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Performance Evaluation Of Index Funds And Etfs

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Abstract:
This study tries to find out and analyze the performance of 147 passive Mutual Fund schemes (index and ETFs funds) following the same benchmark index. The performance of the selected mutual fund schemes are analyzed on the basis of data available in the AMFI website. It includes data from 2006 to 2022. This study uses the differential return and its standard deviation, excess return against benchmark. 96 index funds and 51 ETFs funds and their corresponding benchmark index data are taken for study. This study will give the investors the clear idea as to invest in which passive funds. This study uses the single index model to get the value of alpha, beta and R squared. The mean and the standard deviation are calculated from the differential return. From this, the researcher will able to get the best performing passive funds. This study is useful for the investors and help them to invest in different passive mutual funds. The result suggest that Index funds performs better in gross as well as net return than the ETFs.

Keywords*:*
Mutual funds, Index funds, Exchange traded funds.

I. Introduction:

An investment is an asset or item purchased for income or capital appreciation. Valuation refers to the increase in value of an asset over time. When a person purchases a commodity as an investment, the intention is not to consume the commodity, but to use it to create wealth in the future. The current capital is used to increase the value of investment. Investing involves investing capital in the form of time, money, effort, etc., with the expectation of a higher future return than was originally invested. Investment refers to the medium or mechanism used to generate future income, such as: Bonds, Stocks, Real Estate, Alternative Investments. Investments generally do not guarantee an increase in value. Investor may earn less when they started. Investor can diversify their investments to reduce risk, but this may reduce the amount of potential income.

Mutual funds can be an excellent investment for those seeking portfolio diversification. Mutual funds offer low cost, diversity andconvenience, but whether or not to invest in them depends on investor's unique circumstances.

A mutual fund is a professionally managed fund that pools money with other investors to purchase a collection of securities such as stocks and bonds from multiple companies and other issuers such as governments and mutual funds. Investors do not own the securities directly, but sharein the fund's gains or losses with each other.

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Mutual fund portfolios are managed either actively or passively**.** Mutual fund portfolios can be actively or passively managed. Portfolio management means how the underlying assets (stocks, liabilities, gold, etc.) are bought and sold by a fund manager. Index Funds are an open-ended schemes where the investors buy and redeem units of the Mutual Funds at the net-asset values. In other words, the performance of an index fund is dependent on the performance of a particular index. Index funds contain shares in a similar proportion as they are in a particular index. A passive exchange-traded fund (ETF) is a financial instrument that seeks to replicate the performance of the broader equity market or a specific sector or trend. Passive ETFs mirror the holdings of a designated index—a collection of tradable assets deemed to be representative of a particular market or segment. Investors can buy and sell passive ETFs throughout the trading day, just like stocks on a major exchange. So in this study, the researcher tries to analyze to invest in which passive funds.

Passive funds do not change their portfolio frequently, so they buy or hold stocks to benefit from the valuation of the underlying securities over time. The index and ETFs are tracking the same indexes and buy the same stocks and remains same until it changes. Passive funds generally have lower management fees than actively managed funds because they don't buy or sell stocks frequently for short term gains. This paper, tries to examine the performance of passive investment vehicles, to choose among the multiple passive options following the same index and to compare the pre-expenses performance of ETFs and index funds following the same index. The need for this research is to analyze the performance and comparison of index funds and ETFs and to know which index fund and ETF is performed well.

II. Review Of Literature:

Javier Vidal-García, Marta Vidal et.al (2022) says that countries with a higher average daily fund return show a larger abnormal return from stock selection and also present a higher spread between the top and bottom deciles. They examined on a Comparison of Short-Term Persistence of Mutual Fund Performance in Europe. They examine the short-term persistence in mutual fund performance in Europe between 1990 and 2022.

Mutual Fund Performance and Flows during the COVID-19 Crisis is studied by Lubos Pastor and M. Blair Vorsatz (2022). They present a comprehensive analysis of the performance and flows of U.S. actively managed equity mutual funds during the 2020 COVID-19crisis. They find that most active funds underperform passive benchmarks during the crisis, contradicting a popular hypothesis. Funds with high sustainability ratings perform well, as do funds with high star ratings. Investors favour funds that apply exclusion criteria and funds with high sustainability ratings, especially environmental ones.

The impact of carbon neutrality on the investment performance: Evidence from the equity mutual funds in BRICS was conducted by Xiangfeng Ji, Yusong Zhang (2021). They using the monthly data between 2011 and 2019 and study 6519 actively managed mutual funds in BRICS after sorting them into black, brown, and green categories based on their investment holdings. Their findings also indicate Chinese green funds perform better than those of other countries.

Performance analysis of money market mutual funds, fixed income mutual funds, mixed mutual funds, and stock mutual funds in Indonesia during the 2015-2020 period was done by Jessica Claudia Mawikere (2021). This research aims to analyze the performance of money

market mutual funds, fixed income mutual funds, mixed mutual funds, and stock mutual funds in Indonesia in the period 2015-2020. Their results showed that it is not easy to maintain the best fixed mutual fund performance. While the worst performance for each year has similarities in certain mutual fund products.

Carmen-Pilar and Martí-Ballester (2020) says that**,** biotechnology and healthcare mutual funds perform similarly, while both of them outperform conventional mutual funds. They done a research on Financial Performance of SDG Mutual Funds Focused on Biotechnology and Healthcare Sectors.

Edwin J. Elton, Martin J. Gruber and Andre de Souza (2019) says that, investor followed a strategy of selecting either the index fund or ETF each period, whichever had the lower expenses, the institutional investor would be better off by 5 basis points per year compared to always selecting the ETF while the performance of retail investors would be unchanged.

Fund characteristics such size, expense ratio, portfolio turnover ratio, and age affect trading strategy of mutual funds says the author Inderjit Kaur (2018). The study has implications for investors of mutual funds as they can optimize their portfolio return with a strategy based on past one-year risk adjusted conditional Carhart alpha. Mutual fund ranking firms can consider conditional Carhart alpha as one of the criteria to rank mutual funds.

Charles Cao, Peter Ilie, Raisa Velthuis (2017) says that larger and older small-cap funds are more likely to hold mid and large cap stocks.They find that holdings in mid-cap and large-cap stocks are widespread among small-cap funds. They document that small-cap mutual funds allocate on average 27% of their portfolio to mid and large-cap stocks.

III.Methodology:

A. Models Used For The Study:

Monthly Gross Returns:

To calculate the gross return Morningstar adjusts the monthly total return for the share class by the share class level fees prevailing at that time. For periods where Morningstar does not have the prevailing fees for the share class not gross returns will be calculated. The monthly gross return is calculated by using the equation 1 as follows:

$$\boldsymbol{MGTR_i = \frac{(TR_i+1)}{(1-RC_i)} - 1} \quad (1)$$

Were,

MGTRi = Gross return for month i

TRi = Total return for month i

RCi = Un-annualized representative cost that covers month i

Monthly return:

Monthly Return is the period returns re-scaled to a period of 1 month. This allows investors to compare returns of different assets that they have owned for different lengths of time. The formula used is given below:

$$\textbf{Month return} = \frac{\textbf{(End value – Beginning value)}}{\textbf{Beginning value}} \quad (2)$$

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People frequently convert annual returns to average monthly returns using this formula: Monthly Return = (Period Ending Price/Period Beginning Price) ^ (1/12) – 1. The monthly return is the value of equation 2 it is calculated from the NAV of every month. The monthly return is then used for monthly gross return calculation. It is calculated as end value of NAV of fund for every month minus beginning value of every month divided by beginning value.

Single Index Model:

The Single Index Model (SIM) is an asset pricing model, according to which the returns on a security can be represented as a linear relationship with any economic variable relevant to the security. In case of stocks, this single factor is the market return. The single index model can be expressed by the following equation 3:

$$R_i = \alpha_i + \beta_i R_M + e_i$$

R_i = Return on security i

(3)

R_M = Return on the market index

α_i = Part of security return independent of market performance.

β_i = Constant measuring the expected change in the dependent variable, R_i, given a change in the independent variable R_M

e_i = random residual error.

Standard deviation

Measure the data's proclivity to spread. Accountants can draw crucial conclusions from past data in this way. The standard deviation is denoted by the letter S, and sigma is calculated as equation 4 follows:

$$\sigma = \sqrt{\frac{\sum(x_i - \mu)^2}{N}}$$

(4)

x_i= Individual fund differential return

μ = Average differential return of the selected category of funds.

N= Total no. of funds.

B. Data:

The present study is exclusively based on the secondary data. Secondary data is the data that has already been collected through primary sources and made readily available for researchers to use for their own research. It is a type of data that has already been collected in the past. Example: Government publication, websites etc. The main sources of historical data of mutual funds were taken from the website of advisorkhoj.com, morning star and AMFI website. The NAV value are taken from its launch date till its current date. The longest period for the ETF and index fund date is 2006. These funds are grouped as various categories. They are based on the indices.

The investment trusts from the company were the data were present in the website were considered based on the asset under management. The data were considered from the data available in the AMFI website includes 2006 to 2022 December. Some funds are having data from 2006 so that data taken from that date itself. Only systems for which a complete dataset

of was available during the study period were considered. It excluded the commodity funds. Then eliminated all index and ETF funds were there was not at least one index fund and one ETF fund following the same index at the same time. Using the above criteria, 147 out of 150 were taken under 16 categories. They are based on the indices. They are nifty 50, nifty 100, nifty alpha low volatility 30, nifty auto, nifty bank, nifty IT, S&P BSE low volatility, S&P BSE quality and S&P BSE Sensex etc.

C. Period Of Study:

This study uses the data that is available in the website. It includes the period of 2006 to 2022. It is collected from the AMFI websites for all the index funds and the ETFs. The benchmark index funds data are taken for the corresponding passive funds which have the same benchmark index.

IV. Results:

A. The differential returns of Index funds and ETFs in the gross return:

In this section the performance of index and ETF funds are measured. This measures the performance of the manager for the two types of passive funds. Table 1, present the performance statistics for ETFs and index funds both overall and separately for the sixteen categories. In computing performance of ETFs and index funds, the return on NAV represents the value of the assets in a portfolio.

Two types of performance measures are employed. The first uses the differential monthly return (fund return minus index return in percentage) and examines the mean and standard deviation. The second measure of performance employs three characteristics of regression of the return (pre-expense) against the index that the fund follows. The three statistics are the intercept, the beta, and the coefficient of determination. Overall averages are computed using all funds**.**

In this below table the column 1 shows the category of fund it is based on the benchmark, both the ETFs and index fund have the same benchmark. The second column represents the type of fun whether it is index or ETFs fund. The 3rd column denotes the number of funds in each type of funds. The 4th and 5th column has the pre-expense monthly average difference and the standard deviation of the monthly difference between each index fund or ETF. The next three columns present for each category and overall statistics of the time series regression of the pre-expense return for each fund or ETF against the index it follows.
Insert table No.1 here.

From the table No. 1, it reveals that index funds perform well as it has higher value in differential return, alphas, betas and R^2. But it has smaller standard deviation as compared to ETF funds. By comparing the overall performance of 16 category the index funds perform better than the ETFs funds. So the index funds performs better with the higher excess return, mean, high correlate the benchmark index and closely follow the index.

B. The differential returns of Index funds and ETFs in the net return:

This table shows the overall performance and comparison of index and ETFs funds using the net returns. Total of 147 funds consists of 96 index funds and 51 ETFs funds.

Insert table No.2 here.

From the table No.2, it reveals that index funds perform well as it has higher value in differential return, alphas, betas and R^2. But it has smaller standard deviation as compared to ETF funds. By comparing the overall performance of 16 category the index funds perform better than the ETFs funds. So, the whole, the index funds perform better with the higher excess return, mean, highly corelate the index and closely follow the index. In both the cases with expense ratio and without the expense ratio the index funds perform better irrespective of their expense ratio.

V. Findings And Implications:

From the results the researcher finds that index funds perform better than the ETFs in the gross return as well as the net return. The index funds gives higher returns and excess returns than the ETFs. So the investor are advised to invest in index funds than the ETFs. In gross return, all the sixteen categories shows that the index funds perform better than the ETFs with excess return and less deviation from the benchmark index. But in case of the net return, the ETFs perform better in the category of Nifty 100, Nifty Auto, Nifty Midcap 150, Nifty Midcap 150 Quality 50, Nifty 50 Equal Weight and S&P BSE quality.

VI. Conclusion:

Many investors think Mutual funds are like direct equity instruments which can make short term capital gains, but on reality Mutual funds should be seen primarily as medium to long term-oriented investment avenues where investors can invest for a period of a minimum of one year and a maximum of however the investor wishes to invest (Maximum 10-15 years). In this study, 96 index funds and 51 ETFs funds and their corresponding benchmark index data are taken for study. This study will give the investors the clear idea as to invest in which passive funds. This study uses the single index model to get the value of alpha, beta and R squared. The mean and the standard deviation are calculated from the differential return. From this, the researcher will able to get the best performing passive funds. This study is useful for the investors and help them to invest in different passive mutual funds. The result suggest that Index funds performs better in gross as well as net return than the ETFs.

Hence this research puts limelight into some mathematical/statistical concepts that can be used to easily analyze any mutual fund with adequate data. From this research, the investors should know where to invest in active or passive funds. In passive funds investor get a idea about where to invest whether in index or ETFs funds and which one has the less expense ratio. So, it is concluded that index funds are better perform than ETFs.

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APPENDIX

Table No. 1 The differential returns of Index funds and ETFs in the gross return

Category	Type of fund	Nos.	Mean	Standard Deviation	Alpha	Beta	R^2
Nifty Next 50	**Index fund**	**20**	0.006033	0.001154	0.006063	1.00196	0.999565
Nifty Next 50	**ETF**	**5**	-0.00206	0.045738	-0.00199	0.991897	0.682623
Nifty 50	**Index fund**	**22**	0.003878	0.001786	0.003925	0.995193	0.99875
Nifty 50	**ETF**	**10**	-0.00122	0.027928	-0.00121	0.999616	0.771488
Nifty 100	**Index fund**	**2**	0.006073	0.00146	0.006203	0.988495	0.999554
Nifty 100	**ETF**	**3**	0.004056	0.000776	0.004039	1.002725	0.999699
Nifty Alpha Low Volatility 30	**Index fund**	**2**	0.006346	0.000765	0.006341	1.023553	0.999492
Nifty Alpha Low Volatility 30	**ETF**	**1**	0.004796	0.000791	0.004755	1.003242	0.999614
Nifty Auto	**Index Fund**	**2**	0.006018	0.000389	0.006042	1.004487	0.999801
Nifty Auto	**ETF**	**1**	0.00282	0.001675	0.00272	1.011364	0.99932
Nifty Bank	**Index Fund**	**4**	0.005938	0.001519	0.006015	0.994866	0.999557
Nifty Bank	**ETF**	**7**	-0.00963	0.075681	-0.00977	1.018462	0.593281
Nifty IT	**Index Fund**	**2**	0.007359	0.002288	0.007246	1.017517	0.998419
Nifty IT	**ETF**	**3**	0.005614	0.052302	0.002911	1.181075	0.768382
Nifty Midcap 150	**Index Fund**	**10**	0.006191	0.001001	0.006249	0.998809	0.999698
Nifty Midcap 150	**ETF**	**2**	0.001455	0.001033	0.001525	0.996734	0.999794
Nifty Midcap 150 Quality 50	**Index fund**	**4**	0.006476	0.00104	0.006698	1.026804	0.999253

Nifty Midcap 150 Quality 50	**ETF**	**1**	0.003758	0.000814	0.003795	1.005824	0.999762
Nifty 50 Equal Weight	**Index fund**	**4**	0.007342	0.001652	0.007252	1.010619	0.999084
Nifty 50 Equal Weight	**ETF**	**1**	0.004072	0.001252	0.004056	1.003867	0.999299
Nifty 50 Value 20	**Index Fund**	**2**	0.006271	0.001734	0.006249	1.002191	0.998081
Nifty 50 Value 20	**ETF**	**1**	0.002212	0.002337	0.002157	1.004758	0.997349
Nifty 100 Quality 30	**Index Fund**	**2**	0.006055	0.001428	0.006053	0.999334	0.998719
Nifty 100 Quality 30	**ETF**	**1**	0.003712	0.001119	0.003657	1.033741	0.999312
Nifty 200 Momentum 30	**Index fund**	**6**	0.006479	0.001114	0.006462	1.003163	0.999611
Nifty 200 Momentum 30	**ETF**	**4**	-0.01759	0.064904	-0.0174	0.645828	0.752887
S&P BSE Low Volatility	**Index fund**	**4**	0.008078	0.002152	0.007914	1.017874	0.996524
S&P BSE Low Volatility	**ETF**	**1**	-0.08247	0.253482	-0.07389	-0.00969	1.97E-06
S&P BSE Quality	**Index Fund**	**2**	0.007677	0.003322	0.007145	1.074858	0.984985
S&P BSE Quality	**ETF**	**1**	0.00419	0.003715	0.003631	1.084132	0.982929
S&P BSE Sensex	**Index Fund**	**8**	0.004622	0.002643	0.004663	0.996152	0.996793
S&P BSE Sensex	**ETF**	**9**	-0.00099	0.030277	-0.00109	1.007894	0.761072
All	**Index fund**	96	0.006291	0.001586	0.006272	1.009688	0.997996
All	**ETF**	51	-0.00483	0.035239	-0.00451	0.936342	0.831676

Table No. 2. The differential returns of Index funds and ETFs in the net return

Category	Type of fund	Nos.	Mean	Standard Deviation	Alpha	Beta	R^2
Nifty Next 50	**Index fund**	**20**	0.000216	0.001122	0.000265	0.996183	0.999565
Nifty Next 50	**ETF**	**5**	-0.00523	0.045467	-0.00514	0.988907	0.682623

Nifty 50	**Index fund**	**22**	0.000273	0.002804	0.000375	0.991678	0.99875
Nifty 50	**ETF**	**10**	-0.00194	0.027908	-0.00193	0.998896	0.771488
Nifty 100	**Index fund**	**2**	0.000206	0.001632	0.0004	0.982792	0.999554
Nifty 100	**ETF**	**3**	0.00041	0.000768	0.000424	0.999117	0.999699
Nifty Alpha Low Volatility 30	**Index fund**	**2**	0.004841	0.000742	-0.00505	1.003698	0.999738
Nifty Alpha Low Volatility 30	**ETF**	**1**	0.000523	0.000778	0.000535	0.999028	0.999614
Nifty Auto	**Index Fund**	**2**	-0.0009	0.000369	-0.00091	0.997548	0.999801
Nifty Auto	**ETF**	**1**	0.000797	0.001629	0.000714	1.009341	0.99932
Nifty Bank	**Index Fund**	**4**	-0.00026	0.001656	-0.00008	0.988832	0.999557
Nifty Bank	**ETF**	**7**	-0.01134	0.075549	-0.01146	1.01673	0.593281
Nifty IT	**Index Fund**	**2**	0.000761	0.002158	0.00069	1.010895	0.998419
Nifty IT	**ETF**	**3**	-0.00842	0.050989	-0.01119	1.16342	0.768382
Nifty Midcap 150	**Index Fund**	**10**	-0.00006	0.001026	0.000047	0.992652	0.99969
Nifty Midcap 150	**ETF**	**2**	0.000439	0.001059	0.000524	0.995741	0.999794
Nifty Midcap 150 Quality 50	**Index fund**	**4**	0.000435	0.000895	0.000622	1.020611	0.999253
Nifty Midcap 150 Quality 50	**ETF**	**1**	0.000666	0.000771	0.000683	1.002706	0.999762
Nifty 50 Equal Weight	**Index fund**	**4**	0.000426	0.001559	0.000394	1.003738	0.999084
Nifty 50 Equal Weight	**ETF**	**1**	0.000947	0.001236	0.000944	1.000755	0.999299
Nifty 50 Value 20	**Index Fund**	**2**	0.00118	0.001723	0.001209	0.997171	0.998081
Nifty 50 Value 20	**ETF**	**1**	0.000996	0.00233	0.000955	1.003553	0.997349
Nifty 100 Quality 30	**Index Fund**	**2**	0.000669	0.001433	0.000658	0.993975	0.998719
Nifty 100 Quality 30	**ETF**	**1**	0.000696	0.001056	0.000646	1.030639	0.999312

Nifty 200 Momentum 30	**Index fund**	**6**	-0.00013	0.0011	-0.00012	0.996601	0.999611
Nifty 200 Momentum 30	**ETF**	**4**	-0.02068	0.064705	-0.02049	0.643851	0.752887
S&P BSE Low Volatility	**Index fund**	**4**	0.001308	0.002067	0.001205	1.011098	0.996524
S&P BSE Low Volatility	**ETF**	**1**	-0.08525	0.252738	-0.07667	-0.00966	1.972182
S&P BSE Quality	**Index Fund**	**2**	0.001021	0.003232	0.000539	1.067809	0.984985
S&P BSE Quality	**ETF**	**1**	0.001258	0.003672	0.00072	1.080988	0.982929
S&P BSE Sensex	**Index Fund**	**8**	0.000281	0.00435	0.00038	0.989078	0.984782
S&P BSE Sensex	**ETF**	**9**	-0.00224	0.03025	-0.00232	1.00668	0.761072
All	**Index fund**	96	0.000642	0.001742	0.000039	1.002772	0.997257
All	**ETF**	51	-0.00802	0.035057	-0.00769	0.933168	0.954937