

INVESTMENTS IN MUTUAL FUNDS DURING RECESSION AND POST-RECESSION PERIODS IN INDIAN CONTEXT- AN OPTIMIZATION

Sharmistha Ghosh*
Tanupa Chakraborty**

Abstract

In India, there are a lot of investment avenues available to investors. But when it comes to capital market investing, retail investors' participation is divided into active and passive ways of investing. The most appealing investment alternative for small investors is the Mutual Fund. Mutual funds provide a platform to common investors with low saving capacity to invest their funds in the capital market. The evaluation of performance of various mutual fund schemes becomes more complex for the retail investors in order to accommodate both the risk and return element while giving due importance to their investment objectives. With the changing market conditions, it may sometimes become difficult for the investors to earn a positive return consistently during all phases of market situation from a portfolio of mutual funds. In this paper, an attempt has been made to construct a well diversified portfolio of mutual funds with optimum weights assigned which may generate positive return during different phases of the market.

Keywords: Recession, Post- Recession, Weighted Portfolio, Mutual Funds.

JEL Classification: D53; G01; G11

1. Introduction

Mutual fund business started in India long back in 1963 with the formation of Unit Trust of India (UTI) at the initiative of Reserve Bank of India and Government of India. The first scheme was launched by UTI in units in 1964. Later, in 1987 public sector banks, and Life Insurance Corporation of India (LIC) and General Insurance Corporation (GIC) entered the mutual fund market. The year 1993 marked the entry of private sector funds in the mutual fund market. A new era started providing the investors with a wider choice of fund families. In this manner, with reforms in the financial market, mutual funds have emerged as an important avenue of investment. But fluctuations in the financial market often perplex the investors while making investment as mutual funds get affected by market risk for which investors may suffer

*Assistant Professor, Department of Commerce, Shri Shikshayatan College, Kolkata
E-mail: sghosh.2008@yahoo.in

**Associate Professor, Department of Commerce, University of Calcutta
E-mail: tanupachakraborty@gmail.com

reduced or negative return. In this context, a review of existing literature has been attempted in the following section to throw light on the research that has been conducted so far in relation to investors' decision on mutual fund investment.

2. Literature Review

Mutual funds have been a quite interesting area of research since few years. Recent academic research predicts that equity mutual funds have a systematically better performance during periods of economic downturn. Glode (2011) has shown both theoretically and empirically, that U.S. equity mutual funds have a systematically better performance during periods of economic downturn and that investors are willing to pay higher fund fees for this recession insurance. He goes 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), Staal (2006) and Kosowski (2011) have documented that U.S. equity mutual fund managers perform significantly better during economic downturns than during economic upturns. They stated that risk-adjusted performance of U.S. mutual funds is negatively correlated with the business cycle and that mutual fund alphas are 1- 3.5% p.a. higher in recessions than in expansions. On the contrary, Fink, Raatz and Weigert (2015) have tested the hypothesis using international fund data from 16 different countries, and surprisingly they obtained opposite results and found that mutual funds underperform by a statistically significant -0.4% during months of economic downturn. To add to it, Breloer et al. (2014) have found that a majority of international equity mutual funds exhibit significant exposure to country momentum or sector momentum indicating that these factors matter for risk-adjusted fund performance evaluation.

Jambodekar (1996) has 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 news papers and magazines are used as information sources with safety of principal amount and investor services as priority points for investing in mutual funds.

Likewise, several other research works have been done in this area, but, as yet, no published work on creation of a weighted portfolio of mutual funds to yield a positive return during different phases of market situation has appeared in literature. The present study aims at fulfilling this vacuum.

3. Research Objectives

- To construct weighted portfolios of mutual funds which are likely to generate positive returns in the recessionary period and post-recession period.
- To guide investors regarding different prospective mutual fund schemes to be included in the portfolio.

4. Methodology

4.1 Period of study

Based on the impact of recession, following sub- prime crisis, on the Indian stock market and its effect on BSE Sensex during the year 2007 to 2008, the period of study has been split into two phases. The first phase from January 2007 to December 2009 has been considered as the *recessionary phase* and the next phase from January 2010 to December 2013 as the *post- recession period* (end period restricted by non-availability of data).

4.2 Sample selection

CRISIL has ranked the mutual fund schemes as Consistent Performers from different categories namely Equity, Balanced and Bond fund. The sample for the study has been created taking first two funds from each rank 1 to rank 5 (except for which only one fund was ranked under the category) provided. As a result, 24 Mutual Fund schemes have been selected (refer *Annexure*) from across all the categories.

4.3 Data Type & Data Source

The daily NAV of the sample mutual fund schemes are collected from AMFI website and average monthly NAV is calculated for each scheme. As such, data have been considered for the Dividend category of each scheme and have been collected from the relevant website of Association of Mutual Funds of India (www.amfiindia.com).

4.4 Steps in Research

- a. Return for each scheme is calculated from the monthly NAV $[(P1 - P0)/P0]$ where, P1 is current NAV and P0 is initial NAV]
- b. Then, Descriptive Statistics of NAV return is calculated for each scheme.
- c. Finally, optimization programming is run in LINGO software using the following syntax:

```

SETS:
  ASSET: AMT, RET;
  COVMAT(ASSET, ASSET): VARIANCE;
ENDSETS
DATA:
  !Get the names of the Assets;
  ASSET= 'Asset.xls' , 'ASSETS_NAME' ) ;
  !Covariance matrix;
  VARIANCE = 'covariance.xls', 'COV_assets' ;
  RET = 'Return.xls', 'RET_assets' ;
  TARGET = 0.10;
ENDDATA
  ! Minimize the end-of-period variance in portfolio value;
  [VAR] MIN= @SUM( COVMAT( I, J): AMT( I)* AMT( J) * VARIANCE( I, J));
  ! Use exactly 100% of the starting budget;
  [BUDGET] @SUM(ASSET: AMT) = 1;
  ! Required wealth at end of period;
  [RETURN] @SUM( ASSET: AMT * RET) >= TARGET;
END

```

Where,

ASSET denotes the sample mutual fund schemes.

AMT denotes the weight to be assigned to schemes.

VARIANCE denotes the covariance in returns of the sample schemes.

RET denotes the mean return of the sample schemes.

COVMAT is the Covariance matrix of the sample schemes.

TARGET stands for the minimum return to be achieved from the portfolio.

d. In the light of Markowitz Principle, *Portfolio return* $[E(R_p) = w_1 E(R_1) + w_2 E(R_2) + \dots + w_n E(R_n)]$, where, w_1, w_2, \dots, w_n are the weights assigned to the n-number of individual schemes selected in the optimal portfolio by LINGO and R_1, R_2, \dots, R_n are the mean returns on such 'n' schemes] and *Portfolio risk* $(\sigma_p = \sqrt{w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + \dots + w_n^2 \sigma_n^2 + 2w_1 w_2 \sigma_1 \sigma_2 r_{12} + 2w_1 w_3 \sigma_1 \sigma_3 r_{13} + 2w_1 w_3 \sigma_1 \sigma_3 r_{23} + \dots + 2w_n w_{n-1} \sigma_n \sigma_{n-1} r_{n,n-1}})$, where, $\sigma_1, \sigma_2, \dots, \sigma_n$ are the standard deviations of n optimal schemes in the portfolio and $r_{12}, r_{13}, r_{23}, \dots, r_{n,n-1}$ are the correlations between the selected schemes in the portfolio) are determined for each phase to compare the same with individual return and risk of the optimal schemes and assess whether the benefit of diversification is achieved or not.

4.5 Software /Statistical Tools Used

For carrying out calculation of Descriptive Statistics, SPSS software and for optimization

programming, LINGO software have been used. MS-Excel has been used for carrying out different operations and drawing tables.

5. Analysis and findings

5.1 Recessionary phase (2007-2009)

The recessionary phase which has been considered for the purpose of study is the period during which BSE Sensex started showing a declining trend.

Table 1 depicts the descriptive statistics of the selected mutual fund NAV returns during this period. Birla Sun Life 95 (BSL95_PLNA) shows the highest mean return of 0.01129% while Birla Sun Life Midcap fund (BSL_MIDCAP) shows the greatest variance in return i.e. 0.012% and Kotak Bond (KOTAK_BOND) shows the lowest variance in return i.e. 0.0000143%.

Table 1: Descriptive Statistics of Mutual Fund NAV Returns (2007-2009)

MUTUAL FUND SCHEMES	N (months)	Minimum (%)	Maximum (%)	Mean (%)	Std. Deviation (%)	Variance (%)	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
EQUITY FUND										
BSL_ADV	36	-0.2161	0.2153	0.0061	0.0948	0.00899	0.112	0.393	0.567	0.768
BSL_IND_GNXT	36	-0.1684	0.1366	-0.0002	0.0749	0.00561	-0.11	0.393	-0.285	0.768
BSL_DIVYD PLUS	36	-0.1469	0.1639	0.0089	0.0718	0.00515	-0.136	0.393	-0.138	0.768
BSL_EQ-PLNA	36	-0.2131	0.2100	0.0036	0.0932	0.00869	0.073	0.393	0.139	0.768
BSLF_EQ	36	-0.1989	0.1993	0.0064	0.0841	0.00707	0.059	0.393	0.422	0.768
BSL_INFR A	36	-0.2337	0.2396	0.0086	0.1016	0.01031	-0.001	0.393	0.277	0.768
BSL_MIDCAP	36	-0.2414	0.2532	0.0071	0.1098	0.01205	-0.038	0.393	0.143	0.768

MUTUAL FUND SCHEMES	N (months)	Minimum (%)	Maximum (%)	Mean (%)	Std. Deviation (%)	Variance (%)	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
FI_OPPOR	36	-0.2133	0.1817	0.0007	0.0865	0.00747	-0.165	0.393	0.283	0.768
HSBC_PROG THEME	36	-0.2519	0.1380	-0.0002	0.0869	0.00756	-0.696	0.393	0.822	0.768
ICICI PRU_DISCO V-REG	36	-0.2645	0.2260	0.0056	0.0995	0.00990	-0.157	0.393	0.799	0.768
BALANCED FUND										
BSL95_PLN A	36	-0.1707	0.1670	0.0113	0.0731	0.00535	-0.373	0.393	0.621	0.768
DSP BLCKRK_BA L	36	-0.1423	0.1258	0.0044	0.0636	0.00404	-0.188	0.393	-0.32	0.768
HDFC_BAL	36	-0.2346	0.1502	0.0016	0.0760	0.00578	-0.719	0.393	1.678	0.768
HDFC_PRU	36	-0.1925	0.1673	0.0018	0.0819	0.00671	-0.731	0.393	0.581	0.768
ICICI PRU_BAL	36	-0.2432	0.1086	-0.0021	0.0676	0.00457	-1.301	0.393	3.3	0.768
KOTAK_BAL	36	-0.1585	0.1293	0.0024	0.0669	0.00448	-0.443	0.393	0.109	0.768
UTI_BAL	36	-0.1545	0.1161	0.0015	0.0633	0.00401	-0.343	0.393	-0.211	0.768
BOND FUND										
DSP BLCKRK_BO ND	36	-0.0380	0.0627	0.0006	0.0154	0.00024	1.296	0.393	7.7	0.768
HDFC_HIF- DYNMC	36	-0.0352	0.0941	0.0019	0.0202	0.00041	2.561	0.393	12.165	0.768

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MUTUAL FUND SCHEMES	N (months)	Minimum (%)	Maximum (%)	Mean (%)	Std. Deviation (%)	Variance (%)	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
KOTAK_BOND	36	-0.0072	0.0119	0.0000	0.0038	0.00001	1.448	0.393	3.724	0.768
LIC NOM_MF-BOND	36	-0.0153	0.0678	0.0013	0.0135	0.00018	3.575	0.393	17.159	0.768
SBI_MAG-INC	36	-0.0086	0.0234	0.0012	0.0061	0.00004	0.955	0.393	3.799	0.768
TEMP IND_INC	36	-0.0427	0.0388	0.0004	0.0134	0.00018	-0.336	0.393	3.384	0.768
UTI_BOND	36	-0.0379	0.0859	0.0011	0.0182	0.00033	2.593	0.393	13.676	0.768

Source: Computed by the researchers

Table 2 shows the weighted portfolio of mutual funds where only two schemes Kotak Bond (KOTAK_BOND) and SBI Magnum Income (SBI_MAG-INC), both from the bond family, constitute the optimum portfolio in LINGO, with Kotak Bond fund assigned the highest share which might be due to its lowest variance of return although it has 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 (as discussed in sub-section 4.4–d), and it is observed that the total return from the portfolio is positive during the recessionary period. Portfolio risk, as calculated in terms of standard deviation using Markowitz formula (discussed in sub-section 4.4–d), is also less than the individual risks of the constituent mutual fund schemes in the portfolio thereby providing benefit of diversification.

Table 2: Weighted Portfolio of Mutual Funds (2007-2009)

ASSETS	CATEGORY	WEIGHTS	MEAN NAV RETURN	RETURN	RISK
KOTAK_BOND	BOND	0.73	-0.000037	-0.000027	0.003788
SBI_MAG-INC	BOND	0.27	0.001241	0.000335	0.006065
Portfolio		1		0.000308	0.003294

Source: Computed by the researchers

5.2 Post-recession period(2010-2013)

After 2009, market again started to rise and based on such observation the post recession period has been assumed to be from 2010 to 2013.

Table 3 shows the descriptive statistics of sampled mutual fund NAV returns during this period. It is found that Birla Sun Life Frontline Equity Fund (BSLF_EQ) gives the highest mean return (0.0101%) with the greatest variance (0.0308%) in average returns as well. While Birla Sun Life Midcap (BSL_MIDCAP) has got the lowest mean return (-0.0045%), with Kotak Bond (KOTAK_BOND) fund having the lowest variance (0.000014%) in return. These observations are almost similar to those in recessionary period.

Table 3: Descriptive Statistics of Mutual Fund NAV Returns (2010-2013)

MUTUAL FUND SCHEMES	N (months)	Minimum (%)	Maximum (%)	Mean (%)	Std. Deviation (%)	Variance (%)	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
EQUITY FUND										
BSL_ADV	48	-0.1272	0.1101	0.0030	0.0466	0.0022	-0.206	0.343	0.069	0.674
BSL_IND_GNXT	48	-0.1262	0.0874	0.0047	0.0469	0.0022	-0.404	0.343	0.034	0.674
BSL_DIVYD PLUS	48	-0.0724	0.0834	0.0011	0.0402	0.0016	0.053	0.343	-0.895	0.674
BSL_EQ-PLNA	48	-0.0838	0.1029	0.0015	0.0456	0.0021	0.033	0.343	-0.790	0.674
BSLF_EQ	48	-0.4601	1.0710	0.0101	0.1756	0.0308	4.442	0.343	30.295	0.674
BSL_INFR A	48	-0.1187	0.1265	0.0041	0.0533	0.0028	-0.078	0.343	-0.445	0.674
BSL_MIDCAP	48	-0.1504	0.0988	0.0045	0.0552	0.0030	-0.889	0.343	1.002	0.674
FI_OPPOR	48	-0.0822	0.0983	0.0007	0.0421	0.0018	-0.070	0.343	-0.775	0.674
HSBC_PROG THEME	48	-0.1441	0.1873	0.0042	0.0654	0.0043	0.118	0.343	0.292	0.674
ICICI PRU_DISCOV-REG	48	-0.0864	0.1152	0.0029	0.0414	0.0017	0.093	0.343	-0.067	0.674

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MUTUAL FUND SCHEMES	N (months)	Minimum (%)	Maximum (%)	Mean (%)	Std. Deviation (%)	Variance (%)	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
BALANCED FUND										
BSL95_PLN A	48	-0.0883	0.0486	0.0011	0.0319	0.0010	-0.505	0.343	-0.226	0.674
DSP BLCKRK_BAL	48	-0.0694	0.0861	0.0016	0.0331	0.0011	0.038	0.343	-0.264	0.674
HDFC_BAL	48	-0.1010	0.0907	0.0012	0.0393	0.0015	-0.518	0.343	0.254	0.674
HDFC_PRU	48	-0.1320	0.0898	0.0021	0.0415	0.0017	-0.482	0.343	0.700	0.674
ICICI PRU_BAL	48	-0.0667	0.0823	0.0028	0.0317	0.0010	-0.167	0.343	-0.158	0.674
KOTAK_BAL	48	-0.1869	0.0719	0.0037	0.0388	0.0015	-2.186	0.343	9.629	0.674
UTI_BAL	48	-0.0569	0.0809	0.0025	0.0314	0.0010	-0.026	0.343	-0.574	0.674
BOND FUND										
DSP BLCKRK_BOND	48	-0.0327	0.0174	0.0005	0.0103	0.0001	-1.033	0.343	1.168	0.674
HDFC_HIF-DYNMC	48	-0.0307	0.0317	0.0002	0.0134	0.0002	-0.584	0.343	0.631	0.674
KOTAK_BOND	48	-0.0122	0.0121	0.0002	0.0039	0.000014	0.053	0.343	5.296	0.674
LIC NOM_MF-BOND	48	-0.0607	0.0209	0.0012	0.0158	0.0002	-2.137	0.343	5.072	0.674
SBI_MAG-INC	48	-0.0065	0.0106	0.0036	0.0045	0.0000	-0.719	0.343	-0.283	0.674
TEMP IND_INC	48	-0.0226	0.0153	0.0005	0.0074	0.0001	-1.200	0.343	1.792	0.674
UTI_BOND	48	-0.0229	0.0300	0.0013	0.0100	0.0001	-0.091	0.343	0.975	0.674

Source: Computed by the researchers

Considering the risk and return of the sample schemes, *Table 4* shows the weights assigned to schemes optimally selected in LINGO for earning a positive return on the portfolio. Maximum weight is assigned to Kotak Bond Fund (KOTAK_BOND) carrying the lowest individual risk but lowest mean NAV return among the other constituents of the portfolio as in the recessionary period. The next highest weight is assigned to SBI Magnum Income Fund from the Bond fund category, and the two Balanced funds – HDFC Balanced (HDFC_BAL) and ICICI Prudential Balanced (ICICI PRU_BAL) have very little share in LINGO's optimal portfolio. Portfolio return determined in the manner as discussed in sub-section 4.4-d is positive during this period as well. It can be observed that the optimal portfolio in post recession period is a combination of both Bond and Balanced funds, unlike recession period, with more weight being given to Bond Schemes. The portfolio risk is lower than all the individual risks of the constituent schemes thus providing benefit of diversification.

Table 4: Weighted Portfolio of Mutual Funds (2010-2013)

ASSETS	CATEGORY	WEIGHTS	MEAN NAV RETURN	RETURN	RISK
KOTAK_BOND	BOND	0.556	0.000159	0.000088	0.003865
SBI_MAG-INC	BOND	0.438	0.003573	0.001565	0.004457
HDFC_BAL	BALANCED	0.001	0.001243	0.000001	0.039270
ICICI PRU_BAL	BALANCED	0.005	0.002799	0.000014	0.031680
Portfolio		1		0.001668	0.002818

Source: Computed by the researchers

6. Conclusion

The above study has attempted to understand the risk return characteristics of the sample mutual fund schemes and thereby create a portfolio with them. It also makes sure that proper weight is assigned to the right fund to get included in the portfolio, so that it may yield a positive return during the different phases of the market. It may be noted that Kotak Bond Fund and DSP Blackrock Balanced fund are the funds which appear in the portfolio in both the market phases. It is also observed that maximum weight has been assigned to Kotak Bond Fund in both the periods which may be due to the lower variance in its return.

The above results suggest that it is possible to earn a positive return from a well diversified portfolio of mutual funds provided its risk return characteristics have been considered and optimum weight is assigned to the best alternative available. Hence, from the study investors may get an insight into the characteristics of different ranked schemes of mutual funds and their importance as a constituent of the portfolio.

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ANNEXURE: LIST OF SELECTED MUTUAL FUNDS

S. No.	SAMPLE MUTUAL FUNDS	ACRONYM
EQUITY FUND		
1.	Birla Sun Life Advantage Fund	BSL_ADV
2.	Birla Sun Life India GenNext Fund	BSL_IND_GNXT
3.	Birla Sun Life Dividend Yield Plus	BSL_DIV_YD PLUS
4.	Birla Sun Life Equity Fund -Plan A	BSL_EQ-PLN A
5.	Birla Sun Life Frontline Equity Fund	BSLF_EQ
6.	Birla Sun Life Infrastructure Fund	BSL_INFRA
7.	Birla Sun Life Midcap Fund	BSL_MIDCAP
8.	Franklin India Opportunities Fund	FI_OPPOR
9.	HSBC Progressive Themes Fund	HSBC_PROG THEME
10.	ICICI Prudential Discovery Fund-Regular	ICICI PRU_DISCOV-REG
BALANCED FUND		
11.	Birla Sun Life 95 Fund-Plan A	BSL95_PLN A
12.	DSP BlackRock Balanced Fund	DSP BLCKRK_BAL
13.	HDFC Balanced Fund	HDFC_BAL
14.	HDFC Prudence Fund	HDFC_PRU
15.	ICICI Prudential Balanced Fund	ICICI PRU_BAL
16.	Kotak Balance	KOTAK_BAL
17.	UTI Balanced Fund	UTI_BAL
BOND FUND		
18.	DSP BlackRock Bond Fund	DSP BLCKRK_BOND
19.	HDFC High Interest Fund-Dynamic fund	HDFC_HIF-DYNMC
20.	Kotak Bond	KOTAK_BOND
21.	LIC Nomura MF Bond Fund	LIC NOM_MF-BOND
22.	SBI Magnum Income Fund	SBI_MAG-INC
23.	Templeton India Income Fund	TEMP IND_INC
24.	UTI Bond Fund	UTI_BOND

