

EFFICIENT MARKET HYPOTHESIS (EMH): A STUDY OF REVIEW OF LITERATURE

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Abstract: Stock markets are considered one of the key indicators of the health of the economy. The major attribute of capital market is that the prices of securities must reflect all available information and new information should swiftly adjust into prices so that no investor can generate excess returns by the use of such information. A large number of tests on the relevance and applicability of the random walk hypothesis and EMH is carried out across the globe. The study concludes that the Indian stock market follows all three forms of market efficiency i.e weak, semi-strong and strong forms of market efficiency.

Keywords : *weak-form, Semi-Strong form, Strong -form, EMH.*

The term market efficiency is used to explain the relationship between information and share prices in the capital market literature. Fama classifies market efficiency into three categories namely, weak-form, semi-strong form and strong form. The EMH, popularly known as the Random Walk Theory, simply points out that current stock prices fully reflect available information about the value of the firm and there is no way to earn excess profits (more than the market overall) by using this information. Thus the efficient market hypothesis (EMH) is a concept of informational efficiency and refers to market's ability to process information into

prices. The idea of the EMH emerged in the beginning of the twentieth century in the theoretical contribution of **Bachelier (1900)**. As noted by **Dimson and Mussavian (1998)**, whilst **Bachelier (1900)** first modeled the formulation for a random walk in security prices.

These empirical findings combined with the theory of **Samuelson**, published in his influential paper “Proof that Properly Anticipated Prices Fluctuate Randomly”, led to the EMH. According to this hypothesis, in an information ally efficient market, price changes must be unforecastable if they fully incorporate the expectations and information of all market participants. Since news is announced randomly, prices must fluctuate randomly. Consequently, it states that it is not possible to exploit any information set to predict future price changes.

A market will be considered weak- form efficient if current prices fully reflect all information contained in historical prices, which reveals that merely based on this past price behavior, no investor can earn the abnormal profits. Thus the stock returns are serially uncorrelated and have a constant mean as states by the EMH. If stock prices instantaneously reflect any new publicly available information then market is semi-strong efficient and if prices reflect all types of information whether available publicly or privately then market will be considered as strong efficient. Turn of the year, month, week and holidays are reported to have consistently generated abnormal equity returns, unrelated to the attendant risks, at the developed stock markets and are identified as calendar anomalies.

Fama (1965) reported Monday's variance to be 20 per cent greater than other daily returns. Later, many empirical studies by **French (1980)**, **Gibbous and Hess (1981)**, **Gultekin and Gultekin (1983)**, **Board and Sutcliffe (1988)** presented ample evidence as to the calendar anomalies using the data relating to the developed economies. Taxation at the year-end, cash flows at the month-end, unfavorable news releases at the weekend and over-reactions due to human psychology are attributed to be the reasons for such anomalies. The earlier tests of the

weak-form of EMH are concerned with the predictability power of past returns. It indicates that future returns cannot be forecasted from past returns data since the current returns are considered to contain all information that is incorporated in historic data. In the short-run, when stock returns are measured over periods of days or weeks, the general evidence against market efficiency is a presence of positive correlation in stock returns. However, recent studies on autocorrelation in stock returns have shown mean reversion in stock prices. Following by Fama's theory and comprehensive empirical work of efficient capital market, a plethora of studies were devoted to testing validity of the weak-form of the EMH. However, a large number of these researches have focused on developed markets. There is no serial correlation when empirical studies test the EMH in terms of the null hypothesis

Engel and Morris (1991) and **Fama and French (1988)** analyzed and found that there is significant negative serial correlation in long horizon returns in U.S.. Similarly, **Poterba and Summers (1986)** found positive serial correlation at short horizons and negative serial correlation at long horizons in the United States and 17 other countries. Positive autocorrelation infers predictability of returns in the short horizon, whereas negative autocorrelation reflects predictability in the long horizon (**Fama, 1991**). On the other hand, similar to **Poterba and Summers (1986)** and **Fama and French (1988)**, **Lo and MacKinlay (1988)** found the evidence against the EMH in stock prices of small firms but not for large firms. The study also argued that the rejection of random walk hypothesis cannot be explained completely by infrequent trading or time varying volatilities, although the rejections are due largely to the behavior of small stocks. Contrary to the results of **Fama and French (1988)**, **Lo and MacKinlay (1988)** asserted that the rejection of random walk for weekly returns does not support a mean reverting model of asset prices.

Kim, Nelson and Startz (1991) examined the random walk pattern of stock prices by using weekly and monthly returns in five Pacific-Basin Stock Markets and found that all stock markets

except Japanese stock market did not follow random walk. **Butler and Malaikah (1992)** examined the weak-form efficiency for the Kuwait and Saudi Arabian stock markets by using autocorrelation test. The study covered daily stock returns of two stock markets for the period 1985 to 1989 and found evidence of efficiency in Kuwait stock market, but not in the Saudi Arabian market. **Choudhry (1994)** examined and investigated the stochastic structure of individual stock indices in seven Organisations for Economic Cooperation and Development (OECD) countries: the United States, the United Kingdom, Canada, France, Germany, Japan and Italy. The Augmented Dickey-Fuller and KPSS unit root tests and Johansen's cointegration tests were used to test the log of monthly stock indices from the period 1953 to 1989. The study concluded that stock markets in seven OECD countries are efficient during the sample period. The results from both unit root tests showed that all the seven series seem to contain a stochastic trend (unit root) and they are non-stationary in levels. The result of Johansen's cointegration test shows no support for a stationary long-run relationship between the seven stock series. Absence of long-run multivariate relationships also provides evidence of efficient markets.

Huang (1995) examined the efficiency of nine Asian stock markets: Hong Kong, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Thailand and Taiwan by using the variance ratio statistic with both assumptions homoscedastic and heteroskedastic. The data consisted of weekly stock returns of nine stock market indexes from the period 1988 to 1992. Excluding the market in Indonesia, Japan and Taiwan, the random walk hypothesis for the remaining markets is rejected. The result of variance ratio exceeds one in the markets of Korea, Malaysia, Hong Kong, Thailand and Philippines, indicating the presence of positive serial correlation. The hypothesis for markets of Korea and Malaysia is rejected for all holding periods, whereas the hypothesis for the Hong Kong, Singapore, and Thailand markets is also rejected by using the heteroscedasticity-consistent variance ratio estimator.

Chang, Fawson, Glover and Fang (1996) tested the weak form of the EMH using monthly data on the Taiwan stock exchange from 1967 to 1993. Employing the Ljung-Box Q, the runs and the unit root tests, the study observed that the Taiwan stock market is weak-form efficient.

Liu, Song and Romilly (1997) examined daily closing prices on the Shanghai and Shenzhen stock exchanges using the ADF unit root and cointegration tests from the period May 21, 1992 to December 18, 1995 to test the randomness in each stock exchange share price index and cointegration and causality tests and examine the relationship between the two share price indexes. The results suggested that the random walk for both the Shanghai and Shenzhen is accepted, indicating that each market is individually efficient.

Ojah and Karemera (1999) examined the random walk of four Latin American markets. The study applied single variance ratio, multiple variance ratio and runs tests to monthly national stock price indexes in US dollar terms for the period December 1987 to May 1997. Under the single variance ratio test, except Argentina, rest of the three markets including Brazil, Chile and Mexico do not follow a random walk. However, the result of multiple variance ratios indicates that all the four market follow a random walk, whereas the runs tests reject the random walk hypothesis for Chile, but not Argentina, Brazil and Mexico. Similar to **Urrutia (1995)**, **Ojah and Karemera (1999)** concluded that four Latin American emerging markets are weak-form efficient.

Darrat and Zhong (2000) examined whether or not the stock prices in both Chinese markets follow a random walk use the variance ratio test of Lo and MacKinlay (1988) and a model-comparison method. The study concentrated its investigation of the market behaviour on daily data of the A-share closing index prices of the Shanghai exchange from December 20, 1991 to October 19, 1998 and the Shenzhen exchange from April 4, 1991 to October 19, 1998. The results from variance ratio and model-comparison tests indicated that A-share indices on both

Chinese stock markets do not follow a random walk. The results also showed that prices of A-share indices exhibit positive autocorrelation implying the potential for predictability. The study further suggested that the inefficiency probably arise from thin trading and asymmetric information. The study also claimed that market imperfection such as ineffective legal structures and lack of transparency that prevents the smooth transfer of information, which typically characterized emerging markets, are also another explanation for inefficiency in Chinese stock markets.

Abeysekera (2001) indicated that the Colombo Stock Exchange (CSE) in Sri Lanka is weak-form inefficient by using the serial correlation, runs and unit root tests. The data included daily, weekly and monthly returns of the Sensitive Share Index (based on market prices of 24 blue-chip companies listed on the CSE) and a 40-security value weighted index for the period January 1991 to November 1996. The results of three tests consistently reject the random walk hypothesis. The study also examined a day-of-the-week and a month-of-the-year effect on the CSE, but neither effect found to be on the stock market in Sri Lanka.

Abraham, Seyyed and Alsakran (2002) examined weak-form efficiency in three major Gulf stock markets including Kuwait, Saudi Arabia and Bahrain using the variance ratio and runs tests for the period October 1992 to December 1998. The data consisted of weekly index values for each of three Gulf stock markets. The results of both the tests rejected the random walk hypothesis in all markets. Taking into consideration on possible infrequent trading in all three markets, the study applied a correction to the observed index by using decomposition of index returns. After the correction, the study failed to reject the random walk hypothesis for the Saudi Arabia and Bahrain markets, but not for the Kuwait market. **Hassan, Al-Sultan and Al-Saleem (2003)** observed that the Kuwait stock market (KSE) is weak-form inefficient.

Moustafa (2004) examined the behaviour of prices in the United Arab Emirates (UAE) stock market using daily prices of 43 stocks included in the UAE market index for the period October 2, 2001 to September 1, 2003. The study found that the returns of the 43 stocks do not follow normal distribution. However, the results of runs tests showed that the returns of 40 stocks out of the 43 are random at 5 per cent level of significance. Although the UAE stock market is newly developed and it is still very small, also suffering from infrequent trading, the UAE is found weak-form efficient.

Gao and Kling (2005) examined calendar effects in Chinese stock markets, particularly monthly and daily effects. Using individual stock returns on Shanghai and Shenzhen stock markets, the study observed that Shanghai and Shenzhen stock markets exhibit daily and monthly calendar effects. The study argued that China has two features related to calendar effects, which differ from other markets. One aspect is that the year ends in February; therefore, a January effect cannot be expected, and second is that tax-loss selling is not relevant since there are no taxes for capital gains. The results showed that the year-effect was strong in 1991, but disappeared later. As Chinese year-end is in February, the study suggested that the highest returns can be achieved in March and April. The study also found that the day-of-the-week effect follows a different pattern compared to other markets, as Mondays are considerably weak and Fridays show significantly positive average returns.

Gersdorff and Bacon (2008) examined the efficiency of the market with respect to the announcement of the mergers and acquisitions by US Company on stock prices risk adjusted rate of return using twenty recent mergers as of 31st Aug 2007 by Standard event study methodology test. The weak, semi-strong and strong form efficient market hypothesis which test an investor's ability to earn a positive abnormal return on the basis of merger announcements are examined. Specifically, this work focused on the semi-strong form test in an effort to test the efficiency of merger announcement public information. Evidence supports the semi-strong market efficiency

along with a positive signal exhibited by the sample of acquiring firms during the event period. Evidence of lingering excess returns after the merger announcement was also observed.

Earl and Bacon (2011) examined the semi-strong form of EMH by analyzing the impact of the failure announcement of Federal Deposit Insurance Corporation (FDIC) bank on the stock price returns of Bank Holding Companies. The period covered under this study is from 13th Feb 2009 to 16th Jul 2010. The study employed the Standard Risk Adjusted Event Study Methodology over the sample of 36 FDIC bank failure announcements which have been taken from publicly traded Companies which are traded on NYSE, NASDAQ or OTC. The study concluded that the market shows the negative signals on and around the bank failure announcements which suggested that the Bank Holding Companies cannot earn abnormal return and the management and stock holders have fear of FDIC bank failure announcement.

Patel, Radadia and Dhawan (2012) examined the day of the week effect in four selected stock markets of Asian countries namely India (BSE), Hong Kong (Hong Kong Stock Exchange), Japan (Tokyo Stock Exchange) and China (Shanghai Stock Exchange) and found that in BSE, the maximum average return is on Wednesday with highest standard deviation on Monday. The BSE is the only market which has given average positive returns on all days among Asian markets. The return distributions in all market were not normally distributed. In Hang Seng, maximum average return is on Friday with highest standard deviation on Monday. In Nikkei, the highest return is on Thursday and the average returns were negative on rest of the days. The maximum volatility was found on Monday. In SSE, the maximum average return is on Wednesday. The maximum volatility was found on Monday. The Monday was a day of high volatility in Asian markets under study. This may be because of the trading gaps of non-working days prior to Monday. There is no evidence in favour of the day of the week effect and also provide evidence that investor cannot predict market behaviour and may not have opportunities to improve their returns by timing their investments during whole period and all the three sub-

periods for any of markets under study of Asian region. This suggested that the markets understudy is efficient which indicates investor or any other person cannot predict volatility of all markets during the period. Therefore, it is concluded that the investor may not get the stream of arbitrage benefits due to markets efficiency.

Obaidullah (1990) analyzed the stock market reaction to half-yearly announcements and found that the Indian stock market is semi-strong efficient. The study on day of the week effect in returns at the Indian capital market. **Chaudhury (1991)** examined the behaviour of the Bombay Stock Exchange (BSE) Sensitive Index (SENEX) during June 1988 and January 1990 and found that average return pertaining to Monday was significantly negative and highest returns were usually on Fridays.

Jayadev (1996) evaluated the performance of two growth oriented mutual funds namely Master-Gain 1991 of Unit Trust of India and Magnum Express of SBI Mutual Funds. The study period spanned from June 1992 to March 1994 and employed the risk adjusted performance measures suggested by Jensen, Treynor and Sharpe in order to evaluate the performance of mutual funds. It is concluded that both the mutual funds do not perform better than their benchmark indicators. It also concluded that Magnum express is found to be highly diversified while Mastergain is low diversified. Moreover, the fund managers of both the funds are found to be poor in market timing and selectivity. **Choudhry (2000)** examined the week day patterns in return and volatility of seven emerging markets including India. For the Indian market, using the daily data of returns from January 1990 to June 1995, the study obtained a positive Friday effect in returns and a positive Thursday effect in volatility.

Thomas and Shah (2002) analyzed the Indian stock market index from April 1979 to June 2001 by using 26 budget dates. The study found that in some years, post-budget returns are positive, in other years post-budget returns are negative; on an average, there is no clear pattern about

movement in the Index after budget date. The study did not provide no evidence of over-reaction or under-reaction prior to budget date or immediately after it. Thus, the study concluded that the information processing by stock market participants is rational and that the Indian stock market is semi-strong efficient.

Gupta (2003) examined the semi-strong efficiency of the Indian Stock market over the period from 1995 to 2000 by employing event study. The study involved a sample of 145 bonus issues, in order to examine the announcement effects of bonus issues on equity share prices in India. The study concluded that the Indian Stock market was semi-strong form efficient. **Gupta and Kundu (2006)** examined the impact of union budgets on Sensex of stocks from 1991 to 2005. The study found that investors can earn super profits during the short-term and medium-term periods around the budget (up to 15 days) and also confront with the risk of abnormal losses if the investors' expectations are not fulfilled from the budget. **Agrawal (2007)** investigated whether monetary policy announcements contained any informational value to the stock market in achieving pricing efficiency in the semi-strong form by conducting event study on 50 constituent stocks of CNX Nifty index over the period from 1st January 2006 to 31st August 2007. The study evidenced that the impact of the announcement on the stock price on the event day was not consistently significant because sometimes such announcements had already been discounted by the market in advance. However, both in pre and post-announcement periods, significant positive (negative) abnormal returns were observed for good (bad) news and therefore, the study failed to confirm the efficiency of the Indian stock market in its semi-strong form. **Dhar, Satyajit and Chhaochharia (2008)** analyzed the impact of the information relating to the announcement of stock split and bonus issue on stocks listed on National Stock Exchange (NSE) by employing event study. Both the events, i.e. stock split and bonus issue, reflect significantly positive announcement effect. For bonus issues, the abnormal return was about 1.8 per cent and for stock splits it was about 0.8 per cent. Thereby the study supports the view that Indian Stock Market is efficient in semi-strong form. **Sharma and Mahendru (2009)** examined

the weak form efficiency of 11 securities listed on the BSE using weekly closing values from July 2007 to October 2007 by employing runs analysis and auto-correlation test. The study finished with the conclusion that the BSE is weak-form efficient and the stock prices are having very little effect on future prices which implies that an investor cannot earn any profit by studying the past values of shares.

Khan and Ikram (2010) analyzed the efficiency of the Indian capital market in its semi-strong form of efficient market hypothesis (EMH). The efficiency is tested in relation to the impact of Foreign Institutional Investors (FII's) largely on the Indian capital market. For the purpose, two major stock indices viz; National Stock Exchange (NSE) and Bombay Stock Exchange (BSE) that represent the Indian capital market have been taken. Monthly averages of NSE & BSE and Monthly FII's net investment have taken over the period from 1st April 2000 to 30th April 2010 in order to test the efficiency of Indian capital market. Karl-Pearsons' Product Moment Correlation Coefficient (Simple Correlation) and linear regression equations have been used to analyze and determine the degree and direction of the relationship between the variables involved. The results suggested that the FII's did have significant impact on Indian capital market, which leads to the conclusion that Indian capital market is semi-strong form efficient.

Gupta and Yang (2011) analyzed the weak form efficiency in two of the Indian stock exchanges Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) by employing three different tests namely, ADF, PP and KPSS for the period from 1997 to 2011. The results of market efficiency are mixed. For quarterly data, all three methods support the weak form efficiency for later sample period from 2007 to 2011, but slight conflict for earlier period from 1997 to 2007 as only PP test shows weak form efficiency. In case of monthly data, all three tests are consistent on the weak form efficiency for the period from 2007 to 2011 and not efficient for period from 1997 to 2007. In case of daily and weekly data, all three tests methods reject weak form efficiency during all sample periods.

Joshi (2012) analyzed and found the evidence of the inefficient form of the Indian stock market in long run but efficient form in short term. Hence, the results supported the random-walk hypothesis in short period but does not in long term. All indices of BSE do not support the weak form of market efficiency. The information regarding yesterday's and today's indices can be used to predict tomorrow's indices. The stocks in the index do not absorb the price information effectively. It means investors can identify available undervalued securities in the market make excess returns by correctly picking them. **Nageshwari and Selvam (2012)** investigated whether Friday effect exist in Bombay stock market and found that there was highest mean return recorded in Friday and the lowest mean returns on Monday and the Friday's average return is significantly higher than the other day's average returns. The presence of Friday effect defeats the basic premises of the efficient market hypothesis. The analysis of seasonality results revealed that there is no significant Friday effect exists in Indian stock market during the study period from 1st April 2002 to 31st March 2010.

Conclusions and Findings

Indian stock market delivered mixed results, few studies says that indian stock market is weak form efficient, while other points out that it is semi-strong form of efficient. The study concludes that indian stock market follows all three forms of market efficiency i.e weak, semi-strong and strong forms of market efficiency.

So far number of studies on the efficient market hypothesis (EMH), to test the randomness of stock prices of individual companies revealed that there are enough gaps in the study regarding to test the random walk of equity market indices around the globe including India.

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