



**“An Analysis of the Portfolio Return if Stock Selection Criteria is P/B Ratio: A Study of Indian Equity Market”**

**Dr. Dhanjay Yadav, Assistant Professor,  
Indira Gandhi Delhi Technical University for Women,  
GNCT, Kashmere Gate, Delhi-110006.**

**Abstract**

Returns from different trading rules have been an important part of the study of finance literature. Although The EMH( Efficient Market Hypothesis ) neglects any unusual returns from trading strategies which are based on the past information related to stock prices and financials, many researchers have proved otherwise and shown abnormal returns by implementing simple trading rules. In this study, a comparative study has been done between the returns of High P/B i.e. Growth stocks, Low P/B i.e. Value stocks and BSE 500 index on 21 years data from 1993 to 2013. The main finding is that the returns of these different P/B stocks are significantly different from the overall market returns, and the returns from Value stocks are better than Growth stocks.

**Key Terms:** Trading Strategies. P/B Ratio, Value Stocks, Growth Stocks, Indian Equity Market.

**INTRODUCTION**

In Finance literature, the returns from pre-defined rules of making investments in equity have been an interesting topic for research. Several researchers have proved abnormal returns can be earned by implementing such trading rules.

Trading rules or strategies are defined as buying and selling of securities in a systematic manner. The basic objective of trading rules is to maximize the returns with the given level of risk. This systematic management is based on certain assumptions regarding the particular security, market behaviour and goals of the portfolio. Trading strategies are also related to theoretical philosophies regarding market and investors behaviour e.g. Efficient Market Hypothesis (EMH), rational market theory etc. in his classic statement of this hypothesis Fama (1970) defines “ an efficient market is a market where security prices always fully reflect the available information”. In 1978, Michal Jensen declared that “there is no other proposition in economics which has more solid empirical evidence supporting it then the EMH”. This strong statement ignited a reversal to the EMH and gave birth to the challenges

to this hypothesis. The rational market theory is the basis of the modern portfolio theory which consists of assessment of risk and return characteristics of an individual security in a portfolio.

The basic objective of portfolio management is to match the risk and return characteristics of an individual security in the portfolio to minimize risk and maximize the overall gains. For managing a portfolio there are certain rules for determination of level of acceptable risk and required return from the portfolio. The rational market theory forms the basis to reshuffle the portfolio to re-balance the risk and return factors with the help of trade. Various trading strategies are connected with the objective of the portfolio. Because of the unpredictability of the market behaviour, individual and institutional investment behaviour has led to the development of different trading strategies. Further these strategies make some fundamental assumption regarding the nature of market for predictability.

The bases of various trading strategies are the level of risk acceptable for investor, time horizon of the investment and the nature of the market in which investments are made. Some important trading strategies are Contrarian strategy, Momentum strategy, Value stocks, Growth stocks, High Beta & Low Beta etc. A growth investor focuses on current and future economic story of a company, with less regard to share valuation. Value stocks are defined as those that are relatively cheap e.g. low P/E and P/BV high yield and modest opportunities e.g. regulated firms. A stock is said to be in momentum, if its price is increasing consistently and in momentum strategy this is believed that this momentum will continue. In a Contrarian Strategy, the stocks whose price is continuously going down are selected in the portfolio on the premise of trend reversal. The objective of this study is to evaluate the performance of index and returns from various trading rules implemented as trading strategies in Indian Equity Market.

### **OBJECTIVES:**

The objective of this study is to evaluate the performance of Value Stocks and Growth stocks classified according to their P/B ratio and compare the same with the returns of BSE 500

- 1.) To examine whether value and growth strategy work in Indian equity market.
- 2.) To apply Fama & French Three Factor Model to know the return characteristics of above strategies in Indian Equity Market.

### **YPOTHESIS:**

1. H<sub>0</sub>: The returns of Low P/B stocks are less than or equal to BSE 500 in the given period.

$$(R_{\text{Value}} \leq R_{\text{BSE500}})$$

H1: The returns of Low P/B stocks are greater than BSE 500 in the given period.

$$(R_{\text{Value}} > R_{\text{BSE500}})$$

2. H0: The returns of High P/B stocks are less than or equal to BSE 500 in the given period.

$$(R_{\text{Growth}} \leq R_{\text{BSE500}})$$

H1: The returns of High P/B stocks are greater than BSE 500 in the given period.

$$(R_{\text{Growth}} > R_{\text{BSE500}})$$

3. H0: Returns from Value stocks and growth stocks strategies are normal. In Three Factor Model,

$$(\alpha_p = 0)$$

H1: Returns from Value stocks and growth stocks are not normal. In Three Factor Model,

$$(\alpha_p \neq 0)$$

## LITERATURE REVIEW

### Value Stocks and Growth Stocks

Value investment style involves investing in stocks of firms that are underpriced relative to their fundamentals. It is argued that investors frequently react irrationally to information resulting in distorted prices that can be exploited to generate superior returns. Several researchers have investigated and documented the superior performance of value based investment strategies. **Fama and French (1992)** found that stocks with high earnings-price (E/P) ratio produced higher returns during the 1963-1990 period. They further observe that the positive relationship between firms with positive E/P ratios and average returns can be attributed to the positive correlation between E/P and book-to market value equity (BV/MV) ratios. Their results suggest that value investment strategies based on a firm's BV/MV can be used to form superior portfolios. Corroborating evidence is provided by Basu (1973) and **Lakonishok, Shleifer, and Vishny (1994)** investigated a contrarian investment strategy by comparing the performance of value stocks and glamour stocks. They report that value stocks significantly outperformed the glamour stocks, generating an average annual return of 19.8% compared to 10.5% for glamour stocks. The authors note that the superior returns are due to the ability of the contrarian investment strategy to exploit the suboptimal behavior of investors rather than due to relatively higher systematic risk as argued by Fama and French (1992). There is extant evidence on

the superior performance of momentum strategies as well. Furthermore, value and momentum strategies were found to be negatively associated with each other suggesting interaction effects. Further analysis reveals that value strategy is relatively superior among firms with weak momentum (and weaker among firms with strong momentum). Similarly, momentum strategy produces superior return among firms with poor values (relative to firms with high value). For empirical analysis of value and momentum strategies in international markets see Capul, Rowley and Sharpe (1993), Schiereck, De Bondt, and Martin Weber (1999) Rouwenhorst (1997), Scott, Stump and Xu (2003) and Bird and Whitaker (2003). Taken together, the empirical evidence suggests that both value and momentum strategies can be used to predict stock returns and generate abnormal returns. However, there is a lack of consensus about the source of such returns. Several explanations have been offered for the ability of value and momentum investment strategies to outperform the market. One school of thought argues that naïve investors tend to be guided by irrational optimism and pessimism. As a result, investors bid up the prices of stocks when they are overly optimistic (such as during the dot com boom) and depress the prices of stocks on other occasions due to panic selling (such as post 911). By trading against naïve investors, it will be possible for contrarian investors to generate superior returns. Writings on volatility tests (Shiller, 1981), noise traders (Shleifer and Summers, 1990), social psychology (Shiller, 1984) fad variable (Summers, 1986), heuristic decision making (Kahneman and Tversky, 1986) predictability of stock returns (Jegadeesh, 1990) and short-run speculative motive of investors (Keynes, 1936) suggest market inefficiencies or irrationalities in investor behavior, at least in the short-run. Fama (1992), on the other hand, argues that the higher returns are a compensation for the higher fundamental risk involved in such portfolios. A third explanation for excess returns or predictive ability is the possibility of methodological flaws such as data mining, survivorship bias, and inappropriate modeling (Kleidon, 1986; Black, 1993). In context of Value Stocks and Growth stocks, Fama and French (1992, 1993, 1995, 1996, and 1998) show that the value effect is associated with the degree of relative distress in the economy. They show that some common variation in stock returns (distressed stocks) are not explained by the market return. Therefore, they argue that such value effect is priced in addition to the traditional CAPM-type market risk. The authors suggest a three-factor model with one factor proxied by risk related to fundamental relative distress (high-minus-low book-to-market; HML) and another factor proxied by risk related to the size effect (small-minus-big, SMB). Fama and French find that HML and SMB factors have the greatest explanatory power in explaining the cross section of returns and suggest that such factors omitted from the CAPM. Overall, Fama and French argue that the observed higher returns produced by such value effect are justified by the risk associated with "value stocks". Concurrent to Fama and French studies, **Sharpe (1992)** found that size and Growth/Value characteristics could explain a large part of the returns from an equity portfolio.

**Capaul, Rowley and Sharpe (1993)** show that on average value stocks (low P/B ratios) tend to outperform growth stocks (high P/B ratios) in their sample of monthly returns from four developed European markets, the U.S. and Japan. They show in their sample that global value stocks outperform growth stocks by almost 40 percent. The cumulative outperformance of value stocks over growth stocks is 69.5 percent for Japan, 15.6 percent for the U.S. and 31.9 percent for Europe. Importantly, these authors also document the time-varying nature of the value growth return spread in these six developed markets. Their results show the standard deviation of the value-growth spread is lowest for the global series suggesting that there are diversification benefits associated with global tilting given the low correlation across the spreads in different countries. They suggest an investor considering a tilt toward value stocks should implement the policy globally rather than within a single country or a single region. However, their sample includes only 12 years of data (1981 to 1992).

A very important study by **Lakonishok et al. (1994)** argues that value strategies are not fundamentally riskier than growth strategies. They suggest that such value effect arises because future growth rates of "growth stocks" are consistently overestimated relative to "value stocks".

**Shleifer and Vishny (1990)** and **De Long et al. (1990)** argue that institutional investors tend to favor a growth strategy that is more likely to yield higher returns in the short run whilst value strategies tend to pay high abnormal returns over 3 to 5 years.

William F. Sharpe (1993) found that "the returns obtained from portfolios of stocks with high price/book ratios (growth stocks) and those obtained from portfolios of stocks with low price/book ratios (Value stocks) were analyzed for six countries over the period from January 1981 through June 1992. Results suggest the existence of a significant "value-growth factor" in each country. The returns on portfolios formed according to the value – growth factor differ far more from month to month than would be expected if the securities had been selected randomly. Value stocks outperformed growth stocks on average in each country during the period studied both absolutely and after adjustment for risk. Cross – country correlations of monthly value – growth spreads were small suggesting that any decision to "tilt" a portfolio toward value stocks would have been more effective if done globally.

**Salim Chahive (2008)** considering the earnings growth, and controlling Fama & French risk factor, a value strategy with a high earnings growth rate, that is, undervalued value stocks, outperformed both value and growth strategies in the Euro zone from 1988 to 2003.

**Phillip S. Russel (2008)** suggested that the superior returns observed in prior studies can be attributed to risk premium.

**Anna Beukes (2011)** : Value premium is not just a first world phenomena, but has clearly been demonstrated in the financial market of a developing country such as South Africa. Results further show that based on one-dimensional tests the value premium is South Africa is higher than in any of the first world region used for comparison in the study, except which CF/P is used for portfolio formation.

### **Indian Scenario**

The research on prior return strategies has also been extended to emerging markets including India. Studies in emerging markets have been conducted by Claessens et al. (1998); Fama and French (1998); Patel (1998); Rouwenhorst (1999); Barry et al. (2002); and Vander et al. (2003). In general, they found that stock selection strategies that work well in developed markets also provide extra normal returns for emerging markets. Other studies by Frankel and Schmukler (1996, 1998), Froot et al. (2001), Richards (2002) and Kaminsky et al. (2004) conclude that foreign investors in emerging markets tend to employ momentum strategies. Sehgal and Balakrishnan (2002) empirically find in India that there is reversal in long-term returns, once short-term momentum effect has been controlled. They also find short-term continuation in stock returns. Sehgal and Balakrishnan (2004) find that momentum returns that are missed by CAPM are partially explained by Fama-French three-factor model. Ananthanarayanan (2004) does not find any evidence of contrarian and momentum strategies being employed by foreign investors in Indian market. Sehgal and Balakrishnan (2008) report strong momentum profits in India for individual stocks as well as wide range of characteristic-sorted portfolios. The study suggests there are rational sources of momentum profits, which are in contrast to the US market. This paper extends the work to evaluate the momentum and contrarian strategies for a sample period of 21 years and on the index BSE 500, which is a very important index in the sense that it covers about 91% valuation of BSE. There is no study available in our knowledge reviewing the performance of these strategies on such large data in Indian equity market.

## RESEARCH METHODOLOGY

1. **Data and their sources:** The data comprises of monthly (i) share prices adjusted for stock splits, stock dividends and rights issues, (ii) P/B ratio, (iv) Market Capitalization and (v) Book Value of the constituent stocks of BSE 500 Index for 21 years from January 1993 to December 2013. The above data has been collected through Prowess the CMIE database. The 91 days Treasury bill rate data has been collected from RBI website.

2. **Design/methodology:**

The research design is to first construct portfolios implementing different trading strategies and then compare their returns with the Index return i.e. BSE 500. We have implemented a buy and hold strategy to form our various non overlapping equally weighted portfolios implementing different trading strategies. The index return is the return from an equally weighted portfolio of all constituent stocks of BSE 500 index for a particular holding period. We have considered only those stocks which were present at the beginning of the period i.e. at the time of ranking in BSE 500 and the data available of these stocks varies from 203 stocks in 1993 to 496 in 2013. The trading strategies implemented in this research work are as follows:

### **Value and Growth Strategy:**

To know the returns from Value stocks and growths stocks, we have constructed portfolios on the basis P/B ratio i.e. price to book value, low P/B ratio shares are value stocks and high P/B stocks are growth stocks.

i.) If the formation date of the portfolio is t, to construct the portfolios, first the stocks are arranged in ascending order according to their P/B ratio in t-12 months period. Then the stocks are divided in four quartiles, the first quartile is portfolio of low P/B stocks i.e. value stocks and last quartile is the portfolio of high P/B stocks i.e. growth stocks. The portfolios of value stocks and growth stocks is bought and maintained for the next t+12 months and their return is calculated using MS Excel tools, return is calculated with the help of following model :

$$R_p = \sum [(P_1 - P_0) / P_0] \quad (1)$$

N



- i.) Where,  $R_p$  = Return of Portfolio,  $P_0$  = Price of Stock at the Beginning of the period,  $P_1$  = Price of the stock at the end of the period,  $N$  = No. of stocks in portfolio. has been used as above. Using Descriptive Statistics, the returns of the entire portfolio implementing Value stocks and Growth stocks are compared with the returns from investing in equally weighted portfolio of all the stocks of BSE 500.
- ii.) Using Descriptive Statistics, the returns of the entire portfolio implementing Value Stocks and Growth Stocks Strategy are compared with the returns from investing in all stocks of BSE 500 altogether.
- iii.) t test at 95% significance level has been used to test the significance of the difference in returns between Value Stocks strategy and BSE 500 and Growth Stocks Strategy and BSE 500.
- iv) Transaction cost is assumed to be zero in all cases.

#### **Fama & French Three Factor Modal:**

$$R_{pt} - R_{ft} = \alpha_p + \beta_p(R_{mt} - R_{ft}) + \gamma_p \text{SMB}_t + \delta_p \text{HML}_t + \varepsilon_{pt}$$

Where  $R_{pt}$  is the holding period return from implementing a trading strategy.

$R_{ft}$  is the risk free rate observed at the beginning of each period. ( in our study we have used RBI 91days Treasury Bill rate as risk free rate).

$R_{mt}$  is the market return involving all stocks.

$\text{SMB}_t$  is the difference between the returns of the portfolio of big size firms minus returns from the portfolio of small size firms portfolio.

$\text{HML}_t$  is the difference between the returns of the portfolio of high book to market equity stocks portfolio and low book to market equity stocks portfolio.

The values of  $(R_{mt} - R_{ft})$ ,  $\text{SMB}_t$  and  $\text{HML}_t$  are regressed against the value of  $R_{pt} - R_{ft}$  to know the values of intercepts  $\alpha_p$ ,  $\beta_p$ , and  $\delta_p$ .  $\varepsilon_{pt}$  is the error factor and has a very negligible value. The steps to calculate  $\text{SMB}_t$  and  $\text{HML}_t$  are as follows:

Step 1: The stocks are sorted at beginning of each year in two groups independently. In the first group, the stocks are sorted as per their capitalization as Big Stocks and Small Stocks.

Steps 2: On the other side the stocks are sorted in three groups independently as per their Book to Market Equity ratio (BE/ME) in Low BE/ME, medium BE/ME and high BE/ME.



Step 3: Six styled portfolios are constructed with the intersection of above portfolios as follows:

|          | Low BE/ME | Medium BE/ME | High BE/ME |
|----------|-----------|--------------|------------|
| Big(B)   | $R_{BL}$  | $R_{BM}$     | $R_{BH}$   |
| Small(S) | $R_{SL}$  | $R_{SM}$     | $R_{SH}$   |

$$SMB_t = (R_{SL} + R_{SM} + R_{SH} - R_{BL} - R_{BM} - R_{BH}) / 3$$

$$HML_t = (R_{SH} + R_{BH} - R_{SL} - R_{BL}) / 2$$

**DATA ANALYSIS AND FINDINGS:**

1.  $H_0: R_{Value} \leq R_{BSE500}$

$H_1: R_{Value} > R_{BSE500}$

The average return from low P/B stocks portfolio i.e. value stocks is 53 % during 1993-2013 which is greater than average return from BSE 500 portfolio which is 38% and is statistically significant, so we can reject null hypothesis  $H_0$  and accept alternative hypothesis  $H_1$ .

2.  $H_0: (R_{Growth} \leq R_{BSE500})$

$H_1: (R_{Growth} > R_{BSE500})$

The average return from high P/B stocks portfolio i.e. growth stocks is 33 % during 1993-2013 which is lower than average return from BSE 500 portfolio which is 38% and is statistically insignificant, so we can accept null hypothesis  $H_0$  and reject alternative hypothesis  $H_1$ .

3.  $H_0: (\alpha_p = 0)$

$H_1: (\alpha_p \neq 0)$

(a) Value of  $\alpha_p$  is greater than 0 and statistically significant in following strategies:

Low P/B value stocks  $\alpha = 0.45, p = 0.01$

High P/B Growth Stocks,  $\alpha = 0.08, p = 0.64$

Here in above strategies, three factor model is predicting more than normal returns not explained by size and value factor, but the values of  $\alpha$  is not significant in case of growth stocks. Hence  $H_0$  is accepted for value stocks in above strategies and  $H_1$  is rejected.

**Analysis of Descriptive Statistics:**

| <i>value(P/B)</i>  |          | <i>growth(P/B)</i> |          |
|--------------------|----------|--------------------|----------|
| Mean               | 0.536002 | Mean               | 0.330996 |
| Standard Deviation | 0.580076 | Standard Deviation | 0.497814 |
| Range              | 2.559151 | Range              | 2.126515 |

Table (i)

**DISCUSSIONS AND IMPLICATIONS**

Summary of Results:

- a) Low P/B value stocks portfolio returns have outperformed the BSE 500 portfolio return, hence value stocks strategy is working in Indian equity market.
- b) High P/B growth stocks returns have underperformed the BSE 500 portfolio return, hence growth stocks strategy is not working in Indian equity market.
- c) Low P/B value stocks have shown returns which are higher than normal returns not explained by value and size factor in three factor modal.

**IMPLICATIONS:**

- a) Results have shown that abnormal returns can be earned through value stocks.
- b) Value stocks are performing better than the index BSE 500.
- c) In this study, we have not worked on the reasons of abnormal returns which give scope for further study to know the reasons of abnormal returns.
- d) Our study does not consider risk and transaction cost, which gives a scope for further study considering risk and transaction cost.

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