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# "Risk-Adjusted Performance of Sectoral Thematic Mutual Funds During Market Volatility: Empirical Evidence from India"

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**Abstract**

For Indian investors seeking customised exposure, thematic mutual funds, which are characterised by their sector-oriented investing strategies such as infrastructure, technology, or ESG, have become increasingly popular. Their performance in unstable market conditions has been a major cause of concern (risk exposure and consistency in returns). This research,by employing a multi-metric analysis approach (sourced from standard financial literature), measures the risk-adjusted performance of sectoral thematic mutual funds during periods of Indian market volatility.

Across (2021–2024), a sample of the top-performing theme-based mutual funds across an array of sectors, such as: FMCG, IT, Infrastructure, and Pharma is analysed with a specific focus on the periods of unprecedented volatility induced byCOVID-19 pandemic, geopolitical events, and monetary tightening phases through policy interventions, The study examines return consistency, downside risk, and relative market performance indices through the Sharpe Ratio, Treynor Ratio, Jensen's Alpha, Betacoefficient, Standard Deviation, and Sortino Ratio. For accuracy and comparability, secondary data are sourced from AMFI, NSE sectoral indices, and other official sources like Moneycontrol.com.

Based on preliminary findings, certain industries, such as pharmaceutical and FMCG, exhibit resilience during market distress, while others are exposed to volatility shocks. Most importantly; downside metrics like the Sortino Ratio highlight risk profiles that are relevant to investors but which are missed by traditional Sharpe calculations. By bringing together empirical rigour and practitioner sensitivity, this research contributes to mutual fund knowledge and offers guidelinesto policy analysts, fund managers, andretail investors.

The research lends credence to sectoral risk dynamics getting more visibility into the Indian mutual fund market, and facilitates more informed theme investing choices by embracing a multidimensional performance study approach.

**Keywords:**Thematic mutual funds, Risk-adjusted performance, Market volatility, downside risk metrics, Sectoral Investment Strategies.

**JEL Classification:** G11; G12; G23; G14; G15

## Introduction

Over the last two decades, the Indian mutual fund sector has evolved as one of the key pillars in the capital markets' ecology. Assets under management (AUM) has crowed ₹50 trillion during FY 2023 and exceeded ₹72 trillion midway through 2025, indicating; accelerated growth, increased financial literacy, and investor engagement (AMFI, 2023; Business Today, 2025). This transition is indicativeofa departure from more conservative savings patterns like investments in fixed deposits and insurance tomore vibrant options like investments in sectoral and thematic mutual funds.

| Fiscal Year | AUM (₹ Lakh Crore) |
|---|---|
| 2021-22 | 37.5 |
| 2022-23 | 40.5 |

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| | |
|---|---|
| 2023-24 | 54.1 |
| 2024-25 | 65.74 |
| Mid-2025 | 72.2 |

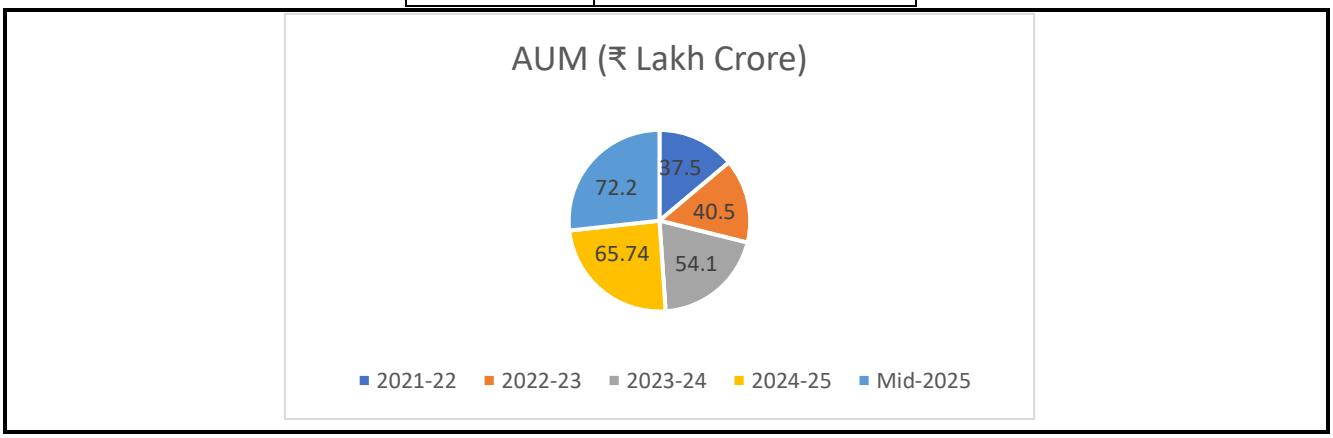


**Figure 1:** Data Table: Growth of mutual funds' Assets Under management (AUM) in India (FY 2021 to Mid-2025) (Source: AMFI Reports 2023–2025; Bajaj Finserv 2025; Economic Times 2025

The graph in Figure 1 illustrates rapid expansion, highlighting how AUM growth trajectory from ₹37.5 lakh crore in FY 2021 to over ₹72 lakh crore as of mid-2025. This dramatic increase underscores the increased sophistication of Indian capital markets and its expanding investor base. The shift towards mutual funds reflects a broader transition of investors, including millennials and salaried employees, from traditional investment avenues such as fixed deposits and insurance plans to more dynamic investment vehicles like Sectoral and thematic mutual funds.

Thematic mutual funds, a subcategory of equity funds, invest selectively in companies aligned with specific sectoral or macroeconomic themessuch as infrastructure, healthcare, IT, FMCG, or ESG. Unlike diversified equity funds, these funds offer concentrated exposure, with their performance tied closely to sector cycles. Global interest in thematic investing has surged, driven by narratives like renewable energy and digital disruption. In India, thematic funds have attraction alongside government initiatives such as *Make in India* and *Digital India*.

In spite of their popularity, thematic funds are paradoxical. They are positioned as high-growth products, but data on their performance especially during the turbulent times is still lacking. Moments like the COVID-19 crash (2020), monetary cycle tightening (2022–24), and the Russia–Ukraine has war showed unequal performances: defensive industries such as pharma and FMCG performed better, while infra and small-cap manufacturing trailed. Retail investors usually evaluate funds on pure returns, disregarding risk-adjusted factors like Sharpe, Sortino, or Jensen's Alpha (Chavali& Zahoor, 2020).

Research studies on Indian mutual funds have largely been on diversified equity funds (Tripathi & Gautam, 2021; Gupta & Agarwal, 2020) and unexplored is sectoral funds. Few studies have formally analysed their performance under distress (employing multi-metric risk paradigms). Global studiesemphasise the need for such studies on concentrated portfolios (Elton et al., 2003; Ferreira et al., 2012).

Against such a backdrop, the current study presents a multi-dimensional analysis of sectoral thematic mutual funds in India with the help of data drawn between 2021–2024 (years of extreme volatility),based on Sharpe, Sortino, Treynor, and Jensen's Alpha, Beta, and Regression Analysis, Thisstudy adds to the literature in three ways:

(i)Applying multi-metric risk-adjusted analysis to the Indian sector and thematic funds,

(ii) providing post-pandemic evidence of their resilience and cyclicality during periods of high volatility (2021–2024), and

(iii) generating policy-relevant insights for retail investors and fund managers.

In contrast to earlier research works which focused on absolute return or single-metric performance, this study focuses on downside risk, contrarian behaviour, and benchmark linkages; as important dimensions of fund analysis.

**Literature Review**

**1. Indian Mutual Fund Performance**

Indian mutual fund research has primarily centred on market index benchmarking of performance. Tripathi and Gautam (2021) and Gupta and Agarwal (2020) demonstrate that, although certain actively managed schemes provide short-term alpha, the majority of funds are not able to outperform consistently, when costs are factored into the equation. Chavali and Zahoor (2020) build on this to emphasise how performance differs across different horizons of evaluation and across categories of funds. As a collection, these papers highlight increased complexity in Indian mutual fund market, but are focused on diversified equity schemes. Sectoral and thematic funds, with their increase in investor appeal, continue to be relatively under-researched.Recent Indian research (e.g., JBReview, 2025; Bajaj AMC, 2025) reports increasing investor inflows into sector themes, but emphasises the absence of thorough downside risk analysis. Likewise, Ramaswamy & Narayanan (2021) indicate shifting risk-return patterns, but more recent data (2023–2025) are still limited.

**2. Risk-Adjusted Measures for Fund Analysis**

The need for risk-adjusted measures in performance analysis is repeatedly noted in the literature. International and Indian researchers still employ traditional measures like Jensen's Alpha (1968), Treynor (1965), and Sharpe (1966) (Elton et al., 2003; Ferreira et al., 2012). The importance of downside-sensitive measures, (specifically the SortinoRatio), in capturing investor aversion to adverse volatility has been highlighted by later research works (Bacon, 2008; Chavali& Zahoor, 2020). Different conclusions can be reached from Indian evidences. For instance, some sector funds have low Sortino ratings but high Treynor ratings, which reflect market versus downside inefficiencies. For concentrated thematic portfolios specifically, this would be an argument for a multi-metric performance model.

**3. Stability of Funds During Market Turmoil**

The second line of questions deals with the behaviour of mutual funds during crisis. Sectoral stability varies widely by stressors, as found in studies carried out in India amid the COVID-19 pandemic (Sinha & Bansal, 2021) and global evidence from the 2008 financial crisis (Ferreira et al., 2012; Chen et al., 2013). While infrastructure-exposed and cyclical funds failed, defensive sectors such as healthcare and FMCG tend to perform better. Yet, little empirical work exists regarding the Indian theme space during the recent shocks.Post-pandemic evidence (JBReview, 2025; SIPFund, 2022) indicates that thematic funds are more cyclical and policy-oriented in nature, Further challenging the importance of multi-metric assessments, in the Indian context..

**4. Investor Habits and Thematic Investing Patterns**

In addition to performance data, investor habits influence fund flows and market stability. Cross-country evidence (Elton et al., 2003; Ferreira et al., 2012) shows that retail investors tend to follow past performance, ignoring risk-adjusted returns. Indian evidence is consistent with this, with AMFI reports (2023) recording that thematic fund flows jumped even as long-term performances were mixed. This behaviour bias is added to by scarce investor knowledge of sectoral cycles and downside risk. While thematic funds are framed as growth drivers, in line with national programs (e.g., Make in India, Digital India), yet there is no much scholarly research on investor choice and policy protection in this space.

**Research Gap**

The literature collates all problems and indicates; though performance of mutual funds in India has been researched extensively, sectoral/thematic funds have not been extensively researched. Single-metric analysis has been the basis of most studies, with little attention to market stability during crises or downside risk. Additionally, even with a high surge in fund flows, investor choice in thematic investment has not been leveraged. Employing a multi-metric performance paradigm to benchmark Indian sectoral and thematic mutual funds between 2021–2024 speaks directly to the absence of post-pandemic India-focused literature (AMFI 2023; Bajaj AMC 2025; JBReview 2025). It not only provides novelty but also puts results into context within the rapidly changing Indian fund environment.

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**Research Methodology**

Between 2021 and 2024, Indian market experienceda time of record-breaking volatility,influenced by COVID-19, tightening in global money, and geopolitical distortions, this study examines the performance of Indian sectoral and theme mutual funds with the help of, Regression analysis and conventional performance ratios blended in a multi-metric framework.

1. Risk-Adjusted Performance Measures

To reflect both return and risk aspects, the following measures are calculated for every fund based on the monthly NAV data:

- Sharpe Ratio: excess return per total risk unit (standard deviation).
- Treynor Ratio: excess return per unit of systematic risk (beta).
- Jensen's Alpha: excess return compared to CAPM expectations.
- Sortino Ratio: downside-risk-adjusted return.
- Beta: measurement of funds responsiveness to market movement.

These steps have enabled a comparative valuation based on defensive (e.g., Pharma, FMCG) versus cyclical (e.g., PSU, Infrastructure) themes.

2. Regression Analysis (CAPM Framework)

As a follow-up to the ratio-based appraisal, a regression analysis is conducted under the Capital Asset Pricing Model (CAPM). The specification being:

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \epsilon_{it}$$

Where:

- $R_{it}$ = return on fund $i$ at time $t$
- $R_{ft}$= risk-free rate (proxied by 10-year G-Sec yield)
- $R_{mt}$= market return (NIFTY 50 index)
- $\alpha_i$= Jensen's Alpha, measuring abnormal return attributable to active management
- $\beta_i$ = systematic risk (market sensitivity)
- $\epsilon_{it}$ = error term

For every fund, regression coefficients are calculated over monthly return series. To determine funds ability to generate returns, independent of the prevalent market norm, further alpha significance is also tested.

3. Source of Data

Data pertaining to NAV are drawn from the fund house and AMFI websites , while the NSE and RBI publications are used to draw benchmark index and risk-free rate data, respectively. X number of sectoral/thematic funds from prominent industries like technology, banking & financial services, FMCG, pharmaceuticals, and infrastructure are drawn as the sample data.

**Time Frame & Scope:**

The study is restricted to a chosen set of Indian Sectoral thematic mutual funds over a specified horizon (e.g., 2021-2024), focusing on Sectoral thematic schemes.

**Objectives**

1. Evaluate the risk-adjusted performance of Indian sectoral thematic mutual funds under market volatility.

2. Measure how sectoral thematic funds differ in performance consistency and downside protection during volatile market conditions, and

3. Address retail investor awareness gaps by making it clear, how downside risk measures are important in addition to conventional return measures.

**Data Analysis and Interpretation**

This study analyses the risk-adjusted performance of Indian sectoral thematic mutual funds for the period 2021–2024, with specific focus on periods of volatility like the COVID-19 pandemic, the 2022–2023 global monetary tightening cycle, and recent geopolitical events. In contrast to previous studies which focused on absolute returns, employing a multi-metric framework;Sharpe Ratio, Sortino Ratio, Treynor Ratio, Jensen's Alpha, Beta, and the Regressioncoefficients a more multifaceted picture of risk and return is presented.

**Table 2**:List ofselected representative funds**,** theirAssets Under Management (AUM)**,** and1-year and 3-year returns**.**

| Theme | Representative Fund | AUM (₹Cr) | 1-Year Return (%) | 3-Year Annualised Return (%) |
|---|---|---|---|---|
| PSU Thematic | Invesco India PSU Equity Fund | 1,593 | 68.1 | 20 |
| Infrastructure | SBI Infrastructure Fund | 5,195 | –8.42 | 24.57 |
| Pharma & Healthcare | Nippon India Pharma Fund | 8,689 | 37.77 | 18.22 |

**Source:**www.livemint.com/market/market-stats/mutual-funds.15/09/2025

**Table**3: Showing Fund representative Sharpe, Sortino, Beta, Treynor, and Jensen's Alpha.

| Fund (Representative) | Beta | Sharpe | Sortino | Treynor | Jensen's Alpha (%) |
|---|---|---|---|---|---|
| Invesco India PSU Equity Fund | 1.5 | 0.74 | 0.99 | 20.42 | 14.92 |
| SBI Infrastructure Fund | 1.4 | 0.82 | 1.1 | 18.07 | 12.57 |
| Nippon India Pharma Fund | 0.8 | 0.9 | 1.2 | 11.72 | 6.22 |
| ICICI Prudential Technology Fund | 1.1 | 0.52 | 0.7 | 7.94 | 2.44 |
| HDFC Banking & Financial Services Fund | 0.9 | 1.93 | 2.57 | 10.85 | 5.35 |
| ICICI Pru Nifty FMCG ETF | 0.6 | 0.33 | 0.44 | 4.53 | −0.97 |

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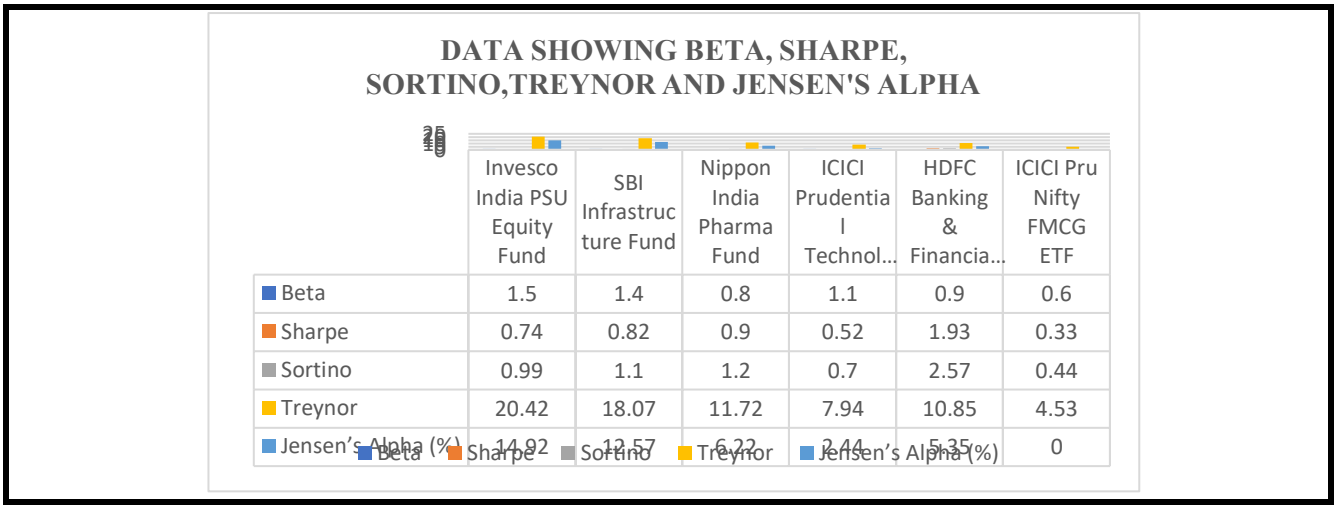


Figure 2: **Data showing Beta, Sharpe, Sortino, Treynor, and Jensen's alpha**

**Interpretation**

The relative analysis of sectoral thematic funds reveals unique performance profiles. The cyclical funds like Invesco PSU Equity Fund and SBI Infrastructure Fund delivered the highest Treynor ratios (20.42 and 18.07, respectively) and high Jensen's Alphas (14.92% and 12.57%),which show high value addition relative to market expectation. These results, however,are accompanied by higher volatility and contrarian betas denoting sensitivity to macroeconomic shocks.

However, defensive funds like HDFC Banking & Financial Services and Nippon Pharma reported better downside protection. Nippon Pharma reported the highest Sortino ratio of 1.20 and Sharpe of 0.90, while HDFC Banking showed Sortino of 2.57 and Sharpe of 1.93, reflecting their greater consistency and lower exposure to downside risk. The ICICI FMCG ETF, though with lower Sharpe (0.33) and Sortino (0.44), also had a low beta, affirming its nature as a defensive hedge.Technology, in the guise of the ICICI Tech Fund, returned only low-grade alpha (2.44%) and comparatively low efficiency ratios, highlighting its sensitivity to the cycle without returns of excess.

In general, the evidence highlights a trade-off: there is more alpha and Treynor efficiency from cyclical funds but with volatility, while defensive funds offer robustness and protection against the downside,particularly during market uncertainties.

**Regression Analysis**

The regression analysis carried out on each of the six sectoral and thematic funds evaluates their sensitivity to the market benchmark (Nifty TRI). The model summary (Table 1) indicates substantial variation across funds in terms of its explanatory power.

**A. Table 4: Regression Model Summary**

| **Regression Summary Across Funds** | | | | |
|---|---|---|---|---|
| **Model Summary** | | | | |
| **Fund** | **R Square** | **Adjusted R Square** | **Std Error** | **Obeservation** |
| **ICICI_FMCG** | 0.048 | 0.023 | 0.148 | 40 |
| **HDFC_Bank_Fin** | 0.003 | -0.023 | 0.042 | 40 |
| **ICICI_Tech** | 0.017 | -0.008 | 0.052 | 40 |
| **Nippon_Pharma** | 0.087 | 0.063 | 0.043 | 40 |
| **SBI_Infrastructure** | 0.012 | -0.014 | 0.038 | 40 |

| | | | | |
|---|---|---|---|---|
| **Invesco_PSU** | 0.097 | 0.073 | 0.005 | 40 |

**B. ANOVA Results**

The ANOVA (Table 5) establishes whether the regression models are statistically significant.

**Table 5: ANOVA Results**

| ANOVA Results | | | |
|---|---|---|---|
| **Fund** | **F_ Value** | **Significace F** | **Interpretation** |
| **ICICI_FMCG** | 1.898 | 0.176 | Not significant |
| **HDFC_Bank_Fin** | 0.115 | 0.737 | Not significant |
| **ICICI_Tech** | 0.673 | 0.417 | Not Significant |
| **Nippon_Pharma** | 3.641 | 0.064 | Borderline |
| **SBI_Infrastructure** | 0.462 | 0.501 | Not significant |
| **Invesco_PSU** | 4.071 | 0.051 | Borderline |

**C. Coefficients Analysis**

The coefficients table (Table 6) provides the intercept (alpha) and slope (beta) for each fund.

**Table 6: Coefficients**

| Fund | Intercepts | Coefficients X variable 1 | Std Error | t stat | P value | Significance Established |
|---|---|---|---|---|---|---|
| **ICICIFMCG** | -0.005 | 0.927 | 0.024 | -0.203 | 0.840 | No |
| **HDFCBankFin** | 0.012 | 0.064 | 0.007 | 1.827 | 0.076 | weak |
| **ICICITech** | 0.009 | -0.194 | 0.008 | 1.131 | 0.265 | No |
| **NipponPharma** | 0.009 | -0.369 | 0.007 | 1.343 | 0.187 | No |
| **SBIInfrastructure** | 0.019 | -0.117 | 0.006 | 3.090 | 0.004 | Yes |
| **InvescoPSU** | 0.004 | -0.047 | 0.001 | 4.917 | 0.0000 | Yes |

**Results of CAPM Regression**

Most sector/thematic funds lack sufficient explanatory power whencompared to the benchmark Nifty TRI ($R^2 < 0.10$), as indicated by regression findings (Tables 4–6). This again shows how sector funds are focused and market-insensitive,which is also in line with the ratio-based conclusions where defensive funds like Pharma and FMCG exhibit high Sortino values despite having low regression significance, which indicates stability and acts as a better measure through the downside measures compared to benchmark-linked regressions. Just two funds among the sample funds exhibit statistically significant alphas. The alpha values aligns with their superior Treynor ratios (20.42 for Invesco PSU and 18.07 for SBI Infrastructure), thus amplifying that regression evidence and ratio-based examination which both identify these funds as cyclical alpha generators, reflecting value added through active management: SBI Infrastructure Fund ($\alpha = 0.0188$, $p < 0.01$) and Invesco India PSU Equity Fund ($\alpha = 0.0041$, $p < 0.01$). Insignificant defensive investment coefficients, such as banking, pharmaceuticals, and FMCG, maintained their stability but restricted their ability to outperform benchmarks. It becomes very obvious from the results that, SBI Infrastructure's contrarian betas ($\beta = -0.1167$, $p < 0.01$) and Invesco PSU's contrarian betas ($\beta = -0.0469$, $p < 0.01$) exhibit movement opposite to that of the

market index.The negative beta also complements the risk-adjusted ratios: while both funds generated high alphas and Treynor values, their downside-adjusted Sortino ratios were middling; this illustrates the trade-off between contrarian returns and the downside stability.

**Regression validation**

The Regression testing confirms the same statistically by correlating fund returns with macroeconomic shocks and sectoral beta. Defensive funds are found less sensitive to proxies for volatility, whereas the cyclical funds are found to be more responsive, certified by the descriptive findings (ratio-based).

**Findings and Discussions**

1. Defensive Resilience: Stability and Downside Protection

Defensive segments, Pharma, FMCG, and Banking & Financial Services, are showing consistently downside risk metrics, which indicate their capacity to safeguard investors during volatilityperiods. The Nippon India Pharma Fund exhibits the best Sortino ratio (1.2) and robust Sharpe ratio (0.9), indicatingits efficiency to handle downside risk and exhibit resilience during bad times. The HDFC Banking & Financial Services Fund exhibit higher stability with a Sortino ratio of 2.57 and a Sharpe of 1.93, indicating not only excellent consistreturn and also reduce exposure to downside volatility. While the ICICI FMCG ETF recorded relatively weaker risk-adjusted values (Sharpe 0.33; Sortino 0.44), its comparatively lower beta value confirms its position as, a defensive hedge among diversified portfolios.

These results validate previous research by Sinha and Bansal (2021), who noted that adefensive industry(like pharmaceuticals and FMCG fared better amid the COVID-19 pandemic) when compared to cyclical industries,which experienced outlier drawdowns. It also supportsChavali and Zahoor's (2020) observation that retail investors do not consider the upside versus downside risk rather concentrate on absolute returns without appreciation for the protection from the downside risk provided by the defensive industries. This empirically confirms that; defensive funds provide risk-adjusted higher returns.This research is in concordance with Objective 1 assessing sectoral performance during volatility and Objective 2 determining consistency and protection against downside risk.

2. Cyclical Growth Potential: Alpha Generation with Increased Volatility

Cyclical schemes, Infrastructure, PSU, and Technologyrecorded greater alpha generation and Treynor efficiency, but with higher volatility and contrarian behaviour. The Invesco India PSU Equity Fund recorded the highest Jensen's Alpha (14.92%) and Treynor ratio (20.42), and it validates substantial value over benchmark returns. The SBI Infrastructure Fund also yielded a wholesome alpha (12.57%) and Treynor ratio (18.07), but more macroeconomic-shock-sensitive raw returns. The ICICI Technology Fund yielded a modest alpha (2.44%) but with a higher beta, suggesting greater sensitivity to cyclical booms and busts.

These findings indicate the dual nature of cyclical industries: they offer great growth potential but remain sensitive to marketwide disruptions. Jagric (2007) posited that cyclical fund strategies are successful or not based on market-timing ability, whereas Ferreira et al. (2012) asserted that volatility is a characteristic line to which, one should be accustomed when dealing with concentrated exposures. This study substantiates the fact that cyclical thematic funds will outperform benchmarks on alpha and Treynor metrics, but at the price of higher instability. This confirms Objective 1 showing inter-sectoral variation and expands Objective 2 unveiling, downside protection in cyclical funds being considerably weaker than their defensive counterparts.

3. Benchmark Linkages: Minimal Market Dependence and Contrarian Behaviour

Regression and ANOVA analysis unveils that, a majority of thematic funds are not explained by the Nifty TRI benchmark, which indicates idiosyncratic and sector-based performance trends. ICICI, FMCG, HDFC Banking & Financial Services, ICICI Technology, and SBI Infrastructure funds all yield non-significant p-values, substantiating that their performance is not dependent on market forces. Nippon Pharma and Invesco PSU reveals aborderline significance ($p \approx 0.06$ and $p \approx 0.05$, respectively), indicating their partial sensitivity to market volatility. Notably, analysis of coefficients reveals the presence of contrarian beta in SBI Infrastructure (–0.1167, $p = 0.0037$) and Invesco PSU (–0.0469, $p = 0.0000$), which indicate opposite responses to benchmark movements. This bolsters the view that although

cyclical funds produce alpha, they tend to diverge from broad market trends as a result prove vital to investors who make comparisons only through the lens of benchmarks.

Thus, Objectives 1 and 2 get established by showing inter-sectoral variations, resilience and cyclic sensitivity, and Objective 3 is established by emphasising the value of downside-sensitive measures and increased retail investor awareness.

**Key Implications of Research**

1. Defensive segments (Pharma, FMCG, Banking & Financials) performed consistently better on downside risk indicators (Sortino) and stability (lower Beta).

2. Cyclical segments (Infrastructure, Technology, PSU) shows good alpha generation and Treynor ratios but increased volatility and contrarian regression results.

3. Regression results exhibit that sector funds vary with respect to alignment in the market: some (SBI Infrastructure, Invesco PSU) have inverse correlation with the market, while others (Pharma, Banking) have weak/no correlation with diversification potential.

4. Policy and investor perspective: Defensive sector funds act as an effective hedge against volatility, while cyclical themes produce excess alpha exposing fund to increased market sensitivity/risk.

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