SYNOPSIS OF THE THESIS

# A STUDY OF EFFICIENT MARKET HYPOTHESIS AND ITS IMPACT ON VALUATION MODELS IN INDIAN STOCK MARKET, WITH SPECIFIC REFERENCE TO POST LIBERALIZATION PERIOD

## Doctoral Thesis submitted

## In partial fulfillment of the requirements
## For the award of the degree of
## Doctor of Philosophy
## In management

## By

## SOURAV MAZUMDER

## Under the Guidance of

Research Co-Supervisor

**Dr.Subir Sen**
**Dean and**
**Head of the Department**
**Supreme Knowledge Foundation**
**Group of Institutions**
**Kolkata**

Research Supervisor

**Dr. B. M. Singh**
**Dean - Faculty of**
**Management Studies**
**ICFAI University**
**Jharkhand**
**Ranchi**

**ICFAI UNIVERSITY JHARKHAND**
RANCHI
AUGUST 2017

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# A STUDY OF EFFICIENT MARKET HYPOTHESIS AND ITS IMPACT ON VALUATION MODELS IN INDIAN STOCK MARKET, WITH SPECIFIC REFERENCE TO POST LIBERALIZATION PERIOD

## Chapter 1: Introduction

### 1.1 Introduction:

A stock market is an aggregation of buyers and sellers of stocks (also called shares) which also includes securities listed on a stock exchange as well as those traded privately. Trade in stock markets means the transfer of shares (stocks and securities) for money from a seller to buyer. Participants in the stock market range from small individual investors to large institutional trader investors and also include banks, insurance companies, pension funds, hedge funds etc.

Stock market plays an important role in the *capital formation* of a country. The Stock market is often considered as the primary indicator of a country's economic condition, its strength and development. It allows the businesses to raise additional financial capital for investment by selling shares or units of ownership of the company in the public market. Investors also participate in the transaction as a buyer of the shares in the stock market. The liquidity provided by the stock market allows the investors to buy and sell their shares quickly and easily. This is an attractive feature of investing in stocks compared to less liquid assets such as immovable property.

In a stock market, a potential buyer bids a specific price for a share or stock and a potential seller asks a specific price for it. Buying and selling at market means that both buyer and seller will accept any ask price or bid price respectively. When the bid and ask to price match, a transaction takes place.

Hence valuation of stocks plays the most critical role in everyday's transaction in the stock exchanges.

Valuation of securities is a method of ascertaining the intrinsic value of a stock based on its present financial position and the forecast of various economic and corporate factors. Based on this intrinsic value and comparing the same with the market price, investors normally take the decision to buy, hold and sell the stock. Valuation methods are very important because it creates the link between the market price and firm's financial position.

Selecting the correct method of valuation is a complex task due to involvement of multiple factors. Efforts have been made in the past to find the most suitable method of valuation, ranging from a simple to a very complex method, taking into the consideration relevant factors at the company's level like earnings, dividend, risk, cost of money and future growth rate, etc. In addition to that, many macroeconomic factors like price level, money supply, inflation or the interest rate level have also been considered.

Broadly, there are three types of valuation methods, namely:

- Absolute valuation method
- Relative valuation method
- Option valuation method

Absolute valuation models attempt to find the intrinsic value of a stock based only on fundamentals. Looking at fundamentals simply mean one would only focus on such things as dividends, cash flow and growth rate or variables limited to a single company. Valuation models that fall into this category include the dividend discount model, discounted cash flow model, residual income models and other asset-based models.

While absolute value models are widely accepted in the academic fraternity because of its rigor; they are seldom used by practitioners. Researchers value stocks by applying a close surrogate of earnings multiple (usually price to earnings or simply P/E multiple). The approaches to the establishment of the P/E multiple covers a wide range. Most researchers use historical P/E multiple of stocks or the historical P/E multiple of a stock or panel data across a particular industry or a market proxy (usually an index).

One of the earliest empirical studies to use this approach was (Whitbeck-Kisor, 1963). According to this model the P/E multiple of a stock was related to its earnings, payout policy, and risk. Accordingly, the relationship was defined as: P/E multiple = 8.2 + 1.5 (projected earnings growth rate) + 6.7 (dividend payout) – 0.20 (variation in earnings).

An option is a financial contract which gives the buyer the right, but not the obligation, to buy or sell an underlying asset at a specified strike price, on or before a specified date. The seller has the corresponding obligation to fulfill the transaction, which is to sell or buy respectively, if the buyer exercises the option. In essence, the buyer of an option can hold on to the right till maturity or sell it before the expiry date. In finance, a price is paid or received for purchasing or a selling option, which is called the 'premium'.

The valuation of equity share is considered as the residual claim, i.e. equity holders lay claim to all cash flows left over after other financial claim holders (debt, preferred stock etc.) being satisfied. If the firm is liquidated, the same principle applies with equity investors receiving whatever is left over in the firm after all outstanding debts and other financial claims are paid off. The principle of limited liability protects the equity investors in publicly traded firms if the value of the firm is less than the value of the outstanding debt, and they cannot lose more than their investment value. Therefore, the pay-off to equity investors is identical with the pay-off available to the buyer of a call

option. Equity thus can be viewed as a call option of a firm, where exercising the option requires the firm be liquidated and the face value of the debt is paid off.

The efficient market hypothesis suggested by Eugene Fama deals with how information is incorporated into the stock price and considers the speed of impounding of information. It has been subdivided into three categories, weak, semi-strong and strong, each dealing with different types of information.

The weak form of efficiency tests whether all information contained in historical prices are fully reflected in current prices. Semi-strong form of efficiency tests whether all publicly available information is fully reflected in current stock prices. Finally, the strong form of an efficient market hypothesis is the test of whether all information, public and private are fully reflected in security prices and no investor can make extra profit.

The efficient market hypothesis has strong implication for security analysis. If for example, empirical tests find that future returns cannot be predicted from past returns, then trading rules based on an examination of the sequence of past prices are meaningless. If the semi-strong form of the hypothesis is supported by empirical evidence, then trading rules based on publicly available information have no value. Finally, if the strong form tests show efficiency, then the value of the security analysis itself would be a suspect. Thus, an understanding of efficient market tests should provide guidance in determining what type of analysis is useful.

However, understanding the efficiency of the stock market is very important in the context of the testing valuation models in that particular market, because most valuation models presume the market as 'efficient'. The term 'efficient market' broadly means that the security prices fully reflect all available information. However, most tests of the efficient market hypothesis simply

deal with how fast information is incorporated but does not deal with if the information is correctly incorporated into the price.

## 1.2 Significance of the study:

The stock market of India has gone through a series of revolutionary changes since economic liberalization commenced in 1991. The changes were necessary to transform Indian stock market into a more efficient one. Earlier, the stock market of a developing country like India was characterized by extensive governmental regulation over its financial system and investment activities. Moreover, it was an underdeveloped capital market which was influenced by:

- Restriction on capital structure

- Fewer instruments

- Rationing of commercial bank credit

- Restriction on investment opportunities

- Underdeveloped securities market

- Uncertainty in supply of funds

- Complex bureaucracy and regulatory norms

The Indian stock market has witnessed a number of changes as well as unprecedented growth since 1991. Several measures have been initiated by the Government to strengthen the operations of the stock market. Some of such measures can be summarized as follows:

- Liberalization and globalization of Indian economy

- Formation of Securities Exchange Board of India (SEBI)

- Establishment of new stock exchanges and Over the Counter Exchange of India (OTCEI)

- Introducing free pricing of public issue

- Advent of foreign institutional investors

- Setting up advisory panels for primary and secondary markets

- Inspect the affairs of stock market

- Entry of private sector mutual fund

- Electronic linkage of the stock exchanges

- Easy transferability of stocks

- Dematerialization of stocks

- Smaller marketable units of stocks

- Introduction of Derivatives

Therefore, there is a need to test valuation models and to develop a customized model in the context of the Indian stock market in the post-liberalization era. This research also carried out tests of efficiency in the context of the Indian stock market to measure the degree of strength and maturity.

## 1.3 Research Gap:

Based on the literature review, the following research gaps have been identified:

- We did not find any references to substantiate that Whitbeck-Kisor model has been tested in the Indian stock market during the post-liberalization era.

- Several tests have been conducted regarding the validity of Capital Asset Pricing Model (CAPM) by the researchers in Indian stock market, however, the results were found to be dichotomous.

- Despite failure of earlier studies, very little introspection made into the causal effect which was missing in the existing literature.

- Existing literature have tend to view 'valuation models' and 'Efficient Market Hypothesis' are two mutually exclusive and independent fields of study

- In view of the above, an attempt has been made in this research to indicate 'Efficient Market Hypothesis' as a possible causal effect.

## 1.4 Research Objective:

The objectives of the research are:

1. To test a price-earnings (Whitbeck-Kisor) valuation model in context of the Indian stock market

2. To test Capital Asset Pricing Model (CAPM) in context of the Indian stock market

3. To develop and test the customized valuation model

4. To test the efficiency of the Indian stock market (All three forms)

5. To find the impact of Efficiency Market Hypothesis (EMH) on valuation models

All the three efficiency tests (the weak form, the semi-strong form and the strong form) will be conducted in context of the Indian stock market for a period starting from 1996-2015.

The research will throw new insights into the Indian stock market and its behavior. Stock market has undergone a series of changes and it is necessary

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to test the market efficiency since most of the tests were conducted in context of a developed economy. Moreover, a customized stock valuation model will also help to identify the factors that drive the stock price in the Indian stock market in the post-liberalization era.

## 1.5 Hypothesis:

### 1.5.1 To test a price-earnings (Whitbeck-Kisor) valuation model in context of the Indian stock market

Ho:  No significant relationship exists between price earnings ratio (dependent variable) and growth rate of earnings per share (independent variable), dividend payout (independent variable) and standard deviation of earnings (independent variable).

### 1.5.2. To develop a customized valuation model

Ho:  No significant relationship exists between price earnings ratio (dependent variable) and the independent variables as formulated in the model.

### 1.5.3. To test the weak form of efficiency of stock market (Regression test)

Ho:  No significant relationship exists between current year's return on S & P BSE 100 Index (T) (dependent variable) and the previous three year's return i.e. T-1, T-2 and T-3 (independent variables)

# Chapter 2: Methodology

## 2.1    Data Source:

The sources of data required for this research were primary and secondary in nature. The secondary data collected from the following sources:

- Company data from Centre for Monitoring Indian Economy (CMIE)

- Stock market data published by different stock exchanges and websites

- Economic reviews of different Govt. authorities

- Audited Balance sheet and profit and loss statements of different companies

## 2.2    Methods of collecting data:

For objectives numbers 1, 2 and 4 secondary data has been collected from the CMIE (Centre for Monitoring Indian Economy) PROWESS database. Additional information collected from various websites i.e. bseindia.org, moneycontrol.com, nseindia.org etc. For the formulation of the customized model, i.e. objective number 3, primary data collected from individuals who are working in the field of stock valuation in the Indian stock market. A 'Feedback Form' sent to 19 Mutual Fund companies and the customized model is developed with the feedback received from 10 respondents.

## 2.3    Period of reference:

The main objective of the research is to test valuation models and develop a customized model and testing the efficiency of Indian stock market in the post-liberalization period. Hence a period of 1996 – 2015, a period of 20 years

has been selected for the research. However, the Whitbeck-Kisor model tested for the period 2000-2015 since the standard deviation calculated for a period of five preceding years, i.e. standard deviation of the year 2000 calculated for 1996-2000. The customized valuation model also formulated for the period 2000-2015 as both the models considered the price-earnings ratio as the dependent variable. Research conducted for the other tests covered a period of 1996 – 2015.

## 2.4    Methods and tools of analysis:

### 2.4.1 Test of price-earnings (Whitbeck-Kisor) valuation model in context of the Indian stock market

Data for price earnings ratio (dependent variable) and historical growth rate of earnings per share (independent variable), dividend payout (independent variable) and standard deviation of earnings (independent variable) collected for 100 stocks included in S & P BSE 100 broad-based index. Regression analysis was done using SPSS 17.0 tool for the above mention data and the result thus obtained analyzed using F test.

### 2.4.2 Test of Capital Asset Pricing Model (CAPM) in context of the Indian stock market

Beta and return of all stocks (100 stocks included in S & P BSE 100) are calculated for each year. The equal weighted portfolio of the stocks is formed and grouped in deciles. All stocks are grouped into 10 deciles and an average return of the stocks included in the group calculated. Ranks are assigned to each group for beta and return. Groups are arranged from higher rank to a lower rank of beta and the differences in ranks of beta and return are calculated. The risk and return relationship explored by using Spearman's Rank Order Correlation formula.

### 2.4.3 To develop a customized valuation model

The process followed is a 'primary survey' among the eligible and qualified professionals who are working in the field of equity research for a considering period of time in the Indian stock market. They were asked a question, 'What are the factors, you consider affecting the price-earnings ratio of the Indian stocks during 2000-2015?' From the feedback obtained from the respondents, the quantitative variables are identified and data collected from CMIE Prowess system form 2000 – 2015 for the stocks included in the BSE 100 index. Stepwise regression analysis was done using SPSS 17.0 tool, considering the price-earnings ratio as the dependent variable and other quantitative factors as independent variables. By using stepwise regression analysis by SPSS 17.0 tool, the customized model developed which shows the optimum value of R squared obtained for beta, debt-equity ratio and age as the independent variables.

### 2.4.4 Test of efficiency of stock market (Weak form, Semi-strong form and strong form)

The test of market efficiency conducted for weak form, the semi-strong form and the strong form.

The methods will be followed by the test of the weak forms of efficiency

- Monthly pattern
- Regression test

The method for the semi strong form of efficiency will be followed as follows:

- Collection of sample firms that had a surprise announcement (Bonus declaration, stock split, increase of dividend payout etc.)

- Determine that particular day and designate day as zero

- Defining the period to be studied (-30 days to +30days)

- Computation of the return on each of the days being studied

- Computation of the abnormal returns for each of the days being studied for each firm in the sample

- Computation of the average abnormal return for each day in the event period for all the firms in the sample

- Each day's abnormal return is added together to compute the cumulative abnormal return from the beginning of the period

The strong form of efficiency tested performing the same test mentioned above considering any particular day having a substantial increase in transaction volume as day zero.

## 2.5 Limitations of the study:

The research has certain limitations also:

- The Whitbeck-Kisor model considered the projected growth rate of earnings, whereas the research considered the historical growth rate of earnings.
- In testing CAPM theory, Beta is calculated on daily return of each stock for every year instead of multiple years covering different stages of the market.
- In the stock valuation model, qualitative factors are not considered which might have influenced the price–earnings of stocks in the referred period of study.

- Only two tests are considered verifying the weak form of efficiency and one test each considered for semi-strong and strong form of test.
- Since the composition of the BSE S & P 100 index changed during the period of study, the study conducted considering the stocks which remained constant during this period.

# Chapter 3: Observations and findings

## 3.1 Data analysis and discussions

### 3.1.1 Test of a price-earnings (Whitbeck-Kisor) valuation model in context of the Indian stock market

- The model established a negative relationship of the price earnings ratio with the growth of earnings per share and std. deviation of earnings per share, but a positive relationship with dividend payout.

- Poor values of R-squared reveals that the model is not validated in the Indian stock market not only during 2000-2015 but also during cross-sectional periods of ten years each during the same time frame.

### 3.1.2 Test of Capital Asset Pricing Model (CAPM) in context of the Indian stock market

- Except for the years 2002, 2003 and 2006, 2007; correlation coefficient between systematic risk and return did not show the desired relationship during the time frame of 1996 – 2015.

### 3.1.3 To develop a customized valuation model

- The result shows that the Indian capital market discounted the three variables the age (negative relationship), the debt-equity ratio (negative relationship) and beta (strong positive relationship) explaining the

price earnings ratio for the period of 2000-2015 with a very poor R-squared value of 9.6%.

### 3.1.4 Test of weak form of efficiency of stock market

- (i) Time pattern of security return: The study clearly shows that it is possible to earn positive return by buying in March and selling in July or November irrespective of the market condition. This contradicts with the weak form of efficiency, which states the movement of the market is random and should not follow any pattern. In an efficient market, no investor can earn an extra return analyzing the historical seasonal pattern of stock returns.

- (ii) Correlation test: The result shows a positive constant term and negative coefficients for all the three dependent variables with a very low R squared value. The research also concluded that there is a poor relationship exists between current year's return on BSE 100 index (T) (dependent variable) and the previous three year's return i.e. T-1, T-2 and T-3 (independent variables).

### 3.1.5 Test of semi-strong form of efficiency of stock market

- To satisfy the condition for the semi-strong form of efficiency, the abnormal return should be observed on the date of announcement but not other days. In our experiment, abnormal positive returns observed on the days from -30 till +30. The study clearly shows that the Indian

capital market fails to satisfy the test of semi-strong form of efficiency and showed existence of insider trading.

### 3.1.6 Test of strong form of efficiency of stock market

- The Study conducted on the movement of the share price of 30 selected firms around day 0 and Cumulative Abnormal Return (CAR) calculated and plotted. The graph fails to generate a pattern which can show that the Indian capital market satisfies strong form of efficiency.

# Chapter 4: Conclusions and Future direction

## 4.1 Conclusions

- The basic constituents of the price-earnings ratio (growth of earnings, variability of earnings and dividend payout) failed to justify the Whitbeck Kisor model in the Indian context during the time frame 1996-2015.

- The testing of Capital Asset Pricing Model (CAPM) also reveals the poor relationship between systematic risk and the return of the stock market during the same time frame except for the years 2002, 2003 and 2006, 2007, a four year period of among 20 years of study.

- The customized valuation model also failed to generate an acceptable relationship between price-earnings ratio and other variables since the overall R-squared value is very low.

- Indian stock market failed to satisfy all three forms of efficiency (weak, semi-strong and strong) tests conducted during 1996-2015. After liberalization of Indian economy and implementation of several policies of the Government of India, Indian stock market prominently showed the signs of inefficiencies. Hence this research raised the question whether the valuation models do work in an inefficient market? The definition of efficiency of stock market considers the 'informational efficiency' of the market, but not the 'market rationality'. The stock market is said to be efficient if the information is not only quickly incorporated into the price to restrict all the people (insiders and outsiders) to gain an extra return but should also consider the correctness of the price.

## 4.2 Scope for future research

In this research, though the test of Whitbeck-Kisor model failed in the broader market, the same variables may not be responsible for the price-earnings ratio of the market as a whole but some other sector-specific variables justify the price-earnings ratio of that particular industry. This leaves a huge area for a further scope of the study. Firstly, instead of considering the broader market, the multiples could be defined consistently within the industry and among industries. Secondly, the price-earnings ratio of every industry could be analyzed and compared to find the basic nature of the multiplier. Thirdly, fundamental variables responsible for the movement of the price-earnings ratio over time for each industry can be analyzed and effects of the changes of the variables with that of the multipliers can be looked into. Moreover, the conclusion of this research ended with a question mark. Do valuation models work in an inefficient market? The research tried to throw some light in this darker area and raises the question about the definition of the efficient market. The efficient market considered the speed of discounting the new information, but ignores the accuracy of the price after impounding of the new information. This leaves a larger scope of future research considering valuation and efficiency together, which can reconsider the very basic definition of 'efficiency' of the stock market. Moreover, other efficiency tests, i.e. weak form, semi-strong and strong tests can be conducted to judge the efficiency of the Indian stock market.

## 4.3 Publication and presentation by the scholar in the research area:

### Publications:

1. Sourav Mazumder *et.al*. Asset Valuation: A synthesis of Existing Literature and New Insights. *The Institute of Cost Accountants of India. Volume 42, No. 1, April 2016 pp. 45-52.*

2. Sourav Mazumder *et. al*. Efficient Market Hypothesis: A study on Indian Capital Market. *The Institute of Cost Accountants of India.Volume 42, No. IV January 2017 pp. 69-79.*

3. Sourav Mazumder *et.al*. Stock Valuation models: A Study of Models in Use and Development of a Customized Model in India. *The ICFAI University, Jharkhand, Volume 5, Issue 1, May 2017 pp.1-9.*

### Presentations:

1. 'Asset Valuation: A Synthesis of Existing Literature and New Insights' presented in the 'Globsyn Management Conference 2015' organized by the 'Globsyn Business School', Kolkata on 18Dec2015 and won the best paper award.

2. 'Stock Valuation models: A Study of Models in Use and Development of a Customized Model in India' presented in the National Doctoral Conference organized by 'The ICFAI University, Jharkhand' on 09Mar2017 and own the best paper award.