RESEARCH ARTICLE

MEASURING FUND PERFORMANCE USING MULTI-FACTOR MODELS: EVIDENCE FROM THE INDIAN MUTUAL FUNDS AND ULIP FUNDS.

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Manuscript Info	*Abstract*
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Performance evaluation of investments is of great concern to the investors especially when they have to forego their hard earned money in the form of fees for rendering professional fund management services. In this maiden study performance evaluation of equity-oriented Mutual Funds and Unit Linked Insurance Plan (ULIP) funds is done for the period April 2008 to March 2016. Multi factor models Fama & French Three Factor Model and Carhart Four Factor Model are used to evaluate the selected 80 mutual funds and 60 ULIP funds. It is found that mutual fund managers are adding significant value to the return generation, whereas the ULIP fund managers are not able to add significant value to the return generation.

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Introduction:-
India has emerged as the fastest growing major economy of the world. Economic growth has put more money in the hands of the people. This has led to increase household savings and investments which can be gauged from the fact that the gross financial savings have breached the Rs. 15 trillion in 2016. Reserve Bank of India's (RBI's) monetary easing policy is instigating decline in the interest rates, which is resulting into the waning of the allure of traditional investment avenues such as bank fixed deposits. On the other hand, the Indian equity markets represented by the benchmark indices S&P BSE Sensex and Nifty-50 are making their new all-time highs. In these equity investment friendly times, Mutual Funds and Unit Linked Insurance Plans (ULIPS) have emerged as tools that allow all types of investors, irrespective of risk profile and return horizon, to participate in the financial markets and benefit from India's growth story. But this will continue only if the expectations of the investors are duly met. The funds are required to continually outperform their benchmarks so that the large amount of expenses paid to the fund managers for professional fund management can be justified. Therefore, it is worth examining the performance of fund managers as a whole to see whether they provide value addition to portfolios or they are just sweeping benefits from investors. This poses a case of performance evaluation of these funds.

Review of Literature:-
Fund performance evaluation started with the focus on fund returns measurement in the form of absolute return, money-weighted return and time-weighted returns. Later, Sharpe [1], Lintner [2], [3] and Mossin [4] contributed the Capital Asset Pricing Model (CAPM) concentrating on the average return and variance. Then, M.C. Jensen (1967) gave a comprehensive indicator of fund performance (alpha) and concluded that the funds in his study were, on an average, not able to predict security prices well enough to outperform a buy-the market-and hold policy further

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concluded that there is very little evidence that any individual fund was able to do significantly better than that which we expected from mere random chance [5]. E. Fama (1970) developed a methodology for evaluating investment performance of managed portfolios by suggesting that the overall performance of managed portfolios could be broken down into several components. He argued that the observed return of a fund could be due to 'selectivity ability' i.e. ability of fund managers to pick up the best securities at a given level of risk and 'timing ability' i.e. due to the prediction of general market price movement [6]. Thereon, several researchers provided theoretical and empirical evidences that expected returns can be explained by more than one variable i.e. by using multifactor models. Stock returns are affected by many factors influencing the change in future cash flows and a five-factor model which included expected inflation, unexpected inflation, interest rate term structure, default premium and industrial production was proposed [7]. Elton et al. [8] suggested for a three-index model, including return on large stock, small stock and bond indexes. Fama and French put forward a 3-factor model comprising, the return on the market portfolio, firm size and book-to-market ratio [9]. In addition to Fama and French's three-factor model, Mark Cahart presented that fund managers employ momentum strategy in order to earn an abnormal return [10]. The momentum anomaly was pointed out in [11]. It was concluded that stocks which perform best over a period, tend to continue to perform well over a subsequent period, and if fund managers employ this phenomenon in order to earn abnormal returns, it should not be counted as value added. Subsequently, Carhart proposed his four-factor model which included one extra variable to capture the momentum anomaly in addition to 3 factors from Fama and French.

Empirical Literature Review:-
Many empirical studies attempted to get a better understanding and a more accurate assessment of the fund performance. A fund that outperforms the benchmark on an after-cost basis is considered to adding value for investors. Active fund managers believe that they have the ability to better estimate the true securities' risks and returns, to spot any mispriced securities, and to time the market, thus generating excess returns for the fund and adding value to the investors. Some of the important researches in this area are as discussed below:

Financial performance of five close-ended growth funds for the period February 1991 to August 1993 was evaluated and it was concluded that the performance was below average in terms of alpha values (all negative and statistically not significant) [12]. In the research [13] 191 mutual funds of New Zealand were studied from August 1991 to July 2001 by employing Fama and French and Carhart Models. It was established that New Zealand mutual funds underperformed the benchmark and performed poorly with negative Jensen's Alfa Values. One another study over the period 1975-2002 found that the average net return alpha was around 0.5% below the market benchmark and there were some fund managers who significantly outperformed the market [14]. Later, in a research [15] the performance of Greek equity fund managers for the period June 2001–December 2009 was evaluated using single and multi-factor risk-adjusted performance measures and found that the managers fail to demonstrate significant stock picking abilities resulting in repeated underperformance relative to benchmarks. Managers also fail even to justify the various expenses paid by them for active portfolio management services.

In a study on emerging markets 164 mutual funds of the Polish mutual fund industry were evaluated by using Carhart Model and it was concluded that Polish mutual funds on average were not able to add value, as indicated by their negative net alphas [16]. An important research on Portuguese markets got conducted and overall performance and market timing abilities of Portuguese equity funds investing in the domestic and in the European Union market, during the period of January 2000 to December 2007 were studied [17]. It was found that while National funds were neutral performers, European Union funds underperformed the market significantly. A major study in the south Asia in China, Singapore and Thailand for twelve years (2000 to 2011) was done by using Carhart four-factor model to determine whether any equity mutual funds significantly outperformed, or beat the market. The results showed that the chance for equity mutual funds to beat the market was very slim, but the chance that equity mutual funds performed poorer than their index performance was much higher [18]. A multifactor study in India [19] used Fama-French model and the Carhart model and suggested that fund managers did not add any value to the fund returns. The return generated by the funds, were due to the risk factors already considered in these models. It raised questions on the fund houses pocketing huge fees while not adding any significant value to the return. In an article it was concluded that the active managers could add value if they timed market-turns well but it was prohibitively difficult to identify these turns. Also active funds were charging far too much just for the market discovery and it was hard to believe that why the investors were paying such prices [20].

From the above literature, it can be seen that there is a dearth of literature available on ULIP fund performance, whereas mutual fund evaluation studies conclude that researchers reach contradictory conclusions while evaluating fund performance. But the majority of the researchers ascertained that portfolio managers are not able to out-perform the market. Through this paper, we try to apply two of the most accepted methodologies i.e. Fama & French Three Factor Model and Carhart Four Factor Model to evaluate the performance of Indian equity-oriented Mutual funds and ULIP funds.

Objectives of the Research:-
The performance of the mutual funds and the ULIP funds is evaluated through achieving the following main objectives:
i. To assess whether the mutual fund managers are adding any significant value to the return generation.
ii. To assess whether the ULIP fund managers are adding any significant value to the return generation.

Research Methodology:-
Research Design:-
The research followed is empirical in nature. Mutual Fund and ULIP fund daily NAVs data from April-2008 to March-2016 is used. NSE Nifty 50 has been chosen as the market benchmark index and daily closing data is acquired from the NSE website. '91 Day Treasury Bills' return is taken as the risk free rate and the data is obtained from the Reserve Bank of India (RBI) website. Only those funds which have a corpus size of more than 50 crore, at least 60% equity investment in its portfolio; and which are launched before April 1, 2008 are selected using a deliberate sampling method to make the study long term and robust.

Fama and French's Three Factor Model:-
Fama and French's three-factor unconditional model [6] was used to evaluate the performance of the sample of funds. In addition to a value-weighted market proxy, this model includes two additional risk factors, size (SMB) and book-to-market (HML). It is calculated as:

$$r_{pt} - r_{ft} = \alpha_{pt} + \beta p\ (r_{mt} - r_{ft})\} + sp(SMB) + hp(HML) + \varepsilon_t \qquad .....(1)$$

Where:
SMB - SMB denotes the size factor which reflects the difference between the returns on small stocks and the returns on big stocks. SMB is calculated as the average return difference of a small cap index, i.e. NIFTY Small Cap 50 and a large cap index, i.e. NIFTY 50.
HML - HML denotes the book-to-market-value factor which measures the difference between the returns of stocks with high book-to-market ratios and stocks with a low book-to-market ratio. It can be calculated by the return of the top 30% of stocks ranked by book-to-market minus the bottom 30% of stocks ranked by book-to-market ratio.

Carhart Four Factor Model:-
Carhart four-factor model [10] was used to evaluate the performance of the sample of funds. It considers an additional factor to the three-factor model of Fama and French, which is the momentum factor. It is calculated as:

$$r_{pt} - r_{ft} = \alpha_{pt} + \beta p\ (r_{mt} - r_{ft})\} + sp(SMB) + hp(HML) + piPR12m + \varepsilon_t \qquad .....(2)$$

where α_{pt} = Carhart's alpha measure for fund p $\varepsilon_{t,=}$ Error Term
PR12m = the momentum factor capturing Jegadeesh & Titman (1993) momentum anomaly is formed. We rank the sample securities at the end of t-1 on the basis of their 12m average returns and form two groups, i.e., P_1 & P_2 while P_1 includes top 30% of stocks on past performance, P_2 comprises of a bottom 30% of stocks. The equally-weighted daily returns are estimated for the year t and the return difference is calculated between the two portfolios. The portfolios are re-formed at the end of time 't' and the process is repeated on year to year basis.

Empirical Evidences:-
Performance Evaluation of Equity Based Mutual Funds using Fama & French Model:-
The regression analysis is utilized to obtain various coefficients has given below:

Table 1:- Fama & French Three Factor Model Regression Analysis Results for Mutual Funds

S. No.	Fund Name	Fama & French							
		Alfa	p Alfa	rm-rf	p rm-rf	SMB	p SMB	HML	p HML
1	Baroda Pioneer Growth	0.026	0.361	0.909	0.0000	0.0843	0.0000	-	0.0015

			6	9				0.0258	
2	Birla Sun Life (I) Opportunities	0.065	0.138	0.696	0.0000	0.2122	0.0000	0.0759	0.0000
3	Birla Sun Life Advantage	0.070	0.079	0.821	0.0000	0.1721	0.0000	-0.046	0.0000
4	Birla Sun Life Equity	0.064	0.075	0.829	0.0000	0.1714	0.0000	-0.044	0.0000
5	Birla Sun Life Frontline Eqt	0.073	0.024	0.872	0.0000	0.1105	0.0000	-0.043	0.0000
6	Birla Sun Life India GenNext	0.100	0.006	0.741	0.0000	0.2341	0.0000	-0.03	0.0177
7	Birla Sun Life International Eqt	0.005	0.875	0.792	0.0000	0.1379	0.0000	-0.002	0.9021
8	Birla Sun Life Top 100	0.070	0.033	0.863	0.0000	0.1141	0.0000	-0.066	0.0000
9	Birla SunLife Div. Yield Plus	0.095	0.002	0.760	0.0000	0.2500	0.0000	-0.124	0.0000
10	BNP Paribas Dividend Yield	0.090	0.003	0.811	0.0000	0.1735	0.0000	-0.069	0.0000
11	BNP Paribas Equity	0.037	0.171	0.895	0.0000	0.0798	0.0000	-0.024	0.0091
12	Can Robeco Equity Divers	0.067	0.032	0.865	0.0000	0.1292	0.0000	-0.068	0.0000
13	DSP-BR Equity	0.077	0.007	0.821	0.0000	0.2306	0.0000	-0.105	0.0000
14	DSP-BR Opportunities	0.062	0.018	0.877	0.0000	0.1536	0.0000	-0.045	0.0000
15	DSPBR Top 100 Equity	0.044	0.120	0.899	0.0000	0.0765	0.0000	-0.081	0.0000
16	DWS Alpha Equity	0.018	0.494	0.908	0.0000	0.0737	0.0000	0.0206	0.0105
17	DWS Investment Opportunity	0.011	0.677	0.872	0.0000	0.1443	0.0000	0.0160	0.0600
18	Franklin (I) Flexi Cap	0.082	0.007	0.868	0.0000	0.1437	0.0000	-0.022	0.0156
19	Franklin High Growth	0.094	0.004	0.824	0.0000	0.1987	0.0000	-0.003	0.7452
20	Franklin India Bluechip	0.050	0.055	0.919	0.0000	0.0471	0.0000	-0.011	0.1704
21	Franklin India Opportunities	0.034	0.228	0.900	0.0000	0.1025	0.0000	-0.020	0.0151
22	Franklin India Prima Plus	0.082	0.004	0.864	0.0000	0.1448	0.0000	-0.038	0.0000
23	HDFC Capital Builder	0.075	0.007	0.858	0.0000	0.1514	0.0000	-0.049	0.0000
24	HDFC Core & Satellite	0.062	0.079	0.816	0.0000	0.2002	0.0000	-0.069	0.0000
25	HDFC Equity	0.086	0.006	0.864	0.0000	0.1584	0.0000	-0.089	0.0000
26	HDFC Growth	0.048	0.086	0.879	0.0000	0.1405	0.0000	-0.068	0.0000
27	HDFC Large Cap	0.002	0.942	0.893	0.0000	0.0944	0.0000	0.0137	0.1075
28	HDFC Premier MultiCap	0.052	0.133	0.829	0.0000	0.1779	0.0000	-0.081	0.0000
29	HDFC Small and Mid Cap	0.075	0.012	0.856	0.0000	0.1705	0.0000	-0.011	0.2326
30	HDFC Top 200	0.068	0.021	0.906	0.0000	0.0918	0.0000	-0.079	0.0000
31	HSBC Equity	0.006	0.836	0.905	0.0000	0.0757	0.0000	-0.035	0.0001
32	HSBC India Opportunities	0.037	0.172	0.871	0.0000	0.1355	0.0000	-0.029	0.0011
33	ICICI Pru Dynamic Plan	0.057	0.028	0.846	0.0000	0.1599	0.0000	0.0285	0.0025
34	ICICI Pru Exports & Other Serv.	0.063	0.084	0.800	0.0000	0.1367	0.0000	0.0879	0.0000
35	ICICI Pru Indo Asia Equity	0.032	0.378	0.739	0.0000	0.1435	0.0000	0.1054	0.0000
36	ICICI Pru Value Discovery	0.151	0.000	0.724	0.0000	0.3310	0.0000	-0.001	0.9582
37	ICICI Prudential Multicap	0.048	0.086	0.894	0.0000	0.0986	0.0000	-0.001	0.9094
38	ICICI Prudential Top 100	0.038	0.177	0.907	0.0000	0.0542	0.0000	0.0091	0.2896
39	IDFC Classic Equity	0.007	0.826	0.863	0.0000	0.1286	0.0000	-0.003	0.7599
40	Imperial Equity	0.003	0.919	0.923	0.0000	0.0203	0.0214	-0.005	0.5951
41	JPMorgan India Equity	0.031	0.237	0.911	0.0000	0.0779	0.0000	0.0076	0.3366
42	Kotak 50	0.030	0.279	0.909	0.0000	0.0650	0.0000	-0.024	0.0056
43	Kotak Classic Equity	0.048	0.087	0.866	0.0000	0.1446	0.0000	-0.051	0.0000
44	Kotak Opportunities	0.048	.0931	.8752	.00000	0.1454	0.0000	-0.015	0.0781
45	L&T Equity	0.061	0.012	0.909	0.0000	0.0993	0.0000	-0.035	0.0000
46	L&T India Large Cap	0.058	0.021	0.904	0.0000	0.0996	0.0000	-0.031	0.0002
47	L&T India Special Situations	0.078	0.009	0.837	0.0000	0.1960	0.0000	-0.047	0.0000
48	LIC NOMURA Equity	0.014	0.659	0.894	0.0000	0.0945	0.0000	-0.037	0.0000
49	LIC NOMURA Growth	0.011	0.871	0.447	0.0000	0.0251	0.2276	0.1053	0.0000
50	Mirae (I) Opportunities	0.100	0.000	0.867	0.0000	0.1711	0.0000	0.0103	0.2032
51	Principal Dividend Yield	0.047	0.117	0.814	0.0000	0.2210	0.0000	-0.084	0.0000

52	Principal Growth	0.029	0.296	0.854	0.0000	0.1938	0.0000	-0.029	0.0006
53	Principal Large Cap	0.046	0.093	0.891	0.0000	0.1110	0.0000	0.0103	0.2151
54	Quantum Long-Term Equity	0.085	0.016	0.812	0.0000	0.1077	0.0000	-0.083	0.0000
55	Reliance Eqt Opportunities	0.107	0.001	0.814	0.0000	0.2236	0.0000	-0.035	0.0004
56	Reliance Focused Large Cap	0.024	0.401	0.865	0.0000	0.1599	0.0000	-0.091	0.0000
57	Reliance Growth	0.074	0.009	0.800	0.0000	0.2811	0.0000	-0.067	0.0000
58	Reliance RSF - Equity	0.076	0.013	0.806	0.0000	0.2664	0.0000	-0.051	0.0000
59	Reliance Top 200	0.050	0.078	0.903	0.0000	0.0905	0.0000	-0.014	0.0854
60	Reliance Vision	0.054	0.077	0.866	0.0000	0.1490	0.0000	-0.096	0.0000
61	Religare Invesco Contra	0.097	0.003	0.797	0.0000	0.2112	0.0000	-0.071	0.0000
62	Religare Invesco Growth	0.042	0.155	0.862	0.0000	0.0961	0.0000	-0.019	0.0548
63	SBI Blue Chip	0.056	0.037	0.886	0.0000	0.1283	0.0000	-0.030	0.0004
64	SBI Contra	0.033	0.237	0.864	0.0000	0.1621	0.0000	-0.037	0.0000
65	SBI Magnum Equity	0.053	0.070	0.889	0.0000	0.1022	0.0000	-0.043	0.0000
66	SBI Magnum Multicap	0.045	0.117	0.866	0.0000	0.1627	0.0000	-0.032	0.0003
67	SBI Magnum Multiplier	0.079	0.007	0.821	0.0000	0.2181	0.0000	-0.074	0.0000
68	Sundaram Equity Multiplier	0.031	0.617	0.566	0.0000	0.0888	0.0000	0.0265	0.1475
69	Sundaram Growth	-0.03	0.691	0.221	0.0000	0.0110	0.6297	0.1393	0.0000
70	Sundaram Rural India	0.037	0.528	0.571	0.0000	0.1414	0.0000	0.0486	0.0060
71	Sundaram Select Focus	0.039	0.604	0.204	0.0000	0.1501	0.0000	-0.093	0.0000
72	Tata Equity Opportunities	0.048	0.090	0.839	0.0000	0.2000	0.0000	-0.018	0.0502
73	Tata Equity PE	0.087	0.007	0.791	0.0000	0.2527	0.0000	-0.067	0.0000
74	Tata Ethical	0.044	0.140	0.773	0.0000	0.2213	0.0000	0.1102	0.0000
75	Tata Pure Equity	0.045	0.082	0.896	0.0000	0.1065	0.0000	-0.032	0.0001
76	Taurus Star Share	0.032	0.350	0.823	0.0000	0.2178	0.0000	-0.026	0.0072
77	Templeton India Growth	0.053	0.099	0.836	0.0000	0.1692	0.0000	-0.024	0.0176
78	UTI Dividend Yield	0.054	0.037	0.901	0.0000	0.0632	0.0000	-0.083	0.0000
79	UTI Equity	0.067	0.006	0.892	0.0000	0.1060	0.0000	-0.054	0.0000
80	UTI India Lifestyle	0.044	0.087	0.891	0.0000	0.0897	0.0000	-0.083	0.0000
81	UTI Mastershare	0.034	0.172	0.922	0.0000	0.0421	0.0000	-0.029	0.0006
82	UTI MNC	0.131	0.000	0.708	0.0000	0.2360	0.0000	-0.008	0.5765
83	UTI Opportunities	0.064	0.021	0.895	0.0000	0.0741	0.0000	-0.041	0.0000
84	UTI Top 100	0.023	0.396	0.904	0.0000	0.0688	0.0000	-0.025	0.0047
Mean		0.05547		0.827		0.14161		-0.027	

From the Table 1 it can be detected that 83 of the selected mutual funds in the sample have positive alphas. Only Sundaram Growth Fund shows a negative alpha value. These positive alphas values mean that the equity based mutual fund managers are not merely allocating the Assets Under Management (AUMs) to diversify their portfolios but are also adding value to their respective fund portfolios. Furthermore, it can be observed out of these 83 funds only 33 funds have significant alpha values(p values less than .05 at 5% significance level), while the others are insignificant. So, it can be concluded that only these thirty three funds are making profits in excess of returns on a market index.

Furthermore, it can be observed that in the case of equity based mutual funds excess market returns have a significant impact on the mutual fund returns since the 'rm-rf' is 0.8267 with all the corresponding p-values less than 0.05. For example Baroda Pioneer Growth Fund has an 'rm-rf' beta coefficient of 0.9099 and p=0 i.e. <0.05(At 5% Significance Level). The size factor SMB with a small mean value of 0.1416 has not have very big impact, but it's significant (82 of 84 funds having p<0.05). Here, Baroda Pioneer Growth Fund with SMB 0.0843(p<0.05) has significant size factor. Similarly, the value factor HML with -0.0267 mean value, have a smaller magnitude but significant impact (64 of 84 funds showing p< 0.05). Baroda Pioneer Growth Fund has significant HML factor of -0.0258(p=0.0015 < 0.05). With R^2 value of 0.833 it can be inferred that 83.3 % of returns generated were because of the market movements, size and value factors only. The rest of the returns were due to other factors which are not included in the Fama and French Three Factor model.

Performance Evaluation of Equity Based ULIP Funds using Fama & French Model
The regression analysis is utilized to obtain various coefficients as given below in the table:

Table 2:- Fama & French Three Factor Model Regression Analysis Results for ULIP Funds

S. No.	Fund Name	Fama & French							
		Alfa	p Alfa	rm-rf	p rm-rf	SMB	p SMB	HML	p HML
1	Aviva Enhancer	0.053	0.429	-0.00219	0.925	0.26008	0.000	0.04060	0.067
2	Aviva Growth	0.011	0.829	-0.01118	0.631	0.26668	0.000	0.04656	0.035
3	Aviva Index	0.043	0.596	0.00816	0.727	0.24150	0.000	0.05057	0.023
4	Bajaj Asset Allocation	0.041	0.264	0.00885	0.706	0.22584	0.000	0.01354	0.545
5	Bajaj Equity Growth	0.047	0.491	0.01067	0.648	0.24278	0.000	0.05816	0.009
6	Bajaj Equity Growth Pension	0.074	0.279	0.00804	0.730	0.24779	0.000	0.06558	0.003
7	Bajaj Equity Index	0.040	0.622	0.01517	0.516	0.23926	0.000	0.05548	0.013
8	Bajaj Equity Index II	0.036	0.662	0.01653	0.480	0.23121	0.000	0.05867	0.008
9	Bajaj Equity Index Pension	0.044	0.589	0.01397	0.549	0.24298	0.000	0.05326	0.017
10	Bajaj Equity Index Pension II	0.040	0.622	0.01083	0.643	0.24144	0.000	0.05421	0.015
11	Bajaj Pure Stock	0.095	0.096	-0.00632	0.787	0.23475	0.000	0.06909	0.002
12	Bharti Axa Grow Money	0.041	0.628	0.01675	0.488	0.00432	0.856	-0.01315	0.567
13	Bharti Axa Grow Money Pension	0.049	0.527	0.11778	0.000	0.17397	0.000	0.01880	0.399
14	Birla Sun Life Multiplier	0.107	0.125	-0.05108	0.026	0.31866	0.000	0.04355	0.046
15	Birla Sun Life Magnifier	0.044	0.522	-0.01131	0.626	0.27080	0.000	0.04533	0.040
16	Birla Sun Life Maximiser	0.054	0.482	-0.00404	0.862	0.27010	0.000	0.03694	0.095
17	Birla Sun Life Plan 1	0.020	0.733	-0.00576	0.805	0.24381	0.000	0.04556	0.041
18	Exide Life Equity	0.031	0.671	0.00161	0.945	0.25612	0.000	0.04871	0.028
19	HDFC Equity Managed	0.131	0.000	0.70798	0.000	0.23602	0.000	-0.00750	0.577
20	HDFC Equity Managed II	0.070	0.248	-0.01200	0.606	0.26318	0.000	0.04647	0.036
21	HDFC Equity Managed Pension	0.065	0.293	-0.01097	0.637	0.27522	0.000	0.01834	0.407
22	HDFC Growth	0.061	0.386	-0.01008	0.664	0.27245	0.000	0.01956	0.376
23	HDFC Growth II	0.048	0.49	-	0.84	0.2661	0.000	0.01679	0.44

#	Name								
			4	0.00456	5	2	0		8
24	HDFC Growth Pension	0.061	0.388	-0.01161	0.617	0.2794	0.000	0.01987	0.369
25	ICICI Pru Pension Flexi Growth	0.047	0.466	-0.00660	0.777	0.2662	0.000	0.04143	0.061
26	ICICI Pru Pension Maximiser	0.055	0.451	0.01421	0.542	0.2469	0.000	0.04827	0.030
27	ICICI Pru Pension Multiplier II	0.036	0.629	0.01859	0.426	0.2370	0.000	0.05714	0.010
28	ICICI Pru Pension Flexi Growth II	0.057	0.380	-0.00814	0.726	0.2668	0.000	0.04087	0.065
29	ICICI Prudential Flexi Growth	0.070	0.248	-0.01200	0.606	0.2631	0.000	0.04647	0.036
30	ICICI Prudential Flexi Growth IV	0.053	0.414	-0.00262	0.910	0.2643	0.000	0.04030	0.069
31	ICICI Prudential Multiplier II	0.049	0.500	0.01180	0.613	0.2439	0.000	0.06035	0.007
32	ICICI Prudential Pension Rich	0.055	0.412	0.00785	0.736	0.2537	0.000	0.05039	0.023
33	ICICI Prudential Flexi Growth II	0.053	0.412	-0.00310	0.894	0.2642	0.000	0.03843	0.083
34	ICICI Prudential Maximiser II	0.065	0.379	0.01535	0.511	0.2449	0.000	0.04720	0.034
35	ICICI Prudential Pension Rich II	0.062	0.357	0.00508	0.828	0.2541	0.000	0.05145	0.020
36	Kotak Agressive Growth	0.058	0.428	0.00515	0.826	0.2445	0.000	0.03921	0.078
37	Kotak Dynamic	0.030	0.599	0.01367	0.560	0.2304	0.000	0.04562	0.041
38	LIC Growth	0.017	0.739	0.00394	0.867	0.2353	0.000	0.02550	0.253
39	Max Life Growth	0.020	0.638	0.01672	0.475	0.2325	0.000	0.04240	0.057
40	PNB Metlife Accelerator	0.019	0.746	0.02605	0.265	0.2372	0.000	0.04625	0.038
41	PNB Metlife Multiplier	0.024	0.741	0.02251	0.335	0.2405	0.000	0.04765	0.032
42	PNB Metlife Virtue	0.033	0.621	-0.00020	0.993	0.2569	0.000	0.07059	0.001
43	Reliance Life Equity	0.048	0.496	0.00870	0.709	0.2443	0.000	0.04987	0.025
44	Reliance Life Pension Equity	0.048	0.497	0.00933	0.690	0.2433	0.000	0.04885	0.028
45	Reliance Life Super	0.034	0.548	0.01187	0.611	0.2440	0.000	0.04558	0.040
46	SBI Equity	0.023	0.781	0.31355	0.000	0.07938	0.000	0.18852	0.000
47	SBI Equity Optimiser	0.004	0.963	0.33102	0.000	0.09493	0.000	0.20840	0.000
48	SBI Equity Optimiser Pension	0.003	0.972	0.33007	0.000	0.09375	0.000	0.20827	0.000
49	SBI Equity Pension	0.014	0.865	0.31148	0.000	0.08826	0.000	0.19005	0.000
50	SBI Growth	-0.017	0.804	0.34578	0.000	0.09167	0.000	0.23828	0.000

51	SBI Growth Pension	-0.001	0.984	0.34520	0.000	0.10212	0.000	0.22314	0.000
52	Shriram Accelerator	0.030	0.700	0.00487	0.834	0.25634	0.000	0.05348	0.016
53	Shriram Maximas	0.023	0.653	0.00465	0.841	0.26160	0.000	0.05100	0.021
54	Shriram Wealth Creator	0.025	0.748	0.00578	0.804	0.25361	0.000	0.04905	0.027
55	Tata Aggressive Growth	0.031	0.516	0.00660	0.778	0.24602	0.000	-0.01654	0.457
56	Tata Equity	0.032	0.661	0.00192	0.935	0.24680	0.000	-0.01274	0.567
57	Tata Future Equity Pension	0.059	0.402	-0.00366	0.876	0.25134	0.000	-0.01680	0.450
58	Tata Growth	0.020	0.679	0.00777	0.740	0.24374	0.000	-0.01342	0.547
59	Tata Large Cap	0.056	0.429	-0.00402	0.863	0.25128	0.000	-0.01579	0.478
60	Tata Whole Life Aggressive	0.046	0.317	0.00251	0.915	0.24879	0.000	-0.02056	0.355
Mean		0.04		0.05		0.23		0.05	

Table 2 shows that out of selected 60 unit linked insurance plan funds, 58 have positive alpha values. Only two funds i.e. SBI Growth Fund and SBI Growth Pension Fund show a negative alpha value. So, the fund managers are adding value to their respective fund portfolios. Moreover, it can be witnessed that out of these 58 funds only one fund, HDFC Equity Managed Fund has the significant alpha value (p values less than .05 at 5% significance level), while all the others have insignificant ones. So, it can be established that most of the ULIP funds are not making profits in excess of returns on a market index.

It can also be noticed that in the case of equity based ULIP funds excess market returns have non-significant impact on the mutual fund returns since the mean 'rm-rf' beta coefficient is 0.0493 with 51 of the 60 corresponding p-values greater than 0.05. For example Aviva Enhancer Fund has an 'rm-rf' beta coefficient of -0.00219 and p=0.925 i.e. > 0.05(At 5% Significance Level). The size factor SMB with a mean value of 0.23 is significant (59 of 60 selected funds having p<0.05). Here, Aviva Enhancer Fund with SMB 0.26 (p<0.05) has significant size factor. Similarly, the value factor HML with 0.0534 mean value, have a smaller magnitude but significant impact (36 of 60 funds showing p< 0.05). But Aviva Enhancer Fund has non-significant HML factor of 0.0406 (p> 0.05). With R^2 value of 0.062 it can be inferred that just 6.2 % of returns generated were because of the market movements, size and value factors only. Therefore, the ULIP fund returns were due to many other factors which are not accounted for in the Fama and French Three Factor model.

Performance Evaluation of Equity Based Mutual Funds using Carhart Model
The regression analysis is utilized to obtain various coefficients as given in the forthcoming table:

Table 3:- Carhart Four Factor Model Regression Analysis Results for Mutual Funds

S. No.	Fund Name	Carhart Model									
		Alfa	p-Alfa	rm-rf	p-rm-rf	SMB	p-SMB	HML	p-HML	PRIM	p-PRIM
1	Baroda Pioneer Growth	0.026	0.350	0.909	0.00	0.084	0.00	-0.026	0.00	-0.010	0.20
2	Birla Sun Life (I) Opportunities	0.065	0.138	0.696	0.00	0.212	0.00	0.076	0.00	0.001	0.91
3	Birla Sun Life Advantage	0.071	0.077	0.821	0.00	0.172	0.00	-0.046	0.00	-0.007	0.53
4	Birla Sun Life Equity	0.065	0.07	0.82	0.0	0.17	0.0	-	0.0	-	0.2

			2	8	0	1	0	0.045	0	0.012	6
5	Birla Sun Life Frontline Eqt	0.073	0.023	0.871	0.000	0.110	0.000	-0.043	0.000	-0.009	0.32
6	Birla Sun Life India GenNext	0.101	0.005	0.740	0.000	0.234	0.000	-0.030	0.02	-0.009	0.49
7	Birla Sun Life International Eqt	0.005	0.875	0.792	0.000	0.138	0.000	-0.002	0.90	0.000	1.00
8	Birla Sun Life Top 100	0.071	0.031	0.862	0.000	0.114	0.000	-0.066	0.00	-0.012	0.24
9	Birla SunLife Div. Yield Plus	0.095	0.002	0.760	0.000	0.250	0.000	-0.124	0.00	-0.003	0.77
10	BNP Paribas Dividend Yield	0.090	0.003	0.810	0.000	0.173	0.000	-0.070	0.00	-0.002	0.86
11	BNP Paribas Equity	0.037	0.168	0.895	0.000	0.080	0.000	-0.024	0.01	-0.004	0.62
12	Can Robeco Equity Divers	0.068	0.030	0.864	0.000	0.129	0.000	-0.068	0.00	-0.012	0.21
13	DSP-BR Equity	0.077	0.007	0.820	0.000	0.231	0.000	-0.105	0.00	-0.007	0.48
14	DSP-BR Opportunities	0.063	0.017	0.876	0.000	0.153	0.000	-0.045	0.00	-0.012	0.16
15	DSPBR Top 100 Equity	0.045	0.114	0.899	0.000	0.076	0.000	-0.081	0.00	-0.013	0.17
16	DWS Alpha Equity	0.018	0.487	0.907	0.000	0.074	0.000	0.021	0.01	-0.005	0.55
17	DWS Investment Opportunity	0.012	0.669	0.871	0.000	0.144	0.000	0.016	0.06	-0.005	0.55
18	Franklin (I) Flexi Cap	0.083	0.006	0.867	0.000	0.144	0.000	-0.022	0.01	-0.013	0.14
19	Franklin High Growth	0.095	0.004	0.824	0.000	0.199	0.000	-0.003	0.74	-0.004	0.71
20	Franklin India Bluechip	0.051	0.052	0.919	0.000	0.047	0.000	-0.011	0.16	-0.012	0.15
21	Franklin India Opportunities	0.035	0.214	0.899	0.000	0.102	0.000	-0.020	0.01	-0.016	0.05
22	Franklin India Prima Plus	0.083	0.004	0.863	0.000	0.145	0.000	-0.038	0.00	-0.013	0.16
23	HDFC Capital Builder	0.076	0.007	0.857	0.000	0.151	0.000	-0.049	0.00	-0.009	0.32
24	HDFC Core & Satellite	0.062	0.078	0.816	0.000	0.200	0.000	-0.070	0.00	-0.006	0.56
25	HDFC Equity	0.087	0.006	0.864	0.000	0.158	0.000	-0.089	0.00	-0.010	0.27
26	HDFC Growth	0.048	0.083	0.879	0.000	0.140	0.000	-0.068	0.00	-0.009	0.32
27	HDFC Large Cap	0.002	0.939	0.893	0.000	0.094	0.000	0.014	0.11	-0.001	0.88
28	HDFC Premier MultiCap	0.053	0.127	0.828	0.000	0.178	0.000	-0.081	0.00	-0.012	0.25
29	HDFC Small and Mid Cap	0.076	0.011	0.854	0.000	0.170	0.000	-0.011	0.22	-0.016	0.07
30	HDFC Top 200	0.069	0.020	0.905	0.000	0.092	0.000	-0.079	0.00	-0.011	0.17
31	HSBC Equity	0.006	0.827	0.904	0.000	0.076	0.000	-0.035	0.00	-0.005	0.54

32	HSBC India Opportunities	0.038	0.167	0.870	0.00	0.135	0.00	-0.030	0.00	-0.008	0.37
33	ICICI Pru Dynamic Plan	0.057	0.027	0.845	0.00	0.160	0.00	0.028	0.00	-0.011	0.26
34	ICICI Pru Exports & Other Serv.	0.064	0.081	0.799	0.00	0.137	0.00	0.088	0.00	-0.013	0.24
35	ICICI Pru Indo Asia Equity	0.032	0.370	0.738	0.00	0.143	0.00	0.105	0.00	-0.012	0.35
36	ICICI Pru Value Discovery	0.152	0.000	0.723	0.00	0.331	0.00	-0.001	0.95	-0.010	0.34
37	ICICI Prudential Multicap	0.049	0.082	0.893	0.00	0.098	0.00	-0.001	0.89	-0.012	0.16
38	ICICI Prudential Top 100	0.039	0.173	0.907	0.00	0.054	0.00	0.009	0.29	-0.007	0.43
39	IDFC Classic Equity	0.007	0.814	0.863	0.00	0.129	0.00	-0.003	0.75	-0.008	0.40
40	Imperial Equity	0.003	0.911	0.922	0.00	0.020	0.02	-0.005	0.59	-0.005	0.54
41	JPMorgan India Equity	0.032	0.231	0.911	0.00	0.078	0.00	0.007	0.34	-0.007	0.38
42	Kotak 50	0.030	0.274	0.908	0.00	0.065	0.00	-0.024	0.01	-0.006	0.51
43	Kotak Classic Equity	0.048	0.084	0.866	0.00	0.145	0.00	-0.051	0.00	-0.009	0.34
44	Kotak Opportunities	0.049	0.089	0.874	0.00	0.145	0.00	-0.015	0.07	-0.010	0.23
45	L&T Equity	0.061	0.011	0.907	0.00	0.099	0.00	-0.035	0.00	-0.014	0.08
46	L&T India Large Cap	0.059	0.020	0.903	0.00	0.100	0.00	-0.031	0.00	-0.011	0.17
47	L&T India Special Situations	0.079	0.009	0.836	0.00	0.196	0.00	-0.047	0.00	-0.011	0.22
48	LIC NOMURA Equity	0.014	0.649	0.893	0.00	0.094	0.00	-0.037	0.00	-0.007	0.42
49	LIC NOMURA Growth	0.012	0.865	0.446	0.00	0.025	0.23	0.105	0.00	-0.009	0.66
50	Mirae (I) Opportunities	0.100	0.000	0.866	0.00	0.171	0.00	0.010	0.21	-0.011	0.18
51	Principal Dividend Yield	0.048	0.111	0.813	0.00	0.221	0.00	-0.084	0.00	-0.013	0.20
52	Principal Growth	0.030	0.283	0.853	0.00	0.194	0.00	-0.030	0.00	-0.013	0.13
53	Principal Large Cap	0.046	0.089	0.890	0.00	0.111	0.00	0.010	0.22	-0.010	0.24
54	Quantum Long-Term Equity	0.086	0.015	0.811	0.00	0.108	0.00	-0.083	0.00	-0.017	0.17
55	Reliance Eqt Opportunities	0.108	0.000	0.813	0.00	0.223	0.00	-0.035	0.00	-0.015	0.13
56	Reliance Focused Large Cap	0.024	0.398	0.865	0.00	0.160	0.00	-0.091	0.00	-0.003	0.76
57	Reliance Growth	0.074	0.010	0.800	0.00	0.281	0.00	-0.067	0.00	-0.002	0.85
58	Reliance RSF - Equity	0.076	0.012	0.805	0.00	0.266	0.00	-0.051	0.00	-0.011	0.24
59	Reliance Top 200	0.051	0.07	0.90	0.00	0.09	0.00	-	0.00	-	0.2

No.	Fund Name										
			5	2	0	0	0	0.014	8	0.009	8
60	Reliance Vision	0.055	0.074	0.866	0.00	0.149	0.00	-0.096	0.00	-0.007	0.45
61	Religare Invesco Contra	0.098	0.003	0.796	0.00	0.211	0.00	-0.071	0.00	-0.008	0.46
62	Religare Invesco Growth	0.042	0.150	0.861	0.00	0.096	0.00	-0.020	0.05	-0.008	0.42
63	SBI Blue Chip	0.057	0.036	0.886	0.00	0.128	0.00	-0.030	0.00	-0.008	0.36
64	SBI Contra	0.033	0.232	0.864	0.00	0.162	0.00	-0.037	0.00	-0.006	0.49
65	SBI Magnum Equity	0.053	0.068	0.889	0.00	0.102	0.00	-0.043	0.00	-0.008	0.38
66	SBI Magnum Multicap	0.045	0.116	0.866	0.00	0.163	0.00	-0.032	0.00	-0.002	0.84
67	SBI Magnum Multiplier	0.080	0.007	0.820	0.00	0.218	0.00	-0.074	0.00	-0.010	0.28
68	Sundaram Equity Multiplier	0.031	0.616	0.566	0.00	0.089	0.00	0.026	0.15	-0.002	0.91
69	Sundaram Growth	-0.032	0.684	0.222	0.00	0.011	0.63	0.139	0.00	0.012	0.57
70	Sundaram Rural India	0.037	0.524	0.571	0.00	0.141	0.00	0.049	0.01	-0.006	0.72
71	Sundaram Select Focus	0.040	0.602	0.203	0.00	0.150	0.00	-0.093	0.00	-0.003	0.88
72	Tata Equity Opportunities	0.049	0.088	0.839	0.00	0.200	0.00	-0.018	0.05	-0.007	0.45
73	Tata Equity PE	0.088	0.006	0.790	0.00	0.253	0.00	-0.067	0.00	-0.013	0.19
74	Tata Ethical	0.044	0.140	0.773	0.00	0.221	0.00	0.110	0.00	-0.003	0.74
75	Tata Pure Equity	0.046	0.078	0.896	0.00	0.106	0.00	-0.032	0.00	-0.011	0.20
76	Taurus Star Share	0.033	0.337	0.822	0.00	0.218	0.00	-0.026	0.01	-0.013	0.15
77	Templeton India Growth	0.054	0.093	0.835	0.00	0.169	0.00	-0.024	0.02	-0.015	0.13
78	UTI Dividend Yield	0.054	0.036	0.900	0.00	0.063	0.00	-0.083	0.00	-0.005	0.56
79	UTI Equity	0.067	0.006	0.892	0.00	0.106	0.00	-0.054	0.00	-0.007	0.42
80	UTI India Lifestyle	0.045	0.086	0.891	0.00	0.090	0.00	-0.083	0.00	-0.003	0.72
81	UTI Mastershare	0.034	0.167	0.922	0.00	0.042	0.00	-0.029	0.00	-0.008	0.35
82	UTI MNC	0.132	0.000	0.707	0.00	0.236	0.00	-0.008	0.57	-0.010	0.44
83	UTI Opportunities	0.064	0.021	0.895	0.00	0.074	0.00	-0.041	0.00	-0.006	0.53
84	UTI Top 100	0.023	0.395	0.904	0.00	0.069	0.00	-0.025	0.00	-0.001	0.87
Mean		0.054		0.826		0.142		-0.027		-0.008	

From table 3 it can be inferred that 83 funds have positive alpha values when Carhart four factor model is used. Only Sundaram Growth Fund has shown a negative alpha value. So, the fund managers are adding value to their

respective fund portfolios. Moreover, it can be witnessed that out of these funds 33 have the significant alpha values (p values less than .05 at 5% significance level), while all the others have insignificant alpha values. So, it can be established that majority of the selected mutual funds are not making profits in excess of returns on a market index.

It can be detected from the table 3 that in the case of equity based mutual funds excess market returns have very significant impact on the mutual fund returns since the mean 'rm-rf' beta coefficient is 0.826 with all corresponding p-values less than 0.05. For example Baroda Pioneer Growth Fund has an 'rm-rf' beta coefficient of 0.909 and p=0.0 i.e. < 0.05(At 5% Significance Level). The size factor SMB with a mean value of 00.142 is having very small magnitude but significant (82 of 84 selected funds having p<0.05). Here, Baroda Pioneer Growth Fund with SMB 0.084 (p<0.05) has significant size factor. Similarly, the value factor HML with -0.0269 mean value, have a smaller magnitude but significant impact (68 of 84 funds showing p< 0.05). But Baroda Pioneer Growth Fund has non-significant HML factor of -0.02597 (p< 0.05). The fourth, newly introduced factor PRIM has again negative but very small mean value i.e. -0.00818 which is non-significant (1of 84 have p<0.05). Baroda Pioneer Growth Fund with PRIM 0.01020 (p>0.05) has non-significant momentum factor. With R2 value of .81 to 0.89 it can be inferred that 81% to 89% of returns generated were because of the market movements, size, value and momentum factors only. Therefore, only approximately 11% of the mutual fund returns were due to many other factors which are not accounted for in the Carhart Four Factor model

Performance Evaluation of Equity Based ULIP Funds using Carhart Model
We use the regression analysis to obtain various coefficients as given in the next table:

Table 4:- Carhart Four Factor Model Regression Analysis Results for ULIP Funds

S. No.	Fund Name	Carhart									
		Alfa	p- Alfa	rm-rf	p rm-rf	SMB	p SMB	HML	p-HML	PRIM	p-PRIM
1	Aviva Enhancer	0.053	0.43	-0.002	0.94	0.260	0.00	0.041	0.07	0.005	0.83
2	Aviva Growth	0.011	0.83	-0.011	0.65	0.267	0.00	0.047	0.04	0.006	0.77
3	Aviva Index	0.043	0.60	0.008	0.72	0.242	0.00	0.051	0.02	0.003	0.89
4	Bajaj Asset Allocation	0.041	0.27	0.009	0.70	0.226	0.00	0.014	0.54	0.003	0.88
5	Bajaj Equity Growth	0.048	0.49	0.011	0.65	0.243	0.00	0.058	0.01	-0.002	0.94
6	Bajaj Equity Growth Pension	0.074	0.28	0.008	0.73	0.248	0.00	0.066	0.00	-0.001	0.98
7	Bajaj Equity Index	0.040	0.62	0.015	0.51	0.239	0.00	0.056	0.01	0.003	0.89
8	Bajaj Equity Index II	0.036	0.66	0.017	0.48	0.231	0.00	0.059	0.01	0.003	0.88
9	Bajaj Equity Index Pension	0.044	0.59	0.014	0.54	0.243	0.00	0.053	0.02	0.003	0.89
10	Bajaj Equity Index Pension II	0.040	0.62	0.011	0.64	0.241	0.00	0.054	0.01	0.003	0.88
11	Bajaj Pure Stock	0.095	0.09	-0.007	0.76	0.235	0.00	0.069	0.00	-0.010	0.64
12	Bharti Axa Grow Money	0.042	0.63	0.017	0.49	0.004	0.86	-0.013	0.57	0.000	0.99
13	Bharti Axa Grow Money Pension	0.049	0.53	0.118	0.00	0.174	0.00	0.019	0.40	0.002	0.94
14	Birla Sun Life Multiplier	0.107	0.12	-0.051	0.03	0.319	0.00	0.044	0.05	-0.001	0.97

15	Birla Sun Life Magnifier	0.044	0.52	-0.011	0.63	0.271	0.00	0.045	0.04	0.002	0.91
16	Birla Sun Life Maximiser	0.053	0.48	-0.004	0.87	0.270	0.00	0.037	0.09	0.003	0.89
17	Birla Sun Life Plan 1	0.020	0.73	-0.006	0.81	0.244	0.00	0.046	0.04	0.001	0.97
18	Exide Life Equity	0.031	0.67	0.002	0.93	0.256	0.00	0.049	0.03	0.004	0.85
19	HDFC Equity Managed	0.058	0.34	-0.010	0.68	0.273	0.00	0.022	0.33	0.006	0.80
20	HDFC Equity Managed II	0.070	0.25	-0.012	0.62	0.263	0.00	0.047	0.04	0.004	0.84
21	HDFC Equity Managed Pension	0.065	0.30	-0.011	0.65	0.275	0.00	0.018	0.40	0.005	0.80
22	HDFC Growth	0.061	0.39	-0.010	0.68	0.273	0.00	0.020	0.37	0.007	0.76
23	HDFC Growth II	0.048	0.50	-0.004	0.86	0.266	0.00	0.017	0.45	0.007	0.76
24	HDFC Growth Pension	0.061	0.39	-0.011	0.63	0.273	0.00	0.020	0.37	0.007	0.76
25	ICICI Pru Pension Flexi Growth	0.047	0.46	-0.007	0.77	0.266	0.00	0.041	0.06	-0.004	0.87
26	ICICI Pru Pension Maximiser	0.056	0.45	0.014	0.56	0.247	0.00	0.048	0.03	-0.006	0.78
27	ICICI Pru Pension Multiplier II	0.036	0.63	0.019	0.43	0.237	0.00	0.057	0.01	0.001	0.96
28	ICICI Pru Pension Flexi Growth II	0.057	0.38	-0.008	0.72	0.267	0.00	0.041	0.07	-0.003	0.89
29	ICICI Prudential Flexi Growth	0.070	0.25	-0.012	0.62	0.263	0.00	0.047	0.04	0.004	0.84
30	ICICI Prudential Flexi Growth IV	0.053	0.41	-0.003	0.90	0.264	0.00	0.040	0.07	-0.005	0.80
31	ICICI Prudential Multiplier II	0.049	0.50	0.012	0.62	0.244	0.00	0.060	0.01	-0.001	0.95
32	ICICI Prudential Pension Rich	0.055	0.41	0.008	0.73	0.254	0.00	0.050	0.02	0.001	0.96
33	ICICI Prudential Flexi Growth II	0.053	0.41	-0.003	0.88	0.264	0.00	0.038	0.08	-0.005	0.81
34	ICICI Prudential Maximiser II	0.065	0.38	0.015	0.52	0.244	0.00	0.047	0.03	-0.006	0.77
35	ICICI Prudential Pension Rich II	0.062	0.36	0.005	0.83	0.254	0.00	0.051	0.02	0.000	1.00
36	Kotak Agressive Growth	0.058	0.43	0.005	0.82	0.245	0.00	0.039	0.08	0.003	0.89
37	Kotak Dynamic	0.029	0.60	0.014	0.55	0.230	0.00	0.046	0.04	0.004	0.85
38	LIC Growth	0.017	0.74	0.004	0.87	0.235	0.00	0.026	0.25	0.005	0.83
39	Max Life Growth	0.020	0.64	0.017	0.47	0.233	0.00	0.042	0.06	0.004	0.86
40	PNB Metlife Accelerator	0.019	0.75	0.026	0.26	0.237	0.00	0.046	0.04	0.004	0.86
41	PNB Metlife Multiplier	0.024	0.74	0.023	0.33	0.241	0.00	0.048	0.03	0.003	0.89

42	PNB Metlife Virtue	0.033	0.62	0.000	0.99	0.257	0.00	0.071	0.00	0.000	0.99
43	Reliance Life Equity	0.048	0.50	0.009	0.71	0.244	0.00	0.050	0.02	0.001	0.98
44	Reliance Life Pension Equity	0.048	0.50	0.009	0.69	0.243	0.00	0.049	0.03	0.001	0.98
45	Reliance Life Super	0.034	0.55	0.012	0.61	0.244	0.00	0.046	0.04	0.002	0.92
46	SBI Equity	0.023	0.78	0.314	0.00	0.079	0.00	0.189	0.00	0.000	0.98
47	SBI Equity Optimiser	0.004	0.96	0.331	0.00	0.095	0.00	0.208	0.00	-0.001	0.96
48	SBI Equity Optimiser Pension	0.003	0.97	0.330	0.00	0.094	0.00	0.208	0.00	-0.001	0.95
49	SBI Equity Pension	0.014	0.86	0.311	0.00	0.088	0.00	0.190	0.00	-0.001	0.96
50	SBI Growth	-0.017	0.80	0.346	0.00	0.092	0.00	0.238	0.00	-0.001	0.96
51	SBI Growth Pension	-0.001	0.99	0.345	0.00	0.102	0.00	0.223	0.00	-0.002	0.93
52	Shriram Accelerator	0.030	0.70	0.005	0.83	0.256	0.00	0.053	0.02	0.000	0.99
53	Shriram Maximas	0.023	0.65	0.005	0.84	0.262	0.00	0.051	0.02	0.000	0.99
54	Shriram Wealth Creator	0.025	0.75	0.006	0.80	0.254	0.00	0.049	0.03	0.000	0.99
55	Tata Aggressive Growth	0.031	0.52	0.007	0.77	0.246	0.00	-0.016	0.46	0.004	0.84
56	Tata Equity	0.032	0.66	0.002	0.92	0.247	0.00	-0.013	0.57	0.004	0.85
57	Tata Future Equity Pension	0.059	0.40	-0.003	0.89	0.251	0.00	-0.017	0.45	0.004	0.86
58	Tata Growth	0.020	0.68	0.008	0.73	0.244	0.00	-0.013	0.55	0.003	0.87
59	Tata Large Cap	0.055	0.43	-0.004	0.88	0.251	0.00	-0.016	0.48	0.005	0.82
60	Tata Whole Life Aggressive	0.046	0.32	0.003	0.91	0.249	0.00	-0.021	0.36	0.003	0.89
Mean		0.042		0.037		0.231		0.054		0.001	

Table 4 shows that out of selected 60 unit linked insurance plan funds, 58 have positive alpha values. Only two funds i.e. SBI Growth Fund and SBI Growth Pension Fund show a negative alpha value. So, the fund managers are adding value to their respective fund portfolios. Moreover, it can be witnessed that out of these 58 funds not even a single fund has the significant alpha value. So, it can be established that most of the ULIP funds are not making profits in excess of returns on a market index.

It can be discovered from the table 4 that in the case of equity based ULIP funds excess market returns have very non-significant and small magnitude impact on the ULIP fund returns since the mean 'rm-rf' beta coefficient is 0.0374 with only 9 corresponding p-values less than 0.05. For example Aviva Enhancer Fund has an 'rm-rf' beta coefficient of -0.00185 and p=0.94 i.e. > 0.05(At 5% Significance Level). The size factor SMB with a mean value of 0.231 is having very small magnitude but significant (all selected funds having p<0.05). Here, Aviva Enhancer Fund with SMB 0.084 (p<0.05) has significant size factor. Similarly, the value factor HML with -0.0269 mean value, have a smaller magnitude but significant impact (68 of 84 funds showing p< 0.05). But Aviva Enhancer Fund has non-significant HML factor of -0.02597 (p< 0.05). The fourth, newly introduced factor PRIM has again negative

but very small mean value i.e. -0.00818 which is non-significant (1of 84 have p<0.05). Aviva Enhancer Fund with PRIM 0.00457 (p>0.05) has non-significant momentum factor. With R2 value of 0 to 0.1 %, it can be concluded that only maximum of 10% of returns generated were because of the market movements, size, value and momentum factors. Therefore, about 90% of the ULIP fund returns were unexplained by the Carhart Four Factor model.

Findings of the Study:-

i.   On the basis of Fama & French Three Factor Model regression analysis results 83 of 84 mutual funds have positive Alfa values, of which 33 have significant values; therefore mutual funds are adding value to their respective fund portfolios.

ii.   On the basis of Fama & French Three Factor Model regression analysis results 58 ULIP funds have positive Alfa values, of which only one have significant value; therefore ULIP funds are not adding any significant to their respective fund portfolios.

iii. On the basis of Carhart Four Factor Model regression analysis results 83 of 84 mutual funds have positive Alfa values, of which 33 have significant values; therefore mutual funds are adding value to their respective fund portfolios.

iv.   On the basis of Carhart Four Factor Model regression analysis results 58 ULIP funds have positive Alfa values, of which none has the significant value; therefore ULIP funds are not adding any significant value to their respective fund portfolios.

Conclusions:-

The study has evaluated the performance of selected 84 equity-oriented mutual funds and 60 equity-oriented ULIP funds in India over the period April 2008 to March 2016 by employing multifactor models Fama & French Three Factor Model and Carhart Four Factor Model. It can be concluded that the mutual funds are adding value to their respective fund portfolios, whereas the ULIP funds are not adding any significant value to their respective fund portfolios. So, the large amount of expenses charged by the ULIP fund managers is not justified. The further research studies can be conducted in future by focusing on different other multi-factor models.

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