

Indirect Investing and Direct Investing - An Empirical Study with Special Reference to Stock Market in India

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Abstract

Retail investing in India is gaining momentum with more and more investor awareness about different types of investment avenues including investment in stock markets, and obviously with increased flow of funds in the hands of investors. The attitude of investors varies between both active to passive in nature. Active investment or direct investment, although being a bit risky for some kind of investment alternative, sometimes helps in earning better returns than passive investing. Most prominent among active investing or direct investing is investment in Shares, while most common form of passive or indirect investment include investment through Mutual Funds. But the fluctuations in the financial market due to different reasons create uncertainties for the investors of both categories. In this regard, the paper aims at constructing minimum risk weighted portfolios of mutual funds and shares that earn positive returns during different phases of market situation. It also identifies the most viable alternatives for investment within each category of investment avenues. The study thus concludes empirically that it is possible to earn a positive return even during slowdown phase of the market.

Keywords: BSE Sensex, Investment, Jensen's Alpha, Mutual funds, Portfolio, Risk, Return, Shares, Slowdown, Sharpe ratio.

1. Introduction

Indians are known to be big savers, but when it comes to investment, they are generally very skeptical and only resort to such investment avenues that provide assured returns with lesser degree of risk. But with increased flow of funds in the hands of investors and widespread public awareness regarding stock market investing, people are becoming risk takers and opting for direct investing in shares or indirect investing through mutual funds. Direct

investing in shares entitles the investor to get dividend as well as the capital gain arising out of rise in market prices of shares. Moreover, the investor as a shareholder gets the voting rights in the company and most importantly, shares provide liquidity to his investments. In spite of all these merits, there remains the risk of losing capital due to uncertain fluctuations i.e. volatility in share prices. On the other hand, the built in diversification and ease of investment through Systematic Investment Plans (SIPs) or otherwise makes mutual funds, or rather

indirect investment in stock market, an attractive alternative for investment. In addition, it provides customized service by matching the investors' different attitude towards risk and investing accordingly, where the risk management responsibility is shifted on to the mutual fund company. The demerits of investing in mutual funds are that the investor has to bear the fees and commissions charged by the mutual fund house, and the possibility of better managing investment portfolio through direct investment and earning higher returns than that offered by mutual funds cannot be ruled out. But given the continued volatility in the stock market, it requires considerable skill and judgement to decide about the best alternative to invest within different asset classes, be it mutual funds or shares. Here arises the need for diversification. The rationale behind diversification is often expressed as the equivalent of not putting all the eggs in one basket. Diversifying within an asset class by purchasing shares across different industry sectors, or units across different fund managers while investing in managed funds, often helps in avoiding or reducing the risk of loss. In this context, a review of literature is attempted in *Section 2* to throw some light on the research works that have been conducted so far in the area of portfolio creation and investors decision in relation to investment in stock market and mutual funds. While *Section 3* sketches the objectives of the study, *Section 4* draws the methodology of the analysis conducted. *Section 5* is devoted to the analysis and findings of the study, and finally *Section 6* summarizes the concluding observations.

2. Literature Review

Portfolio theory provides with a broad understanding of the risk- return tradeoffs and the benefits of diversification. *Wang, Kutan, and Yang (2005)* worked with the information available in the Chinese stock markets. The authors found that there is higher dependence of stock exchanges on each other for the information. At the same time, it has also been found that there is constant reflection in the prices of one sector on the information of the other sector. Industry sector (excluding finance sector) is found to be most integrated with the impact on each other due to the information flow and the finance sector could stay alone or indifferent to the other sectors information. According to *Evans and Archer (1968)*, portfolio risk is measured by the standard deviation of its returns from average return. They assumed equal investment in all securities in the portfolio, which is optimum if the investor has no information about future returns' variances and co-variances. Their study concluded that for a randomly selected and equally weighted portfolio, there is very little diversification benefits beyond eight to ten stocks. On the other hand, *Glode (2011)* showed, both theoretically and empirically, that U.S. equity mutual funds exhibit a systematically better performance during periods of economic downturn and that investors are willing to pay higher fund fees for this recession insurance. He went on to argue that it is rational for investors to accept negative average alphas if active funds outperform in recessionary periods when marginal utility is high. Also, *Moskowitz (2000) and Kosowski (2011)* documented that U.S. equity mutual fund managers

perform significantly better during economic downturns than during economic upturns. *Jambodekar (1996)* conducted a study to find out the investors' preference towards mutual funds and to identify factors that influence mutual fund investment decision. The study tells that open-ended scheme is most favoured among other things, and that income schemes and open-ended schemes are preferred over closed-ended and growth schemes. He also revealed that newspapers and magazines are used as information sources, and safety of principal amount and investor services act as priority points for investing in mutual funds.

Research Gap

Likewise, several other research works have been done in this area, but published work on creation of a weighted portfolio of mutual funds or shares to yield a positive return during different phases of market situation in India has not appeared in literature yet. Accordingly, the present study aims at fulfilling this vacuum.

2. Objective Of The Study

The present study aims to:

- construct portfolios for Mutual Funds and Shares which generate positive returns in different phases of market situation, namely, slowdown period and post-slowdown period;
- test the performance of the optimal portfolios created above with respect to BSE Sensex, and
- identify the category of mutual funds and shares that are best bet for investors.

4. Methodology

4.4.1 Period of Study

Based on the impact of sub-prime financial crisis and the resultant economic slowdown on the Indian stock market and its effect on BSE Sensex during the year 2007-2008, the study is conducted for the phase January 2007 to December 2009 termed as the *slowdown phase*, and the next phase from January 2010 to December 2015 termed as the *post-slowdown period*.

4.4.2 Sample Selection

The two independent sub samples - one on mutual funds and the other of shares, are designed for the empirical part of the study as follows.

- Mutual funds are selected taking first two funds each from rank 1 to rank 5 (except for which only one fund was ranked under the category) provided by CRISIL. Mutual fund schemes are selected based on 'Consistent performers' for the period from each category, namely, Equity, Balanced and Bond fund. Consequently, 24 Mutual Fund schemes are selected based on availability of data (ref. *Annexure I* for sample of mutual funds). Data are considered for the Dividend category of each scheme.
- The sample of shares consists of 40 stocks constituting 'BSE Sensex' with replacements over the entire period of study i.e. 2007-2015, except for the post-slowdown period (2010-2015) where 38 stocks are considered since Sesa Goa has merged with Vedanta Ltd. and stocks of Sesa Goa are not traded on BSE from 2013 onwards, while Ranbaxy

Laboratories has merged with Sun Pharmaceuticals and stocks of Ranbaxy Laboratories are delisted from all the Indian stock exchanges with effect from April 2015. The sample, however, includes 32 Large Cap stocks (i.e. stock whose market capitalization ranges between Rs. 200 billion to Rs. 3500 billion), 2 Mid Cap stocks (i.e. stock whose market capitalization ranges between Rs. 50 billion to Rs. 200 billion), and 1 Small Cap stock (i.e. stock whose market capitalization lies below Rs. 50 billion) [Source: www.bseindia.com]. Out of the rest 5 stocks, *Castrol India Ltd.* was a Mid Cap stock till June 2010 and then it got included in Large Cap stocks due to increase in its capital base, and similarly *Colgate Palmolive Ltd.* was a Mid Cap stock till October 2005 and then it entered into Large Cap category, while *Sesa Goa Ltd.* belonged to Mid Cap category till November 2005 and thereafter got included in Large Cap category. *Novartis India Ltd.*, which was a Small Cap stock till June 2008, got included in Mid Cap category later. Likewise, *NIFT Ltd.* was a Small Cap stock till October 2005 and turned into a Large Cap stock afterwards (ref. *Annexure II* for the sample of shares).

4.4.3 Data Type and Data Source

The study is based on secondary data which are accessed in the following manner:

- For Mutual Funds (MFs), daily Net Asset Value (NAV) for each scheme are collected for the period January 2007 - December 2013 (due to non-availability of data for the later study period) from the relevant website of Association of

Mutual Funds of India (AMFI) i.e. www.amfiindia.com.

- For the stocks considered for the purpose of study, data relating to monthly closing prices of stocks during the period January 2007-December 2015 are collected from the official website of Bombay Stock Exchange (BSE) i.e. www.bseindia.com.

4.4.4 Softwares Used

For the purpose of calculation and analysis, SPSS Software and LINGO optimization software are used. MS-Excel is also used for carrying out different operations and for plotting graphs and creating tables.

4.4.5 Steps in Research

- (i) Descriptive statistics (such as Minimum, Maximum, Mean, Standard Deviation, Variance, Skewness and Kurtosis) of the return series for different selected assets under the asset class-mutual funds and shares, are calculated for each of the phases to assess the characteristics of the data set. In case of mutual funds, average monthly NAV (Total of daily NAV for each month *divided by* Number of days of trading in each month) is calculated for each scheme and in case of stocks monthly closing prices are considered for determination of return series. Then lognormal NAV return / lognormal return [$\ln (P_1 / P_0)$ where P_1 is current month's NAV/ price and P_0 is immediately preceding month's NAV/ share price] is calculated for each month of the period under consideration in order to take the compounding effect of return into account.

- (ii) Covariance matrix is then constructed between assets for each asset class separately for each time phases in order to understand the comovement between the assets' returns.
- (iii) Then, LINGO portfolio optimization program is run using the return derived for each asset and the covariance between the assets under each asset class

separately, given a target minimum return, for both the phases to identify the assets that would comprise the optimal portfolio for each asset class and find out the weights to be assigned to optimal assets in the portfolio. The general optimization expression used to determine the minimum risk weighted optimal portfolio with 'n' number of individual assets is as follows:

Minimize $\sigma_p^2 = w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + \dots + w_n^2\sigma_n^2 + 2w_1w_2\text{Cov}_{12} + 2w_1w_3\text{Cov}_{13} + 2w_2w_3\text{Cov}_{23} + \dots + 2w_{n-i}w_n\text{Cov}_{n-i,n}$

Subject to : $(\sum (w_1 + w_2 + \dots + w_n)) = 1$
 $w_1(R_1) + w_2(R_2) + \dots + w_n(R_n) \geq R_p$

where,

σ_p^2 is the portfolio variance measuring portfolio risk;
 $\sigma_1^2, \sigma_2^2, \dots, \sigma_n^2$ are the variances in returns of n-individual assets in the portfolio;
 w_1, w_2, \dots, w_n are the weights assigned to individual assets;
 $i = 1, 2, 3, \dots, (n-1)$;
 R_1, R_2, \dots, R_n are the mean returns on individual assets;
 $[w_1(R_1) + w_2(R_2) + \dots + w_n(R_n)]$ is the Portfolio Return, and
 R_p is the desired level of expected return (i.e. target minimum return) from the Portfolio.

- (iv) In the light of Markowitz Principle, *portfolio return* $[(R_p) = w_1(R_1) + w_2(R_2) + \dots + w_n(R_n)]$, where w_1, w_2, \dots, w_n are the weights assigned to n-number of individual assets selected in the optimal portfolio by LINGO and R_1, R_2, \dots, R_n are the mean returns on such 'n' individual assets], and *portfolio risk* $[\sigma_p = \sqrt{(w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + \dots + w_n^2\sigma_n^2 + 2w_1w_2\sigma_1\sigma_2r_{12} + 2w_1w_3\sigma_1\sigma_3r_{13} + 2w_2w_3\sigma_2\sigma_3r_{23} + \dots + 2w_nw_{n-i}\sigma_n\sigma_{n-i}r_{n,n-i})}$,

where $\sigma_1, \sigma_2, \dots, \sigma_n$ are the standard deviations of n-optimal assets in the portfolio and $r_{12}, r_{13}, r_{23}, \dots, r_{n,n-i}$ (where $i = 1, 2, 3, \dots, n-1$) are the correlations between the selected assets in the portfolio] are determined for each asset classes under each phase to compare the same with individual return and risk of the optimal assets in the portfolio under the said asset classes.

(v) To test the performance of the optimal portfolio designed by LINGO vis-à-vis market index, the following hypothesis is examined:

Null Hypothesis (H_0): The designed portfolio does not outperform market index.

The above null hypothesis is evaluated based on standard measures of portfolio performance as follows.

(a) In case of optimal portfolio on mutual funds -

(1) A proxy measure of beta for the funds that constitute the optimal portfolio designed in LINGO are calculated for each relevant phase from the monthly lognormal NAV returns of the fund with respect to benchmark return - Sensex. Then portfolio beta is calculated as the weighted average of individual betas (proxies) of funds comprising the portfolio to find out the sensitivity of the model portfolio to market movement.

(2) Jensen's Alpha is then calculated for the optimal portfolio for each relevant phase to determine whether the portfolio is able to outperform the market using the following formula:

Jensens' Alpha = Mean portfolio return - Expected return on portfolio (as per Capital Asset Pricing Model)

$$\text{or, } \alpha_p = \bar{R}_p - [R_f + \beta_p(\bar{R}_m - R_f)]$$

where \bar{R}_p = Mean portfolio return

R_f = Risk free return = Treasury Bill return = 4.60% (during the period of study)

β_p = Portfolio beta

\bar{R}_m = Average market return

If $\alpha_p = 0$ or < 0 , it implies that the designed portfolio does not outperform market index thereby accepting null hypothesis. But if $\alpha_p > 0$, then it implies that the designed portfolio outperforms market index thereby rejecting null.

(b) The performance of optimal portfolio with shares is evaluated as follows -

(1) Portfolio return for each phase is compared with BSE Sensex return by plotting graph using MS -Excel.

(2) Beta value is calculated for each asset in model portfolio in order to determine the extent of sensitivity of the stocks to market movement. Then portfolio beta is calculated as the weighted average of beta values of individual stocks comprising the designed portfolio to find out the extent of systematic risk in the model portfolio.

(3) Thereafter, to evaluate portfolio performance, Sharpe ratio is calculated for the optimal portfolio of stocks for each phase by determining the excess return earned on the portfolio per unit of volatility or total risk as follows.

Sharpe Ratio = (Mean portfolio return - Risk Free rate) / Standard Deviation of portfolio return

$$= (\bar{R}_p - R_f) / \sigma_p$$

where \bar{R}_p = Mean portfolio return

R_f = Risk free return = Treasury Bill Return = 4.60% p.a.

σ_p = Portfolio standard deviation

Sharpe Ratio for stock market index can be calculated in a similar way by substituting mean and standard deviation of index return in place of portfolio return.

If Sharpe ratio for portfolio > Sharpe ratio for stock market index, then it implies that the designed portfolio outperforms index thereby rejecting null hypothesis; otherwise accepting null.

(4) Finally, tracking error, also known as active risk, is calculated for the optimal portfolio of shares created for each phase with respect to benchmark return i.e. BSE Sensex to find out how closely it follows the market. There is no universal standard of acceptable limit of tracking error, but it is always acceptable to have a low tracking error with positive excess returns. Also, the lower the tracking error, the more closely it resembles the market index which, in turn, implies that the designed portfolio is well diversified. Tracking error is calculated using the following formula:

$$\text{Tracking Error} = \sigma (R_P - R_B)$$

where σ = Standard Deviation of difference between portfolio return and benchmark return.

R_P = Portfolio Return

R_B = Benchmark Return i.e. Sensex Return

5. Analysis And Findings

Based on the methodology discussed above, the findings with mutual funds and shares as

asset classes are segmented into slowdown and post-slowdown phases as follows.

5.1 Slowdown Phase (2007-2009)

(a) Mutual Funds

The descriptive statistics of the selected mutual funds' NAV returns during this period show that Birla Sun Life 95 has the highest mean return of 0.86%, while Birla Sun Life Midcap fund has the greatest variance in return i.e. 1.23% and Kotak Bond has the lowest variance in return i.e. 0.001%. *Table 1* shows the weighted portfolio of mutual funds where only two schemes - Kotak Bond and SBI Magnum Income, both from the bond family, constitute the optimum portfolio in LINGO, with Kotak Bond fund being assigned the highest weight which might be due to its lowest variance of return although it has a negative mean return. Return contributed by the individual optimal schemes to portfolio return is obtained by multiplying individual weight assigned to the schemes and their respective mean NAV return. The aggregate of individual return contributions yield portfolio return, and it is observed that the total return from the portfolio is positive during the slowdown period. Portfolio risk, as calculated in terms of standard deviation using Markowitz formula, is also less than the individual risks of the constituent mutual fund schemes in the portfolio thereby providing benefit of diversification. Weighted beta is calculated by multiplying individual weight assigned to selected schemes and the beta of those schemes during this period. The aggregate of the individual weighted beta of the schemes represent portfolio beta which is less than 1

($\beta=0.0043$) and this indicates the defensive nature of the portfolio.

Table: 1

Weighted Portfolio of Mutual Funds (2007-2009)

ASSETS (1)	CATEGORY (2)	WEIGHTS (3)	MEAN NAV RETURN (4)	WEIGHTED RETURN IN PORTFOLIO (5)=(3)*(4)	RISK (σ) (6)	BETA (β) (7)	WEIGHTED BETA (8)=(3)*(7)
KOTAK_BOND	BOND	0.73	-4.30E-05	-3.10E-05	0.003779	0.007359	0.005372
SBI_MAGNUM_INCOME_FUND	BOND	0.27	0.001222	0.00033	0.006042	-0.00386	-0.00104
Portfolio		1		0.000299	0.003278		0.00433

Table 2 shows the efficiency of the optimal portfolio of mutual funds with respect to market index-Sensex through Jensen's Alpha (α). Jensen's Alpha calculated for the portfolio is less than 0 (i.e. - 4%) which justifies the null hypothesis suggesting that

the portfolio underperforms the market to some extent. This may be due to the impact of slowdown that investors, in general, may have started selling off their holdings which constituted the portfolio of the sampled optimal mutual fund schemes.

Table: 2

**Portfolio Performance Evaluation (2007-2009)
 [Jensen's Alpha]**

	PORTFOLIO	BSE SENSEX	
AVERAGE PORTFOLIO RETURN (\bar{R}_p)	0.003575	0.078823	
EXPECTED RETURN OF THE PORTFOLIO $[R_f + \beta_p (\bar{R}_m - R_f)]$	0.046142		
JENSEN'S ALPHA			-0.04257

(b) Shares

The descriptives of the 40 stocks during the slowdown period show that Castrol India Ltd. has the highest mean return, with Sesa Goa Ltd. having the highest variance in return on its securities, while Colgate Palmolive Ltd. and HUL have the lowest variance in return i.e. 0.6%. Table 3 shows

the portfolio with the weights assigned by LINGO to selected stocks. It may be observed that the maximum weight is given to the stocks of Colgate Palmolive Ltd., followed by Glaxo Smithkline Pharmaceuticals Ltd. The portfolio in this period comprises 4 Large Cap stocks with 1 Small Cap stock. The betas of the individual stocks, as well as the portfolio, are lesser than the market beta (i.e.1) indicating the

nature of defensive portfolio. And even during the slowdown phase, it is seen that the portfolio of stocks is yielding a positive return of 1.16% with a risk lower than the

individual risks of all the constituent shares in the portfolio, thereby providing benefits of diversification.

Table: 3
Weighted Portfolio of Stocks (2007-2009)

ASSETS (1)	CATEGORY OF CAPITALIZATION (2)	WEIGHTS (3)	MEAN RETURN (4)	WEIGHTED RETURN IN PORTFOLIO (5)=(3)*(4)	RISK (σ) (6)	BETA (β) (7)	WEIGHTED BETA (8)=(3)*(7)
BHARAT_HEAVY_ELECTRICALS_LTD	LARGE CAP	0.072	0.00128	9.09E-05	0.151007	0.79523	0.057257
COLGATE_PALMOLIVE_LTD	LARGE CAP	0.42	0.01468	0.006166	0.076924	0.19671	0.082619
GLAXO_SMITHKLINE_PHARMA	LARGE CAP	0.252	0.009	0.002268	0.08773	0.21321	0.053729
NOVARTIS_INDIA_LTD	SMALL CAP	0.068	0.0125	0.00085	0.115751	0.59801	0.040665
SUN_PHARMACUETICALS_INDUSTRIES	LARGE CAP	0.188	0.01198	0.002252	0.086368	0.48397	0.090986
Portfolio		1		0.011627	0.050007		
Portfolio Beta							0.325255

The comparison between the above model portfolio with BSE Sensex during slowdown period (2007-2009) in *Figure 1* shows how the portfolio return tracks the Sensex return during this phase. *Table 4* portrays the efficiency of the portfolio through Sharpe ratio and it may be interpreted that the

portfolio formed with the assigned weights significantly outperforms the Sensex, which rejects the null hypothesis. The tracking error of 7.84% also shows that the portfolio is able to track the market to a sufficient extent.

Figure: 1

Total Return from Portfolio vis-a-vis Sensex Return during Jan 2007- Dec 2009

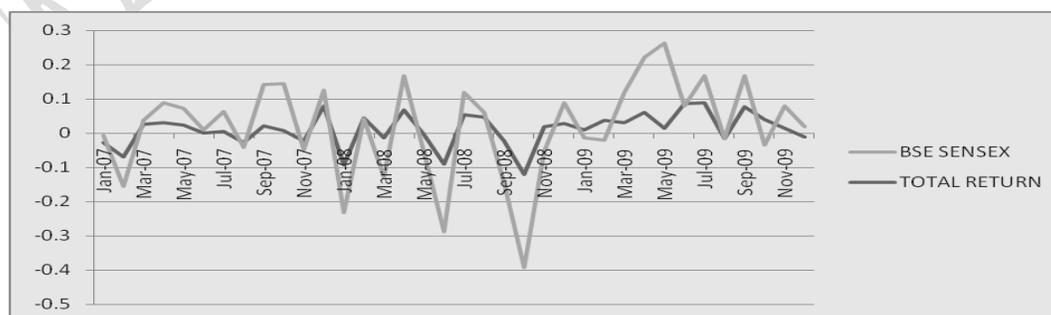


Table: 4

Portfolio Performance Evaluation (2007-2009)
 [Sharpe Ratio and Tracking Error]

	PORTFOLIO	BSE SENSEX	
EXCESS OF AVERAGE PORTFOLIO RETURN OVER RISK FREE RETURN	0.093537	0.032823	
STANDARD DEVIATION (σ) OF PORTFOLIO RETURN	0.268119	0.719481	
SHARPE RATIO	0.348864	0.04562	
TRACKING ERROR (MONTHLY)			0.078441

Therefore, it may be deduced from the above analysis that, even during the slowdown phase, if a well diversified portfolio is formed with any category of assets as discussed above, it is possible to earn positive return.

5.2 POST- SLOWDOWN PHASE (2010-2015)

(a) Mutual Funds

The descriptive statistics of sampled mutual funds' NAV returns during this period show that Birla Sun Life India GenNext Fund, an equity fund, and SBI Magnum Income Fund, a bond fund, have the highest mean return (0.36%), with Birla Sun Life Frontline Equity Fund having the greatest variance (2.15%) in returns. While HSBC Progressive Themes Fund has got the lowest mean return (-0.63%), Kotak Bond fund has the lowest variance (0.0015%) in return. Considering the risk and return of the sample schemes, *Table 5* shows the weights assigned to schemes optimally selected in

LINGO for earning a positive return on the mutual fund portfolio. Maximum weight is assigned to Kotak Bond Fund carrying the lowest individual risk. The next highest weight is assigned to SBI Magnum Income Fund, again from the Bond fund category, and the two Balanced funds – HDFC Balanced and ICICI Prudential Balanced have very little share in LINGO's optimal portfolio. The beta (β) of the portfolio, being less than 1 (i.e. $\beta=0.011$), suggests that the portfolio is a defensive one. Portfolio return determined is positive during this period as well. It can be observed that the optimal portfolio in post slowdown period is a combination of both Bond and Balanced funds unlike slowdown period, when only Bond schemes comprised LINGO's optimal portfolio. The portfolio risk is lower than all the individual risks of the constituent schemes thus providing benefit of diversification.

Table: 5

Weighted Portfolio of Mutual Funds (2010-2013)

ASSETS (1)	CATEGORY (2)	WEIGHTS (3)	MEAN RETURN (4)	WEIGHTED RETURN IN PORTFOLIO (5)=(3)*(4)	RISK (σ) (6)	BETA (β) (7)	WEIGHTED BETA (8)=(3)*(7)
KOTAK_BOND	BOND	0.555	0.000152	8.42E-05	0.003864	0.018499	0.010267
SBI_MAGNUM_ INCOME_FUND	BOND	0.439	0.003557	0.001561	0.004448	-0.00067	-0.00029
HDFC_BALANCED_ FUND	BALANCED	0.002	0.000478	9.56E-07	0.03968	0.188777	0.000378
ICICI_PRUDENTIAL_ BALANCED_FUND	BALANCED	0.004	0.002305	9.22E-06	0.031706	0.224566	0.000898
Portfolio		1		0.001656	0.002796		0.01125

Table 6 shows the Jensen's Alpha of the constructed portfolio to be less than 0 (i.e. -2.5%) indicating that the portfolio is unable

to beat the market. This justifies the null hypothesis, but it shows that the situation has improved than the slowdown phase.

Table: 6

Portfolio Performance Evaluation (2010-2013)
 [Jensen's Alpha]

	PORTFOLIO	BSE SENSEX	
AVERAGE PORTFOLIO RETURN (\bar{R}_p)	0.020237	0.048107	
EXPECTED RETURN OF THE PORTFOLIO [$R_f + \beta_p (\bar{R}_m - R_f)$]	0.046024		
JENSEN'S ALPHA			-0.02579

(b) Shares

The descriptive statistics of the stocks during 2010-15 period show that HUL has the maximum mean return followed by Dr. Reddy's Lab, with maximum variance seen in the stock returns of Tata Power Co. Ltd. On the other hand, Nestle India Ltd. has the minimum variance in returns. Table 7 shows the diversified portfolio of stocks with individual weights assigned in order to get a

positive return. It is observed that the portfolio consists of 16 stocks, with maximum weight assigned to the stocks of Dr. Reddy's Lab and Nestle India Ltd, followed by HUL and Wipro Ltd. Although it is seen that some of the stocks have negative mean returns, still they constitute the optimal portfolio in LINGO, which may be due to the low variance in return associated with such stocks. It is observed

that almost all the stocks comprising the model portfolio in this period belong to the Large Cap category. The total return from the portfolio during this phase also shows a positive result with a risk lower than all the individual risks of the constituent shares in

the portfolio, thereby providing benefit of diversification. Moreover, apart from a few stocks like that of SBI and RPL, the beta coefficients for the rest of the stocks in the portfolio are less than 1 ($\beta < 1$) indicating a lower volatility than the market.

Table: 7

Weighted Portfolio of Stocks (2010-2015)

ASSETS (1)	CATEGORY OF CAPITALIZATION (2)	WEIGHTS (3)	MEAN RETURN (4)	WEIGHTED RETURN IN PORTFOLIO (5)=(3)*(4)	RISK (σ) (6)	BETA (β) (7)	WEIGHTED BETA (8)=(3)*(7)
BHARAT_HEAVY_ELECTRICALS_LTD	LARGE CAP	0.02	-0.03660	-0.00073	0.21855	0.65303	0.01306
CASTROL_INDIA_LTD	MID CAP TILL JUNE 2010 THEN LARGE CAP	0.015	-0.00438	-0.00007	0.12927	0.43674	0.00655
COLGATE_PALMOLIVE_LTD	LARGE CAP	0.03	0.00559	0.00017	0.10065	0.27964	0.00839
DRREDDY_S_LAB	LARGE CAP	0.142	0.01386	0.00197	0.07159	0.35376	0.05023
GAIL_INDIA_LTD	LARGE CAP	0.09	-0.00133	-0.00012	0.06984	0.72313	0.06508
GLAXO_SMITHKLINE_PHARMA	LARGE CAP	0.09	0.00995	0.00090	0.06465	0.23013	0.02071
GRASIM_INDUSTRIES_LTD	LARGE CAP	0.064	0.00564	0.00036	0.08222	0.91173	0.05835
HUL	LARGE CAP	0.1	0.01642	0.00164	0.06543	0.53229	0.05323
ITC_LTD	LARGE CAP	0.04	0.00352	0.00014	0.09212	0.46387	0.01856
MAHINDRA_MAHINDRA	LARGE CAP	0.04	0.00226	0.00009	0.10418	0.63692	0.02548
NESTLE_INDIA_LTD	LARGE CAP	0.142	0.01137	0.00162	0.05125	0.42756	0.06071
NOVARTIS_INDIA_LTD	MID CAP	0.05	0.00520	0.00026	0.07918	0.57627	0.02881
RIL_RPL	LARGE CAP	0.06	-0.00102	-0.00006	0.07185	1.06413	0.06385
SBI	LARGE CAP	0.014	-0.03188	-0.00045	0.26642	1.02592	0.01436
SUN_PHARMACEUTICALS_INDUSTRIES	LARGE CAP	0.003	-0.00845	-0.00003	0.20996	0.93108	0.00279
WIPRO_LTD	LARGE CAP	0.1	-0.00269	-0.00027	0.10112	0.35988	0.03599
Portfolio		1		0.005421	0.032147		
Portfolio Beta							0.526159

A comparison of model portfolio with BSE Sensex during post slowdown phase (2010-2015) in *Figure 2* shows that the total return from portfolio almost tracks the Sensex return in each month with a little deviation. *Table 8* shows that the Sharpe ratio of the portfolio is higher than the ratio on Sensex, which suggests that the constructed portfolio

is more efficient than the Sensex thereby rejecting the null hypothesis. Moreover, the tracking error shows that the portfolio is unable to track the market only to the extent of 3%, which may again be substantiated by the fact from *Table 7* that the portfolio beta is less than 1 ($\beta < 1$) indicating a defensive portfolio.

Figure: 2

Total Return from Portfolio vis-a-vis Sensex Return during Jan 2010 - Dec 2015

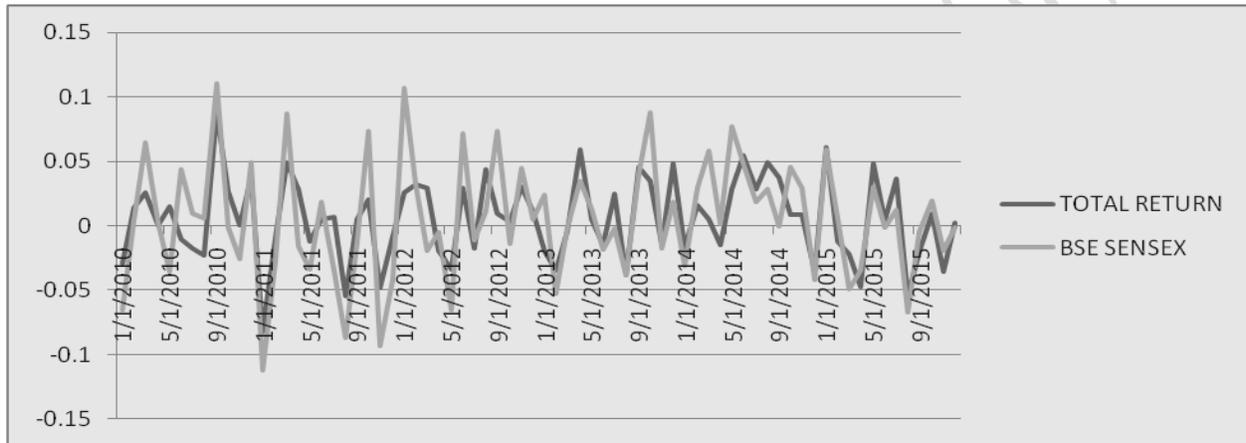


Table: 8

**Portfolio Performance Evaluation (2010-2015)
 [Sharpe Ratio and Tracking Error]**

	PORTFOLIO	BSE SENSEX	
EXCESS OF AVERAGE PORTFOLIO RETURN OVER RISK FREE RETURN	0.019054	0.021070	
STANDARD DEVIATION (σ) OF PORTFOLIO RETURN	0.107454	0.20477	
SHARPE RATIO	0.177321	0.102895	
TRACKING ERROR (MONTHLY)			0.030174

6. Conclusion

The study reported in this paper has attempted to construct well diversified weighted portfolios of mutual funds and shares that yield positive returns during both the slowdown and post slowdown phases of the Indian financial market. It also makes sure that proper weights are assigned to the

right assets that get included in the portfolio. The study shows that in case of mutual funds, the rank assigned by rating agency such as CRISIL may help to select the sample funds initially, and finally a well diversified portfolio may be constructed that would yield positive return, considering their risk-return characteristics and optimum weight(s) being assigned to the best

alternative(s) available. The optimum portfolio of mutual funds shows that Bond funds should be given importance while diversifying across different categories. The study also shows that it is possible to earn positive return with stocks even during slowdown phase of the market. Hence, slowdown does not mean that one should stop investing in stocks. Proper care should be taken while selecting the appropriate stocks in the portfolio considering their risk and past returns. It is not only that Large Cap stocks should be preferred over Small Cap and Mid Cap stocks due to their higher market capitalization, because even Small Cap stocks could find a place in the portfolio during the slowdown phase in the study. It is wise to invest and diversify across Large Cap, Mid Cap and Small Cap stocks depending upon their characteristics of return and risk, though Large Cap stocks are to be preferred during adverse market condition or just after when the market is in a state of recovery. The weighted portfolios of stocks during both the phases show that maximum weight is assigned to the stocks either from Indian FMCG industry or from its Pharmaceuticals industry. This may be due to the effect of NREGA initiative which increased the number of potential consumers in the Indian rural sector, and further incentive being provided by the government

through favourable taxation policy which made many of the Indian FMCG companies to make huge investments in the tax-holiday states in India. On the other hand, Pharmaceutical stocks are always known to be defensive in nature unlike other sectors which are volatile. Moreover, the weakening of Indian currency has led to export competitiveness of Indian pharmaceutical products and enhanced its attractiveness for stock investment. It is also evident from the analysis that while diversifying among stocks, a defensive strategy should be adopted to avoid major losses due to sudden crisis.

Thus, the present study guides one to construct portfolios with the most viable investible assets under each category of investment avenues, namely, mutual funds and shares, based on their risk and return characteristics, though there may be other factors like transaction cost, liquidity, investment horizon etc. affecting investors' investment choices. Hence, further studies may be carried out on portfolio construction considering such other aspects like transaction cost, liquidity etc. as well. Moreover, a primary survey among the investors may be done to gain an insight about the different situations and considerations faced by them, and to know which factors affect their portfolio choices.

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RESEARCH CHRONICLER

ANNEXURE I

LIST OF SELECTED MUTUAL FUNDS

S. No.	SAMPLE MUTUAL FUNDS	RANK (BY CRISIL AS ON MARCH 2013)
EQUITY FUND		
1.	Birla Sun Life Advantage Fund	5
2.	Birla Sun Life Dividend Yield Plus	2
3.	Birla Sun Life Equity Fund -Plan A	4
4.	Birla Sun Life Frontline Equity Fund	2
5.	Birla Sun Life India GenNext Fund	1
6.	Birla Sun Life Infrastructure Fund	3
7.	Birla Sun Life Midcap Fund	3
8.	Franklin India Opportunities Fund	4
9.	HSBC Progressive Themes Fund	5
10.	ICICI Prudential Discovery Fund-Regular	1
BALANCED FUND		
11.	Birla Sun Life 95 Fund-Plan A	3
12.	DSP BlackRock Balanced Fund	4
13.	HDFC Balanced Fund	2
14.	HDFC Prudence Fund	1
15.	ICICI Prudential Balanced Fund	2
16.	Kotak Balance	3
17.	UTI Balanced Fund	5
BOND FUND		
18.	DSP BlackRock Bond Fund	5
19.	HDFC High Interest Fund-Dynamic fund	3
20.	Kotak Bond	2
21.	LIC Nomura MF Bond Fund	4
22.	SBI Magnum Income Fund	2
23.	Templeton India Income Fund	4
24.	UTI Bond Fund	1

ANNEXURE II
LIST OF SELECTED STOCKS

CATEGORIES OF SAMPLE STOCKS	
S. No.	LARGE CAP
1.	Acc Ltd.
2.	Ambuja Cement
3.	Bharat Heavy Electricals Ltd.
4.	Cipla Ltd.
5.	Dr Reddy's Lab
6.	Gail India Ltd.
7.	Glaxo Smithkline Pharma
8.	Grasim Industries Ltd.
9.	HDFC
10.	HDFC Bank Ltd.
11.	Hero Motor Corporation
12.	Hindalco India Ltd.
13.	Hindustan Petroleum Corporation
14.	HUL
15.	ICICI Bank Ltd.
16.	IDBI Ltd.
17.	Infosys Ltd.
18.	ITC Ltd.
19.	Larsen and Toubro
20.	Mahindra & Mahindra
21.	Nestle India Ltd.
22.	ONGC Ltd.
23.	Reliance Infra Ltd.
24.	RIL & RPL
25.	SBI
26.	Sun Pharmaceuticals Industries
27.	Tata Chemicals
28.	Tata Motors Ltd.
29.	Tata Power Co. Ltd.
30.	Tata Steel
31.	Wipro Ltd.
32.	Zee Entertainments Ltd.
	MID CAP
33.	Indian Hotels Companies Ltd.
34.	Ranbaxy Laboratories (merged with Sun Pharmaceuticals in April 2015)
	SMALL CAP
35.	Mahanagar Telephone Nigam Ltd.
	MID CAP TO LARGE CAP
36.	Castrol India Ltd.
37.	Colgate Palmolive Ltd.
38.	Sesa Goa Ltd. (merged with Sesa Sterlite Ltd. in August 2013 and renamed as Vedanta Ltd. in 2015)
	SMALL CAP TO MID CAP
39.	NIIT Ltd.
40.	Novartis India Ltd.