicly available information, semi strong form includes all analysis from the financial reports, dividend announcements, initial public offerings announcements etc., whereas strong efficient form includes all insider information that normally is hard to obtain. There are different methods that are commonly used to test these forms of efficient market hypothesis like run test for weak efficient form, and event study for weak efficient form but before that it has to be determined that either

the market that is supposed to be any one of the above mentioned form actually behaves also. So, the determination of the market is also very much important before applying any of the above procedures for testing the efficient market hypothesis.
Now there are many researchers who claim that the future returns of the stock can be predicted by making fundamental or technical analysis by the rational investors who are present in the market and has all the necessary fundamental knowledge necessary to make such analysis and therefore execute the role of the arbitrageurs in the markets. But according to EMH, the returns of the securities cannot be predicted from the past available information and future returns of the securities are function of the performance of the companies and decisions made by their management.

## 2. Literature Review

According to the efficient market hypothesis, the prices of the securities reflect all the available information thus making trade based on the average historical returns unprofitable in an efficient market. The returns attributable to the trading strategies with the exploitation of observable trends in the historical prices of the stocks are not superior to the long term buy and hold strategies (Gunasekarage and Power 2001). The returns whether calculated on the buy and hold strategy pattern or through the trading strategies with observable patterns depends on the efficiency of the stock market. This phenomenon is observed in Bombay stock market as the number of foreign investors is greater and the market was more efficient as compared to the Karachi, Dhaka and Colombo stock markets where the results were opposite (Gunasekarage and Power 2001).

The main emphasis on the efficient market hypothesis is due to weight of the academic opinion, but in practical aspect, the returns of the stock markets have predictable properties which sometimes negate even the weak form of efficiency (Jarrett 2010).

According to the Jarrett (2010), weak form of efficiency does not exist for the emerging markets as the returns are predictable and so the desire of the stock markets to become strongly efficient is much difficult. Also in certain developed markets even, the role of insider trading is important as these individuals can surely beat the market.

Forecasters normally try to predict the behavior of the stock market returns and in doing so, the stationarity in the data does not persist in the long run especially when predicted by large number of investors and therefore it makes it complicate to test for various forms of market efficiency and in predicting successful forecasting approaches (Timmermann and Granger 2003).

There are likely gains for the innovators till the time when large number of investors may come to know the same strategy and therefore with the passage of time that will be incorporated in the security prices. This race of innovation in predicting

methods for market returns and its adoption finally by the market will give rise to many financial forecasting methods (Timmermann and Granger 2003).

It is usually believed that the less developed countries are weak form efficient only because of lack of access to information by the investors, inadequate regulations, lack of supervision and non availability of data in simple and usable form (Mobarek and Keasey 2000).

The empirical research on market efficiency can be divided into two main parts. First to predict the returns from the observable past return patterns and secondly through the fundamental analysis which states that the others factors are also present and are important in the determination of the future prices (Mobarek and Keasey 2000).

There is also a possibility that the stock prices are not adjusted by the information availability as are expected because different investors interpret information in different ways. So there can be instances that the prices of stocks will move in a way not justified by the information available (Mobarek and Keasey 2000).
The returns of the stocks, talking specifically about the weak form of market efficiency, not only depends upon the incorporation of past prices in the current prices but also on the investor's different interpretations about the available information. For example, dividend announcement has negative impact on the prices of stocks because of the tax effect, however the cash dividends have not been incorporated in the prices of stocks (Akbar and Baig, 2010)

According to Malkiel (2003), our stock markets are more efficient and less predictable than many of the previous academic researchers would have believed. By the start of the twenty first century, the efficient market hypothesis theory was targeted by many of the academicians and economists. According to them, the future prices of the stocks are predictable on the basis of the technical as well as fundamental analysis, and also the future prices or the stock returns are very much dependent on the sentiments or behavior of the investors (Malkiel 2003).

The stock market behavior is dependent on a mix of investors, some of them are very rational whereas others are noise traders and this mix makes the whole market sometimes in efficient. But as we have to view the market as a whole, the information as far is concerned is reflected in the prices and with the passage of time this efficiency can be expected to increase with the availability of more public and private information thus at the same time diminishing the role of professional in the market (Malkiel 2003).

According to Fama (1991), the judgment of market efficiency literature is based on how it improves our ability to describe the time series and cross-sectional returns of security returns.

New opinion about the three assumptions of market efficiency is that the test results regarding the semi strong and strong form of market efficiency are same but the new research about weak form of market efficiency differs from the old theory. It says that the stock market returns can be predicted from the observed regularities from the past prices (Fama 1991).

Much of the research work now suggests that the future predictability of stock prices or returns depends on the time horizon of returns with predictable variation in expected returns from around 3 percent for shorter horizons to about 25 percent horizons ranging from 2 to 5 years (Balvers et al 1990). According to Fama (1988), predictability about the future stock prices in not bound to be inconsistent with the market efficiency. According to Balvers et al (1990), output is highly correlated with consumption and therefore is predictable.

Consumption opportunities vary following variations in output resulting in less smooth consumption patterns faced by the investors, so for making these patterns smooth, investors adjust their required rate of return on the stock. So due to that linkage, returns of the stocks should be related to the level of the aggregate output (Balvers et al 1990).

A market in which prices at any time "fully reflect" available information is called "efficient". This definition given by Fama in 1970 and in that paper, he has used fifteen times the work fully reflect in the quotation marks thus making a point that he was himself aware of the fact the term cannot be used for the empirical work although at that time the concept of efficient market hypothesis was quite dominant among the researchers and the financial community (Guerrien and Gun 2011).

Market efficiency does not occur by itself even if information is readily available in the market. It heavily depends upon the interpretational and analytical abilities of the traders present in the market considering they have sufficient time and are willing to transfer the sensitive information that plays an important role in the fluctuation of the stock market returns (Akbar and Baig 2010).

## 3. Methodology

The dependent variable in our study is the average closing stock prices listed on the Karachi stock exchange whereas the independent variable are debt/equity ratio, net profit margin, earnings per share, current ratio and return on capital employed. The resulting equation formulated including all the above mentioned independent variables is given below. The data on average closing stock prices is taken from Karachi stock exchange website. The resulting equation including all the independent variables is given on next page

$$y=\alpha+x1+x2+x3+x4+x5+\epsilon$$

Where,

y=Closing average stock prices (Dependent variable)
x1=Debt/equity ratio
x2=Net profit margin
x3=Earnings per share
x4=Current ratio
x5=Return on capital employed
$\epsilon$ = Error term

Data on our independent variables is taken from Securities and Exchange Commission of Pakistan and State Bank of Pakistan website from 2001 to 2011. All the listed companies have been selected in our sample to include the closing prices of their shares on the stock market and then the stock prices are regressed on the basis of the above mentioned information. The impact of all the independent variables are to be observed on the changes in the prices of the securities to observe the extent of association between the given financial information available to the public and the final stock prices. There can be many other type of financial information that can be used to see its impact on the prices of the securities but we have taken such information that rational investors seek important in making their decisions in trading these securities.

*Research Question*

- Do security prices of the stocks in Karachi stock exchange depicts all available information.
- How much variation is shown by the financial indicators in the prices of the stocks?

*Delimitation of the study*

There can be much financial information that can be included as the independent variable to check their impact on the stock prices. Also there can be many other tests to check the market efficiency, i.e., run test in case of weak form of market efficiency and event study in case of semi strong form of market efficiency

**Data Analysis**

**Regression Analysis**

| *Regression Statistics* | |
|---|---|
| *Multiple R* | 0.926558404 |
| *R Square* | 0.858510477 |
| *Adjusted R Square* | 0.717020954 |
| *Standard Error* | 2104.305501 |

**Analysis of Variance**

| **ANOVA** | ***df*** | ***SS*** | ***MS*** | ***F*** | ***Significance F*** |
|---|---|---|---|---|---|
| **Regression** | 5 | 134341101 | 26868220 | 6.0677 | 0.0349 |
| **Residual** | 5 | 22140508.2 | 4428102 | | |
| **Total** | 10 | 156481609 | | | |

| | Coefficients | Standard Error | t Stat | P-value |
|---|---|---|---|---|
| Intercept | 34671.39397 | 17574.5983 | 1.972812884 | 0.10554361 |
| Debt/Equity Ratio | -3413.992356 | 5781.021927 | -0.590551705 | 0.580501532 |
| Net Profit Margin | 995.1597929 | 1234.77724 | 0.805942773 | 0.45687843 |
| Earning per share | 3676.899741 | 2347.047946 | 1.566606148 | 0.177987172 |
| Current Ratio | -244.6330854 | 82.46062118 | -2.966665566 | 0.031277213 |
| Return on capital employed | -775.9154015 | 915.9105796 | -0.847151915 | 0.435572924 |

**Cross Correlation Table**

| Co-relation | Debt/Equity Ratio | Net Profit Margin | Earning per share | Current Ratio | Return on capital employed |
|---|---|---|---|---|---|
| Debt/Equity Ratio | 1 | | | | |
| Net Profit Margin | -0.58997073 | 1 | | | |
| Earning per share | 0.112013064 | 0.4567 | 1 | | |
| Current Ratio | -0.39174268 | 0.4417141 | -0.22462623 | 1 | |
| Return on capital employed | -0.45139306 | 0.8534844 | 0.777163057 | 0.1633 | 1 |

**Descriptive Statistics**

| | Debt/Equity Ratio | Net Profit Margin | Earning Per Share | Current Ratio | Return on capital employed |
|---|---|---|---|---|---|
| Mean | 1.5800 | 7.2682 | 3.3200 | 92.9882 | 23.3973 |
| Standard Error | 0.0709 | 0.4331 | 0.2984 | 3.2596 | 1.0590 |
| Standard Deviation | 0.2352 | 1.4366 | 0.9895 | 10.8108 | 3.5122 |

| | | | | | |
|---|---|---|---|---|---|
| **Sample Variance** | 0.0553 | 2.0637 | 0.9792 | 116.8727 | 12.3352 |
| **Kurtosis** | -0.9753 | 2.3525 | -1.1064 | 0.2628 | -1.1797 |
| **Skewness** | 0.4308 | 1.4429 | 0.3963 | 1.1760 | 0.2689 |

**Data Interpretation**

In the regression analysis the value of R square is 0.9266 which shows that the 92.66 percent of the changes in the prices of the stock is explained by the independent variables that we have selected representing the public information. This value is quite high thus confirming the implication of efficient market hypothesis in the Karachi Stock Exchange. Also the difference between the R square and adjusted R square is low which shows that the number of variables is less as compared to the number of observations. The value of the pearson correlation coefficient is 0.9266 which shows that the correlation between the observed and the predicted values is 92.66 percent which is quite high value. In the analysis of variance section, the F value is 6.0677 and p value associated with it is 0.0349 which is highly significant under 95 percent confidence interval thus indicating that the group of independent variable reliably predicts the changes in the prices of the securities which we have taken as our dependent variable. Further analysis of variance in the above table shows that the p values are not quite significant except for the current ratio which is significant upto 0.03 i.e., highly significant at 95 percent interval and therefore the value of standard error associated with it is quite low i.e. 82.46 as compared to other independent variables.

In the cross correlation of the variables, the net profit margin, current ratio and return on capital employed is negatively correlated with the debt to equity ratio indicating that the increase in debt in the company's financing results in lower net profit margin, lower proportion of current assets relative to current liabilities and also resulting in less return on capital employed. Also earnings per share is negatively related to the current ratio showing that the increase in the level of current assets results in decrease in level of earnings per share to the equity holders. In descriptive statistics, the mean value of debt to equity ratio is 1.58 thus indicating that the companies listed on the Karachi Stock Exchange in all the years of which data has been collected have 1.58 times debt financing as compared to the equity financing. Earnings per share for the listed stocks remain at 3.32 rupees and the current ratio on average for all the listed stocks is almost 93 times.

## 4. Conclusion

In this paper we have tried to examine the impact that all the publicly available information that can be extracted mainly from the financial reports of the companies on the average stock price listed on the Karachi Stock Exchange. The regression analysis justifies the efficient market hypothesis that all the publically available

information is fully reflected in the prices of the listed stocks. Also the impact is significant, i.e., the investors while trading in specific stocks can go through the available information about the said stocks. There can be lot of financial information that can also be included as the independent variables to see the impact on the security prices. As we are mainly concerned with the weak efficient market therefore we have mainly focused on the publicly available information. In studies focusing on other than weak efficient forms, i.e., semi strong form and strong form, many of the other tests can be performed i.e. event study in semi strong form of market efficiency. This study also proves that in our emerging market the implication of efficient market hypothesis are strong as compared to the behavior or sentimental perspective of the investors as the independent variables included in our study explained the price changes of the listed stocks to a great extent.

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