Copernican Journal of Finance & Accounting

2023, volume 12, issue 3

e-ISSN 2300-3065
p-ISSN 2300-1240

Veeravel, V. (2023). Short-term Persistence Performance of Equity Mutual Fund Returns: Evidence from India. Copernican Journal of Finance & Accounting, 12(3), 79–92. http://dx.doi.org/10.12775/CJFA.2023.017

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SHORT-TERM PERSISTENCE PERFORMANCE OF EQUITY MUTUAL FUND RETURNS: EVIDENCE FROM INDIA

Keywords: performance persistence, mutual funds, Fama-French three factor, multi-factor models.

J E L Classification: C51, G11, G23.

Abstract: The present study verifies the short-term persistence performance of equity mutual fund returns. The study considers 47 equity funds' monthly excess returns spanning from January 2000 to December 2019. The study employs prominent asset pricing models such as Jensen (1968) one-factor model, Fama-French (1993) three-factor model, and Carhart (1997) four-factor model to capture the short-term persistence of equity mutual fund returns. The results show that Jensen's one-factor and Fama-French three-factor models are explaining a better persistence performance in the Indian context.

Introduction

Mutual funds have started gaining momentum and popularity among investors in recent years. It is difficult for an individual investor to create and manage their portfolios due to a lack of skills and experience in the stock market. Mutu-

Date of submission: April 29, 2023; date of acceptance: August 23, 2023.

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al funds provide the benefits of diversification of risk to the unitholders. After deducting the expenses required to manage the mutual fund organisation, the profit is distributed among the unitholders. Mutual funds are not confined to retail investors but also to other sophisticated investors, namely banks, investment companies, financial institutions, etc. Moreover, mutual funds are professionally managed by fund managers, which enables fund managers to minimize potential losses and maximize returns.

Mutual funds performance is well documented in the finance literature. During the 1990s, studies like (Brown & Goetzmann, 1995; Hendricks, Patel & Zeckhauser, 1993; Wermers, 1997; Carhart, 1997) found evidence of persistence over a short-term duration like one to three years. Whereas Elton, Gruber and Blake (1996) reveal little evidence that persistence of performance over the long-term horizon. Similarly (Benos & Jochec, 2011; Bollen & Busse, 2005) study the U.S. equity mutual funds' performance persistence and found little evidence of performance persistence over the short-term horizon. Otten and Bams (2002) analysis of the performance of European equity mutual funds. The study results find strong persistence in average returns, moreover, the fund to invest in UK securities. However, the mutual fund industry has gained more attention from investors as well as the academic community. Moreover, market practitioners, academicians, and researchers have been intrigued by developing highly sophisticated economic models to study mutual funds' performance and efficiency. The equity mutual fund managers show a "hot hands" performance. The mutual fund performance persistence is an important issue. The investors have certain questions before investing in mutual funds, like whether the mutual funds exhibit hot hands persistence of performance.

There is a need to examine the persistence performance of equity fund returns. Hence, the present study verifies the persistence performance in equity mutual fund returns with the help of different asset pricing models. The present study contributes to the existing body of literature in the developing area of mutual funds persistence performance in the Indian context. The study finds little evidence that asset pricing models capture the short-term persistence performance in the Indian context.

The rest of the paper is organised as follows: section 2 discusses the literature review. Section 3 explains the data and estimation models. Section 4 exhibits empirical results. Finally, section 5 represents concluding remarks.

Review of literature

This section briefly describes the significant contributions made by different researchers on asset pricing frameworks in matured markets. Jensen (1968) finds a prominent place in the field of asset pricing due to its uniqueness in quantifying the association between risk and return on equity stocks. Numerous studies have investigated the mutual fund persistence performance and find mixed results. The results may differ from country to country and sample funds. Studies like (Elton, Gruber, Das & Hlavka, 1993; Jensen, 1968; Kahn & Rudd, 1995) find little evidence of performance persistence over long-term horizons. (Blake & Timmermann, 1998; Carlson, 1970; Lehmann & Modest, 1987; Otten & Bams, 2002; Droms & Walker, 2001) exhibit short-term persistence over one to three years. Studies such as (Jain & Wu, 2000; Sauer, 1997; Vos, Brown & Christie, 1995) have failed to exhibit significant evidence of performance persistence. Leite and Cortez (2015) examine the French socially responsible investment (SRI) and conventional funds investment styles and timing ability during the financial and non-financial crises from 2001 to 2012. The study finds little evidence of significant style timing ability. Matallín-Sáez, Soler-Domínguez and Tortosa-Ausina (2016) verify the US equity funds performance persistence. Vidal-García, Vidal, Boubaker and Uddin (2016) study the international equity funds' short-term persistence performance. The study results strongly support the persistence of daily equity fund returns rather than quarterly measurements. The overall results document that superior performance exists only in short-term occurrences. Mateus, Mateus and Todorovic (2016) re-examine the performance of UK 887 active mutual funds. It finds that adjusted Fama and French three-factor and Carhart four-factor alphas of UK active mutual funds are greater than three and four-factor models, and most of the alphas are positive. Gao, O'Sullivan and Sherman (2017) evaluate the statistical and economic significance of performance persistence of Chinese domestic securities investment funds. The study finds that performance persistence exhibits only a short-term periods. Kiymaz and Simsek (2017) study the performance of US equity mutual funds, which is mainly investing in developing market equity and bond funds. The results reveal that diversified developing market funds produce positive alphas, whereas the bond funds do not generate any significant positive alphas, and most of the alpha values are negative. Climent, Mollá and Soriano (2020) compare the performance of Islamic and socially re-

sponsible investment funds by employing a capital asset pricing model. The study suggests that Islamic funds outperformed than conventional funds during the study period. Andreu, Matallín-Sáez and Sarto (2018) find strong evidence of positive persistence in past performance predicting strategies and selectivity skills while this persistence does not exist in the overall performance.

In the Indian context, Sehgal and Jhanwar (2008) explain the advantages of using daily prices of equity mutual funds for analysis. Prior studies document weak evidence on selectivity could be biased due to the adoption of lower frequency data, which influenced the study results. Tripathy (2018) uses daily Net Assets Values (NAV) and the CNX NIFTY Index to assess the Indian fund managers' performance. The study suggests that investors may be shrewd in making correct investment decisions to fulfill their objectives. Deb (2019) and Veeravel and Balakrishnan (2023) use actively managed equity funds after adjusting risk factors such as market, size, value, momentum, and expenses to study the persistence in performance, which mainly depends on fund size, age, holding period, investment style or expenses ratio. The study finds persistence over a short-term duration. Bhattacharjee, Yadev and Singh (2022) examine fund performance by measuring the managerial attributes of fund managers such as educational qualification and work experience. The study results show that work experience of fund managers positively impacts open ended funds performance.

On the contrary, Veeravel and Mohanasundaram (2020) document that unconditional and conditional models do not reveal significant timing ability among Indian large-cap equity fund managers. However, most of the studies employ only traditional performance methods. Hence, the present study verifies the short term persistence performance of equity fund returns by employing prominent multi-factor asset pricing models.

Data

The study considers 47 equity mutual funds' monthly excess returns data spanning from January 2000 to December 2019. We collect BSE 500 Index listed companies' monthly adjusted closing stock price, market capitalisation, and P/B ratio are used as a proxy for the size and value factors. BSE 200 Index closing price is used as a market return, and the 91-day t-bill rate is used as a proxy for risk-free returns collected from the Reserve Bank of India website. We employ Fama-French's (1993) methodology for constructing factor-mimick-

ing portfolios, such as size, value, and momentum factors. We follow Carhart's (1997) four-factor methodology to construct the WML factor. All the data are collected from the Bloomberg database.

METHODOLOGY

Risk-adjusted measurement models

The present study employs the Jensen (1968) one-factor model to examine whether equity mutual fund managers produce positive abnormal returns using the following equation (1).

$$R_{it} - R_{ft} = a_i + \beta_i\left(R_{m_t} - R_{ft}\right) + e_{it} \quad (1)$$

where R_{it} represents the returns of the individual fund t; R_{mt} refers to the market return; R_{ft} presents risk-free returns; a_i refers to Jensen's alpha; and β_i is the sensitivity coefficient of systematic risk; e_{it} and is an error term.

The study also employs Fama-French (1993) three-factor model (FFTFM) using the following equation (2).

$$R_{it} - R_{ft} = a_i + \beta_i\left(R_{Mt} - R_{ft}\right) + s_i(SMB_t) + h_i(LMH_t) + e_{it} \quad (2)$$

Where R_{it}, R_{Mt}, R_{ft}, a_i, β_i, e_{it} are citrus paribus in equation (1), where SMB_t represents the size factor (Small minus Big), and LMH_t refers to the value factor (Low minus High).

Further, the study uses the Carhart (1997) four-factor model to discover the persistence performance using the following equation (3).

$$R_{it} - R_{ft} = a_i + \beta_i\left(R_{Mt} - R_{ft}\right) + s_i(SMB_t) + h_i(LMH_t) + w_i(WML_t) + e_{it} \quad (3)$$

Where R_{it}, R_{Mt}, R_{ft}, a_i, β_i, e_{it} are citrus paribus in equation (1), where SMB_t represents the size factor; LMH_t refers to the value factor; WML_t refers to the momentum factor (Winner minus Loser).

Empirical Results

Table 1 presents the descriptive statistics of 47 equity mutual fund returns and factor variables. The mean excess returns of equity mutual funds show a positive of 3.638. Out of 47 equity mutual funds, 39 (82.89 percent) show positive average excess returns, whereas 8 (17.02 percent) funds register negative returns. Out of which, 23 funds outperformed better than the benchmark market index. On the other hand, three funds outperform negatively than the benchmark index. The standard deviation of mutual funds is 80.737. Out of 47 equity mutual funds, 31 generate higher risk than the benchmark market index. The Jarque-Bera statistics are statistically significant at the 5 % level, which means that all the equity fund returns are normally distributed.

Table 1. Descriptive Statistics

Variables	Mutual Fund Returns	RMRF	SMB	LMH	WML
Mean$	3.638	3.925	15.905	-8.114	9.331
Maximum	0.257	0.278	0.129	0.137	0.251
Minimum	-0.286	-0.312	-0.137	-0.272	-0.366
Std. Dev#	80.737	85.352	46.723	61.880	67.714
Skewness	-0.907	-0.687	0.249	-1.387	-1.201
Kurtosis	6.201	5.845	4.052	7.652	12.309
Jarque-Bera	133.682	98.537	13.371	289.683	912.647
Probability	0.000	0.000	0.001	0.000	0.000

S o u r c e : Authors' calculations; $, and # excess returns and standard deviation are annualised.

Table 2. Correlation matrix

Variables	RMRF	SMB	LMH	WML
RMRF	1			
SMB	0.158*	1		
HML	-0.300**	-0.304**	1	
WML	-0.035	-0.039	0.335**	1

S o u r c e : Author's calculation; *, and ** indicate significant at 5 %, and 1% respectively.

Table 2 explains the correlation between factor variables. The correlation results reveal that there is a negative correlation between market returns and value (-0.300) and market returns and momentum factors (-0.035), respectively. Also, the size factor and value factor (-0.304) and size and momentum factors (-0.069) have a negative correlation. The size and value factors are statistically significant at 5% and 1%, respectively. Moreover, the size and value factors are statistically significant at a 1% level. Despite this, the value and momentum factor are also statistically significant at 1% percent. The results clearly show that there is no multicollinearity between dependent and explanatory variables.

Table 3. Jensen's one-factor model

S. No	Scheme Name	α	β	$t(\alpha)$	$t(\beta)$	R^2
1	DSP Equity Fund-RD	-0.006	0.947	-2.34**	24.76***	0.72
2	Canara Robeco Equity Tax-RD	-0.009	0.962	-3.01***	22.96***	0.69
3	Aditya Birla SL Equity Fn-RG	0.003	1.010	2.21**	48.72***	0.91
4	HDFC Top 100 Fund-RG	0.004	0.925	2.83***	49.71***	0.91
5	HDFC-India Equity-RG	0.005	0.920	3.88***	48.49***	0.91
6	Nippon Growth Fund-RG	0.005	0.945	2.88***	37.27***	0.85
7	Tata Mid Cap Growth Fund-RG	0.005	0.820	2.59***	27.81***	0.76
8	Nippon Vision Fund-RG	0.004	0.921	2.50**	36.62***	0.85

Table 3. Jensen's...

S. No	Scheme Name	α	β	t(α)	t(β)	R^2
9	Franklin India Bluechip-RG	0.004	0.853	3.50***	58.74***	0.94
10	Franklin India Tax shield-RG	0.005	0.838	3.94***	49.94***	0.91
11	JM Equity Fund-RG	-0.003	1.005	-2.09**	52.82***	0.92
12	Aditya Birla MNC Fund-B RG	0.005	0.693	2.45**	26.43***	0.75
13	ICICI Prudential FMCG-RG	0.005	0.591	1.99**	17.04***	0.55
14	Franklin India Prima Fund-RG	0.005	0.976	2.52**	33.04***	0.82
15	Franklin India Prima Plus-RG	0.004	0.853	3.58***	56.77***	0.93
16	HDFC India Capital Blder-RG	0.004	0.810	2.33**	32.85***	0.82
17	Templeton India Growth-RG	0.003	0.912	2.44**	50.00***	0.91
18	Aditya Birla SL Tax RL 96-RD	-0.007	1.056	-2.04**	21.66***	0.66

S o u r c e : Author's calculation; ***, **, * represent significant level at 0.01%, 0.05%, and 0.10% respectively.

Table 3 depicts the results of Jensen's one-factor model. The table represents individual equity mutual fund's alpha, beta, t statistics, and r square values. Out of 47 equity funds, only 18 are positively and statistically significant at 1%, 5%, and 10%, respectively. Four funds are negatively statistically significant at 5% and 1%, namely DSP Equity Fund-RD (-2.34), JM Equity Fund-RG (-2.09), Aditya Birla SL Tax RL 96-RD (-2.04), and Canara Robeco Equity Tax-RD (-3.01). Further, the study finds that there are 29 schemes statistically insignificant. However, the R square exhibits high values, which implies that the market factor plays a vital role in explaining the equity mutual fund returns. It is also documented that all the funds have an R square value greater than 0.50. The results clearly show that Jensen's one-factor model explains the performance persistence of equity funds. Further, Jensen's alpha explains the stock-picking skills of fund managers. The one-factor model explains that the excess market returns drive the excess returns of equity mutual funds.

Table 4. Fama -French three-factor model results

S. No	Scheme Name	α	β	s	l	t(α)	t(β)	t(s)	t(l)	R^2
1	DSP Equity Fund-RD	-0.009	0.919	0.205	-0.002	-3.10***	22.85***	2.79***	-0.03	0.72
2	SBI IT Fund-RD	-0.010	0.986	0.548	0.593	-2.66***	18.13***	5.51***	7.62***	0.62
3	Tata Tax Saving Fund-RD	-0.010	1.097	0.245	0.203	-2.19**	17.90***	2.18**	2.32**	0.60
4	Canara Robeco Equity Tax-RD	-0.013	0.967	0.313	0.068	-4.18***	22.77***	4.03***	1.12	0.72
5	HDFC Top 100 Fund-RG	0.005	0.910	-0.082	-0.101	4.15***	52.77***	-2.59***	-4.09***	0.93
6	HDFC-India Equity-RG	0.004	0.900	0.074	-0.101	2.73***	47.04***	2.11**	-3.69***	0.92
7	Franklin India Bluechip-RG	0.004	0.860	-0.055	-0.046	3.95***	60.31***	-2.13**	-2.23**	0.95
8	Franklin India Tax shield-RG	0.003	0.830	0.071	0.012	2.70***	50.42***	2.37**	0.51	0.92
9	JM Equity Fund-RG	-0.004	1.008	0.119	0.060	-2.75***	50.73***	3.27***	2.10**	0.92
10	Aditya Birla MNC Fund-B RG	0.004	0.719	0.129	0.121	2.23**	27.08***	2.66***	3.18***	0.77
11	SBI Magnum Tax Gain-RG	-0.008	1.078	0.370	0.233	-2.42**	22.66***	4.25***	3.43***	0.71
12	Franklin India Prima Plus-RG	0.003	0.859	0.086	0.014	2.92***	58.01***	3.17***	0.67	0.94
13	Principal Person Tax Save-RG	-0.007	0.965	0.220	-0.029	-2.01**	19.19***	2.40**	-0.40	0.65
14	Taurus Discovery Fund-RG	-0.007	1.004	0.328	-0.043	-2.36**	25.34***	4.52***	-0.75	0.77
15	Aditya Birla SL Tax Plan-RD	-0.008	0.934	0.338	0.150	-3.54***	29.61***	5.86***	3.32***	0.81
16	Aditya Birla SL Tax RL 96-RD	-0.011	1.049	0.258	0.086	-3.20***	21.11***	2.84***	1.21	0.68

S o u r c e : Author's calculation; ***, **, * represent significant level at 0.01%, 0.05%, and 0.10% respectively.

Table 5. Carhart four-factor model results

S. No	Scheme Name	α	β	s	l	w	t(α)	t(β)	t(s)	t(l)	t(w)	R^2
1	DSP Equity Fund-RD	-0.009	0.919	0.205	-0.001	-0.001	-3.04***	22.75***	2.78***	-0.02	-0.03	0.72
2	SBI IT Fund-RD	-0.009	0.991	0.557	0.632	-0.095	-2.41**	18.22***	5.60***	7.65***	-1.37	0.62
3	Tata Tax Saving Fund-RD	-0.011	1.087	0.228	0.128	0.184	-2.57***	17.88***	2.05**	1.38	2.38**	0.61
4	Canara Robeco Equity Tax-RD	-0.013	0.966	0.311	0.059	0.021	-4.18***	22.65***	3.99***	0.91	0.39	0.72
5	HDFC Top 100 Fund-RG	0.005	0.909	-0.083	-0.109	0.019	3.96***	52.56***	-2.64***	-4.13***	0.85	0.93
6	HDFC-India Equity-RG	0.004	0.901	0.076	-0.091	-0.025	2.86***	47.01***	2.18**	-3.11***	-1.03	0.92
7	Franklin India Bluechip-RG	0.004	0.858	-0.058	-0.058	0.030	3.64***	60.28***	-2.24**	-2.68***	1.67*	0.95
8	Franklin India Tax shield-RG	0.003	0.829	0.070	0.006	0.015	2.54***	50.20***	2.31**	0.23	0.73	0.92
9	JM Equity Fund-RG	-0.004	1.008	0.119	0.061	-0.004	-2.68***	50.51***	3.27***	2.02**	-0.15	0.92
10	Aditya Birla MNC Fund-B RG	0.004	0.720	0.130	0.125	-0.010	2.24**	26.98***	2.67***	3.08***	-0.29	0.77
11	SBI Magnum Tax Gain-RG	-0.008	1.077	0.368	0.223	0.025	-2.45**	22.54***	4.21***	3.08***	0.40	0.71
12	Franklin India Prima Plus-RG	0.003	0.858	0.085	0.009	0.012	2.78***	57.75***	3.11***	0.41	0.62	0.94
13	Principal Person Tax Save-RG	-0.008	0.963	0.218	-0.042	0.031	-2.06**	19.08***	2.36**	-0.54	0.48	0.65
14	Taurus Discovery Fund-RG	-0.006	1.007	0.334	-0.017	-0.062	-2.13**	25.39***	4.60***	-0.29	-1.23	0.77
15	Aditya Birla SL Tax Plan-RD	-0.008	0.932	0.335	0.136	0.033	-3.62***	29.47***	5.79***	2.84***	0.82	0.81
16	Aditya Birla SL Tax RL 96-RD	-0.012	1.044	0.251	0.055	0.076	-3.36***	21.00***	2.76***	0.73	1.19	0.69

S o u r c e : Author's calculation; ***, **, * represent significant level at 0.01%, 0.05%, and 0.10% respectively.

Tables 4 and 5 present the results of FFTFM and CFFM. Out of 47 equity funds, only 16 are statistically significant at 1%, 5%, and 10%, respectively. The results reveal that 34.04% of schemes exhibit a positive selectivity based on Jensen's models. On the other hand, the size factor drives both model results. The R^2 values represent how much percentage of explanatory variables, such as market, size, value, and momentum factors, explain the dependent variable (equity fund returns). The results clearly show that Jensen's one-factor and FFTFM models mostly explain the persistence performance in the Indian markets compared to CFFM. Further, the Indian market is not driven by a one-year momentum anomaly because it has significantly less explained the equity fund returns. Also, the one-year momentum anomaly gets less premia than the size and value factors. The results are consistent with prior studies like (Veeravel & Mohanasundaram, 2020; Babbar & Sehgal, 2018).

Conclusion

This study verifies the persistence performance of Indian equity fund returns. The study uses monthly equity mutual fund excess returns spanning from January 2000 to December 2019. The study employs prominent multifactor asset pricing models such as Jensen's one-factor, FFTFM, and CFFMs. Based on the one-factor model, only 18 funds reveal the persistence performance. Further, the FFTFM and CFFMs exhibit only 16 funds that show persistence performance. In light of this, the study concludes that there is little evidence of persistence performance in the Indian context. The results are in line with both Indian and International studies (see Sehgal & Jhanwar, 2008; Tripathy, 2018; Deb, 2019; Bollen & Busse, 2005; Otten & Bams, 2002; Droms & Walker, 2001). This study limits only equity mutual funds; other funds like sectoral, balanced, index, and debt funds can be included for better results. The present study may be helpful to investment companies, unitholders, fund houses, academicians, and fund managers for better investment decisions. It may boost the investors' confidence in the fund managers' better stock-picking ability for the entire study period.

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