EVALUATING FINANCIAL PRODUCTS: MUTUAL FUNDS VS. ETFS RETURN ANALYSIS

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Date: 29/04/2024

Examined by:

Seal of the School

DECLARATION BY STUDENT

I hereby declare that the data presented in this Dissertation report entitled, "Evaluating financial products: Mutual Funds vs. ETF's return analysis" is based on the results of investigations carried out by me in the (MBA) in Financial Services at the Goa Business School, Goa University under the Supervision of Dr. Prachi Premanand Kolamker and the same has not been submitted elsewhere for the award of a degree or diploma by me. Further, I understand that Goa University or its authorities / College will be not be responsible for the correctness of observations / experimental or other findings given the dissertation.

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Sayed Azhaar Nazir

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Date: 29/04/2024

Place: Goa University

COMPLETION CERTIFICATE

This is to certify that the dissertation report "Evaluating financial products: Mutual Funds vs. ETF's return analysis" is a bonafide work carried out by Mr Sayed Azhaar Nazir under my supervision in partial fulfilment of the requirements for the award of the degree of Masters in Business Administration in the Discipline Financial Services at the Goa Business School, Goa University. Dr. Prachi Premanand Kolamker Date: 29/04/2024

Kolamker 02/05/2024

Date: 29/04/2024

Dr. Prachi Premanand Kolamker
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Signature of Dean of the School/HoDDept School/Dept Stamp

Date: 29/04/2024

Place: Goa University

CERTIFICATE GIVEN BY THE ORGANIZATION

Choice
The Joy of Earning

April 30, 2024

Internship Completion Certificate

This letter is to certify that Mr. Sayed Azhaar from Goa University, Goa has successfully completed his Internship Program with Choice Equity Broking Private Limited. His Internship tenure was from February 15 2024 to April 12, 2024

We found him extremely inquisitive and hard working. He was interested to learn the functions of our core division and also willing to put his best efforts to get into the depth of the subject to understand it better.

We are happy to acknowledge him for contribution to the company with respect to all the roles assigned to him.

We wish him all the best for his future endeavors.

For, **Choice Equity Broking Private Limited**

Authorized Signatory

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COMPANY PROFILE

Choice Equity Broking Pvt. Ltd

Incorporated in 2010, Choice Equity Broking Pvt. Ltd (commonly known as Choice Broking) is a Mumbai-based full-service stockbroking firm. Choice broking is a subsidiary of a publicly listed financial services firm named 'Choice International Limited' that was formed in 1993.

Choice Broking offers online trading and premium financial services for an entire range of financial products like Equity, Derivatives, Currency, Commodities, Mutual Funds, wealth management, Portfolio management, Insurance, and Loan against share. The company has a depository membership with CDSL and NSDL and is a member of NSE, BSE, MCX, NCDEX, and ICEX. The brokerage charges of Choice Broking are claimed to be one of the lowest in India when compared to other full-service brokers in the industry.

EVALUATING FINANCIAL PRODUCTS: MUTUAL FUNDS VS. ETFS RETURN ANALYSIS

ABSTRACT

The purpose of this Research is to compare index mutual funds and exchange-traded funds (ETFs) replicating the same index for investors by examining their risk profiles and historical performance. The research analyses both financial products prospective returns, looks at how they differ from benchmarks, and uses the Sharpe ratio and Sortino ratio to calculate risk-adjusted returns. Investors can choose their investments with more knowledge if these objectives are addressed.

1. INTRODUCTION

1.1 Background

When it comes to allocating cash, investors have plenty of options in the ever-changing financial landscape of today. Mutual funds and exchange-traded funds (ETFs) are two of the options that have become popular investment vehicles because of their ability to diversify, expert management, and availability across a variety of asset classes. While they both pool investor capital to invest in a diverse range of securities, mutual funds and exchange-traded funds (ETFs) have different forms, management approaches, and trading systems.

Mutual funds have a long history that began when collective investing ideas were initially popularized in the early 1900s. Mutual funds, which were first offered as closed-end funds, changed over time to become open-ended, enabling the ongoing purchase and sale of shares at net asset value (NAV). The idea of investing through mutual funds changed the game by making it possible for regular people to acquire professionally managed portfolios and spread their bets over a variety of securities.

Index mutual funds emerged in the 1970s, pioneered by Jack Bogle with the creation of the first index fund tracking the S&P 500. These funds aim to replicate the performance of a specific market index, such as the Nifty 50, by holding the same securities in the same proportions as the index. They offer broad market exposure, low fees, and are managed passively, making them an attractive choice for investors seeking steady, long-term returns. Instead of having people pick individual stocks, index funds buy a bunch of stocks that are in that index. So, if the Nifty 50 goes up 5%, the fund should go up around 5% too. This is cheaper

than other mutual funds where people are constantly buying and selling stocks, trying to beat the market. With an index fund, they just mirror the index automatically. Most people use index funds for long-term investing in the overall stock market. It's an easy way to get exposure to the majority of companies at once without having to research them each individually.

Although many investors have long favoured mutual funds, the introduction of exchange-traded funds (ETFs) in the early 1990s brought a fresh perspective to the investing scene. ETFs provided investors with a special combination of cost-effectiveness, liquidity, and diversity favoured when they were first designed as index-tracking vehicles. Exchange-traded funds (ETFs) offer investors real-time pricing and intraday liquidity on stock exchanges similar to individual equities, unlike typical mutual funds that are purchased and sold through fund companies at NAV.

Investors can now easily obtain exposure to global markets, commodities, currencies, and alternative investments thanks to the emergence of exchange-traded funds (ETFs), which have distributed access to a wide range of asset classes and investing techniques.

Even though mutual funds and exchange-traded funds (ETFs) are widely used, investors frequently have difficulties in assessing these financial products and choosing their investment portfolios. Important concerns remain about these funds' past performance, how closely they track benchmark indices, and how much risk is traded off for rewards. To address these concerns, a comprehensive study is required that takes into account historical performance as well as risk-adjusted returns, benchmark deviations, and other relevant aspects.

2. LITERATURE REVIEW

(Agapova, 2010) research explores the complex relationships between conventional index funds and exchange-traded funds (ETFs), and finds that although ETFs have become more popular, traditional funds continue to exist because of tracking errors and fee differences. Changes in tax consequences over time have a substantial impact on investor preferences. Moreover, the coexistence of both fund types in the financial landscape is shaped by the accessibility of ETFs in retirement accounts, especially in defined contribution plans.

(Sherrill et al., 2019) looked into how actively managed mutual funds used benchmark and non-benchmark exchange-traded funds (ETFs). They discovered a correlation between owning benchmark ETFs and better tracking of benchmark indexes as well as lower cash holdings. The usefulness of non-benchmark ETFs for mutual fund portfolios was suggested by their association with lower portfolio volatility and potential outperformance, especially in high-diversification positions.

(J.Eltona et al., 2019) find that index funds marginally underperform their benchmarks, whereas exchange-traded funds (ETFs) slightly outperform. Key pre-expense performance factors that they discover are security lending returns, turnover, and the existence of passive funds. Expense ratios after expenses are crucial, as funds with lower costs tend to provide investors with higher returns.

(Bessembinder et al., 2022) mutual funds might not always beat alternative assets like the SPY ETF, which could occasionally cause investors' wealth to drop. They stress the importance of fund fees in determining investment results, the influence of investor flows, and the potential for cost exemptions to increase investor wealth. They also highlight the fund's performance in comparison to alternatives. The significance of taking timeframes into account when assessing

fund performance is further shown by their discovery of performance disparities in mutual funds dependent on investment horizon

(L.Aiken et al., 2022) investigate the cohabitation of mutual funds and actively managed ETFs (AMETFs), discovering that fund families mainly provide SBS AMETFs to diversify their product lines. Mutual funds exhibit minor performance difference after SBS establishment, despite greater costs and more managers. Reduced flows into mutual funds are observed in the study, indicating investor preference for AMETFs, particularly where objectives coincide. Fee differences, portfolio similarities, and manager engagement are the main causes of performance differences; better mutual fund returns are linked to more managers and higher fees.

(Perez and Rodriguez, 2011) examine whether index mutual funds (OEFs) and exchange-traded funds (ETFs) that track the same index are complementary or interchangeable. Their analysis shows that, irrespective of when these funds were established, they complement one another rather than replace one another. They discover a statistically significant and positive link in money flows, suggesting concurrent growth in both fund kinds. This association is consistent across a variety of estimating methods, demonstrating the validity of their study.

(Garyn-Tal, 2013) explores the relationships between mutual fund loads, costs, and performance throughout various time periods and Lipper classification groups. They discovered that, although performance is generally correlated with reduced expenses, fund type and time period had an impact. The effects of load vary, with rear loads occasionally having a favourable effect on performance. There are differences between Lipper categories, which emphasizes the importance of having a sophisticated grasp of fund dynamics.

(Sherrill and Upton, 2017) investigates the connection between actively managed exchange-traded funds (AMETFs) and classic actively managed mutual funds (AMMFs). They discover that, in part because of tax considerations, AMETFs are gradually taking the place of AMMFs,

especially in the mixed and equity asset classes. But there's not enough data to back up the claim that institutional investors only like AMETFs because of their liquidity. The literature emphasizes how investor behaviour is influenced by tax and regulatory regimes as well as the dynamic character of investment decisions.

(Charupat and Miu, 2012) explores exchange-traded funds (ETFs) performance and tracking capabilities. ETFs are tax-efficient investments with low expense ratios, but their overall net benefits may be questioned because their pre-tax performance may not always outperform that of conventional index mutual funds. Compounding effects and replication schemes are two major causes of tracking errors in ETFs. Full replication strategies often have lower tracking errors but may have greater transaction costs. While the introduction of ETFs has the potential to improve liquidity and reduce adverse-selection costs for underlying equities, there is inconclusive data about how they affect bid-ask spreads and the behaviour of liquidity traders.

(Akhigbe et al., 2020) looks at what influences ETF closures, especially in stocks ETFs. Liquidity has a greater impact on stocks ETFs than it does on closure risk, despite poor past performance and high expense ratios increasing closure risk. ETFs that track overseas or sector shares have greater closure probabilities, and the lifespan of an ETF depends on asset size growth.

2.1 Objectives

1. Examine how mutual funds and exchange-traded funds (ETFs) vary from their benchmarks.

2. Provide a clear picture of how well each investment vehicle produces returns in relation to the amount of risk taken by computing and presenting the Sharpe ratios and Sortino ratios of a selection of mutual funds and exchange-traded funds (ETFs).

2.2 Hypothesis/ Research questions

1. How do mutual funds and ETFs (both replicating the same index) differ from their respective benchmarks in terms of performance consistency and tracking accuracy?
2. How does the risk-adjusted performance of mutual funds and ETFs compare, as reflected by their Sharpe and Sortino ratios, and what implications does this have for investors seeking optimal returns relative to risk?

3. RESEARCH METHODOLOGY

The main aim of the study is to compare the returns of Index funds and ETF's which have a same underlying asset (Nifty 50). Keeping in mind the nature of the data and the research questions, the study utilizes a quantitative research method. Data for the study is gathered of 5 ETF funds and 5 Index funds from sources like NSEindia.com, yahoo finance and Rbi.org which includes closing prices of the funds and its replicating index for the time period of 2019 to 2023, also including returns of the 91-day treasury bill to calculate risk free rate for Sharpe ratio and Sortino ratio. The monthly returns are calculated from the closing prices and used to compare between its underlying asset, further using the returns to calculate tracking error to assess how closely a fund's performance tracks or replicates the performance of its benchmark index and also to calculate Sharpe ratio along with Sortino ratio to evaluate the risk-adjusted return.

Also, Tableau, which is a data visualisation software, was utilised to prepare the graphs for the analysis.

To calculate the monthly returns of the underlying asset and the funds the formula utilised is

Monthly Returns=last date of the month-first date of the month /first date of the month

Calculation of tracking error

Tracking Error = Square Root of [(Sum of Squared Differences of Portfolio Returns and Benchmark Returns) / Number of Observations]

Calculation of Sharpe Ratio

$Sharpe\ Ratio=Rp-Rf/\sigma p$

Rp is the expected return of the portfolio or investment.

Rf is the risk-free rate of return.

σp is the standard deviation of the portfolio or investment.

Calculation of Sortino Ratio

Sortino Ratio= Rp−Rf/ σ downside

Rp is the expected return of the portfolio or investment.

Rf is the risk-free rate of return.

σ downside is the downside deviation, which is the standard deviation of negative returns.

4. DATA AND ANALYSIS

4.1. Tracking errors

Calculated as the standard deviation of the return's differentials between the portfolio and the benchmark over a certain time period, tracking error assesses the consistency of an investment portfolio's returns in relation to its benchmark index. While a higher tracking error denotes a larger deviation, a lower tracking error suggests closer alignment with the benchmark and efficient replication of index performance. Market circumstances, sample technique, rebalancing frequency, fund expenses, and portfolio composition are some of the factors that affect tracking inaccuracy. For index-tracking funds, investors usually aim for lower tracking error; however, they might accept larger tracking error for actively managed funds that aim to beat the benchmark. Investors can evaluate the consistency of fund performance and its departure from the returns of the benchmark by having a clear understanding of tracking error.

Tracking Error (ETF)					
Years	Axis Nifty 50 ETF	ICICI Prudential ETF	LIC ETF Nifty 50	Nippon India ETF	Tata Nifty 50 ETF
2019	1.04%	0.32%	2.29%	0.47%	0.75%
2020	6.10%	0.65%	3.11%	0.87%	7.39%
2021	1.15%	0.42%	7.62%	0.31%	5.14%
2022	0.53%	0.21%	0.79%	0.25%	0.94%
2023	0.52%	0.57%	0.37%	0.25%	0.97%

Tracking Error (Index Fund)					
Year	Franklin India Index fund	HDFC Index nifty 50	SBI nifty Index	Tata nifty 50 index	Uti nifty 50 index
2019	0.20%	0.18%	0.17%	0.21%	0.18%
2020	0.23%	0.14%	1.93%	0.29%	0.14%
2021	0.09%	0.09%	0.10%	0.33%	0.11%
2022	0.14%	0.13%	0.41%	0.30%	0.14%
2023	0.15%	0.10%	0.19%	0.11%	0.11%

Analysis

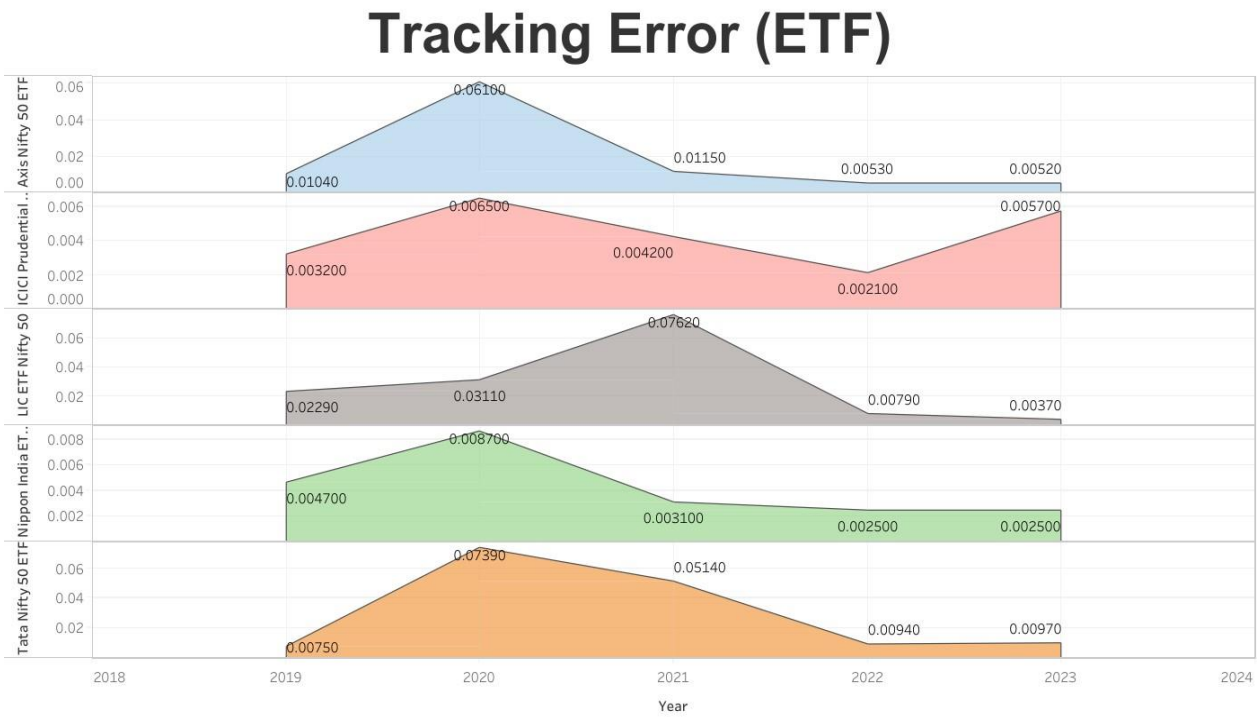

Figure 1: Tracking Errors of ETF

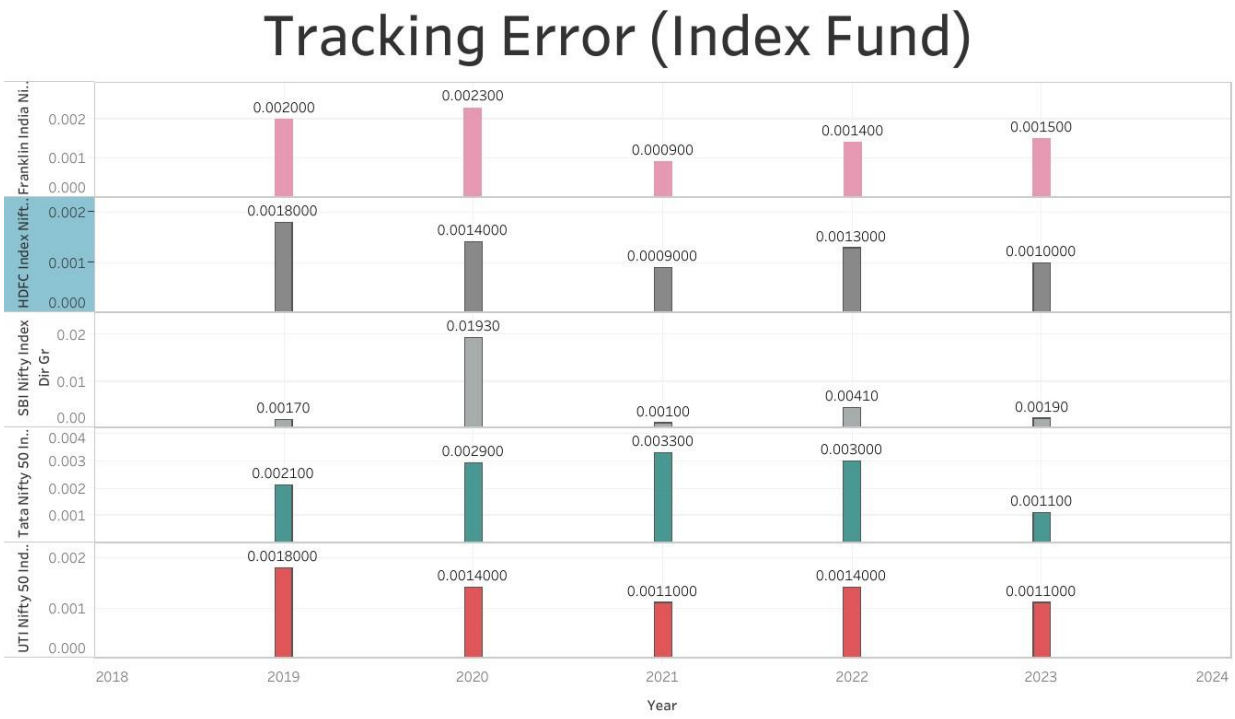

Figure 2: Tracking Errors of Index Fund

2019 had modest tracking errors for both index funds and ETFs, with the majority of products staying quite close to their benchmarks. But when compared to index funds, the tracking errors of the ETFs were marginally greater, suggesting a somewhat less accurate replication of the index performance.

2020 saw a rise in tracking errors for index funds and ETFs, indicating larger departures from their benchmarks. But when compared to index funds, ETFs typically showed higher tracking errors, indicating that there might have been more notable departures from the underlying indices during this time for ETFs.

In 2021, there were differences in tracking errors across index funds and ETFs, with certain funds exhibiting greater deviations from their benchmarks. Interestingly, in certain instances, ETFs had more tracking errors than index funds, suggesting that it would be difficult for ETFs to accurately replicate index performance this year.

For index funds and exchange-traded funds (ETFs), tracking errors stayed comparatively low in 2022, suggesting that they stayed in line with their respective benchmarks. Nonetheless, ETFs often have marginally more tracking errors than index funds, suggesting that ETFs are not as accurate in reproducing index performance.

For both ETFs and index funds in 2023, tracking errors stayed largely modest, with the majority of products closely following their benchmarks. Nevertheless, ETFs persisted in showing somewhat greater tracking errors in contrast to index funds, indicating a marginally reduced degree of accuracy in ETFs' replication of index performance during this time frame.

Although index funds and exchange-traded funds (ETFs) strive to closely track their underlying indexes, over time, ETFs have been found to have slightly higher tracking errors than index funds. This suggests that ETFs are not as accurate at replicating index performance.

4.2. Sharpe Ratio

A popular metric in finance for evaluating an investment's risk-adjusted return is the Sharpe Ratio. Known by the name of Nobel laureate William F. Sharpe, it offers information on how well an investment covers the risk involved. The Sharpe Ratio provides a single metric to compare investments with varying risk levels. It is computed by dividing the excess return of an investment (the return over the risk-free rate) by its standard deviation. Better risk-adjusted

returns are indicated by a greater Sharpe Ratio, which suggests that the investment is producing more return per unit of risk. This ratio is frequently used by investors to assess the performance of individual assets or portfolios in an effort to achieve their investment goals by finding a balance between risk and return.

Sharpe Ratio (ETF)					
Years	Axis Nifty 50 ETF	ICICI Prudential ETF	LIC ETF	Nippon ETF	Tata Nifty 50 ETF
2019	-1.231185604	-1.273030324	-1.376654717	-1.344497	-1.295996398
2020	-0.095298034	-0.146342108	-0.2023597	-0.167409	-0.059134176
2021	-0.514354167	-0.608309012	-0.274355117	-0.655432	-0.601274665
2022	-0.984108241	-1.016047918	-1.052505829	-1.021727	-1.126513743
2023	-1.587239051	-1.611636827	-1.649679555	-1.611637	-1.70391736

Sharpe Ratio (Index fund)					
Year	Franklin Index fund	HDFC Index fund	SBI nifty 50 Index fund	Tata Nifty 50 Index fund	UTI Index fund
2019	-1.320670934	-1.236998826	-1.236998826	-1.299778732	-1.236998826
2020	-0.138405995	-0.143327929	-0.143327929	-0.138405995	-0.143327929
2021	-0.592430061	-0.592430061	-0.592430061	-0.592430061	-0.592430061
2022	-1.014677939	-1.014677939	-0.978889943	-1.016984198	-1.014677939
2023	-1.650969938	-1.650969938	-1.650969938	-1.650969938	-1.650969938

Analysis

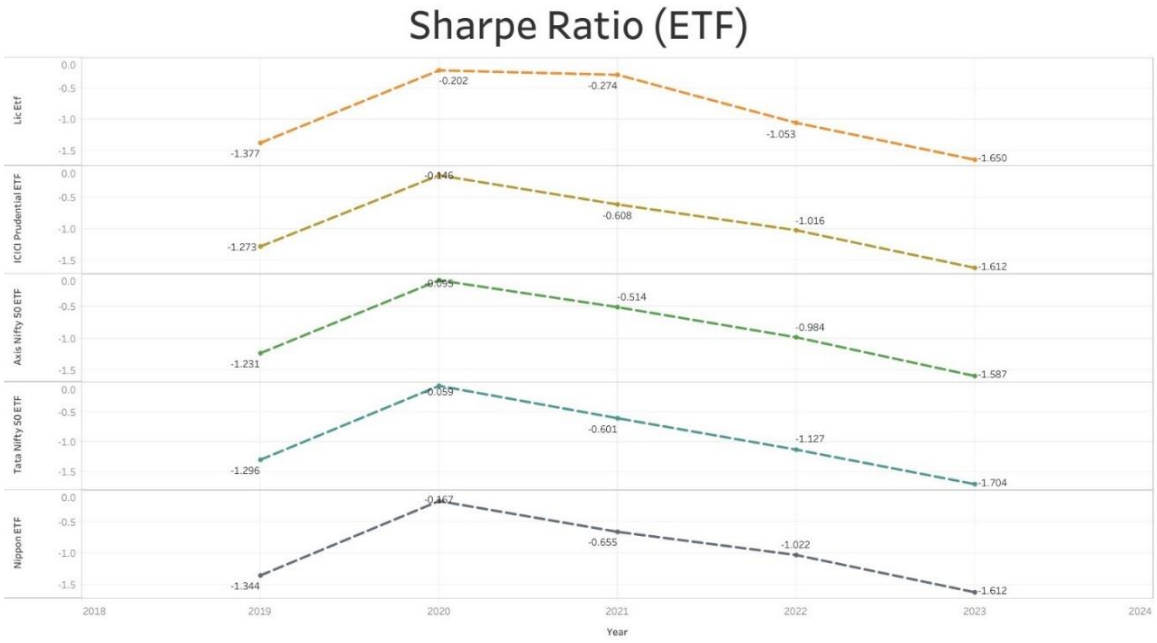

Figure 3: Sharpe Ratios of ETF

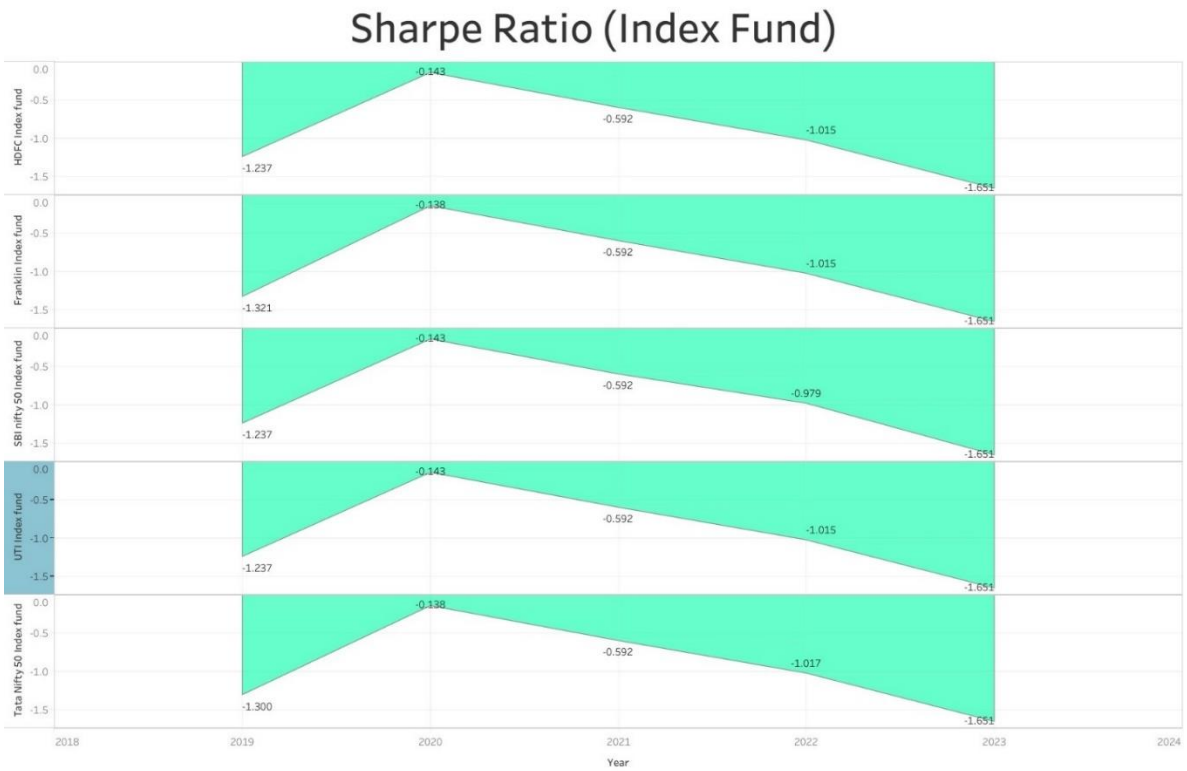

Figure 4: Sharpe Ratios of Index Fund

ETFs and index funds both had negative Sharpe Ratios in 2019, which was indicative of poor risk-adjusted performance. The negative ratios' magnitude differed between the two categories of funds, though, with certain exchange-traded funds (ETFs) exhibiting marginally greater negative values than index funds.

For both index funds and exchange-traded funds (ETFs), the 2020 Sharpe Ratios showed a small improvement from the previous year, indicating a marginally superior risk-adjusted return. On the other hand, when it came to risk-adjusted returns, index funds generally outperformed ETFs.

ETFs and index funds both maintained negative Sharpe Ratios in 2021, a sign of consistent underperformance in relation to risk. This year, there weren't many variations between the two kinds of funds.

Both index funds and exchange-traded funds (ETFs) had negative Sharpe Ratios in 2022, however index funds typically had marginally higher risk-adjusted returns than ETFs.

For index funds and exchange-traded funds (ETFs), the negative Sharpe Ratios persisted in 2023, and there were no notable distinctions between the two categories of funds' risk-adjusted performance.

While index funds and exchange-traded funds (ETFs) have both failed to produce positive risk-adjusted returns throughout the years, index funds have generally outperformed ETFs.

4.3. Sortino Ratio

The Sortino ratio, a measure of risk-adjusted return, builds on the Sharpe ratio by focusing entirely on downside volatility. It assesses an investment's success in relation to its negative risk, specifically how effectively it compensated investors for the risk they took. Unlike the

Sharpe ratio, which takes into account total volatility, the Sortino ratio only evaluates the volatility of returns that fall below a predetermined target or minimum acceptable return, which is typically the risk-free rate or similar benchmark. The Sortino ratio, which emphasizes downside risk, provides a more nuanced perspective on risk-adjusted returns, making it especially ideal for investors who are primarily concerned with safeguarding their capital from losses.

Sortino-ETF					
Years	Axis Nifty 50 ETF	ICICI Prudential ETF	LIC ETF	Nippon ETF	Tata Nifty 50 ETF
2019	6.18	6.52	6.23	5.99	6.50
2020	6.92	12.43	10.12	12.18	11.89
2021	4.13	4.00	8.95	4.11	6.75
2022	6.67	7.35	6.62	7.33	6.91
2023	6.69	6.56	6.62	6.56	6.27

Sortino-Index Funds					
Years	Franklin Index Fund	HDFC Index Fund	SBI Nifty 50 Index Fund	Tata Nifty 50 Index fund	UTI Index fund
2019	6.25	6.47	6.47	6.17	6.47
2020	12.18	12.55	12.55	12.18	12.55
2021	4.20	4.20	4.20	4.20	4.20
2022	7.22	7.22	7.08	7.35	7.22
2023	6.62	6.62	6.62	6.62	6.62

Analysis

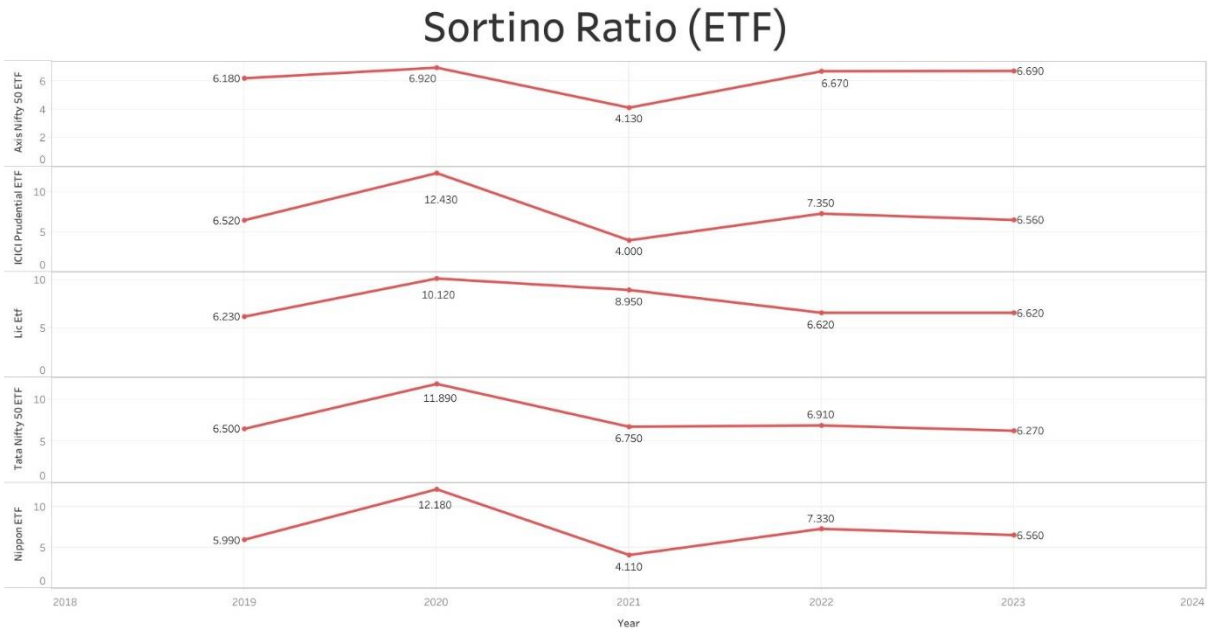

Figure 5: Sortino Ratio of ETF

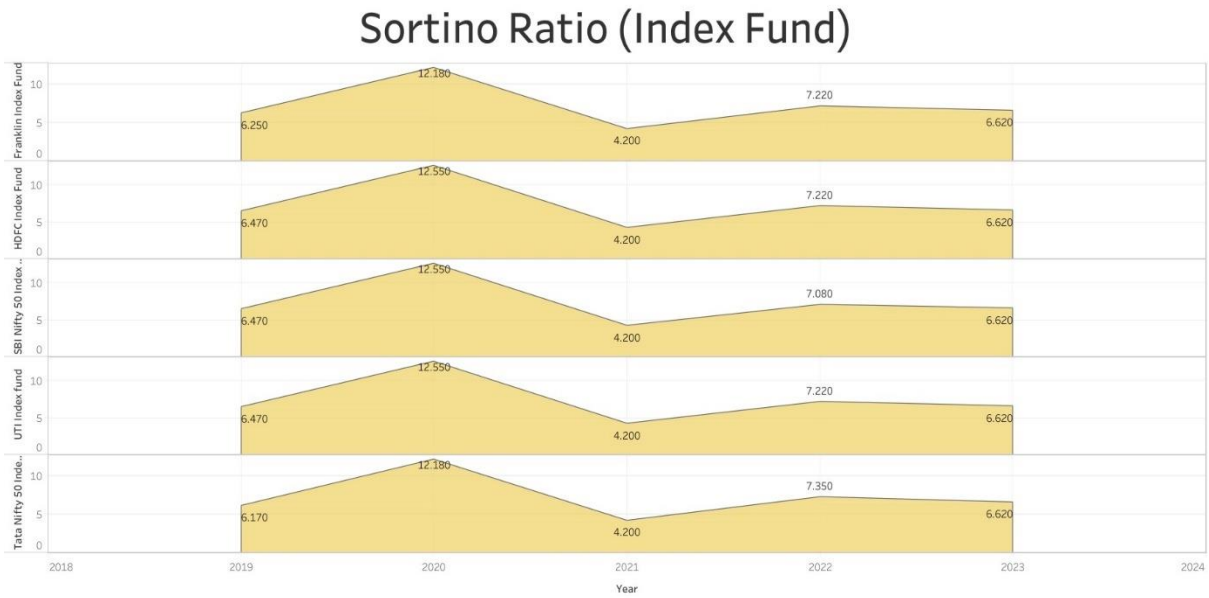

Figure 6: Sortino Ratio of Index funds

Exchange Traded Funds

Axis Nifty 50 ETF

This ETF has shown reasonably constant performance throughout the years, with small swings in its Sortino ratio. While it may not regularly beat its rivals, it does provide a consistent level of risk-adjusted returns.

ICICI Prudential ETF

Over the years, the ICICI Prudential ETF has consistently outperformed other ETFs in terms of Sortino ratios. This means that it provides superior downside risk-adjusted returns than the other ETFs in the group.

LIC ETF

The Sortino ratio for LIC ETF varies, with a notable increase in 2021 compared to the previous year. Despite this, it maintains a competitive edge among its peers.

Nippon ETF

This ETF has shown very constant Sortino ratios throughout the years, but slightly lower than some of its peers. It delivers steady results but may not provide the same level of downside risk mitigation as others.

Tata Nifty 50 ETF

Similar to Nippon ETF, the Tata Nifty 50 ETF has competitive Sortino ratios, showing consistent performance relative to downside risk. While it may not consistently outperform the ICICI Prudential ETF, it remains a good choice for risk-adjusted returns.

Index Funds

Franklin Index Fund

This index fund stands out for its consistently strong Sortino ratios over the years. Franklin Index Fund has attractive downside risk-adjusted returns, making it an appealing choice for risk-averse investors.

HDFC Index Fund

Like Franklin Index Fund, HDFC Index Fund has continuously high Sortino ratios, indicating strong risk-adjusted returns over time. Investors seeking stability in downside risk management may find the HDFC Index Fund appealing.

SBI Nifty 50 Index Fund

This index fund's Sortino ratios are stable, indicating its ability to consistently handle downside risk. While it may not have the best Sortino ratios, it does provide consistent risk-adjusted returns to investors.

Tata Nifty 50 Index Fund

The Tata Nifty 50 Index Fund generally performs well in terms of Sortino ratios, with just slight variations over time. It offers consistent downside protection, making it an attractive option for risk-averse investors.

UTI Index Fund

Like SBI Nifty 50 Index Fund, UTI Index Fund has stable Sortino ratios, showing consistent downside risk protection. Investors can rely on the UTI Index Fund to deliver consistent risk-adjusted returns over time.

Comparison

In general, ETFs have slightly greater Sortino ratios than index funds. This suggests that, on average, ETFs give greater risk-adjusted returns, with a concentration on downside protection.

While ETFs perform consistently with modest volatility, index funds maintain steady Sortino ratios across the examined time. This consistency implies that index funds may provide more predictable risk-adjusted returns over time.

The ICICI Prudential ETF surpasses out among ETFs, whereas the Franklin Index Fund consistently has greater Sortino ratios than other index funds. These funds may be attractive to investors due to their potential for higher risk-adjusted returns.

5. FINDINGS

Tracking Error

Both ETFs and index funds demonstrated relatively low tracking errors overall.

ETFs displayed slightly larger tracking errors than index funds, indicating that ETFs replicate index performance less accurately.

The year 2020 saw an increase in tracking errors for both ETFs and index funds, which was most likely caused by higher market volatility.

Sharpe ratio

ETFs and index funds consistently had negative Sharpe ratios, suggesting poor risk-adjusted performance.

Index funds beat ETFs in terms of risk-adjusted returns, implying that it generated slightly higher returns per unit of risk.

Sharpe ratios indicated minimal variation between ETFs and index funds, with both forms of funds constantly having negative values.

Sortino ratio

ETFs have slightly greater Sortino ratios than index funds, suggesting superior downside risk-adjusted returns on average.

Specific funds, such as the Franklin Index Fund and ICICI Prudential ETF, have regularly outperformed other funds in terms of risk-adjusted returns.

Comparison

While mutual funds and ETFs seek to closely match their benchmarks, ETFs have slightly larger tracking errors and lower risk-adjusted returns than index funds.

Index funds outperformed ETFs in terms of stability and predictability throughout the study period, with less deviations from benchmark indexes.

Notable outliers in each category, such as the ICICI Prudential ETF and Franklin Index Fund, demonstrated sustained outperformance compared to their peers, emphasizing the importance of fund selection.

6. CONCLUSION

In Conclusion, the analysis undertaken in this research offers insight on the performance of mutual funds and exchange-traded funds (ETFs) benchmarked against the Nifty 50. Despite both investment vehicles seeking to closely mimic their benchmarks, ETFs had slightly larger tracking errors and poorer risk-adjusted returns than index funds. Notable outliers, such as the ICICI Prudential ETF and Franklin Index Fund, indicated continuous outperformance in their respective categories. Investors should consider monitoring accuracy, risk-adjusted returns, expense ratios, and liquidity when making investing decisions. This study provides useful information for investors looking to optimize their investment portfolios and improve their ability to navigate the volatile terrain of financial markets.

7. ANNEXTURES

For Graphs: -

https://public.tableau.com/views/SortinoRatioIndexFund/Sheet1?:language=en-US&publish=yes&:sid=&:display_count=n&:origin=viz_share_link

https://public.tableau.com/views/SortinoRatioETF/Sheet1?:language=en-US&:sid=&:display_count=n&:origin=viz_share_link

https://public.tableau.com/views/ShartpeRatioIndexFund/Sheet1?:language=en-US&:sid=&:display_count=n&:origin=viz_share_link

https://public.tableau.com/views/SharpeRatioETF/Sheet1?:language=en-US&:sid=&:display_count=n&:origin=viz_share_link

https://public.tableau.com/views/TrackingerrorIndexFund/Sheet1?:language=en-US&:sid=&:display_count=n&:origin=viz_share_link

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