2018 International Conference On Business Innovation (ICOBI), 25-26 August 2018, NSBM, Colombo, Sri Lanka

Market Efficiency and Related Theories: A Brief History

Samadhi Weeraratne
School of Business
NSBM Green University Town
Pitipana, Homagama, Sri Lanka
samadhi.w@nsbm.lk

***Abstract*—This paper mainly focuses on reviewing the theoretical phenomenon with regard to market efficiency. The paper lays the background for the analysis by elaborating the theory of Efficient Market Hypothesis; a theoretical phenomenon bought forward by E. Fama and explained under three different market forms; Weak form, Semi-strong form and Strong form. Each of the different form is elaborated with empirical findings, which both support and oppose the theory. Review it further extended to elucidate other related concepts such as Random walk theory and different Market Anomalies.**

Keywords—Efficient market hypothesis, Market Anomalies, Political Events

I. INTRODUCTION

The concept of Market efficiency was one prominent concept tested by number of researchers and evolved back in 19th century with the study by Working [1], Kendell and Hill [2], Horne et al. [3], E Fama [4] and many more. An important contributor to the study, Eugene F Fama through a series of studies on market efficiency developed a well structured framework; Efficient Market Hypothesis. Fama [4] assembled a comprehensive work on market efficiency and defined an efficient market as "*one in which trading on available information fails to provide an abnormal profit"*.

The topic was hot during the 19th century, motivating number of researchers to test the hypothesis in different markets, leading to a vast body of knowledge. This paper summaries the theory behind the market efficiency in a sequential order with reference to the oldest and some latest studies with the objective of briefing out the l of studies conducted in this area. Author's purpose is not to test the validity of the methodologies used by different researches, but to draw attention to the empirical finding theories under market efficiency.

The discussion is structured based on the level of importance given to each theory under market efficiency. Accordingly, first I will elaborate the Efficient Market Hypothesis by giving prominence to the three forms of market efficiency. Second, the Radom Walk Theory will be detailed out and thirdly a briefing on market anomalies which will be followed with the concluding remarks.

II. EFFICIENT MARKET HYPOTHESIS

The study of Efficient Market Hypothesis was a blistering topic among researcher and journalists during the 19th century. In the most simplest version Eugene F Fama through his prominent journal article on capital market efficiency explained market efficiency as follows; a situation in which prices always "fully reflect" available information [4]. Basu [5] introduced the EMH concept as, reflecting information through security prices "in a rapid and unbiased fashion…", so that the security valuation gives an unbiased estimation of the underlying values of securities. Moreover he questioned the validity of the hypothesis irrespective of the number of studies which support the same.

Jensen [6]elaborates a more sensible version of hypothesis; the prices reflect information to the extend where the marginal benefit does not exceed the marginal cost of information. Grossman and Stiglitz [7], argues market efficiency as a situation where the cost of getting prices to reflect information equals to zero. Yang et al. [8] simplifies the concept "informationally efficient", as share prices moves as soon as the new information is announced. Burton G Malkiel [9], explained market efficiency as incorporating the market information and news spread in to the stock prices without any delay. Thereby, neither technical nor fundamental analysis allows the investors to gain through returns greater than those that could be obtained by holding a randomly selected portfolio of individual stocks. Yang et al. [8], expatiate on a different view of efficient market hypothesis. As per the authors efficient market hypothesis is an extension of the economic concept "Invisible hand" developed by Adam Smith. The efficient market hypothesis believes the share prices as a balance between the supply and demand conditions of the market. If the market is not balanced at a particular point, then the investor's buying and selling behavior will move the market in to balance in no time.

The developer of EFH, Fama [10] has elaborated the EMH as a clean benchmark that allows to understand what are reasonable information and trading costs, while classifying the extreme version of the theory as false. He further states the theory should be tested jointly with some other model – asset pricing model and not testable individually. Schwert [11], unfold market efficiency using market anomalies. According to Schwert anomalies can be defined as "empirical results that seem to be inconsistent with maintained theories of asset-pricing behavior". Anomalies show either market efficiency or lack of accuracy in the model used. He further highlights the fact that after documenting and analyzing the anomalies, they seem to disappear from the market. With this interesting finding of Schewert, now the existence of market efficiency was questioned. Most recent studies done by Hussain et al. [12] ,

suggests the present prices absorb and adjust to the latest information thereby, replicating the whole existing information through present prices. As per the existing theory, unless otherwise on few lucky events investors are unable to constantly outperform the market with a set of already known information.

A. Weak form efficiency

To begin with EMH, theory comes up with three information subsets; weak form test, semi-strong test and strong form test, based on the availability of the past data, publicly available data and any other information upon which investors have monopolistic access [13]. Fama used the market equilibrium as the model for testing the efficiency. It is a model that specify the nature of the market equilibrium when prices "fully reflect" available information and the conditions of the market equilibrium can be stated in terms of expected return. Fama [13]explained weak form markets as when the information set is just historical prices. As per the findings, weak form test is strongly supported by the empirical evidence.

On the other hand, Malkiel [14] explained Random work theory as a certain portion of weak form market efficiency. Further he explained the theory as follows; "a blindfolded chimpanzee throwing darts at the Wall Street Journal could select a portfolio that would do as well as the experts". In a recent paper Malkiel [9] has further explained random walk as "...not literally to throw darts, but instead to throw a towel over the stock pages". In other words he advised to buy a very board-based index funds rather than creating a narrow index fund. In a separate study by Hussain et al. [12], a test of weak form market efficiency of the stock market returns of 14 emerging equity markets of Asian-pacific region, found that no market is weak form efficient; thereby concluding it is possible to gain through arbitrage benefits due to the market inefficiencies inherent in these markets. Poshakwale [15], a study based on Bombay Stock Exchange, concludes that the series of prices follow a non-random nature, thereby violets the weak form market efficiency whereas the weekend effect was evident in the Bombay Stock Exchange, as returns achieved on Friday are significantly higher than the returns of other six days.

Dickinson and Muragu [16], support the EMH through a study based on Nairobi Stock Exchange. They concluded that small markets like Nairobi, can not specifically categorize as weak form efficient, rather the empirical results does not contradict with the theory. Further, the study was concluded with a suggestion to use a lengthier time interval and variety of methodologies to come in to a strong conclusion regarding the weak form efficiency.

Jarrett [17] , a study on daily variations in four emerging Pacific-basin stock markets concluded that due to the difficulties of emerging markets to achieve efficiency in their capital market, weak form efficiency does hold for these countries. Further to this, Jarrett examines the existing literature on USA, UK and other developed markets, in which the weak form of EMH cannot be rejected, since these market are mature and more complex than the small emerging markets.

B. Semi-strong form and Strong form Efficiency

Semi-strong form market as explained is where the stock prices reflect all the publicly available information such as announcements of annual earnings and stock splits etc. [13]. Poshakwala [15] expatiate semi-strong efficient when the stock prices instantaneously mirror any new publicly available information and strong form efficient when prices mirror all public and private information.

Groenewold and Kang [18], tested the weak form and semi-strong form efficiency in the Australian share market using monthly stock returns. They states that semi-strong EMH indicates that share price movements cannot be predicted based on the publicly available information and have pointed out two types of tests; based on macro data (e.g. inflation, money stock, exchange rates) and micro data (e.g. company specific announcements). Study concludes the Australian share market during 1980s was found to be in line with the EMH.

Hussin et al. [12], examined semi-strong form efficiency of the Malaysian Stock Market to a combination of dividend and earning announcements. The dividend announcements were strongly reflected through the stock prices supporting the semi-strong theorem. Overall the results signify the time required to absorb the information passed through dividend and earnings announcements is extensive, therefore Malaysian stock market is near efficient in semi-strong form for these types of announcements.

Strong form efficient as per Fama [13], concerns whether investors have monopolistic access to any information relevant for price formation. Fama [10], through his second study reworded the strong form test as "test for private information" and semi-strong form as "event studies". Further he states that cleanest evidence on market efficiency come through event studies and share prices are more sensitive towards the firm specific information. The literature lacks studies on strong form efficiency or private information. Accordingly, the tests on private information by Wall Street journal analysts "Heard on the Street" column are statistically reliable but small.

The basic assumption bought-out by many studies so far is, that the response to an event is short-lived. Therefore, most studies have been carried out by observing the stock performance within a very short time span. Fama [19] stated, there is a developing literature which disagrees with this basic assumption, rather stock prices adjust slowly to the information, therefore one must study the stock performance over a long time span. As per the developing literature, the markets are inefficient in the long run. However, Fama in his studies disagrees with the same due to two reasons. Firstly, since both the under-reactions and over-reactions are frequent occurrences in an efficient market, splitting these

two anomalies randomly make it consistent with the market efficiency. Secondly, the long run anomalies tend to disappear when applied in to different models, as a result long run anomalies can also be consistent with the market efficiency [19].

III. Random Walk Theory

Kendell and Hill [2] inspired by the findings of their study based on 22 UK stock and commodity price series, which showed almost zero correlation between different price changes. The paper concluded; "*in series of prices which are observed at fairly close intervals the random changes from one term to the next are so large as to swamp any systematic effect which may be present. The data behave almost like wandering series"*. The finding contradicts with the traditional notion, which has been bought up about the market price changes and labeled as "Random Walk Theory". Scenario further explained by Malkiel [14] through his book "A Random Walk Down Wall Street". Further studies by Malkiel [9] elaborated the meaning of Random Walk as, a random departure of share prices from the previous prices. The fundamental logic behind the concept is, if the prices are immediately adjusted to the market information, then tomorrow's price will react to tomorrow's news only, and will be independent from today's price changes. But news by definition is unpredictable making the price changes unpredictable and random. Lo and MacKinlay [20] rejected the hypothesis of true random walks in the short run. Lo, Mamaysky and Wang [21] further illustrated the use of technical analysis such as head and shoulders and double bottoms to understand the stock price patterns in the short term. Jarrett [17] suggests that "… a daily variation is neither random nor stochastic", therefore there is a possibility to predict the price patterns to a certain extend. A study based on NY stock exchange to test the random movement of stock prices, supports the theory of Random Walk. He further states the intrinsic value of a stock is based on its expected future cash flows, and as and when there is new information, investors may react to the same, leading to a revision in market prices, which takes place in a random pattern [3]. Konak and Seker [22], in a recent study checked the theory during the global financial crisis, from 2001 January to 2009 November within FTSE 100, a developed and matured stock exchange. Study concludes existence of weak form and random walk in FTSE 100 during the financial crisis period. Empirical evidence validate the random walk in number of other developed markets such as Johannesburg Stock Exchange [23] , Australia [24].

Above all the supporting evidence for the Random Walk, there were occasional instances where prices series tend to follow a pattern. Findings of Working [1] confirms non-random walk of market prices.

IV. Market Anomolies

Market anomalies on the other hand support to enhance the market predictability of an investor. Interestingly as per Schwert [11] , market anomalies such as value effect, size effect, weekend effect, dividend yield effect and small-firm turn-of-the-year effect lost their predictive power after publishing the research paper that made these concepts famous and faded away from the markets. This is as a result of the investors and professionals who make use of the anomalies to gain abnormal returns. Jensen [6], agreeing to the same concluded his study stating there can be more anomalies during the several years to come with the market changes.

V. Conclusion

Accordingly, the Efficient Market Hypothesis is a theoretical base, which explains the market structure based on the information availability and accessibility in the market. The theory became the prominent explanation during 1970s. Even today number of studies supports the existence of EMH in different forms out of which Weak form is the most common type of efficiency in most of the markets, whereas Semi-strong form efficiency can be seen in most of the mature and developed markets. Strong form efficiency lacks empirical support. Random Walk Theory is another theoretical back given to explain the price movements which are difficult to explain with certain identified pattern, and been strongly supported by findings. Stock market anomalies are only too often chance events that do not persist into the future. Thereby, the theories of market efficiency continue to provide a clear framework to explain different market structures.

REFERENCES

[1] H. Working, "A Random-Difference Series for Use in the Analysis of Time Series," *J. Am. Stat. Assoc.*, vol. 29, no. 185, pp. 11–24, 1934.

[2] M. G. Kendall and A. B. Hill, "The Analysis of Economic Time-Series-Part I: Prices," *J. R. Stat. Soc. Ser. A*, vol. 116, no. 1, p. 11, 1953.

[3] J. C. Van Horne and G. G. C. Parker, "The Random-Walk Theory: An Empirical Test," *Financ. Anal. J.*, vol. 23, no. December, pp. 87–92, 1967.

[4] E. F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," *J. Finance*, 1970.

[5] S. Basu, "Investment Performance of Common Stocks in Relation To Their Price-Earnings Ratios: a Test of the Efficient Market Hypothesis," *J. Finance*, vol. 32, no. 3, pp. 663–682, 1977.

[6] M. C. Jensen, "Some anomalous evidence regarding market efficiency," *J. financ. econ.*, vol. 6, no. 2–3, pp. 95–101, 1978.

[7] A. Wilson, "Theorizing about theorizing: An examination of the contributions of William I. Grossman to psychoanalysis," *J. Am. Psychoanal. Assoc.*, vol. 57, no. 1, pp. 9–36, 2009.

[8] C. Yang, F. Yang, Q. Xia, and S. Ang, "What makes sales in Chinese shampoo industry?:A DEA study based on efficient market hypothesis," *Asia Pacific J. Mark. Logist.*, vol. 24, no. 4, pp. 678–689, 2012.

[9] B. G. Malkiel, "The Efficient Market Hypothesis and Its Critics," *J. Econ. Perspect.*, vol. 17, no. 1, pp. 59–82, 2003.

[10] E. F. Fama, "Efficient Capital Markets: II," *J. Finance*, vol. 46, no. 5, p. 1575, 1991.

[11] G. W. W. Schwert, "Anomalies and Market Efficiency," *SSRN*

Electron. J., 2002.

[12] B. M. Hussin, A. D. Ahmed, and T. C. Ying, "Semi-Strong Form Efficiency: Market Reaction to Dividend and Earnings Announcements in Malaysian Stock Exchange," *IUP J. Appl. Financ.*, vol. 16, no. 5, pp. 36–60, 2010.

[13] R. M. Stulz, "American Finance Association, Report of the Managing Editor of the Journal of Finance for the Year 1994," *J. Finance*, vol. 50, no. 3, p. 1013, 1995.

[14] A. W. Lo and M. Graig, "A Non-Random Walk Down Wall Street.," *Princt. Univ. Press*, p. F668-, 1999.

[15] S. Poshakwale, "Evidence on weak form efficiency and day of the week effect in the Indian stock market," *Financ. India*, vol. 10, no. 3, pp. 605–616, 1996.

[16] J. P. Dickinson and K. Muragu, "Market Efficiency in Developing Countries: a Case Study of the Nairobi Stock Exchange," *J. Bus. Financ. Account.*, vol. 21, no. 1, pp. 133–150, 1994.

[17] J. E. Jarrett, "Efficient markets hypothesis and daily variation in small Pacific-basin stock markets," *Manag. Res. Rev.*, vol. 33, no. 12, pp. 1128–1139, 2010.

[18] N. GROENEWOLD and K. C. KANG, "The Semi-Strong Efficiency of the Australian Share Market," *Econ. Rec.*, vol. 69, no. 4, pp. 405–410, 1993.

[19] E. F. Fama, "Market Efficiency, Long-Term Returns, and Behavioral Finance," *SSRN Electron. J.*, 1997.

[20] A. W. Lo and A. C. MacKinlay, "Stock Market Prices Do Not Follow Random Walks: Evidence from a Simple Specification Test," *Rev. Financ. Stud.*, vol. 1, no. 1, pp. 41–66, 1988.

[21] A. W. Lo, H. Mamaysky, and J. Wang, "{http://www.afajof.org/journal/abstract.asp?ref=0022-1082&vid=55&iid=4&aid=265&s=-9999Foundations} of Technical Analysis: Computational Algorithms, Statistical Inference, and Empirical Implementation," *J. Finance*, vol. 55, no. 4, pp. 1705–1765, 2000.

[22] F. Konak and Y. Şeker, "The Efficiency of Developed Markets: Empirical Evidence from FTSE 100," *J. Adv. Manag. Sci.*, vol. 2, no. 1, pp. 29–32, 2014.

[23] T. T. Chitenderu, A. Maredza, and K. Sibanda, "The Random Walk Theory And Stock Prices: Evidence From Johannesburg Stock Exchange," *Int. Bus. Econ. Res. J.*, vol. 13, no. 6, p. 1241, 2014.

[24] J. C. DYER, "Random Walks in Australian Share Prices: a Question of Efficient Capital Markets*," *Aust. Econ. Pap.*, vol. 15, no. 27, pp. 186–200, Dec. 1976.