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MUTUAL FUND PERFORMANCE: A STUDY ON THE EFFECT OF PORTFOLIO TURNOVER ON MUTUAL FUND PERFORMANCE IN THE INDIAN FINANCIAL MARKET.

Vinita Bharat Manek

BSc. Accounting and Finance, University of London International Programme

Academic Guidance: Mr. Rajan Nandola.

Abstract

Background:*In India, mutual funds are gaining popularity however they account for less than 5% of the GDP in India. Mutual fund companies are trying to penetrate the market further with constant restructuring of models in an attempt to increase efficiency and investor satisfaction. It is, thus, important to study the effect of management style on the fund performance. It would be useful for fund investors to evaluate managers based on a known characteristic that would affect the fund return.*

Purpose:*The aim of this research paper is to investigate the significance of portfolio turnover on mutual fund return which would provide an indication to investors on how to invest in funds based on management style.*

Data:*In this research paper, only open ended diversified growth oriented equity funds are taken into consideration. Accordingly, dividend paying equity schemes are not considered.*

Result: *Portfolio turnover has a statistically significant effect on scheme returns. It is weakly but positively correlated. That is, with higher portfolio turnover, there is a possibility that manager will be able to outperform the index.*

1. INTRODUCTION

1.1 Industry Background

Mutual funds date back to 1924 with its origination in USA. However, they were introduced in the Indian market relatively late in 1963 as an initiative by the Government of India and Reserve Bank of India. Unit Trust of India (UTI) was the only mutual fund available to investors till 1987, after which public sector banks and Life Insurance Corporation of India set up their own mutual funds. In 1987, SBI Mutual Fund was the first non-UTI mutual fund established in the Indian mutual fund market. Subsequently, 1993 was marked by the entry of private mutual funds in the Indian market.

The Indian mutual fund industry has come a long way and has bright future prospects as investor awareness increases and fund houses try to penetrate the capital markets through constant product innovation in hope for better performance of their schemes. The total asset under management as on March 31, 2010 was Rs. 613,979 crore whereas the total assest under management as on March 31, 2015 was Rs. 1,082,757crore, representing a growth of 76.35% in the industry.

1.2 Problem Definition

Many research papers have focused on various factors affecting mutual fund performance. Some studies have had a definitive result concluding the impact of a factor on fund performance. For example, it is an established fact that high risk seeks higher returns or higher expense ratio leads to lower fund returns. Not much focus has been placed in finding a relation between portfolio turnover and fund returns, especially in the Indian market, thus the attempt has been to empirically find a relation between these two factors which would be used as an additional guiding point for investors while investing funds in a mutual fund. Moreover, portfolio turnover is a non-conventional factor that affects fund return but remains controversial with respect to its relationship and significance with fund returns. The main question this research paper tries to answer is: Does portfolio turnover have a significant effect on fund returns? And if yes, what kind of relationship do the two factors hold?

1.3 Concept Definition: What is Portfolio turnover?

Portfolio turnover, by definition, measures the rate at which assets are traded within a fund by a portfolio manager in a given period of time. In other words, portfolio turnover shows how actively is a fund managed by the fund manager and how often does he trade the assets within the fund in an attempt to out-perform the benchmark. Portfolio turnover is computed by taking the lower of purchases or sales and dividing that by the average monthly net assets of the fund.

$$Portfolio\ Turnover = \frac{Lower\ of\ Total\ Purchases\ or\ Total\ Sales}{Average\ \ Value\ \ of\ the\ portfolio} * 100$$

A portfolio turnover of 100% represents that all stocks in the portfolio were sold and replaced by other stocks in the given period (usually one year). On the other hand, a portfolio turnover of 20% shows an average holding period of 5 years.

$$Average\ Holding\ Period = \frac{12\ months}{Average\ \ annual\ \ turnover\ \ rate}$$

The topic of portfolio turnover remains controversial till date. On one hand, many people believe that high portfolio turnover rates can be associated with higher fund returns but on the other hand, people believe that the hidden costs associated with high portfolio turnover rates reduces the net return of the fund.

It is important to study portfolio turnover because of the possible effect it can have on the net return on the investment. High portfolio turnover indicates higher trading expenses which are not shown in the fund's annual total expense ratio. However, if the fund manager is able to outperform and generate a higher return due to his decisions then portfolio turnover may be preferred than a 'buy and hold strategy'.

1. LITERATURE REVIEW

Many studies have looked at the fund performance as a factor of management style, expense ratio, turnover ratio, manager replacement and other factors. Carhart (1997) suggested that mutual fund performance is significantly and negatively related with mutual fund expenses and turnover ratio. He analyzed this using Capital asset pricing method (CAPM) and his own developed 4 factor model. He concluded that on an average every buy and sell trade reduces mutual fund performance by 0.95%.

Sheng-Ching Wu (2014) attempted to investigate determinants of mutual fund performance under possible endogeneity using 170 open ended equity funds in Taiwan from 2003 to 2012. They also concluded that mutual funds with higher turnover and expenses have relatively lower

fund returns. Moreover, he suggested that underperforming funds are more likely to higher turnover ratio, indicating that not only is turnover a determining factor in fund performance but also that fund performance is a determining factor for turnover.

However, Grinblatt and Titman (1994) show that performance is positively related to portfolio turnover. In support, Wermers (2000) finds that index funds underperform as compared to funds with higher turnover ratio on a net return basis. Karlsson and Persson (2005) investigated whether an investor can find fund attributes influencing return in the Swedish mutual fund market. They reviewed 44 funds between 2000 and 2004 and reconfirmed that factors such as risk, fund size, fund age and management tenure significantly affect performance whereas fund expenses and turnover ratio are insignificant determinant factors of fund performance.

2. METHODOLOGY

3.1 Data Collection

For this study purpose, the data that is used is completely secondary data taken from the software ACEMF. The study considers 27 diversified open ended equity mutual fund schemes with growth option. The sampled funds have been analyzed on a monthly basis for a period of 5 years from January 2010 to May 2015. All funds selected have at least 90% of their AUM (Asset under Management) invested in domestic equities. Equity funds with dividend option have not been considered. Benchmark selected was S&P BSE 200 for all funds because S&P BSE 200 uses equity shares of 200 selected companies based on current market capitalization. Respective benchmarks were not taken for ease of comparison among all funds. This data formed basis for a panel data analysis which can further used to run statistical tests in order to reach to the conclusion.

3.2 Statistic Methodology

A series of statistical methods were used to reach an approximately accurate answer. This section briefly describes the tests used and the rationale behind using them. Quantitative measures are used to establish validity of our conclusion. Quantitative methodology provides us with an efficient way to process data and helps us understand the numerical figures using statistical tools. All the following statistical models were performed in E-views.

To begin with, a time series should be tested for non-stationarity. Stationarity refers to a time series that has a constant mean and variance and where the auto-covariance does not depend on time. It is important to check for non-stationarity to validate our regression analysis, non-

stationary regression parameters can strongly influence the analysis and may not follow the t-distribution which may make our result highly flawed. Hence, it is important to ensure that our data is stationary. Since, this research deals with panel data; I have used the Levin's and Augmented Dickey Fuller test (ADF) to check for non-stationarity. In ADF, the null hypothesis (Ho) states that the data has a unit root and the alternate hypothesis (H1) is stationary.

ADF test can be determined by the following equation,

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta \Delta y_{t-1} + \cdots + \varepsilon_t$$

Where α is the constant and β is the coefficient on a time trend.

In my study, ADF and Levin's have a probability ofless than the critical value of 0.05; therefore we could conclude that the data we used was stationary after the first difference.

Panel unit root test: Summary
Series: DPTR
Date: 07/30/15 Time: 13:39
Sample: 2010M01 2015M05
Exogenous variables: Individual effects
User-specified lags: 2
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-19.8761	0.0000	27	1647
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-35.0003	0.0000	27	1647
ADF - Fisher Chi-square	946.632	0.0000	27	1647
PP - Fisher Chi-square	953.482	0.0000	27	1701

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Table 1: Panel Unit test checking for stationarity.

Panel data specification provides for large number of observations, which allows more degrees of freedom, and reduce co linearity among independent variables, and increased probability of getting more reliable parameter estimates (Wooldridge, 2002).Further, with panel data it is possible to control fund-specific, time-invariant characteristics using fixed effects or random effects models, which is not possible with cross-section specification.

The use of both the fixed and the random effects models could provide better estimates than the OLS method, since it takes into account the characteristics of each fund that are likely to be present in any fund study. This way, including a time difference across regions through

differences in the constant term, we obtain the fixed effects model.Secondly, considering the fund specific effect as a component of the error term, the random effects model with a correlation process between error terms is obtained. In order to choose the most accurate estimation method, the F-statistic, Hausman tests are considered (Greene, 1993; Baltagi, 1995).

Fixed effect and Random effect are regression models used to analyze the impact of variables that vary over time. Fixed effect model, primarily, deals with establishing a relationship between two variables within an entity (in our case, within a fund). Each entity may have its own individual characteristics that may or may not affect the outcome. Under Fixed effect model, we assume that there may be a bias resulting from individual characteristics of the fund. In my research study, I found that under this model, PTR has a p-value of more than 0.05, hence we can say that portfolio turnover has insignificant relationship with scheme returns. Other factor like the return on benchmark has a significant relation with scheme return. This model is reliable since the probability value of F-statistic is 0 which implies that the overall model result is dependable.

Dependent Variable: SR
Method: Panel Least Squares
Date: 07/30/15 Time: 13:42
Sample: 2010M01 2015M05
Periods included: 65
Cross-sections included: 27
Total panel (balanced) observations: 1755

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000979	0.005485	0.178548	0.8583
IR	0.999205	0.000695	1436.787	0.0000
A	0.996338	0.002607	382.1216	0.0000
PTR	0.000104	8.69E-05	1.199918	0.2303

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.999175	Mean dependent var	0.724274
Adjusted R-squared	0.999161	S.D. dependent var	4.597794
S.E. of regression	0.133143	Akaike info criterion	-1.177835
Sum squared resid	30.57931	Schwarz criterion	-1.084327
Log likelihood	1063.550	Hannan-Quinn criter.	-1.143274
F-statistic	72066.53	Durbin-Watson stat	1.922744
Prob(F-statistic)	0.000000		

Table 2: Fixed Effect model

Random Effect model is also regression model but it differs from the fixed effect model because it assumes variation across funds to be random and uncorrelated with the variables included in the model. In Random effect model, we can include time invariant variables which may act like explanatory variables. We can thus generalize inferences beyond the sample used in the model. Random Effect model produced rather surprising results as it concluded that portfolio turnover has a significant effect on scheme returns. However, the significance Index returns has on scheme return is stronger than portfolio turnover. Since the p-value, under this test, is less than 0.05 the relation between portfolio turnover and scheme returns can be deemed as significant. The probability of F-statistic is 0 implying reliability, just as under the Fixed Effect model.

Dependent Variable: SR
Method: Panel EGLS (Cross-section random effects)
Date: 07/30/15 Time: 13:42
Sample: 2010M01 2015M05
Periods included: 65
Cross-sections included: 27
Total panel (balanced) observations: 1755
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000536	0.004946	0.108442	0.9137
IR	0.999228	0.000695	1438.263	0.0000
A	0.996609	0.002592	384.4341	0.0000
PTR	0.000112	5.64E-05	1.980214	0.0478

Effects Specification	S.D.	Rho
Cross-section random	0.012493	0.0087
Idiosyncratic random	0.133143	0.9913

Weighted Statistics

R-squared	0.999163	Mean dependent var	0.577614
Adjusted R-squared	0.999161	S.D. dependent var	4.596490
S.E. of regression	0.133104	Sum squared resid	31.02196
F-statistic	696649.1	Durbin-Watson stat	1.895709
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.999157	Mean dependent var	0.724274
Sum squared resid	31.27510	Durbin-Watson stat	1.880365

Table 3: Random Effect model

To reach to a conclusion, I performed the Hausman test to determine if the Fixed effect test or Random Effect test was more reliable. Hausman test helps to determine which among the two tests should be relied upon, if the probability is more than 0.05 then Random Effect test is better and if the probability is less than 0.05 then Fixed Effect test should be taken into consideration. Under my study, Hausman test concluded that Random Effect test is more reliable.

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	3	1.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
IR	0.999205	0.999228	0.000000	0.4717
A	0.996338	0.996609	0.000000	0.3314
PTR	0.000104	0.000112	0.000000	0.9103

Cross-section random effects test equation:
Dependent Variable: SR
Method: Panel Least Squares
Date: 07/30/15 Time: 13:43
Sample: 2010M01 2015M05
Periods included: 65
Cross-sections included: 27
Total panel (balanced) observations: 1755

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000979	0.005485	0.178548	0.8583
IR	0.999205	0.000695	1436.787	0.0000
A	0.996338	0.002607	382.1216	0.0000
PTR	0.000104	8.69E-05	1.199918	0.2303

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.999175	Mean dependent var	0.724274
Adjusted R-squared	0.999161	S.D. dependent var	4.597794
S.E. of regression	0.133143	Akaike info criterion	-1.177835
Sum squared resid	30.57931	Schwarz criterion	-1.084327
Log likelihood	1063.550	Hannan-Quinn criter.	-1.143274
F-statistic	72066.53	Durbin-Watson stat	1.922744
Prob(F-statistic)	0.000000		

Table 4: Hausman Test

3. ANALYSIS AND EMPIRICAL RESULTS

Whether to invest in actively managed funds or passive funds is a quintessential question that may determine the return on your investment. Passive funds are like index funds that simply track the market without deviating much from its benchmark. On the contrary, active funds are actively managed by a portfolio manager and may deviate from the benchmark considerably on the basis of analysis carried out by the portfolio manager with the objective to outperform the benchmark. Portfolio turnover is one of the key styles that can be attributed to actively managed funds. Passive funds have a relatively low portfolio turnover ratio as the funds simply mimic the index, however active funds may have a high or low portfolio turnover depending upon the manager's style for stock selection.

An actively managed fund can outperform a benchmark on basis of consistently good decisions taken by its manager. This not only depends upon sector allocation and stock selection but also upon the market timing of the manger. One way a manager can manage the fund is by churning the portfolio, in other words, portfolio turnover. A manager may opt to aggressively churn a portfolio where the securities in a portfolio are held for less than six months or a manger may choose to hold securities for longer time.

High portfolio turnover is a concern because it incurs additional costs that ultimately reduce the net return to an investor. For every scrip bought and sold by a fund manager, the funds incurs a cost of 44 basis points as securities transaction tax and another 12 basis point as transaction cost for every buy and sell transaction. It is, thus, important to study the effect of portfolio turnover on mutual fund performance.

This study of 27 diversified equity mutual fund schemes over the period of 2010 to 2015 concluded that portfolio turnover and scheme returns are positively correlated. That is, higher portfolio turnover seeks higher returns because of consistent attempts by a manager to outperform the index. In the attempt to outperform the index and live up to the expectation of investors, a manager must have a detailed understanding and study of not only the market but also its peers.

We can attribute this positive correlation between portfolio turnover and scheme returns to qualitative aspects such as portfolio attribution, stock selection, sector allocation and market timing. It is important for a manager to take an active position to determine how much the fund should deviate from the index funds. This active position calls for active trading and results in relatively higher portfolio turnover ratios.

But the question remains, what is the optimal rate of portfolio turnover? Excessive trading may lead to churning that could adversely affect scheme returns, given its weak but positive correlation. On the other hand, low portfolio turnover may well imply mimicking the index which may not result in outperformance. In the quest to balance returns against turnover, it is important to establish what the optimal rate of portfolio turnover is.

5.1 Conclusion

The main focus of this paper was to establish whether portfolio turnover affects mutual fund scheme returns and if so how significant the relationship is. Our null hypothesis for the study was that portfolio turnover has no significant effect on scheme return whereas our alternate

hypothesis was that mutual fund turnover ratio impacts return. Contrary to the study where Carhart (1997) found a strong negative relation between turnover and scheme returns, my analysis is consistent with Grinblatt and Titman (1994) who found a positive correlation between portfolio turnover and fund performance. Therefore, I reject the null hypothesis and accept the alternate hypothesis.

The major conclusion drawn from my study was not surprising; I found a strong relationship between scheme returns and index returns but a weak correlation between the two main variables under study. However, we can always find exceptions to the study, there may be funds that may have consistently outperformed the index due to its high or low turnover ratio, but whether that outperformance can be completely attributed to turnover is questionable. Consistent outperformance may be a result of other management styles and strategy such as market timing and stock selection. Unlike other studies carried out about turnover and scheme return in the Indian mutual fund context, my analysis is based on an extensive data set and an in depth statistical analysis which helps me to validate my conclusion.

5.2 Scope for further research

This study considered only diversified equity schemes that are growth oriented. Probably, considering other types of schemes may result in a different analysis. Also, the methodology used to reach the conclusion was solely quantitative; a more qualitative approach along with statistical measures could be presented for more conclusive results. Qualitative research could include performance attribution of all schemes that could be used to understand stock selection and market timing of the manager which would help to understand the cause of outperformance in certain schemes. Other than that, portfolio turnover could be studied in varying economic contexts and a relationship could be found between the macroeconomic issues affecting turnover and scheme returns. Further research may address the above suggestions and expand the scope of their research.

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