The Limits of Active Management: Evidence from Indian Equity Mutual Funds.

Abstract

This study examines the performance of active mutual funds in comparison to their benchmark indices. Three categories of equity mutual funds were considered and evaluated separately in this study: large-cap, mid–cap, and small–cap. The evaluation was performed on excess returns, risk, volatility, and consistency-adjusted metrics. All active mutual funds available in the Indian stock market in the last five years were considered and investigated using a cross-sectional benchmark analysis, multiple linear regression, and logistic regression models. The results indicate high market efficiency in the large-cap sector, causing the alpha to be beta-driven, with diminishing efficiency in the mid-cap and small-cap sectors. The influence of managerial skill is also the lowest in the large-cap sector, with an increasing trend in the lower market capitalisation categories. All categories exhibit underperformance on risk-adjusted and consistency metrics, with mid-cap funds greatly underperforming on non–adjusted excess returns also. Small–cap funds were found to have considerable capacity for managerial skill, but were suppressed by inefficient risk utilisation. Overall, the findings highlight that risk utilisation is essential for generating excess returns, and the potential for managerial skill decreases with market capitalisation.

Keywords:*Mutual funds, Indian equity markets, Mutual funds underperformance, Large–cap, Mid-cap, Small-cap*

Introduction

India is a developing country that has continued to experience significant growth in its equity markets. The Nifty 50, a weighted benchmark index of the top 50 listed companies in India, has grown at a rate of 12.5% for the past 10 years (Takalkar, 2025). This growth has led to many investors taking an interest in the equity markets of the country. However, according to SEBI, the penetration of mutual funds and stocks remains at 6.7% and 5.3%, respectively (Agarwal &

Leo, 2025). Mutual funds emerge as the preferred option when considering investing in the equity markets, and will most likely continue to be so due to their professional management and trust among the people in the AMC.

Mutual funds span across multiple categories, namely debt, equity, and money markets. Within equity, it is further divided into categories based on their market capitalization. Each category reflects its own risks, returns, and characteristics. Another important distinction lies within the structure of the mutual fund. Passive mutual funds aim at replicating the benchmark, often charging a lower expense ratio. On the other hand, active mutual funds try to outperform the benchmark by actively managing the portfolio, often charging a higher expense ratio.

Despite this, there has been an ongoing discussion about the credibility of these excess returns over benchmarks for active mutual funds, with significant indications towards active funds underperforming. The underperformance of these active mutual funds also appears to vary across market capitalization.

Regardless, existing knowledge in the Indian context provides limited evidence on how active mutual funds underperform their benchmark indices across different market capitalizations. In addition, the drivers of underperformance are also widely unexplored.

To address this, our study examines the performance of active mutual funds across three different market capitalizations with a focus on identifying the determinants of underperformance. The following research questions have been framed for this study:

RQ1: Whether large-cap actively managed mutual funds underperform their benchmark indices.

RQ2: Whether mid-cap actively managed mutual funds underperform their benchmark indices.

RQ3: Whether small-cap actively managed mutual funds underperform their benchmark indices.

RQ4: What are the primary determinants of underperformance across different mutual fund categories?

Review of Literature

Several studies have looked at how equity mutual funds perform, especially in India. They use tools like Sharpe ratio, Treynor ratio, and Jensen measure to check returns against risk and market benchmarks like Nifty or Sensex. These reviews help understand if funds beat the market or not

1. Chakraborty, Jain, and Kallianpur (2008), along with Bhagyasree and Kishori (2016), studied 30 random mutual fund schemes from April 2011 to March 2015. They used daily closing prices (NAV) and measures like Sharpe, Treynor, and Jensen. Out of the 30, 14 funds did better than their benchmark index.
2. Agrawal (2011) examined how mutual funds in India set prices and perform. He compared funds to the Sensex using relative measures, standard deviation, correlation, and R-squared. The study noted huge growth in the industry, drawing local and foreign investors.
3. Prajapati and Patel (2012) compared top equity funds from five big asset management companies, based on their size (AUM) as of September 2011. Using daily NAV data from 2007 to 2011, they saw that these funds had lower ups and downs (less volatility) than the market index. All selected funds also gave positive returns.
4. Ashraf, S. H., & Sharma, D. (2014). Studied 10 growth oriented open ended equity mutual fund schemes consisting of 5 public and 2 private mutual fund companies. through risk-return analysis, Coefficient of Variation, Treynor's ratio, Sharp's ratio, Jensen's measure, Fama's measure and Regression analysis applied on the monthly closing NAVs and benchmark market index closing period of April 2007 to March 2012. The risk return analysis revealed that out of 10 schemes 3 have underperform the market, 7 are found to have lower total risk than the market and all the schemes have given returns higher than risk free rates.
5. Adhav, M. S. M., & Chauhan, P. M. (2015). Studied 15 Indian mutual funds considering standard deviation and share ratio for the last five years (2009-10 -2013-14), with the Net Asset Value (NAV) of sampled 15 mutual fund companies collected from the websites of AMFI, mutual fund India, value research, Morningstar etc. they found that the equity mutual fund scheme of selected Indian companies has outperformed the benchmark BSE indices by large margins.

6. Mishra and Ahuja (2016) checked high-rated funds (4 or 5 stars) that had lasted 10 years by July 2014, using data from Lipper's database. They tested Sharpe, Treynor, information ratio, Sortino, M-square, Jensen, and Fama measures against Nifty. Most funds underperformed the benchmark, except one, based on Sharpe and Treynor ratios.
7. Safiuddin and Hasan (2022) reviewed 30 research papers from around the world. They found a strong link between fund returns and market returns. Fund features, like size or fees, also affect performance a lot.
8. Cremers, K. M., Fulkerson, J. A., & Riley, T. B. (2022)., studied the benchmark discrepancies and mutual fund evaluation based on the information on funds' prospectus benchmarks from Morningstar Direct and matched that data to CRSP using ticker, CUSIP, and assets. they concluded that risk adjustment is central to performance evaluation.

Research Methodology

The present study employs a cross-sectional and analytical research design to investigate the underperformance of actively managed mutual funds against their benchmark indices.

The cross-sectional approach allows comparison between the metrics for a list of mutual funds over a period of 5 years ending on the 31st of October 2025. The analytical framework involves the usage of regression-based statistical models, which would help to explain the determinants of underperformance. This study incorporates three statistical models: cross-sectional benchmark analysis, Multiple Linear Regression, and Logistic Regression.

The data used in this study is sourced from the Association of Mutual Funds in India (AMFI) and Scheme-level fact sheets published by AMCs. Active funds that were in operation for at least 5 years ending on 31st October 2025 were selected for this study.

The AMFI database was used to source information on information ratio, Absolute returns, and Benchmark returns. Additionally, scheme-level data for every mutual fund was sourced from the factsheets of the mutual funds, namely, beta, Sharpe ratio, standard deviation, and risk- free rate. Furthermore, Additional ratios were computed for better evaluation, namely, Net returns, Alpha,

Treynor Ratio, M2 Measure, M2 Alpha, Beta Neutral returns, Diversification Efficiency, Volatility Adjusted Alpha, Alpha/Beta, and Tracking Error.

The following benchmarks were used to classify underperformance within each category:

Table 1: Sources for Benchmark

Metric	Large-Cap	Mid-Cap	Small-Cap	Literature Support
Alpha	1.0%	1.5%	2.0%	Fama & French (2010), Carhart (1997), Morningstar
Sharpe Ratio	0.35	0.40	0.45	Sharpe (1966), Morningstar
Treynor Ratio	4%	6%	8%	Treynor (1965)
Information Ratio	0.20	0.30	0.40	Grinold (1989), Treynor & Black (1973)
Beta-neutral Alpha	0.50%	1.00%	1.50%	Fama & French (1993; 2010); Berk & van Binsbergen (2015)
Volatility-Adjusted Alpha (VAA)	0.02	0.03	0.04	Fama–French (1996)
Alpha/Beta	0.010	0.015	0.020	Fama–French (1993); Berk & Green (2004)
Diversification Efficiency	1.05	1.10	1.15	Elton & Gruber (1977); Statman (1987)

Tracking Error	3%	4%	5%	Cremers & Petajisto (2009)

Source: Data based on the authors' calculation

Data Interpretation

Large Cap

The table above is cross-sectional data for each of the large-cap mutual funds considered for this study. All values are in either percentages or ratios, respectively.

Cross-sectional Analysis

Table 2: Cross-sectional data for large-cap active funds

Name	Information Ratio	Alpha	M2 Alpha	Beta Neutral Return	Volatility Adjusted Alpha
Aditya Birla Sun Life Large Cap Fund	0.55	0.02	-0.02	0.08	0.03
Axis Large Cap Fund	-1.12	-0.03	-0.20	0.03	-0.04
Bandhan Large Cap Fund	-0.01	0.00	-0.03	0.06	0.00
Baroda BNP Paribas Large Cap Fund	0.26	0.01	-0.02	0.07	0.02
Canara Robeco Large Cap Fund	-0.07	0.01	-0.03	0.07	0.02
DSP Large Cap	-0.10	0.02	0.00	0.07	0.02

Fund					
Edelweiss Large Cap Fund	0.36	0.02	-0.04	0.08	0.02
Franklin India Large Cap Fund	0.20	0.04	-0.02	0.10	0.18
Groww Large Cap Fund	-0.22	-0.41	6.70	6.39	-1.54
HDFC Large Cap Fund	0.93	0.05	-0.02	0.11	0.05
HSBC Large Cap Fund	-0.12	0.00	-0.02	0.07	0.00
ICICI Prudential Large Cap Fund	1.10	0.05	-0.01	0.11	0.07
Invesco India Large cap Fund	0.49	0.01	-0.03	0.07	0.01
JM Large Cap Fund	-0.25	0.01	-0.01	0.06	0.01
Kotak Large Cap Fund	0.44	0.02	-0.04	0.08	0.02
LIC MF Large Cap Fund	-0.53	-0.01	-0.07	0.05	-0.01
Mahindra Manulife Large Cap Fund	0.53	0.01	-0.07	0.11	0.01
Mirae Asset Large	-0.21	0.01	-0.01	0.07	0.02

Cap Fund					
Nippon India Large Cap Fund	1.72	0.08	0.01	0.14	0.09
PGIM India Large Cap Fund	-0.57	-0.01	-0.08	0.06	-0.01
SBI Large Cap Fund	0.02	0.01	-0.04	0.07	0.02
Sundaram Large Cap Fund	-0.18	0.01	-0.05	0.07	0.01
Tata Large Cap Fund	0.63	0.03	-0.01	0.09	0.03
Taurus Large Cap Fund	-0.43	-0.02	-0.09	0.03	-0.02
UTI Large Cap Fund	-0.50	0.00	-0.07	0.06	0.00
Union Large cap Fund	-0.63	-0.01	-0.06	0.05	-0.01

Source: Data based on the authors' calculation

The table below is a benchmark-based categorical performance analysis for large-cap funds.

Table 3: Benchmark analysis of active large-cap funds

Metric	Underperforming Funds	Total Funds	Percentage (%)
Information Ratio	16	26	61.54
Alpha	10	26	38.46
M^2 Alpha	23	26	88.46
Beta Neutral Return	0	26	0.00
Volatility Adjusted Alpha	18	26	69.23

Source: Data based on the authors' calculation

This shows that the funds that seem to generate alpha often underperform when adjusting for risk,
volatility, and consistency, as seen by information ratio underperformance (61.5%), M2 Alpha (88.4%), and volatility-adjusted alpha (69.2%). This is also in line with existing knowledge about large-cap stocks being market efficient, making it harder to generate excess returns.

Despite some evidence of alpha generation, the underperformance rises when adjusting the excess returns for volatility and risk, highlighting that the excess returns generated are not consistent or robust.

Multiple Linear Regression

Table 4: MLR Model fit

Statistic	Value
R^2	0.5701
Adjusted R^2	0.5115

F-statistic	9.73
Standard Error	0.0597
Observations	26
Significant F	0.00027

Source: Data based on the authors' calculation

The multiple linear regression model-fit table for large-cap active mutual funds shows a significant overall fit, as observed in the F-statistic and the significant F value. The R2 value of 57% suggests that a considerable portion of the underperformance of large-cap funds is explained by the selected variables. Adjusted R2 remains high even after adjusting for the number of explanatory variables. A standard error of 0.059 also highlights a reasonable fit for cross-sectional fund data.

Table 5: MLR model results

Variable	**B (Coefficient)**	**Std. Error**	**t-Statistic**	**p-value**	**95% Confidence Interval**
Intercept	-0.2503	0.1814	-1.38	0.1815	[-0.6265, 0.1259]
Standard Deviation	-2.1533	0.5396	-3.99	0.0006	[-3.2723, -1.0342]
Beta	0.6146	0.2156	2.85	0.0093	[0.1676, 1.0617]
Diversification Efficiency	-0.0115	0.0053	-2.17	0.0415	[-0.0224, -0.00049]

Source: Data based on the authors' calculation

The Multiple Linear Regression concludes along the same lines, with the p-value for beta being at p = 0.00928 against underperformance, suggesting that underperformance is driven by beta, and the presence of high market efficiency.

Furthermore, the p-value for standard deviation is at p = 0.00006, which is in line with the earlier observation that excess returns are influenced by high volatility.

Diversification Efficiency also has a significant influence on the underperformance of large-cap funds, with poorly diversified funds continuing to underperform.

Logistic Regression

Table 6: Logistic regression model fit

Statistic	Value
Model Chi-Square (p-value)	22.18 ($p < 0.01$)
Nagelkerke Pseudo R^2	0.779
Classification Accuracy	84.6%
Cutoff Probability	0.50
p-value	2.5E-06

Source: Data based on the authors' calculation

The logistic regression model for large–cap funds exhibit a statistically significant overall fit, as indicated by the model chi-square of 22.18 and a p–value below 0.01.

The Nagelkerke pseudo-R^2 value of 0.779 suggests that the independent variables explain a meaningful portion of the variation in the probability of underperformance. A classification accuracy of 84.6% demonstrated a good predictive performance for underperformance and non-underperformance.

Table 7: Logistic regression results

Predictor Variable	Coefficient (β)	Std. Error	p-value	Odds Ratio (expβ)
Intercept	-1.5439	1.0436	0.1390	0.2136
Information Ratio	-10.1913	5.1837	0.0493	3.75E-05

Source: Data based on the authors' calculation

According to Grinold (1989), the Information Ratio falls when excess returns are volatile or inconsistent. Because beta-driven alpha produces unstable active returns and increases tracking error, it is penalized in the IR framework. This is reflected in the Logistic regression model with IR being a significant predictor of underperformance.

With a negative coefficient, higher IR lowers the probability of underperformance. This result is consistent with earlier observations, as the information ratio penalizes volatility and beta-driven excess returns, which reinforces our observations on the MLR model.

Summary Interpretation

The results indicate that large-cap active mutual funds underperform their benchmark index after adjusting for either risk, consistency, or volatility. Beta and volatility appear to be primary drivers of underperformance. Beta consistently appears as a key determinant of underperformance, which also signals market efficiency. Volatility is observed to significantly weaken risk-adjusted returns.

Midcap

The table below is cross-sectional data for each of the mid-cap mutual funds considered for this study. All values are in either percentages or ratios, respectively.

Cross-sectional Analysis

Table 8: Cross-sectional data for mid-cap active funds

Names	Information Ratio	Alpha	M2 Alpha	Beta Neutral Return	Volatility Adjusted Alpha
Aditya Birla Sun Life Mid Cap Fund	-0.58	-0.02	-0.05	0.04	-0.02
Axis Midcap Fund	-0.77	-0.01	-0.41	0.05	-0.02
Baroda BNP Paribas Mid Cap Fund	-0.38	0.02	-0.01	0.08	0.03
DSP Midcap Fund	-1.40	-0.08	-0.06	-0.02	-0.10
Edelweiss Mid Cap Fund	0.47	0.04	0.15	0.11	0.06
Franklin India Mid Cap Fund	-0.67	-0.04	-0.03	0.02	-0.21
HDFC Mid Cap Fund	0.30	0.06	0.08	0.12	0.10
HSBC Mid Cap Fund	-0.51	-0.02	0.00	0.03	-0.03
ICICI Prudential Midcap Fund	-0.10	0.00	-0.03	0.06	0.00
Invesco India Mid Cap Fund	0.25	0.03	-0.15	0.09	0.00
Kotak Midcap Fund	-0.05	0.02	0.05	0.08	0.03
LIC MF Mid Cap	-0.97	-0.05	-0.05	0.01	-0.06

Fund					
Mahindra Manulife Mid Cap Fund	0.18	0.02	-0.05	0.09	0.03
Mirae Asset Midcap Fund	-0.13	0.00	0.02	0.06	0.00
Motilal Oswal Midcap Fund	0.50	0.03	0.01	0.09	0.04
Nippon India Growth Mid Cap Fund	0.39	0.03	0.02	0.09	0.05
PGIM India Midcap Fund	-0.50	0.01	-0.12	0.08	0.02
Quant Mid Cap Fund	0.13	0.01	0.03	0.07	0.02
SBI Midcap Fund	-0.37	-0.01	-0.07	0.05	-0.01
Sundaram Mid Cap Fund	-0.14	0.00	-0.02	0.06	-0.01
Tata Mid Cap Fund	-0.53	0.00	-0.09	0.06	0.00
Taurus Mid Cap Fund	-1.00	-0.07	-0.09	-0.01	-0.09
UTI Mid Cap Fund	-0.92	-0.01	-0.07	0.04	-0.02
Union Midcap Fund	-0.22	0.01	-0.05	0.06	0.01

Source: Data based on the authors' calculation

The table below is a benchmark-based categorical performance analysis for mid-cap funds.

Table 9: Benchmark analysis of active mid-cap funds

Metric	Underperforming Funds	Total Funds	Percentage (%)
Information Ratio	21	24	87.50
Alpha	16	24	66.67
M^2 Alpha	16	24	66.67
Beta Neutral Return	3	24	12.50
Volatility Adjusted Alpha	19	24	79.17

Source: Data based on the authors' calculation

The results of this table indicate significant underperformance for the mid-cap active funds. With alpha underperformance at 66% and information ratio underperformance at 87.5%, this emphasizes that most funds fail to generate excess returns. Furthermore, the funds fail to generate consistent, risk-adjusted returns, indicating limited evidence of sustained managerial skill.

Mid-cap funds significantly underperform across all metrics considered, clearly indicating a lack of evidence of managerial skill.

Multiple Linear Regression

Table 10: MLR Model fit

Statistic	Value
R^2	0.9701

Adjusted R^2	0.9655566
F-statistic	216.18
Standard Error	0.0062
Observations	24
Significant F	2.09E-15

Source: Data based on the authors' calculation

The multiple linear regression model for mid-cap funds indicates a highly statistically significant overall fit, as evidenced by the F-statistic of 216.18 with a significant F of 2.09-E15. This suggests that the selected variables jointly provide strong explanatory power in accounting for variations in fund underperformance.

An R^2 value of 97.01% and an adjusted R^2 of 95.66% indicate that a very large proportion of the variation in underperformance is explained by the model, with the explanatory strength remaining high even after adjusting for the number of variables considered. The low standard error of 0.0062 reflects minimal dispersion around the fitted values, indicating a precise and well-fitting model

Table 11: MLR model results

Variable	B (Coefficient)	Std. Error	t-Statistic	p-value	95% Confidence Interval
Intercept	-0.1803	0.01825	-9.88	3.87E-09	[-0.2184, -0.1422]
Information Ratio	-0.0622	0.00256	-24.25	2.65E-16	[-0.0676, -0.0569]

Beta	0.1885	0.02036	9.26	1.13E-08	[0.1461, 0.2310]
Diversification Efficiency	0.00031	0.00073	0.43	0.673	[-0.00122, 0.00184]

Source: Data based on the authors' calculation

The multiple linear regression model further reinforces the significance of the information ratio in determining if a fund underperforms or not, with a higher information ratio lowering the underperformance. Additionally, this is suggestive of managerial skill. Beta appears to be a significant determinant of underperformance, where a greater exposure to systematic risk increases underperformance rather than contributing to reasonable alpha.

Logistic Regression

Table 12: Logistic regression model fit

Statistic	Value
Model Chi-Square	16.74
Nagelkerke Pseudo R^2	0.697
Classification Accuracy	87.5%
Cutoff Probability	0.50
AUC	0.945
p-value	4.3E-05

Source: Data based on the authors' calculation

The logistic regression model for mid-cap funds indicates a statistically significant overall fit, as evidenced by the model chi-square value of 16.74 with a p-value below 0.01.

The Nagelkerke pseudo-R^2 value of 0.697 indicates strong explanatory power of the independent variables in accounting for the likelihood of underperformance.

Furthermore, the AUC value of 0.945 reflects excellent discriminative ability, indicating that the model is highly effective in distinguishing between underperforming and non-underperforming funds.

Table 13: Logistic regression results

Predictor Variable	Coefficient (β)	Std. Error	p-value	Odds Ratio (expβ)
Intercept	-0.0646	0.6955	0.9260	0.9374
Information Ratio	-6.4864	2.6448	0.0142	0.00152

Source: Data based on the authors' calculation

The logistic regression model is consistent with the MLR model. Information ratio is seen to significantly explain underperformance of a fund, where, as the information ratio increases, the probability of a fund underperforming decreases. The existence of the information ratio in this model provides further evidence of managerial skill.

Summary Interpretation

The empirical results indicate that mid-cap mutual funds underperform their benchmark index; the underperformance remains after adjusting for risk and volatility. Underperformance is primarily driven by consistency in performance and risk efficiency. The presence of the information ratio in the regression models suggests that mid-cap excess returns are less dependent on beta.

Overall, the findings suggest that mid-cap funds offer greater scope for active management, but successful performance depends on how efficiently active risk is used, not on taking higher systematic risk.

SmallCap

The table above is cross-sectional data for each of the small-cap mutual funds considered for this study. All values are in either percentages or ratios, respectively.

Cross-sectional Analysis

Table 14: Cross-sectional data for small-cap active funds

Name	Information Ratio	Alpha	M2 Alpha	Beta Neutral Return	Volatility Adjusted Alpha
Aditya Birla Sun Life Small Cap Fund	-0.67	-0.02	-0.10	0.04	-0.02
Axis Small Cap Fund	-0.26	0.06	-0.43	0.11	0.08
Bandhan Small Cap Fund	0.65	0.07	0.04	0.12	0.08
Bank of India Small Cap Fund	0.08	0.04	-0.10	0.10	0.05
Canara Robeco Small Cap Fund	-0.02	0.06	-0.09	0.12	0.08
DSP Small Cap	-0.20	0.00	-0.08	0.06	0.00

Fund					
Edelweiss Small Cap Fund	0.11	0.06	-0.11	0.12	0.07
Franklin India Small Cap Fund	0.03	0.06	-0.04	0.11	0.24
HDFC Small Cap Fund	0.43	0.08	-0.02	0.14	0.11
HSBC Small Cap Fund	0.24	0.07	0.16	0.14	0.10
ICICI Prudential Small cap Fund	-0.11	0.06	-0.08	0.12	0.09
ITI Small Cap Fund	-0.21	0.00	0.00	0.05	0.00
Invesco India Small cap Fund	0.53	0.09	-0.16	0.15	0.38
Kotak Small Cap Fund	-0.24	0.03	-0.10	0.09	0.04
LIC MF Small Cap Fund	-0.05	0.03	-0.10	0.09	0.04
Nippon India Small Cap Fund	0.71	0.09	-0.04	0.15	0.12
Quant Small Cap Fund	0.65	0.05	0.06	0.11	0.06
SBI Small Cap Fund	-0.42	0.03	-0.10	0.09	0.05

Sundaram Small Cap Fund	-0.12	0.04	-0.03	0.10	0.06
Tata Small Cap Fund	0.15	0.08	-0.05	0.15	0.10
Union Small Cap Fund	-0.18	0.02	-0.09	0.08	0.03

Source: Data based on the authors' calculation

The table below is a benchmark-based categorical performance analysis for small-cap funds.

Table 15: Benchmark analysis of active small-cap funds

Metric	**Underperforming Funds**	**Total Funds**	**Percentage (%)**
Information Ratio	16	21	76.19
Alpha	3	21	14.29
M^2 Alpha	18	21	85.71
Beta Neutral Return	0	21	0.00
Volatility Adjusted Alpha	5	21	23.81

Source: Data based on the authors' calculation

The alpha in the small-cap funds shows only a 14.29% underperformance, which is relatively low compared to the other categories. However, the underperformance climbs as we adjust excess returns for risk and consistency. The Information ratio underperformance, at 76.19%, and M2 Alpha underperformance at 85.71% indicate a lack of robustness and strength in the excess returns generated.

Overall, small-cap funds do not underperform based on just alpha, but the performance breaks down when adjusting excess returns for risk and consistency, implying that excess returns are not superior or robust.

Multiple Linear Regression

Table 16: MLR Model fit

Statistic	**Value**
R^2	0.9846
Adjusted R^2	0.9808
F-statistic	256.28
Standard Error	0.0041
Observations	21
p-value	2.76E-14

Source: Data based on the authors' calculation

The multiple linear regression model for small-cap active funds exhibits a strong statistical fit, as evidenced by the F-statistic of 256.28 and p-value of 2.76E-14. Additionally, an R2 of 98.46% and an adjusted R2 of 98.08% further indicate that the model explains a very large proportion of the variation in underperformance and that the explanatory power persists even after adjusting for the number of explanatory variables.

A standard error of 0.0041 indicated the high precision of the model.

Table 17: MLR model results

Variable	B (Coefficient)	Std. Error	t-Statistic	p-value	95% Confidence interval
Intercept	-0.2054	0.00955	-21.51	3.10E–13	[-0.2257, -0.1852]
Information Ratio	-0.0697	0.00267	-26.06	1.57E-14	[-0.0754, -0.0640]
Standard Deviation	0.0313	0.02702	1.16	0.263	[-0.0259, 0.0886]
Beta	0.2115	0.01304	16.23	2.34E–11	[0.1839, 0.2392]
Diversification Efficiency	0.00043	0.00064	0.67	0.512	[-0.00092, 0.00177]

Source: Data based on the authors' calculation

The information ratio is a significant determinant in explaining the underperformance of a fund, with a higher ratio reducing underperformance. This can also serve as evidence for ineffective risk utilisation within this sector, which is backed by the underperformance seen within the M2 alpha metric in the previous model. Furthermore, the presence of information ratio is also an indirect suggestion of market inefficiency.

The test with beta revealed a positive coefficient and significant explanatory power. An increase in beta increases funds' underperformance, which aligns with the earlier conclusion of excess returns not being influenced by beta.

Logistic Regression

Logistic regression analysis using single and multiple predictors fails to identify statistically significant threshold determinants of underperformance. This may suggest that small-cap fund underperformance is a continuous phenomenon rather than a binary outcome.

Summary Interpretation

The analysis of small-cap funds shows that they only underperform their benchmark index once adjusted for consistency and risk. Underperformance is primarily driven by inefficient risk utilization rather than the absolute level of risk exposure. Funds with a higher information ratio generally exhibit lower underperformance, indicating that consistent portfolio construction plays a significant role in this segment.

At the same time, higher market exposure and ineffective risk utilisation tend to increase underperformance, suggesting that simply increasing risk does not improve results in small-cap funds. Logistic regression models fail to identify clear cutoff factors for underperformance, implying that poor performance develops gradually rather than through sharp thresholds. Overall, the performance of small-cap funds depends more on efficient risk management than on aggressive risk-taking.

Discussion

This study covers three categories of active equity mutual funds, which were evaluated using three statistical models. Future research may expand on this by employing other relevant supplementary models, increasing the sample size, considering additional categories of mutual funds, or evaluating the data using time series analysis.

The present study is also subject to certain limitations; the sample size is limited, and it may also involve survivorship bias. Furthermore, the use of historical data assumes that market conditions remain stable over the study period.

Conclusion

This study examined the performance of active mutual funds across large-cap, mid-cap, and small-cap segments using cross-sectional benchmark analysis, multiple linear regression, and logistic regression. The findings reveal that the factors influencing underperformance differ across market-cap categories and reveal significant relationships between variables.

The results indicated that large-cap active mutual funds underperform their benchmark indices on a risk-adjusted, consistency, and volatility-adjusted basis. Beta-neutral returns indicate no underperformance for large–cap funds, inferring that the excess returns generated are likely market-driven. This is supported in the subsequent model, where beta is a significant explainer

for underperformance. The information ratio appears to highly influence the probability of underperformance, supporting the ill effect of volatility and the inconsistency. Overall, large–cap sector show structure limitations that limit the potential for managerial skill.

Mid-cap active mutual funds also show evidence of underperforming their benchmark indices on alpha, risk, consistency, and volatility bases. However, the sector does indicate signs of market inefficiency, allowing opportunity for managerial skill. Information ratio and beta appear to be significant explainers for underperformance, where a higher beta increases underperformance and the presence of information ratio suggesting existence of managerial skill. The information ratio is also consistent in its influence to predict the likelihood of underperformance. Although managerial skill is present, it breaks down due to inefficient risk utilisation and inconsistency of returns.

Small-cap funds exhibit the strongest evidence for market inefficiency; no fund appears to underperform in the beta–neutral metric, and raw alpha also exhibits very little underperformance. Subsequent models align with similar results, where beta influences negative performance. Information ratio continues to be a predominant factor in explaining the underperformance, aligning with the performance breakdown seen in the M2 measure. In short, small-cap funds show great potential for managerial skill, but are held back due to inefficient risk allocation and consistency.

This study adds to the body of literature by showing that mutual fund underperformance is not consistent across market segments and that conclusions about managerial skill and market efficiency are highly sensitive to market capitalisation and risk adjustment methodology.

References

Adhav, M. S. M., & Chauhan, P. M. (2015). Comparative study of mutual funds of selected Indian companies. *International Journal of Science, Technology & Management, 4*(2), 2394–1537.

Agarwal, A., & Leo, L. (2025, September 30). Less than 10% of Indian households invested in securities markets, regulator's survey shows.

Reuters.https://www.reuters.com/sustainability/boards-policy-regulation/less-than-10-indian-households-invested-securities-markets-regulators-survey-2025-09-30/

Agrawal, D. (2011). Measuring performance of Indian mutual funds. *Finance India*.

Ashraf, S. H., & Sharma, D. (2014). Performance evaluation of Indian equity mutual funds against established benchmark indices. *International Journal of Accounting Research, 2*(1), 1000113.

Berk, J. B., & Green, R. C. (2004). Mutual fund flows and performance in rational markets. *Journal of Political Economy, 112*(6), 1269–1295.

Berk, J. B., & Van Binsbergen, J. H. (2015). Measuring skill in the mutual fund industry. *Journal of Financial Economics, 118*(1), 1–20.

Carhart, M. M. (1997). On persistence in mutual fund performance. *Journal of Finance, 52*(1), 57–82.

Chakraborty, M., Jain, P., & Kallianpur, V. (2008). Mutual fund performance: An evaluation of select growth funds in India. *South Asian Journal of Management, 15*(4), 79–92.

Cremers, K. M., & Petajisto, A. (2009). How active is your fund manager? A new measure that predicts performance. *Review of Financial Studies, 22*(9), 3329–3365.

Cremers, K. M., Fulkerson, J. A., & Riley, T. B. (2022). Benchmark discrepancies and mutual fund performance evaluation. *Journal of Financial and Quantitative Analysis, 57*(2), 543–571.

Elton, E. J., & Gruber, M. J. (1977). Risk reduction and portfolio size: An analytical solution. *Journal of Business, 50*(4), 415–437.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics, 33*(1), 3–56.

Fama, E. F., & French, K. R. (1996). Multifactor explanations of asset pricing anomalies. *Journal of Finance, 51*(1), 55–84.

Fama, E. F., & French, K. R. (2010). Luck versus skill in the cross-section of mutual fund returns. *Journal of Finance, 65*(5), 1915–1947.

Grinold, R. C. (1989). The fundamental law of active management. *Journal of Portfolio Management, 15*(3), 30–37.

Prajapati, K., & Patel, M. (2012). Comparative study on performance evaluation of mutual fund schemes of Indian companies. *Researchers World, 3*(3), 47.

Rajest, M., & Ahuja, V. (2016). Performance evaluation of Indian mutual funds. *Indian Journal of Finance, 10*(8), 24–42.

Safiuddin, S., & Hasan, M. (2022). Performance analysis of equity-based mutual funds in India. *Empirical Economics Letters, 21*.

Sharpe, W. F. (1966). Mutual fund performance. *Journal of Business, 39*(1), 119–138.

Statman, M. (1987). How many stocks make a diversified portfolio? *Journal of Financial and Quantitative Analysis, 22*(3), 353–363.

Takalkar, R. (2025, December 22). Profitable decade: NIFTY 50 maintains winning streak for 10th year in 2025; Top 5 factors. *Upstox*.https://upstox.com/news/market-news/trading/profitable-decade-nifty-50-maintains-winning-streak-for-10th-year-in-2025-top-5-factors/article-186566/

Treynor, J. L. (1965). How to rate management of investment funds.

Treynor, J. L., & Black, F. (1973). How to use security analysis to improve portfolio selection. *Journal of Business, 46*(1), 66–86.