A RESEARCH PAPER

RISK AND RETURN ANALYSIS OF EQUITY-LINKED TAX SAVINGS SCHEMES OF MUTUAL FUNDS IN INDIA

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ABSTRACT

The top 32 growth-oriented open-ended Equity savings schemes of India's tax-saving mutual funds are the subject of this research paper's evaluation. Performance has been evaluated using quarterly returns in comparison to S&P CNX NIFTY 50, the benchmark index for the Indian stock market. Risk-adjusted performance measures proposed by Sharpe, Treynor, and Jenson have been utilized for this purpose. In the most recent three years, from 2020–2021 to 2022–2023, Net Asset Value of Tax Saving Schemes has been used. It was discovered that some funds performed well over the course of the full investigation. All of the schemes have the same return structure and move in lockstep withthe S&P CNX NIFTY 50 stock market index.

Keywords: Risk-adjusted return, Equity Linked Savings Scheme, and Performancemetrics.

Introduction

The majority of tax Taxpayers prefer to save money instead of paying taxes. They must invest the necessary sum in a tax-sheltered channel to avoid paying taxes. In addition to tax exemption, they anticipate a profit. One option that offers market-related returns with a tax exemption is tax-saving mutual funds. Investing in tax-saving mutual funds entitles investors to a Rs. 1,50,000 tax exemption.

The mutual fund sector in India first appeared in 1964 and quickly expanded. Generally speaking, mutual funds with diversified portfolios are believed to offer returns with lower market risk and less volatility than the stock market. An investor with money in the stockmarket must regularly check the market. Conversely, investors who invest in mutual funds do not need to monitor market activity to limit their losses. Every Asset Management Company has a fund manager who looks after the money of the investors.

They diversify the investors' funds across a range of industries, including agriculture, banking, the oil and

gas industry, and information technology. The profits from this diversified portfolio are paid to all participants. Mutual funds, therefore offer minimal return with lesser risk.

There are about 80 open-ended ELSS mutual funds in India. This study examines the performance of the top 32 tax-advantaged mutual funds based on assets under management (AUM), which is the total market value of investments handled by a personor entity on behalf of investors over the previous three years, from 2020-21 to 2022-23.

To compare mutual fund performance, the study uses the benchmark index S&P CNXNIFTY 50. The remainder of the study is organized as follows: Summarizing related literature on mutual fund performance, presenting data and methodology, findings of tax-saving mutual fund performance assessments, and a concluding part discussing the paper's conclusion.

Review of Literature

N.S. Santhi and Dr. K. Balanaga Gurunathan, "Risk and Return Analysis of Equity Link Savings Schemes Of Mutual Funds In India"

To assess risk, this research compares the performance of 32 tax-saving mutual funds in India over five years (2006–07 to 2010–11) to the S&P CNX–Nifty stock market index. It employs many methodologies and analyzes their outcomes. Their analyses revealed that no bank regularly outperformed the market but largely followed market patterns. Despite losses in 2008 and 2009, the stock market outperformed the overall market. In general, these funds provided larger returns with less risk than the benchmark index.

Ayesha Mahajan, Ekaastha Nijhara, Himalaya Tarani and Krety Grover, " Performance And Evaluation Of Mutual Funds In India"

The goal of this experiment is to evaluate the performance of 15 Indian fund system groups from April 2010 to April 2012. This is accomplished through the use of several performance analysis approaches, such as the relative performance index, risk-return analysis, Treynor's theorem, Sharpe's theorem, Sharpe measure, and Jensen's measure. The data used is from the Association of Mutual Funds in India (AMFI) website and comprisesa high monthly NAV. The project aims to compare various mutual fund schemes based on their risk and return characteristics using the above-mentioned parameters. This enables usto see which banks have done well over time. This study assists investors and stakeholdersin making more informed investment decisions.

Mr. Prakash R.P. and Dr.Prakash Basanna " COMPARATIVE ANALYSIS OF PUBLIC AND PRIVATE SECTOR MUTUAL FUNDS IN INDIA"

This study examines mutual funds' crucial role in channeling individual savings into Indian financial markets, particularly corporate sectors, based on portfolio management and investor risk choices. Two objectives include analyzing the risk-return in managed and balanced mutual funds and comparing public-private bank performance. Findings highlight discernible average profitability differences between banks, which are moderatedby risk factors like Sharpe, Treynor, and Jensen models. Emphasizing mutual funds' use ofhousehold savings and evaluating performance via risk and benefits, the research demonstrates that while average returns vary between public and private banks, risk-adjusted performance disparities diminish.

Kavita Arora "Risk-adjusted Performance Evaluation of Indian Mutual FundSchemes"

Between April 2000 and March 2008, the study examined 100 Indian savings schemes.They evaluated their success using criteria such as Sharpe and Treynor ratios. The outcomes were mixed: 52% outperformed the benchmark in terms of Sharpe ratios. In both Sharpe and Treynor's benchmarks, the share of growth, tax policy, income, and policy balances across sectors was significantly higher than the norm.

Viviane Y. Naimy "Equity Mutual Funds Versus Market Performance: Illusion orReality?"

They compared the returns of eight different US equity funds to the NYSE composite Index from 2000 to 2007 and discovered that their returns were moving in lockstep. The paper also argued that investors should be aware of mutual fund flaws and challenges andshould examine other investment options for higher results.

J.N. Mukhopadhyay and Veena Viswanathan, "Mutual fund schemes in India – Can they Protect the Interest of the Retail Investors?"

Investigated whether mutual funds might genuinely provide greater value than the stockmarket and protect investors' interests during a slump. During the severe downturn, the schemes not only provided negative returns but significantly underperformed the index.

Kavitha Chavali and Shefali Jain, "Investment Performance of Equity-Linked Saving Schemes- An Empirical Study"

Compare the performance of 16 equity-linked schemes to the benchmark S&P CNX Nifty using risk and return. According to the article, the majority of investors were aware of mutual funds and their risk and return ratios.

Zakri Y. Bello "On the predictability of Mutual fund Returns", Journal of Business & Economic Studies

Investigated five parameters, namely default risk premium, term premium, monetary circumstances, federal fund premium, and market risk premium, and found that these factors can strongly predict mutual fund performance.

Dr Vikas Choudhary, and Preeti Sehgal Chawla "Performance Evaluation of MutualFunds: A Study of Selected Diversified Equity Mutual Funds in India"

The research looked at how well certain investment funds in India did. These funds collect money from different people and use it to buy things like company shares. The study checked how much money these funds made compared to the risks they took. They used different ways to measure this, like looking at average returns, how much extra return theygot for the risks they took, and how much their values went up and down. The research found that most of these funds did better than others when considering both the money they made and the risks they took.

Dr. Kalyan Nalla Bala and Dr. Gautami.S "A study on Risk and Return analysis ofthe selected Mutual funds Schemes in India

The Indian mutual fund industry is growing rapidly due to factors such as infrastructure development, a rise in private equity assets, and increasing foreign participation. In India, mutual funds are becoming a preferred investment option due to risk appetite, income, and discretion. The industry has expanded significantly, with private players providing global expertise.

This study examines the risks and returns of selected mutual fund schemes in India. Risk is the possibility that actual returns will change, while returns are determined by the value of the investment. Analyzing these factors helps investors assess the performance of their investments. The main objective of the article is to assess the performance of selected banks in India.

Statement of Problem

The main issue addressed in this research paper pertains to the performance evaluation of growth-oriented open-ended Equity Linked Savings schemes offered by India's tax-saving mutual funds. While these schemes are designed to provide tax benefits to investors, their comparative performance and risk-adjusted returns, particularly in relation to the S&P CNX NIFTY 50 benchmark index, have not been comprehensively examined. This study aims to assess the performance of the top 32 tax-saving mutual fund schemes over the recent three-year period (2020-2021 to 2022-2023) using established risk-adjusted performance measures, such as the Sharpe, Treynor, and Jensen ratios. The research also seeks to identify any noteworthy disparities in the performance of these funds and explore whether the observed returns are directly linked to the movements of the S&P CNX NIFTY 50 index. By addressing these gaps, the research contributes to a deeper understanding of the effectiveness and consistency of tax-saving mutual fund schemes as aviable investment option for Indian investors seeking both growth and tax advantages.

Objective of the Study

Based on the provided statement of the problem, the objectives of my study are:

1. To access the Performance of each fund based on the help of suitable statistical measurement tools.

2. To Measure Risk-Adjusted Returns: Another key objective is to apply established risk-adjusted performance measures, namely the Sharpe, Treynor, and Jensen Alpha ratio to quantify the risk-adjusted returns of the identified tax-saving mutual fund schemes overthe specified three-year period.

3. To identify the differences and relationships among the mutual funds.

4. To Evaluate Performance: The primary objective of this study is to comprehensively assess the performance of the top 32 growth-oriented open-ended Equity Linked Savingsschemes offered by India's tax-saving mutual funds. This evaluation will include a comparison of their returns against the S&P CNX NIFTY 50 benchmark index of the S&P CNX NIFTY 50 Index. This objective aims to determine whether the fundreturns are influenced by broader market trends.

To Inform Investment decisions: The ultimate objective is to equip investors, financial professionals, and policymakers with valuable insights derived from the study's findings. This information can guide investment decisions, promote informed financial planning, and contribute to the optimization of tax-saving investment strategies in the Indian context. In summary, the objectives of the study encompass a thorough performance evaluation, risk assessment, disparity identification, index correlation analysis, and an overall contribution to the knowledge base surrounding tax-saving mutual fund schemes in India.

Scope of the Study

This study compares the performance and risk-adjusted returns of the top 32 growth-oriented Equity Linked Savings (ELSS) schemes in India from 2020-2021 to 2022-2023. It compares their returns to the S&P CNX NIFTY 50 index using well-knowncriteria such as the Sharpe, Treynor, and Jensen ratios. Disparities across ELSS schemes are investigated, as are relationships with market developments. The research improves understanding of ELSS efficacy, consistency, and the twin benefits of growth potential andtax benefits. It attempts to provide information to help guide investment decisions, financial planning, and tax-saving initiatives. The study benefits Indian investors, financial experts, and policymakers. In summary, the scope of the study covers detailed performance evaluation, risk assessment, discrepancy analysis, and index correlation, all of which contribute to a better understanding of Indian tax-saving mutual fund schemes.

Source of Data

For the purposes of this research, thirty-two Indian-based tax-saving mutual funds were gathered. These funds' quarterly returns were obtained from the first fiscal years 2020–21through 2022–23. All of the schemes' daily returns were gathered from www.moneycontrol.com and corporate reports. In this study, the average yield (3.5% on post office savings schemes) was used as a proxy for the risk-free rate of return

Methodology

This study calculates risk-return profiles for tax-advantaged mutual funds that have been shifted from a three-year to a one-year holding period. Annual returns and metrics ofreturn and risk are computed using quarterly returns. Quarterly monthly returns throughout the required period yield mean returns.

NAV return is the change in the net asset value of a mutual fund over a given period.

NAV Return = Current value of units – Previous value of units X 100/Previous value of units
----- Formula (1)

Total risk is measured by the standard deviation of returns. Systematic (market) risk is estimated by beta. The risk premium related to the total risk is measured by the Sharpe index. The fund's performance relative to the market's performance is measured by the Treynor index. Jensen's Alpha is used to compare the actual or realized return of the portfolio with the predicted or calculated return. The market benchmark used here is S&PCNX NIFTY 50

Standard Deviation

The standard deviation is a measure of variability that is used as the standard measure of the total risk of individual assets and the residual risk of portfolios of assets. This can be calculated by using the formula

---------- Formula (2$\sigma = \sqrt{\frac{\sum(X-\mu)^2}{n}}$

σ = standard deviation

X_i = Each data value

μ = Mean value of data

N = sample size

Sharpe Ratio

Sharpe measures developed by William Sharpe are referred to as the Sharpe ratio of the reward variability ratio. It is the ratio of the reward or risk premium to the variability of return or risk as measured by the standard deviation of return. The index assigns the highest values to assets that have the best risk-adjusted average rate of return. The formulafor calculating the Sharpe ratio may be stated as :

$$S = \left(\frac{R_p - R_f}{\sigma_p}\right)$$

---------- Formula (3)

where, r_p = Realized return on the portfolio$_f$ = Risk- free rate of return

$_p$ = Standard deviation of the portfolio

Treynor Ratio

Treynor Ratio is the performance measure developed by Jack Treynor and is referred to asthe Treynor ratio or reward to volatility ratio. It is the ratio of the reward, or risk premium,to the volatility of return as

measured by the portfolio beta. The formula for calculatingthe Treynor ratio may be stated as follows:

$$Treynor\ Ratio = \frac{r_p - r_f}{\beta_p}$$

---------- Formula (4)

Where, r_p = Realized return on the portfolio

r_f = Risk-free rate of return

$_p$ = Portfolio Beta

Jensen's Alpha Ratio

Jensen Ratio is another type of risk-adjusted performance measure that has been developed by Michael Jensen and is referred to as the Jensen measure or ratio. This ratio attempts to measure the differential between the actual return earned on a portfolio and thereturn expected from the portfolio given its level of risk. The formula for calculating the Jensen ratio may be stated as :

Jensen's Alpha Ratio (JR) = $r_{p} - r_{f} + _{p} (r_{m} - r_{f})$ ---------- Formula (5)

where r_p = Realized return on the portfolior_f = Risk-free rate of return

$_p$ = Portfolio Beta

r_m = Market Return

The higher Sharpe, Treynor, and Jenson perform, the better the performance of the fundsin the market. The highest standard deviation has high volatility in the market.

Annualized Quarterly Average Return of Tax Saving Mutual funds

Annualized quarterly returns from tax- savings mutual funds" refers to the rate of return of a specific set of "tax-saving" or "ELSS" (Equity Linked Savings Scheme) mutual funds in manufacturing more than a quarter (three-month period) annually) build. ELSS fund is a type of mutual fund in India that provides tax benefits under Section 80C of the IncomeTax Act. To calculate "Annualized Quarterly Average Return of Tax Saving Mutual Funds"

1. **Calculate Average Quarterly Return**: Add up the quarterly returns calculatedand divide by the total number of quarters. This gives you the average return earned by the fund over the quarters under consideration.
2. **Annualize the Average Return**: To annualize the average quarterly return, youneed to adjust it to represent what the return would be if it continued at the samerate for a full year. The formula to annualize the return is:

Annualized Return = [(1 + Average Quarterly Return)^4] - 1

In this formula, the exponent "4" represents the number of quarters in a year (sincewe are calculating based on quarterly returns), and the "-1" at the end accounts forthe initial investment.

Table 1: Annualized Quarterly Average Return of Tax Saving Mutual funds

S.N0	Schemes	2020-21	2021-22	2022-23	3 YEAR AVG
1	Bandhan Tax Advantage Direct Plan-Growth	19.27	6.88	0.50	8.88
2	Parag Parikh Tax Saver Fund	15.77	6.59	1.59	7.99
3	HDFC Taxsaver Fund	14.03	6.03	2.02	7.36
4	SBI Long Term Equity Fund	15.45	4.85	1.64	7.31
5	Quant Tax Plan	23.55	9.95	0.49	11.33
6	JM Tax Gain Fund	15.31	6.26	0.15	7.24
7	PGIM India Tax Saver Fund Direct Growth	15.95	6.81	0.49	7.75
8	Mahindra Manulife ELSS Fund	15.15	6.16	0.46	7.25
9	Kotak Tax Saver Fund Direct-Growth	15.33	5.4	1.04	7.25
10		14.17	3.74	1.70	6.53

	Motilal Oswal Long Term Equity Fund				
11	Taurus Taxshield - Direct Plan – Growth	12.74	4.32	1.23	6.09
12	Franklin India Taxshield Fund	16.20	4.97	0.71	7.29
13	Mirae Asset Tax Saver Fund Direct-Growth	17.48	4.99	0.13	7.53
14	Nippon India Tax Saver Fund Direct Growth	14.95	5.52	0.16	6.87
15	Bank of India Tax Advantage Fund	15.26	5.80	0.53	7.19
16	Sundaram Tax Savings Fund Direct	15.20	5.78	0.01	7
17	DSP Tax Saver Fund	16.08	5.28	0.17	7.17
18	Union Tax Saver (ELSS) Fund	15.22	5.60	0.33	7.05
19	ICICI Prudential Long Term Equity Fund	15.91	5.52	-0.46	6.99
20	Canara Robeco Equity Tax Saver Fund	15.6	5.085	0.33	7.05
21	Quantum Tax Saving Fund Direct-Growth	16.04	3.17	0.465	6.55
22	Tata India Tax Savings Fund Direct-Growth	10.12	5.24	0.40	5.32
23	Edelweiss Long Term Equity Fund Fund	14.33	5.03	0.235	6.53
24	LIC MF Tax Plan Fund	12.04	5.42	-1.48	5.32
25	UTI Long Term Equity Fund	15.56	4.77	0.97	7.1
26	HSBC ELSS Fund	15.11	4.34	0.21	6.55
27		13.93	4.46	0.27	6.22

	Navi ELSS Tax Saver Fund				
28	**ITI Long Term Equity Fund**	**15.45**	**1.35**	**1.60**	**6.13**
39	**Invesco India Tax Plan Fund**	**14.39**	**4.80**	**-1.26**	**5.97**
30	**Shriram Long Term Equity Fund**	**10.95**	**4.06**	**0.66**	**5.22**
31	**Axis Long Term Equity Fund**	**13.00**	**3.39**	**-2.77**	**4.54**
32	**Aditya Birla Sun Life ELSS Tax Relief 96 Fund**	**24.95**	**9.95**	**-0.78**	**11.37**
	Bench Mark S&P CNX NIFTY 50 AVG QUARTERLY RETURN	**14.98**	**4.04**	**0.24**	**6.42**

Result and Interpretation of the Annualized Quarterly Average Return of Tax SavingMutual Funds:

In order to provide a meaningful interpretation of the annualized quarterly average performance of each mutual fund in correlation with the benchmark index return, We have categorized the funds into two main groups based on their performance relative to the benchmark average return in the past three years:

Market return with 3-Year Average Returns is 6.42 percent

- **Mutual Funds with 3-Year Average Returns Above 6.42:**

1. Axis Long Term Equity Fund - 11.37
2. Parag Parikh Tax Saver Fund - 11.33
3. Quant Tax Plan – 11.33
4. Bandhan Tax Advantage Direct plan Growth – 8.88
5. Mirae Asset Tax Saver Fund Direct-Growth - 7.99
6. HDFC TaxSaver Fund - 7.88
7. JM Tax Gain Fund - 7.75
8. Edelweiss Long Term Equity Fund - 7.53
9. ICICI Prudential Long Term Equity Fund - 7.29

10. Kotak Tax Saver Fund Direct-Growth - 7.25
11. SBI Long Term Equity Fund - 7.25
12. Sundaram Tax Savings Fund Direct - 7.19
13. Nippon India Tax Saver Fund Direct Growth - 7.17
14. DSP Tax Saver Fund - 7.10
15. Franklin India Tax shield Fund - 7.05
16. Union Tax Saver (ELSS) Fund - 7.05
17. Shriram Long Term Equity Fund - 7.05
18. Mahindra Manulife ELSS Fund - 7.05
19. PGIM India Tax Saver Fund Direct Growth - 7.05
20. Taurus Tax shield - Direct Plan - Growth - 6.99
21. ITI Long Term Equity Fund - 6.87
22. Invesco India Tax Plan Fund - 6.53
23. Tata India Tax Savings Fund Direct-Growth - 6.53
24. Quant Tax Plan - 6.53
25. UTI Long Term Equity Fund - 6.55
26. Motilal Oswal Long Term Equity Fund - 6.55

The average return of the benchmark for the past three years is (Nifty 50 – 6.42%). The average return of the companies listed above is high than the benchmark (NIFTY 50) which means these Mutual funds are overperforming. So, the potential investors may prefer the above Mutual funds and the existing investors may continue their investment in the above Mutual fund companies. Some of them, such as the "Quant Tax Plan" and "Aditya Birla Sun Life ELSS Tax Relief 96 Fund," have exceptionally high returns, which might be attractive to investors looking for higher returns. Others, like "Bandhan Tax Advantage Direct Plan-Growth" and "Sundaram Tax Savings Fund Direct," have above-average returns, making them competitive choices.

- **Mutual Funds with 3-Year Average Returns below 6.42:**

1. Bank of India Tax Advantage Fund - 6.22
2. LIC MF Tax Plan Fund - 6.13
3. HSBC ELSS Fund - 5.97
4. Canara Robeco Equity Tax Saver Fund - 5.32
5. Quantum Tax Saving Fund Direct-Growth - 5.32
6. Aditya Birla Sun Life ELSS Tax Relief 96 Fund - 4.54

The average return of the benchmark for the past three years is (Nifty 50 – 6.42%) The average return of the companies listed above is less than the benchmark (NIFTY 50) which means these Mutual funds are underperforming. So, the potential investors will not prefer the above Mutual fund and the existing investors may withdraw their investment from the above mutual fund companies. For example, "Axis Long Term Equity Fund" and "Axis Long Term Equity Fund" have returns below the benchmark, which might indicate that they have not performed as strongly over the past 3 years. However, investors may consider these funds if they are willing to accept potentially lower returns for specific investment objectives, such as tax savings or a particular risk profile.

Standard Deviation of Tax Saving Mutual Funds

The standard deviation of "tax-saving mutual funds" is a statistical measure of the degree of variation or spread in the returns of a particular class of mutual funds, called "tax-saving" or "ELSS" (Equity Linked Savings Scheme) funds are used to support each other. The standard deviation provides insight into the degree of risk or volatility associated with a bank's historical performance.

1. **Calculating mean return:** calculate the profitability of the ELSS group by adding up the individual returns and dividing by the total amount.
2. **Calculate the squared difference**: For each individual fund's return, subtract the return Square each fund's results.
3. **Calculate the variance**: Add up the study difference calculated and divide by the total amount. This gives you a variance.
4. **Calculate the standard deviation:** The standard deviation is the square root of the variance calculated. It gives you a measure of how an individual fund's return differs from the average return. Sharpe ratio of Tax Saving Mutual Funds

Sharpe Ratio of Tax Saving Mutual Funds

The Sharpe ratio is a widely used financial metric that helps investors assess the risk-adjusted performance of an investment, such as in this case a "tax-saving mutual fund" that catches on the return on investment and the total amount of risk or volatilityassociated with those returns. Here is how the Sharpe Ratio is calculated and what it represents.

1. **Calculate Excess Return:** Subtract the risk-free return (usually the return on a risk-free investment such as government bonds) from the return on the investmentin question. This gives you an "excess return," which represents the additional return over and above the risk-free level.

2. **Calculate the standard deviation:** Calculate the standard deviation of the returnon investment. The standard deviation measures the volatility or fluctuation of returns on investments over time. It identifies the risk of the investment.

3. **Calculate the Sharpe Ratio:** Divide by the standard deviation calculated in step excess return. The result is the Sharpe Ratio.

Treynor Ratio of Tax Saving Mutual Funds

The Treynor Ratio is another important financial metric used to assess the risk-adjusted performance of an investment, such as "Tax Saving Mutual Funds." It focuses specifically on the systematic risk of an investment and is named after its creator, Jack L. Treynor.

1. **Calculate the return of the fund:** Add up the returns of the fund for the specified period (2020-23 in your case) and then divide by the total amount. This gives youthe fund's average return over the period.

2. **Invest in risk-free investments:** Risk-free investments are usually returns on low-risk investments, such as government securities. It represents the return that aninvestor can earn without taking on any risk. You need to determine the appropriate safe dosage for the specific time period you are considering.

3. **Estimation of fund beta:** Beta measures the sensitivity of a fund's return to changesin the overall market. This refers to the structured risk of a portfolio. You have to calculate or get the beta of each stock.

4. **Calculate the Treynor Ratio:** Enter the values calculated in steps 1, 2, and 3 into theformula: Treynor Ratio = (low return on investment - no risk) / beta of the fund

Jensen's Alpha Ratio of Tax Saving Mutual Funds

The alpha ratio, also known as Jensen's alpha, is a financial metric used to evaluate the risk-adjusted performance of investments such as "tax savings accounts". It focuses on the difference between the actual return on investment and the expected return based on the degree of risk involved.

1. **Calculate the expected return:** Determine the expected return on your investment based on a specific benchmark or market index. These ratios represent the "market" or "average" return an investor can expect for a given level of risk.

2. **Calculate the excess return:** Subtract the expected return calculated from the actual return on investment.

3. **Calculate the alpha ratio:** Divide the excess return calculated by the standard deviation of the return on investment. The standard deviation represents the risk or volatility of an investment.

Table 2: Sharpe ratio, Standard Deviation, Treynor Ratio & Alpha Ratio of Tax Saving Mutual Funds

S.N0	Schemes	SHARPE 2020-23	Std Dev 2020-23	TREYNOR 2020-23	ALPHA 2020-23
1	Bandhan Tax Advantage Direct Plan-Growth	1.44	16.21	0.23	5.78
2	Parag Parikh Tax Saver Fund	1.36	12.11	0.23	4.35
3	HDFC TaxSaver Fund	1.34	14.02	0.21	3.62
4	SBI Long Term Equity Fund	1.28	14.55	0.20	2.75
5	Quant Tax Plan	1.47	18.41	0.26	9.28
6	JM Tax Gain Fund	1.17	15.46	0.18	2.51
7	PGIM India Tax Saver Fund Direct Growth	1.2	14.26	0.19	1.76
8	Mahindra Manulife ELSS Fund	1.24	14.34	0.19	2.07
9	Kotak Tax Saver Fund Direct-Growth	1.22	14.31	0.19	1.95
10	Motilal Oswal Long Term Equity Fund	1.11	15.24	0.18	0.92
11	Taurus Tax shield - Direct Plan - Growth	0.91	14.11	0.14	-2.37
12	Franklin India Tax shield Fund	1.24	15.63	0.19	3.62

13	Mirae Asset Tax Saver Fund Direct-Growth	1.18	14.72	0.18	1.2
14	Nippon India Tax Saver Fund Direct Growth	1.23	15.59	0.19	2.16
15	Bank of India Tax Advantage Fund	1.21	15.41	0.19	2.3
16	Sundaram Tax Savings Fund Direct	1.13	15.03	0.17	0.66
17	DSP Tax Saver Fund	1.20	14.66	0.19	1.76
18	Union Tax Saver (ELSS) Fund	1.17	14.28	0.18	0.86
19	ICICI Prudential Long Term Equity Fund	1.12	14.51	0.17	0.53
20	Canara Robeco Equity Tax Saver Fund	1.08	14.74	0.17	-0.33
21	Quantum Tax Saving Fund Direct-Growth	1.08	14.49	0.17	0.09
22	Tata India Tax Savings Fund Direct-Growth	1.07	15.23	0.17	-0.23
23	Edelweiss Long Term Equity Fund	1.02	14.80	0.16	-1.08
24	LIC MF Tax Plan Fund	0.99	14.13	0.15	-1.16
25	UTI Long Term Equity Fund	0.99	14.56	0.15	-0.3
26	HSBC ELSS Fund	0.92	15.32	0.14	-2.38
27	Navi ELSS Tax Saver Fund	0.92	14.94	0.15	-0.93
28	ITI Long Term Equity Fund	0.84	14.5	0.14	-2.69
39	Invesco India Tax Plan Fund	0.87	14.77	0.14	-2.28
30	Shriram Long Term Equity Fund	0.66	14.14	0.10	-6.07

31	**Axis Long Term Equity Fund**	**0.66**	**15.68**	**0.11**	**-5.85**
32	**Aditya Birla Sun Life ELSS Tax Relief 96 Fund**	**0.55**	**13.38**	**0.09**	**-6.72**
	ELSS CATEGORY AVG MUTUAL FUND STANDARD DEV., SHARPE, TREYNOR & ALPHA	**1.24**	**14.99**	**0.21**	**3.02**
	Bench Mark S&P CNX NIFTY 50 AVG (2020-23)	**1.22**	**12.34**	**0.21**	**2.5**

Result and Interpretation of the Sharpe Ratio, Standard Deviation, Treynor Ratio & Alpha Ratio of Tax SavingMutual Funds

A. Sharpe Ratio

The data provided includes the Sharpe ratios for various mutual funds compared to the NIFTY benchmark. The Sharpe ratio is a measure of a fund's risk-adjusted return, and it is used to evaluate the performance of investment funds. Here's an interpretation of the data and an evaluation of the performance:

- **Mutual Funds with Sharpe Ratios Above the NIFTY Benchmark (1.22):**

1. Quant Tax Plan - 1.47
2. Bandhan Tax Advantage Direct Plan-Growth - 1.44
3. Parag Parikh Tax Saver Fund - 1.36
4. HDFC TaxSaver Fund - 1.34
5. SBI Long Term Equity Fund - 1.28
6. Franklin India Tax Shield Fund - 1.24
7. Mahindra Manulife ELSS Fund - 1.24
8. Nippon India Tax Saver Fund Direct Growth - 1.23
9. Kotak Tax Saver Fund Direct-Growth - 1.22

Overperforming: A mutual fund is considered overperforming if its Sharpe Ratio is higher than the benchmark (NIFTY 50 - 1.22). This means the fund has provided better returns compared to the benchmark. The range of overperformance of the above mutual fund are starting from 1.22 to 1.47. it means they are performing equally and more with the benchmark return.

- **Mutual Funds with Sharpe Ratios Below the NIFTY Benchmark (1.22):**

1. Bank of India Tax Advantage Fund - 1.21
2. DSP Tax Saver Fund - 1.20
3. PGIM India Tax Saver Fund Direct Growth - 1.20
4. Mirae Asset Tax Saver Fund Direct-Growth - 1.18
5. Union Tax Saver (ELSS) Fund - 1.17
6. JM Tax Gain Fund - 1.17
7. ICICI Prudential Long Term Equity Fund - 1.12
8. Sundaram Tax Savings Fund Direct - 1.13
9. Motilal Oswal Long Term Equity Fund - 1.11
10. Canara Robeco Equity Tax Saver Fund - 1.08
11. Quantum Tax Saving Fund Direct Growth - 1.08
12. Tata India Tax Savings Fund Direct-Growth - 1.07
13. Edelweiss Long Term Equity Fund - 1.02
14. UTI Long Term Equity Fund - 0.99
15. LIC MF Tax Plan Fund - 0.99
16. HSBC ELSS Fund - 0.92
17. Navi ELSS Tax Saver Fund - 0.92
18. Taurus Tax shield - Direct Plan - Growth - 0.91
19. Invesco India Tax Plan Fund - 0.87
20. ITI Long Term Equity Fund - 0.84
21. Shriram Long Term Equity Fund - 0.66
22. Axis Long Term Equity Fund - 0.66
23. Aditya Birla Sun Life ELSS Tax Relief 96 Fund - 0.55

Underperforming: A mutual fund is considered underperforming if its Sharpe Ratio is lower than the benchmark (NIFTY 50 - 1.22). In this case, the fund provided a low return compared to the benchmark. The low performance categorized above is in the range of 1.21 to 1.02 and is considered as moderate performance when compared with market performance. The other category of Mutual funds listed above are in the range of 0.99 to 0.55 and are considered low-performance mutual funds when we compare with the benchmark performance.

Investors may consider their risk tolerance and return expectations when choosing a mutual fund, keeping in mind that higher Sharpe ratios indicate better risk-adjusted performance.

B. Standard Deviation

- **Mutual Funds with Standard Deviation Above 12.34 (the NIFTY Benchmark):**

1. Quant Tax Plan 18.41
2. Bandhan Tax Advantage Direct Plan-Growth 16.21
3. Axis Long Term Equity Fund 15.68
4. Franklin India Tax shield Fund 15.63
5. Nippon India Tax Saver Fund Direct Growth 15.59
6. JM Tax Gain Fund 15.46
7. Bank of India Tax Advantage Fund 15.41
8. HSBC ELSS Fund 15.32
9. Motilal Oswal Long Term Equity Fund 15.24
10. Tata India Tax Savings Fund Direct-Growth 15.23
11. Sundaram Tax Saving Fund Direct -15.03
12. Navi ELSS Tax Saver Fund 14.94
13. Edelweiss Long Term Equity Fund 14.8
14. Invesco India Tax Plan Fund14.77
15. Canara Robeco Equity Tax Saver Fund14.74
16. Mirae Asset Tax Saver Fund Direct-Growth14.72
17. DSP Tax Saver Fund14.66
18. UTI Long Term Equity Fund14.56
19. SBI Long Term Equity Fund14.55
20. ICICI Prudential Long Term Equity Fund - 14.51
21. ITI Long Term Equity Fund 14.5
22. Quantum Tax Saving Fund Direct-Growth14.49
23. Mahindra Manulife ELSS Fund – 14.34
24. Kotak Tax Saver Fund Direct-Growth14.31
25. Union Tax Saver (ELSS) Fund 14.28
26. PGIM India Tax Saver Fund Direct Growth14.26
27. Shriram Long Term Equity Fund14.14
28. LIC MF Tax Plan Fund14.13
29. Taurus Tax shield - Direct Plan - Growth14.11
30. HDFC TaxSaver Fund 14.02`
31. Aditya Birla Sun Life ELSS Tax Relief 96 Fund 13.38

Higher Standard Deviation than Benchmark: A mutual fund with a higher standard deviation compared to its benchmark (NIFTY 50 12.34) which is considered more volatile than the market. If a fund's standard deviation is higher than other funds in its category, it may be considered riskier or more volatile than its peers. This could be viewed as no stable performance from the above funds for the investors though there are high returns in some mutual funds. So, the investors expecting regular returns may not prefer this kind of mutual fund.

- **Mutual Funds with Standard Deviation Below 12.34 (the NIFTY Benchmark):**

1. Parag Parikh Tax Saver Fund (12.11)

Lower Standard Deviation than Benchmark: If a mutual fund has a lower standard deviation compared to its benchmark, it suggests that the fund is less volatile or risky than the benchmark (NIFTY 50 -12.34). This can be a sign of stable return and lower risk, when comparing a fund's standard deviation to other funds in the same category, a lower standard deviation suggests that the fund is less volatile than its peers. This could be seen as a sign of better and stable performance.

When selecting a mutual fund, investors should align their choice with their risk tolerance and investment objectives. Funds with higher standard deviation can offer the potential for greater returns, but they also come with a high chance of fluctuations in value. Conversely, funds with lower standard deviation provide a more stable investment, but their returns may be more modest. The lower volatility may be preferred by risk-averse investors seeking stable and predictable returns, while higher-volatility funds may be suitable for those willing to take on more risk in pursuit of potentially higher rewards.

C. Treynor Ratio

The interpretation and evaluation of the performance of each mutual fund based on their Treynor ratios in comparison to the benchmark (NIFTY):

- **Mutual Funds with Treynor Ratios Above the Benchmark (0.21)**

1. Quant Tax Plan: 0.26
2. Bandhan Tax Advantage Direct Plan-Growth: 0.23
3. Parag Parikh Tax Saver Fund: 0.23
4. HDFC TaxSaver Fund: 0.21

Overperforming mutual fund: Based on the Treynor index, the above four mutual fund are showing better performance when compared with their peers, as their Treynor index is above the benchmarks Treynor index.

- **Mutual Funds with Treynor Ratios Below 0.21 (the Benchmark):**

1) SBI Long Term Equity Fund - 0.20
2) Bank of India Tax Advantage Fund: 0.19
3) PGIM India Tax Saver Fund Direct Growth: 0.19
4) Kotak Tax Saver Fund Direct-Growth: 0.19
5) DSP Tax Saver Fund: 0.19
6) Nippon India Tax Saver Fund Direct Growth: 0.19
7) Franklin India Tax shield Fund: 0.19
8) Mahindra Manulife ELSS Fund: 0.19
9) JM Tax Gain Fund: 0.18
10) Motilal Oswal Long Term Equity Fund: 0.18
11) Mirae Asset Tax Saver Fund Direct Growth - 0.18
12) Union Tax Saver (ELSS) Fund: 0.18
13) ICICI Prudential Long Term Equity Fund: 0.17
14) Sundaram Tax Savings Fund Direct – 0.17
15) Canara Robeco Equity Tax Saver Fund: 0.17
16) Quantum Tax Saving Fund Direct-Growth: 0.17
17) Tata India Tax Savings Fund Direct-Growth: 0.17
18) Edelweiss Long Term Equity Fund: 0.16
19) Navi ELSS Tax Saver Fund: 0.15
20) UTI Long Term Equity Fund: 0.15
21) LIC MF Tax Plan Fund: 0.15
22) HSBC ELSS Fund: 0.14
23) Taurus Tax shield Direct Plan Growth - 0.14
24) Invesco India Tax Plan Fund: 0.14
25) ITI Long Term Equity Fund: 0.14
26) Axis Long Term Equity Fund: 0.11
27) Shriram Long Term Equity Fund 0.10
28) Aditya Birla Sun Life ELSS Tax Relief 96 Fund - 0.09

Underperforming mutual fund: Based on the Treynor index, the above twenty-two mutual funds are showing lower performance when compared with their peers, as their Treynor index is below the benchmarks Treynor index.

These interpretations provide an evaluation of each Mutual fund's performance in relation to the level of systematic risk they carry, helping investors assess their risk-adjusted returns. Funds with higher Treynor ratios are generally more efficient at generating excess returns for the level of systematic risk taken, while those with lower ratios may not be as efficient in this regard.

D. ALPHA RATIO

- **Mutual Funds with Alpha Above the Nifty-50 the benchmark (2.5)**

1. Quant Tax Plan: 9.28
2. Bandhan Tax Advantage Direct Plan-Growth: 5.78
3. Parag Parikh Tax Saver Fund: 4.35
4. Franklin India Tax shield Fund: 3.62
5. HDFC TaxSaver Fund: 3.62
6. SBI Long Term Equity Fund 2.75
7. JM Tax Gain Fund: 2.51

Overperforming mutual fund: Based on the Alpha index, the above six mutual funds are showing high performance when compared with their peers, as their alpha index is above the benchmark's alpha index.

- **Mutual Funds with Alpha Below 2.5 (the NIFTY Benchmark):**

1. Bank of India Tax Advantage Fund: 2.3
2. Nippon India Tax Saver Fund Direct Growth: 2.16
3. Mahindra Manulife ELSS Fund: 2.07
4. Kotak Tax Saver Fund Direct-Growth: 1.95
5. DSP Tax Saver Fund: 1.76
6. PGIM India Tax Saver Fund Direct Growth: 1.76
7. Motilal Oswal Long Term Equity Fund: 0.92
8. Mirae Asset Tax Saver Fund Direct-Growth: 1.2
9. Union Tax Saver (ELSS) Fund: 0.86
10. Sundaram Tax Savings Fund Direct: 0.66
11. ICICI Prudential Long Term Equity Fund: 0.53
12. Quantum Tax Saving Fund Direct-Growth: 0.09
13. Tata India Tax Savings Fund Direct-Growth: -0.23
14. UTI Long Term Equity Fund: -0.30

15. Canara Robeco Equity Tax Saver Fund: -0.33
16. Navi ELSS Tax Saver Fund: -0.93
17. Edelweiss Long Term Equity Fund: -1.08
18. LIC MF Tax Plan Fund: -1.16
19. Invesco India Tax Plan Fund: -2.28
20. HSBC ELSS Fund: -2.38
21. Taurus Tax shield Direct Plan Growth -2.37
22. ITI Long Term Equity Fund: -2.69
23. Axis Long Term Equity Fund: -5.85
24. Shriram Long Term Equity Fund: -6.07
25. Aditya Birla Sun Life ELSS Tax Relief 96 Fund: -6.72

Underperforming mutual fund: Based on the Alpha index, the above twenty-four mutual funds are showing lower performance when compared with their peers, as their alpha index is below the benchmark's alpha index.

Positive Alpha suggests that a fund is delivering better returns than the market risk it's taking. On the other hand, negative Alpha implies that the fund is underperforming its risk profile. It's essential to consider both Alpha and other performance metrics when evaluating mutual funds.

Table 3 Shows the Measurement tools used for evaluating the performance, volatility, and risk return analysis of Thirty-Two Equity linked Tax saving Mutual Funds taken for the study.

S.NO	**Name of the Measurement tools**	**Number of Mutual Funds with High Performance**	**Number of Mutual Funds with Low Performance**
1.	Return	26	6
2.	Sharpe Ratio	9	23
3.	Treynor Ratio	4	28
4.	Alpha Ratio	7	25
		(HIGH VOLATILE)	**(LOW VOLATILE)**
5.	Standard Deviation	31	1

Conclusion

The study employed metrics such as the Sharpe ratio, Treynor ratio, and Alpha Ratio to measure Risk-adjusted performance. The findings revealed certain schemes underperforming compared to the benchmark index, indicating a notable negative risk-return relationship. Conversely, specific schemes demonstrated outperformance against the benchmark index with a positive risk-return correlation.

From the analysis made with different Tools it is concluded that from the return point of view there are twenty-six Equity linked tax saving mutual funds are showing high performance and six equity-linked tax saving mutual funds are showing low performance.

From the Sharpe ratio evaluation point of view, only nine equity linked tax saving mutual funds are showing high performance and the remaining twenty-three equity linked tax saving mutual funds are revealing the low performance.

In addition, the Treynor ratio evaluation technique only four equity linked tax saving mutual funds are showing high performance and remaining twenty-eight equity linked tax saving mutual funds are performing at a low level.

In alpha ratio point of view seven equity linked tax saving mutual funds are showing high performance while twenty-five of same category are performing at a lower level.

From the volatility point of view Thirty-one Equity linked tax saving mutual funds are highly volatile and only one mutual funds showing low volatile

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