

## **Chapter-VI**

# **MARKET INEFFICIENCY; ABNORMAL RETURNS AROUND MUTUAL FUNDS OF INDIAN FIRMS**

MARKET INEFFICIENCY : ABNORMAL RETURNS AROUND  
MUTUAL FUNDS OF INDIAN FIRMS

6.0 Introduction

The purpose of this chapter is to attempt an indepth analysis on the strong form efficiency of the Bombay Stock Exchange (BSE), in terms of traditional performance evaluation applied to a subset of the closed-end mutual funds operating in India.

The earlier studies on the GDR event can be considered what Fama refers to as the strong-form test of efficiency. The hypothesis proposed is that the abnormal levels were caused by price manipulation.

The concept of mutual funds is not very new. Originating in USA and moving on to U.K. in the 1930's, this culture started in India only in the 1960s, with the setting up of the Unit Trust of India (UTI) in 1964. Mutual funds are financial intermediaries in the investment business. In a mutual fund, the resources of many investors are pooled and invested to create a diversified portfolio. Thus, in a mutual fund, the savings of many investors are combined to form a fairly large and well diversified portfolio of investments.

The objectives sought to be achieved by mutual funds are:

- \* To provide an opportunity for lower income groups to acquire property in the form of shares without much difficulty;
- \* To cater mainly to the needs of individual investors whose means are small; and
- \* To manage investors' portfolio in a manner that provides regular income, growth, safety, liquidity and diversification.

#### 6.1.0 Types of Mutual Funds

Mutual funds can be classified into the following three broad categories:

1. Portfolio classification of mutual funds,
2. Functional classification of mutual funds,
3. Geographical classification of mutual funds.

#### 6.1.1 Portfolio classification of mutual funds

Mutual funds differ with reference to the type of instruments in which the money has been invested as per the requirements of investors. These are specified mutual funds structured for feeding a particular investible purpose. Therefore, different mutual funds are designed to meet the objectives of different types of savers. For eg:

(i) Bonds Funds: These provide fixed return for those who desire safety. The savings of investors are invested in

various kinds of bonds in which investment is made primarily with the investment objective of safety. Bond funds are more liquid, diversified and conservative investments with modest capital gains.

(ii) Stock funds: These are established for those who are willing to accept significant risks in the hope of a very high return. These are called common stock funds. These may be further classified as growth funds which assumes high risk to obtain stocks expected to yield high returns. When these funds are invested in stocks which pay consistently high dividend like Blue-chip Companies, then it is known as income funds.

(iii) Income funds: They are established to maximise the current income (i.e. interest and dividend) of investors. There are two aspects of income funds viz., low investment risk, generating constant income and high investment risk generating maximum income. Investment is made in various combinations of high yielding common stocks and bonds with a view to extract income on regular basis with safety of the principal amount of investment.

(iv) Money Market Funds: They are used in short-term liquid assets like Certificate of Deposit [CD(s)] or commercial

papers and for them capital is raised by selling shares to the investing public at a price equal to the asset value of the then existing shares outstanding plus a loading fees (or) service charge. This is known as high liquid asset funds with very low risk and virtually no capital loss.

(v) Specialised funds: Specialised mutual funds envisage to specialise investment in securities of firms of certain industries (or) specific income producing securities. Such funds carry more risk for lack of diversification approach.

(vi) Leveraged funds: Leverages funds (or) borrowed funds are used in order to increase the size of the value of the portfolio and benefit the shareholders by gains exceeding the cost of the borrowed funds. Such funds are used in speculative and risky investments like short sale to take advantage of declining market to realise gains in the portfolio short sales.

(vii) Growth funds: Growth funds have the principal objective of capital appreciation of the investment over a period of time. The investment is made in equity stock which have above average growth potential. This is a high risk investment fund with high capital gain potential and low current income assurance.

(viii) Dual purpose funds: Income and growth are two objectives which are achieved by offering half of the amount of funds to those investors who wish regular income and half to those which wish growth. The funds thus received are pooled together and used for investment. Any income derived from the portfolio goes to the investors who hold income shares. The investors who hold capital shares receive no income, instead they receive capital gains (or) losses that result from investments of total portfolio.

#### 6.1.2 MUTUAL FUND SCENE IN INDIA

Mutual funds made their entry in India in 1964 with the setting up of the Unit Trust of India. However, their progress has not been encouraging in the past 30 years by way of offering investor-friendly products and features.

The present trend in the industry is in favour of open-ended scheme as well as all close-ended schemes. They disappointed the investors by continuously quoting at a discount in their Net Asset Values. The promoters of some recent issues have reacted to this development by coming out with open ended schemes. These schemes are also innovative and cater to different segments of the market. This change has come about with growing awareness among investors about the functioning of mutual funds. Also the individual

investor is increasingly becoming aligned from the primary and secondary markets which makes mutual funds an attractive avenue for investments.

### 6.1.3 Performance of Mutual Funds

The performance of mutual funds can be evaluated by calculating the rate of return earned during the relevant comparison period. The return includes changes in the value of the fund during the performance period plus any income from contributions to the fund minus any outgoes due to withdrawal from the fund.

### 6.2.1 Functional classification of Mutual Funds

The functional classification of mutual funds is based on the basic characteristics of the mutual fund schemes opened for the public. Mutual funds on this account are classified into two broad types.

- (i) open-ended mutual fund
- (ii) close-ended mutual fund

(i) Open-ended mutual fund: The holders of the shares in the fund can resell them to the issuing mutual fund company at any time. They received in turn the net assets value (NAV)

of the shares at the time of resale. Such mutual fund companies place their funds in the secondary securities market. The open-end mutual fund company buys (or) sells their own shares. These companies sell new shares at NAV plus.

(ii) Closed-ended mutual fund: Closed-ended mutual funds are different from the open-end mutual fund in the following respects. Closed-ended fund investment company has a definite target amount for the funds and cannot sell more shares after its initial offering. Its growth in terms of number of shares is limited. The shares of close-ended funds are not redeemable at their NAV as in one open-end funds. On the other hand, these shares are traded in secondary market on stock exchange at market prices that may be above (or) below their NAV. Close-ended funds channelise funds in secondary market in acquisition of corporate securities.

#### **6.3.1 Geographical classification of mutual funds:**

A country's boundaries provide territorial restriction on the sale and purchase of mutual fund units or shares. In view of this, mutual funds which operate within the nation's boundaries are different to those which are meant for



subscription of foreigners. This classification is of broadly two types:

- (i) Domestic mutual funds
- (ii) Offshore mutual funds

(i) Domestic Mutual funds: These are the saving schemes which are opened for mobilising savings of the nationals within the country. These schemes may be of different types. All the schemes that are in vogue in the country by the existing mutual funds include UTI, GIC mutual fund, LIC Mutual fund, SBI Mutual fund.

(ii) Offshore Mutual Fund: The basic objective of opening offshore mutual fund scheme is to attract foreign capital for investment purposes in the country of the issuing company. From investment point of view too, offshore mutual funds open up domestic capital markets to the international investors and global portfolio investments.

The major point of difference between the offshore mutual funds and domestic mutual funds is the covered and country risk for the global investors. Because of high risk, the higher return in the invested funds can be expected like domestic mutual funds, the offshore mutual

funds could also be functionally classified into closed ended (or) open ended funds.

A mutual fund is a pure intermediary which performs a basic function of buying and selling securities on behalf of its unit holders, which the latter also can perform but not as easily, conveniently, economically and profitably. The investors in the MF are given the share in its total funds which is proportionate to their investments and which is evidenced by unit certificates.

The functions of a Mutual Fund are similar to those of other financial intermediaries. However, its special objective (or) advantage is that it provides investors of small and moderate means the opportunity that is enjoyed by large rich investors namely to realise high and secure rate of return on their savings. This is sought to be ensured by diminishing the risk of investing in stocks by spreading (or) diversifying investments over a large number of different kinds of stocks. Unit Trust of India enables a small investor to hold a share in a large and diversified portfolio of assets which reduces the risks of investment. Similarly, it makes it possible for small investors to have the benefit of professional management of portfolio, which in turn helps them to earn a relatively higher rate of

return than they otherwise would have earned if their small savings were invested independently (or) separately. Sometimes, it is said that since MF portfolios are diversified the investors take only the average return from them.

In short, major advantage of investment through MFs are:

- (a) Economies of scale of operations
- (b) Spread of risk
- (c) Expert and professional management
- (d) Diversification of portfolio
- (e) Freedom from house keeping
- (f) Low brokerage and transaction costs
- (g) Good portfolio performance

Financial institutions have a special place in the financial system for certain reasons. First, their existence provides a substantial demand for stocks which help stock prices to rise over long period of time. Second, if corporations have to attract individual investors in large number, they might have to pay more funds in dividends. But purchase of stocks by institutions like unit trusts which seek both dividends and capital gains permit corporation to retain large proportion of their earnings.

#### 6.4.0 Investment pattern:

It is quite natural that MFs should invest mostly in

public limited companies because only such companies are listed and quoted on the stock markets. It can be expected that out of a large number of such companies existing in India, MFs would be investing only in a limited number of companies. This is so for two reasons. First, it is difficult to find many companies which offer a high rate of current dividend and capital appreciation. Second, a close monitoring of the fortunes of the companies becomes increasingly difficult as their number increases.

#### 6.4.1 Problems and Prospects:

It is quite clear from the above that MFs, in India have achieved a remarkable expansion. However, behind this numerical and quantitative growth, there are certain weakness from which the industry suffers.

(i) The MF business is highly concentrated fundwise and schemewise. Similarly, a handful of schemes account for a major part of the unit capital.

(ii) The role of mutual funds on the stock markets has not been always beneficial. There is no doubt that because of their much larger magnitude, huge funds are now available for investment in corporate securities. But at the same time, they have also been instrumental for

unhealthy speculation and unnatural increase in share prices on the stock markets. The expectations in the market that money will certainly come to the market via mutual funds contribute to buoyancy and speculation. This is detrimental to other shareholders and potential investors. They are either income-oriented (or) growth oriented (or) income and growth-oriented and offer many other financial services such as insurance, share exchange, housing and bank loans to their investors.

#### 6.4.2 Advantages of Mutual Funds

Mutual funds are advantageous to individual investors in relation to their direct involvement in investment portfolio.

1. Reduced risk:- Mutual fund provides small investors access to reduced investment risk resulting from diversification, economies of scale in transaction cost and professional finance.
2. Diversified Investment:- Small investors participate in larger basket of securities and share the benefits of efficiently managed portfolio by experts.
3. Revolving type of investment:- Automatic reinvestment of dividends and capital gains provide relief to the members of mutual funds.

4. Selection and timing of investment:

Expertise in stock selection and timing is made available to investors so that invested funds generate higher returns to them.

5. Wide Investment opportunities:- Wider investment opportunities that create an increased level of liquidity for the fund holders become possible because of package of more liquid securities in the portfolio of mutual funds.

6. Tax benefits:- Income tax exemption has been ensured for mutual funds, while originally only such mutual funds as are set up by public sector banks (or) public financial institution were exempt from tax, now the benefit of tax exemption has been extended to all mutual funds.

The above advantages are only illustrative and not exhaustive as there is scope for more to be added to the list in the light of individuals' own experience.

#### 6.5.0 EMPIRICAL RESULTS

##### 6.5.1 Tests of insider information:

The purpose of this chapter is to attempt an indepth analysis on the strong-form efficiency of the BSE,

in terms of traditional performance evaluation applied to a subset of the closed-end mutual funds operating in India.

The earlier studies on the GDR event can be considered a test of insider-information, or what Fama (1991) refers to as the strong-form test of efficiency. The hypothesis proposed is that the abnormal levels were caused by price manipulation.

#### 6.5.2 Mutual funds performance:

Tests of market efficiency aimed at detecting specific kinds of returns predictability are crucial putting together a comprehensive picture of market efficiency in the spirit of Fama (1965), Fama (1970) and Summers (1991). However, they have the weaknesses, namely,

1. There remains the possibility of hitherto unmentioned kinds of returns predictability being present.
2. Practitioners do not appreciate a discussion conducted in terms of issues such as the spectrum of the returns process.

Thus, it seems of value to approach the process of professional portfolio management as a black box, and it is necessary to enquire whether this black box is able to produce excess returns as compared with easily implemented buy-and-hold benchmark strategies. In this study, an attempt is made to evaluate the performance of these funds.

If the professional portfolio managers of these funds are systematically able to produce excess returns, it offers conclusive evidence about the presence of deviations from efficiency. On the other hand, if they fail to produce excess returns, it would constitute a clear evidence about the usefulness of certain of the portfolio management process as currently practised while leaving the possibility of certain unspecified kinds of inefficiencies still being present.

Apart from the issue of strong-form efficiency, systematic performance evaluation procedures are useful for the following reasons:

1. At the simplest, investors need to know how well a fund has fared relative to other funds. This has been done in the industry using comparisons of ex-post returns. These comparisons are meaningless unless different levels of risk adopted are adjusted for.
2. For an individual investor to correctly visualise how his budget set will vary in the different states of nature, he must know more about the policies adopted by the fund with respect to issues like diversification, attempts to find mispriced assets, response to economywide fluctuations etc.
3. For the institution which hires professional managers, performance evaluation procedures are essential in identifying and rewarding exceptional performance.



4. For a manager evaluating alternative mechanisms of portfolio management, performance evaluation gives quantitative feedback about the return generated by alternative data sources, alternative analytical methods, and alternative trading strategies.

### 6.5.3 The Evaluation strategy:

If  $r_j$  are returns on a fund  $j$ ,  $r_f$  the riskless rate of return on lending, and  $r_M$  the returns on the market index, the estimation of the market model would be formulated as:

$$(r_j - r_f) = \alpha + \beta_j (r_M - r_f) + \epsilon$$

$\beta_j (r_M - r_f)$  is interpreted as the risk premium obtained in return for the level of systematic risk  $\beta_j$  adopted by the fund. Under the null hypothesis of the fund manager adding no value, the falsifiable proposition is

$$H_0 : \alpha = 0$$

The approach will comment on the efficiency of the BSE with respect to the information set and analytical tools used by professionals in portfolio management, for a given level of trading cost they face. In the literature, it is well known that it is vulnerable to mis-specifications in the market index portfolio. Our results below use the BSE sensex as the benchmark, and find under performance by managed portfolios of an extreme degree. This may be relatively invulnerable to small changes in the index portfolio.

#### 6.5.4 The Analysis of Data

##### The Mutual funds:

The schemes analysed in this section are presented in Table-VI.1. The data set reflects weekly returns, continuously compounded and not annualised. At best, we have around 200 weeks of returns, or roughly four years. Since many of the entrants into the industry are relatively young, many schemes have fewer observations. Unlike much of the performance evaluation literature to date, we are not given the convenience of observing all these schemes over a common time period. Apart from #2, #4 and #8, all the schemes are observed from their inception onwards.

The schemes observed here have a combined market capitalisation of Rs.68.5 billion. While this is a good dataset in a sampling sense, it is a very small dataset as compared with important studies in the US-Jenson's Ph.D. dissertation which studied 115 funds, and Securities and Exchanges Commission (1971) used data from 125 funds for a decade. Simple summary statistics about these schemes are presented in Table-VI.2.

In its simplest form of comparisons, only #10 has "beaten the market" over the comparable period. The ex-post equity premium has been positive for all these time periods,

Table VI-1

## SCHEMES UNDER EVALUATION

Sl. No.	Scheme	Mkt. cap (6/4/94) (Rs. in billions)	Number of weeks
1.	Can bonus	1.28	71
2.	Can share	0.47	206
3.	Can double	5.38	139
4.	Can growth	0.59	201
5.	Can triple	4.51	60
6.	Canstar - cap	10.29	102
7.	Ind. Ratna	0.58	140
8.	Master share	17.54	215
9.	Master plus 91	15.81	81
10.	UGS 2000	5.72	87
11.	UGS 5000	6.37	87

Table VI.2

## SUMMARY STATISTICS FOR THE MUTUAL FUNDS

S.No.	Scheme	Weeks	rj-rf		rM-rf	
			E()	var ()	E()	var ()
1.	Can bonus	71	-1.159	104	0.073	25
2.	Can share	206	0.107	88	0.589	28
3.	Can double	139	-0.096	90	0.535	31
4.	Can growth	201	-0.320	105	0.605	29
5.	Can triple	60	-0.977	107	0.555	25
6.	Canstar-cap	102	-0.195	137	0.293	37
7.	Ind.Ratna	140	0.376	134	0.600	29
8.	Master share	215	0.511	75	0.514	28
9.	Master plus 91	81	-0.873	52	0.056	23
10.	UGS 2000	87	0.260	48	0.228	23
11.	UGS 5000	87	0.128	87	0.228	23

and six schemes out of eleven have generated negative returns.

The schemes run up enormous levels of total risk, often three to four times higher than the total risk of the Market Index. Even IDBF Mutual Fund, which is three basis points per week ahead of the market index in ex-post returns, requires the consumer to pay double the total risk as compared with the market index in getting there. Indeed, as illustrated by table 3,  $\text{var}(r_j - r_f)$  for many of these schemes looks more like the risk of common stock rather than the risk of a portfolio (Table-VI.3).

This suggests that these mutual funds might be inadequately diversified and that they do not serve consumers through giving diversification services at low transactions cost.

#### 6.5.5 The Market Index:

A Market Index is crucial to estimation of the market model and for the construction of benchmark portfolios. There is no market index on the BSE which matches the qualities of the market indexes used in research in the United States such as the S&P 500.

Table VI.3

RISK OF COMMON STOCK : SOME ILLUSTRATION (11 April 1994)

Security	Mkt.cap	var(rj-rf)	$\beta_j^2$	var(rM-rf)
Largest companies in BSE sensex:				
H.L.L.	106.74	33		15
Reliance	88.10	98		62
ITC	79.96	55		37
TISCO	67.14	59		40
TELCO	60.22	290		29
Largest Companies not in BSE Sensex:				
Colgate	71.74	32		14
Bajaj Auto	49.85	38		15
Tata Chemicals	48.56	66		26
Castrol	38.02	79		29
ICICI	37.14	146		48

BSE Sensex contains wide visibility in India and is used for the purpose of present study. In the estimation of the market model, the index has the following weaknesses as outlined in the earlier section on semi-strong form testing:

- (1) It is a portfolio of only 30 companies.
- (2) There is no algorithm in place for updating the set of 30 companies. In the entire history of the BSE Sensex since 1978-79, there has been only one addition into the index set.
- (3) Returns data for the BSE Sensex which correctly include dividends and rights do not exist. This will generate an upward bias on the estimated  $\alpha$ s and a downward bias in the  $\beta$ s; this causes a bias towards rejecting the null, that mutual funds do not produce excess returns.

However, in the context of the performance evaluation problem, there is one advantage which derives from using the BSE sensex. In an environment where no good broad-based market index exists, and no index funds exist, the BSE Sensex is convenient in so far as it is readily implemented as a portfolio. Thus the benchmark portfolios used in this study are of direct practical relevance to any portfolio manager with assets above Rs.1 million or so.

#### **6.5.6 The Riskless Asset:**

There is no market-determined short-term riskless rate

of return which can be used over the full time period i.e. from January 1990 onwards.

Hence, we use the (time-varying) interest rate paid by banks on short-term fixed deposits as the riskless rate of return. This is only relevant for riskless lending, not for riskless borrowing.

For leverage beyond  $\beta=1$ , the (constant) rate on riskless borrowing of 18% is used.

#### 6.6.0 Estimation of Results

##### (i) Alpha:

Results of estimation of the market model are summarised in table V.4. Standard errors are shown in brackets.

There is no fund where the null of  $H_0: \alpha=0$  can be rejected. All the estimated  $\bar{\alpha}$  are negative, other than #10, where  $\hat{\alpha} = 0.11$ , and this has little statistical significance. Most of the alphas are strongly negative; #5, for example, earns 1.326% less returns each week as compared to that expected at  $\beta = 0.629$ .

##### (ii) Diversification using mutual funds:

The residual variance seen in Table V.5 is generally



Table VI.4

## ESTIMATION OF THE MARKET MODEL

S.No.	Scheme	$\alpha$	$\beta$	$R^2$	$\sigma E$
1.	Can bonus	-1.216 (1.13)	0.779 (0.23)	0.147	9.479
2.	Can share	-0.373 (0.58)	0.815 (0.11)	0.213	8.345
3.	Can double	-0.523 (0.72)	0.799 (0.13)	0.220	8.403
4.	Can growth	-0.966 (0.60)	1.068 (0.11)	0.316	8.489
5.	Can triple	-1.326 (1.29)	0.629 (0.26)	0.094	9.911
6.	Canstar-cap	-0.447 (1.04)	0.862 (0.17)	0.202	10.994
7.	Ind Ratna	-0.360 (0.81)	1.227 (0.15)	0.327	9.535
8.	Master share	-0.119 (0.39)	1.226 (0.07)	0.566	5.710
9.	Master Plus 91	-0.927 (0.63)	0.953 (0.13)	0.402	5.632
10.	UGS 2000	0.110 (0.67)	0.659 (0.14)	0.212	6.197
11.	UGS 5000	0.060 (0.09)	0.822 (0.18)	0.190	8.268
Value weighted average					

enormous. Analysis of variance of  $(r_j - r_f)$  for each scheme is presented in Table 5. The table reinforces the suggestions made to the effect that the total risk of these schemes is unduly high. It reveals that the excessive risk was not caused by a high  $\beta^2$  var  $(r_M - r_f)$ ; instead it is more probably caused by poor diversification.

**(iii) Sharpe's Measure:**

A rational investor would maximise Sharpe's measure,

$$S = \frac{E(r_j - r_f)}{\text{Var}(v_j - r_f)}$$

calculated for their overall portfolio.

The schemes are studied during different time periods and S for the market index will have to be calculated separately for each of them. When  $E(r_j - r_f) < 0$ , Sharpe's measure is not useful for inter-scheme comparison.

From the results in Tables VI.4, 5 and 6, it is clear that these schemes will fare rather poorly with respect to the other measures of performance, namely- Treynor's measure and excess returns obtained over risk-equivalent benchmarks (this could be done using either  $\alpha$  or  $\beta$  risk).

Table VI.5

## ANALYSIS OF VARIANCE OF (rj-rf)

S.No.	Scheme	Total risk of which	Diversifiable risk
1.	Can bonus	104	89
2.	Can share	88	69
3.	Can double	90	70
4.	Can growth	105	72
5.	Can triple	107	97
6.	Canstar-cap	137	109
7.	Ind Ratna	134	90
8.	Master Share	75	33
9.	Master Plus	52	37
10.	UGS 2000	48	38
11.	UGS 5000	83	67

Table VI.6

## SHARPE'S MEASURE

S.No.	Scheme	100 s (r <sub>j</sub> -r <sub>f</sub> )	100 s (r <sub>m</sub> -r <sub>f</sub> )
1.	Can bonus	-1.116	0.289
2.	Can share	0.121	2.081
3.	Can double	-0.107	1.728
4.	Can growth	-0.305	2.078
5.	Can triple	-0.917	2.184
6.	Canstar cap	-0.142	0.792
7.	Ind Ratna	0.280	2.000
8.	Master share	0.684	1.827
9.	Master plus (0)	-1.666	0.243
10.	UGS 2000	0.540	0.974
11.	UGS 5000	0.153	0.974

### 6.6.1 Summary:

From the above discussions, it can be noted that the null hypothesis of non-forecastable returns can be rejected at a purely statistical level. The caveat is that these results must be considered in the light of the fact that all these tests were conducted assuming homoskedasticity of returns. If the data are heteroskedastic, then it is quite possible that the significance of the rejections might be considerably reduced, depending upon how much heteroskedastic is inherent in the data stream.

Even if the results hold with statistical significance after accounting for the heteroskedasticity, the results may still be consistent with market efficiency in an economic sense, where we define market efficiency as the non-existence of arbitrage opportunities, net of trading costs.

Trading costs on the BSE are very high. On paper, brokers charge roughly 1% for one-trip trading. In practice, the costs are never higher, brokers are frequently inefficient so that orders fail to get executed; this is a source of risk from the view point of an arbitrage strategy. Further, the process of trading itself lacks transparency so that a broker can charge a customer any price for a trade

as long as that price lies between the high and the low price for the day. The customer has no way of knowing whether the broker actually transacted at the claimed price. Ex-post, it appears that customers are routinely billed for buy orders at a price close to the days high price and for sell orders at a price close to the days low price.

For the database of the 92 A group companies (which have the best liquidity) over the five years 1990-1994, the average spread of  $2 * (\text{high} - \text{low}) / (\text{high} + \text{low})$  comes to 4.5%. If brokers transact at  $(\text{high} + \text{low}) / 2$  on average, then they would earn half this spread (i.e. 2.25%) on each transaction if buy orders are billed at the high price and sell orders are billed at the low price. A conservative estimate is that the excess trading cost imposed by the lack of transparency is at less than half of this, i.e. 1%. The total one-trip trading cost is 2%.

If true, one trip trading costs are 2%, then all the above results of short-term returns predictability are consistent with market efficiency in an economic sense. It is still difficult to reconcile the observed long-run mean aversion behaviour of the VR tests to any notion of market efficiency. The same holds for the XB-data mispricing and the pre - May 1994 experience of abnormal returns prior to GDR issues.

The overall XB-data mispricing over the five years is hard to rationalise. However, when the variation of XB-data mispricing over the years is analysed; it is found that the mispricing has steadily diminished overtime - in an environment where the micro structure of trading has been broadly stable.

The evidence about mutual fund performance is consistent with the view that the extent to which assets are currently mispriced does not support profitable arbitrage in the light of the current microstructure of trading. The experience with GDR mispricing (which was the first event study conducted with data from the BSE) seems to show a market which does react in terms of closing arbitrage opportunities.

Thus, the overall view of the BSE is that of a market in which some kinds of returns predictability exist, through a combination of weak microstructure and weak finance research. Progress in both dimensions will generate improvements in market efficiency in the years to come.

#### 6.7.1 IMPLICATION OF THE STUDY

Modern portfolio theory suggests diversification across securities as a way of risk reduction. The diversi-

fication could be in the same asset class (or) across different asset classes. All this diversification pertains to a given investment horizon. The present study discusses the question whether it is sufficient to discuss diversification only in terms of across securities and asset classes (or) the investment horizon also has some bearing on the portfolio risk-return trade-off.

In the developed markets, results are available to show that active strategies do not perform better than passive strategies. The strategy of buy and hold is a form of passive strategy which is followed by many investors. There is no indication regarding the optimum holding period for maximising return while minimising the risk. The other question is what is the minimum time period one should hold to get some benefit from the buy and hold strategy. The present analysis throws some light to this effect and indicates that one should hold at least for 5 years to benefit from the strategy in the Indian market. The term structure of volatility indicates that the risk is increasing as the investment horizon increases upto a period of  $4\frac{1}{2}$  years and then it starts falling. Thus, a 5 year horizon is appropriate for sufficient risk reduction. In fact, the risk continues to reduce as the investment horizon is increased. Around 4 1/2 year horizon, the risk-return



trade off reaches a turning point. Beyond this, the trade off becomes much favourable to the investor and the risk reduces while the return increases. This analysis seems to indicate that short-term horizon extends to one year, medium term lies between 1 to 5 years and the long term horizons goes beyond 5 years.

The above analysis reveals that the Indian stock market does not follow the random walk. In general, it can be said that the volatility in the market is a bounded set. It indicates that there is some limit to how far the market can wander as a random walk before it comes back to normality, technically bounded volatility which implies mean reverting behaviour. But mean reversion will not produce increasing Sharpe ratios. In a mean reverting process, the returns also should be bounded and hence the Sharpe ratios should be constant. A mean reverting process is nothing but the behaviour of a series which had given higher returns in one period to revert back and lower returns in the next period. This tendency of mean reversion is mainly attributed to the over reaction of the market participants. Studies have noticed mean reversion and over reaction in the stock markets of number of countries. The Indian market has also been found to be mean reverting and over reacting. If this is true one can opt for the

contradict strategy of selling owners and buying losers of one period for getting extra-ordinary returns in the next period.

But the present study implies that there is something more than mean reversion. It provides avenues for attractive investment strategies. If one is not interested in short-term investing, then investing for periods beyond 5 years should create higher returns with lower risk. The Crave theory and fractal market analysis indicate that it is possible to find out patterns in the markets which apparently look like random movements and where the traditional statistical models test them as random processes. The traditional statistical models check for periodic cycles. But it is possible that the markets have several non-periodic cycles. The chaos theory tries to locate an average cycle length of the non-periodic cycles. The Indian markets have been identified to have an average cycle length of around  $4\frac{1}{2}$  years (Madhusoodanan, 1996). The present study also indicates the possibility of a cycle of  $4\frac{1}{2}$  years, where the volatility reached the maximum height and then started showing declining trend. The cycle length could be seen as an indication of the existence of business cycles of the same duration in the Indian economy.

### 6.7.2 CONCLUSION

The efficient market theory suggests that the market is a randomwalk. It implies that the volatility is constant and follows the trading rule. But the present study indicates drastic deviations from this rule and hence points towards the inefficiency of the market. The results show volatility to be bounded, indicating mean reversion. But the increasing Sharpe ratios suggest that the market behaviour is not fully explained by mean reversion. It also indicates the possibility of the existence of business cycles of duration around  $4\frac{1}{2}$  years.

The implications of the results of the present analysis to investment management are significant. The players in the Indian market are, in general, accused of adopting short-term perspective to do the issues. The present analysis indicates this trend, as the short-term volatilities are much higher than expected while the long term volatilities are much lower. The risk from a one year investment and a seven year investment are the same, while the returns grow at much faster rate than the multiple of the number of periods. The investor having seven year investment horizon is getting more than seven times the return of one year investment. Thus taking a longer term view of the market definitely pays rich rewards. It implies

that buy and hold strategy is likely to be better than any trading strategy on a long term basis which is in conformity with several studies conducted on different stock markets. In the country, the results indicate that the risks faced by short term investors are different from those of the medium term as well as long term investors. The difference between the observed and expected volatilities are positive and increasing during the year, but started decreasing and even became negative thereafter in the subsequent period.

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