

Risk And Return Analysis Of Midcap Funds

(with special reference to selected Asset Management Companies in India)

Dr. Kavitha H¹ Mr. Lingaraja B M² Ms. Ramya Ningoji³

Dean & Associate Professor, RG Institute of Management Studies, Davangere.

E-mail: drkavithahas@gmail.com ORCID: 0009-0000-7937-0132

Assistant Professor, RG Institute of Management Studies (RIMS), Davangere.

E-mail: ngpslingu@gmail.com ORCID: 0009-0006-0485-6748

Assistant Professor, RG Institute of Management Studies (RIMS), Davangere.

E-mail: ramyaningoji943@gmail.com

ABSTRACT

A mutual fund is a sort of collective investment vehicle that collects money from a large number of individuals and invests it in order to achieve a certain goal, with returns given to participants on a pro-rata basis in proportion to their investment. Investing in mutual funds does not eliminate risk; nevertheless, based on the total number of assets managed by the AMCs, the investor must bear the entire expense ratio, which affects the investment's returns and determines whether the returns are influenced by market returns. This study selects ten asset management companies based on their CRISEL ratings, with DSP having a higher standard deviation and higher returns than the other AMCs, and HDFC being more volatile. Just a couple AMCs. Finally, we accept the null hypothesis, implying that there is no substantial causal association between all AMC mid-cap funds and the benchmark index S&P BSE 150. However, Axis mid-cap funds and L&T mid- cap funds have unidirectional Granger causation with the S&P BSE 150 benchmark index, therefore we reject the null hypothesis.

Keywords: Risk And Return, Small Cap Funds, Expense Ratio, Granger Causality Test And Regression Analysis.

Introduction:

Mutual Funds (MFs) are a viable investment alternative for individuals seeking to grow their wealth and achieve their financial objectives. These funds allow investors to diversify their investments while benefiting from expert fund management. In this blog post, we'll go over 7 compelling reasons why you should consider investing in mutual funds today! Let's look at some of ICICI Bank's greatest SIP investment options. Mutual funds offer Professional Fund Management. Experienced and successful Fund Managers manage these funds with the knowledge and expertise to identify the best investment opportunities and minimise risk. Fund Managers use various tools and techniques to analyse market trends and opt for securities that offer the best potential returns. Fund managers employ a variety of risk management techniques, such as asset allocation, diversification, and hedging strategies, to reduce potential risks associated with investing in securities. At ICICI Bank, our approach to risk management guarantees that our funds can provide investors with consistent long-term returns with minimal risk. In a sense, MFs also offer Professional Risk Management services to investors without actually charging them for it.

Literature Review:

1. **Dr. Sarika (2015).** However, there are distinctions between the two. Saving refers to funds set aside for specific purchases shortly as well as for emergencies. Investing, on the other hand, is concerned with increasing net worth and achieving long-Ter concerned with the return on investment. This total risk can be divided into two parts based on standard deviation. Risk can be unsystematic or systematic. Diversifiable risk is another term for unsystematic risk. Systematic risk is also known as non-diversifiable risk, unavoidable risk, or market risk, and it is quantified by Beta. A Study of Risk and Return Performance on Selected Mutual Funds (IJIRST/ Volume 2/ Issue 11/ 032).
2. **N. Bhagyasree Mrs. B. Kishori (2016).** The current paper investigates the performance of open-ended, growth-oriented equity schemes in the transition economy from April 2011 to March 2015. The daily closing NAV of various schemes has been used to calculate the fund scheme returns. For the market portfolio, the BSE-Sensex was used. Sharpe, Treynor, and Jensen's measures were used to evaluate the historical performance of the selected schemes, and the results will help investors make better investment decisions. According to the study, 14 of the 30 mutual fund schemes outperformed the benchmark return. The results also revealed that some of the schemes underperformed; these schemes were struggling with diversification. The Sharpe ratio was positive for all schemes in the study, indicating that funds were providing returns greater risk-free rate. Results of the Jensen measure revealed that 19out of 30 schemes showed positive alpha which indicated the superior performance of

the schemes.

3. **Dr. S.M. Tariq Zafar, Dr. D.S. Choubey, and Syed Imran Nawab Alie (2016).** In this study, the researchers investigate that mutual funds are a unique financial instrument, particularly for beginners with a low-risk tolerance, and will continue to be a unique financial tool due to benefits such as Professional Management, Diversification, Economies of Scale, Liquidity, and Simplicity, as well as some drawbacks such as Costs, Dilution, and Taxes. It has never failed in any country where it operates within a regulatory framework. Indian rules and regulations, issued by SEBI under the guidelines and authority of the RBI, are good, but not as effective as they should be. Social protection requires more pro-investor and anti-defaulter laws. Overall, the future of mutual funds in India is promising and bright under SEBI regulations and current market conditions; however, only committed and serious players will survive in the long run. The study produced sufficient information on risk and return associated with the fund and its rank depending on its performance, which will ultimately help investors to choose the best mutual fund generating maximum return with minimum risk. It's an empirical study stating the ranking & evaluation of funds based on three ratios namely, Jensen's, Treynor's & Sharpe's.
4. **Goutham Sharma (2016),** investigated the growth of the mutual fund industry in India. It is expected to grow rapidly in the coming years. The SEBI regulatory framework has made significant contributions to the Indian mutual fund industry, but there are still some issues to work on, such as disclosure and insolvency; in India, mutual funds are not recognized as a preferred investment by the investor community. As a result, it must focus on long-term growth and profit rather than short-term growth.
5. **Sushil Kumar¹ and Dipesh Dhanda²(2016).** An Econometric Analysis of the Effect of Mutual Fund Investment on Nifty Returns in India. This study reveals that these resources are then moved in and out of the stock market based on their return at various times, causing volatility in the stock market. The relationship between mutual fund investment and the market return is ambiguous; whether the return causes the mutual fund investment or vice versa. Mutual fund investment is a cause of market return at times, but also to be a result of market return at other times. As a result, the current study was undertaken to investigate the impact of mutual fund investment in equities on stock market return. Various econometric tests, such as the Granger Causality Test and the GARCH test, were applied to monthly data of mutual fund flows in the equity segment, namely MFP (Mutual Fund Purchase), MFS (Mutual Fund Sale), NMF (Net Mutual Fund), and Nifty return from January 2011 to December 2015. The study found no correlation between the MFS and the Nifty return in either direction. During the study period, both the MFP and NMF were found to have a unidirectional relationship with the Nifty return, i.e., from the Nifty return to the MFP and NMF. The study provides evidence that past volatility has an impact on Nifty return during the study period for all cases of mutual fund investment inequities. In the recent past, there has been information relating to only MFP and MFS found, to create volatility in Nifty return, not the NMF.
6. **Dr. M. Ravichandran T. Iswarya (April 2016)** study used CAPM to examine the performance of risk-based mutual fund schemes. In the long run, private and public sector companies have outperformed the public sector. The monthly NAV of various schemes was used to calculate the fund scheme returns. For the market portfolio, the BSE-Sensex has been used. The historical performance of the selected schemes was evaluated using Sharpe, Treynor, and Jensen's measures, the results of which will help investors make better investment decisions. According to Treynor's results, 19 of 29 schemes outperformed the benchmark.

Objectives of the Study:

1. To assess the investment performance of selected mutual funds in terms of risk and return.
2. Evaluate the performance of mutual funds from various asset management businesses based on risk, return, and volatility.
3. Evaluating the fund expense ratio can affect the return on mutual fund investments.
4. To investigate the causal relationship between mutual fund flows and stock market returns.

Hypothesis:

H₀: There is no significant relationship between risk and return.

H_a: There is a significant relationship between risk and return.

H₀: There is no significant relationship between fund return and the expense ratio of mutual fund Investment.

Hb: There is a significant relationship between fund return and expense ratio of mutual fund Investment.

H0: There is no significant relationship between mutual fund flow and stock return.

Hc: There is a significant relationship between mutual fund flow and stock return.

Research Methodology:

Research Design:

The present study is descriptive in nature.

Data collection:

The data source is secondary in nature and serves as the basis for the study's analysis. The AMCs are picked according on their crisis rating and assets under management, and only small-cap funds are chosen, with a benchmark index used to evaluate the causal relationship between them. The research was based on secondary data acquired from several asset management businesses' publications and reports, as well as AMFI's website, value research online. Daily data on the closing Net Asset Value of the chosen scheme will be gathered via websites.

Statistical Tool:

Beta and Standard Deviation are statistical techniques for determining the Fund's risk, return, and volatility. Regression analysis is used to analyse the relationship between mutual fund flow and stock market performance, as well as the influence of one variable on the other. The Granger Causality Test is used to explore the causal relationship between the benchmark return and the return of a specific fund.

Midcap Funds:

These equity mutual funds invest at least 65% of their assets in midcap firms. SEBI regulations define midcap companies as those ranked 101st to 250th in terms of total market capitalisation.

Midcap corporations may beat large-cap companies in terms of earnings growth. These companies often operate in high-growth industries or serve a specialised market group. Mid-cap companies are also better positioned to gain from the economic rebound. However, these enterprises are understudied, with huge gaps between their intrinsic worth and market prices. Over time, fund managers who precisely detect these gaps can use them to outperform the market.

Sl. No	Fund Name
1.	Axis Midcap Fund
2.	DSP Midcap Fund
3.	Invesco India Midcap Fund
4.	Tata Mid Cap Growth Fund
5.	Nippon India Growth Fund
6.	Kotak Emerging Equity Fund
7.	L&T Midcap Fund
8.	Edelweiss Midcap Fund
9.	HDFC Midcap Opportunities Fund
10.	Franklin India Prima Fund
11.	(S&P BSE 150 Midcap TRI)

(Data as on March 9th, 2025 Source- Value Research)

Concept of Expense Ratio:

The expense ratio is the amount that mutual funds charge to manage your money, similar to what a physician charges for their services. The expense ratio varies by fund type and is essentially the cost of operating a mutual fund. The fund manager or advisor's fee accounts for the majority of operational expenses, with the remainder going to charges such as custodial services, legal services, registrar fees, record keeping, accounting, and auditing fees, among others. Some operating expenses may involve marketing costs. According to the Securities and Exchange Board of India (SEBI), an equity fund's expense ratio cannot exceed 2.5%, while a debt fund's maximum is 2.25%.

SEBI Regulation on Expense Ratio:

SEBI regulations allow fund houses to charge Total Expense Ratio (TER) up to the following maximum limits:

Asset Under Management (crores)	TER for equity-oriented schemes (%)	TER for other schemes excluding Index Funds, ETFs and Fund of Funds (%)
Rs. 0-500	2.25	2.00
Rs. 500-750	2.00	1.75
Rs. 750-2,000	1.75	1.50
Rs. 2,000-5,000	1.60	1.35
Rs. 5,000-10,000	1.50	1.25

Rs. 10,000-50,000	For every increase of 5,000 crores in AUM TER reduces by 0.05%	For every increase of 5,000 crores in AUM TER reduces by 0.05%
> Rs. 50,000	1.05	0.80

The expense ratio is inversely related to the fund's total assets under management. When the value of a fund's assets is low, the expense ratio is high, allowing managers to cover fund expenses with a lower asset base. Whereas when a fund's asset value is high, the cost ratio is lower since expenses are spread across a larger asset base. However, SEBI enables fund houses to increase their expense ratio by 30 basis points (0.30%) above the upper restrictions for selling in cities outside the top 30 if 30% or more of new inflows come from those cities. This is done to increase the penetration of mutual funds in tier 2 and tier 3. Fund houses are also permitted to charge 5 basis points (0.05%) of AUM over and above the maximum expense ratio restrictions in lieu of an exit fee, if an exit load is levied or is applicable. For close-ended schemes, AMC's are not permitted to charge the expenditure ratio in place of the exit load. As a result, the fund return and expenditure ratio have a strong correlation. The null hypothesis was rejected.

Data Analysis and Interpretation:

Table showing calculated values of Average, Standard Deviation and beta of Midcap Funds:

S L N O	Fund Name	Average	Stan dard Devi ation	Beta
1.	Axis Midcap Fund	22.729	9.571678	2.5958
2.	DSP Midcap Fund	32.96082	15.38895	-0.664
3.	Invesco India Midcap Fund	25.95133	2.548317	1.75779
4.	Tata Mid Cap Growth Fund	573.7.66	278.2373	0.4968
5.	Nippon India Growth Fund	32.86845	16.14118	0.5041
6.	Kotak Emerging Equity Fund	29.12235	13.62919	1.9927
7.	L&T Midcap Fund	23.04885	11.24894	1.1381
8.	Edelweiss Midcap Fund	79.47709	40.11466	0.0648
9.	HDFC Midcap Opportunities Fund	721.8637	269.8831	0.5241
10.	Franklin India Prima Fund	84.21826	38.70521	-0.124
11.	(S&P BSE 150 Midcap TRI)	8452.451	2310.488	1

According to the above table, Average returns are computed, when analysing mutual fund returns. First, the HDFC midcap opportunities fund has the highest return (721.8637) when compared to all other AMC's midcap funds, and the Tata midcap growth fund, Franklin India Prima Fund, and Edelweiss mid-cap funds have the highest returns (573.766), (84.21826), and (79.47709), respectively. The benchmark index S&P BSE 150 mid-cap fund's returns of 8452.452 outperformed compared to all AMC midcap fund returns.

According to the above table, the Tata midcap growth fund has a high standard deviation of 278.2373 when compared to all other AMC's large-cap fund returns, but the S&P BSE 250 has a greater standard deviation of 2310.488 when compared to all other AMC's Midcap fund returns. It shows that the benchmark index is more volatile and riskier than all AMC small-cap funds combined, while the HDFC midcap fund is the second most volatile among all AMC midcap funds combined. As a result, Edelweiss, Franklin India Prima fund, DSP, Nippon Growth fund, Kotak Emerging Equity, L&T, and Axis midcap funds are less volatile and risky.

According to the table above, the Axis midcap fund has a beta value of 2.5958, which is more volatile than the other AMC Midcap fund beta values and entails higher risk, despite the fact that the beta value of the S&P BSE benchmark index is 1. When compared to the remaining AMC's midcap, the beta values of Kotak emerging equities fund, Invesco India midcap, and L&T are second in risk level, at 1.75779, 1.9927, and 1.1381,

respectively. The DSP mid-cap funds and Franklin India premier midcap have negative beta values.

Descriptive Analysis:

	AXIS_ NET_ ASSE T_V A LUE	DSP _NET _ASS E T_V A LUE	EDE L WISE _NET _AS S ET_V ALU E	FRAN KLIN _NET_ ASSET _VA L UE	HDFC _NET _ASSE T_V ALU E	INV E SCO _NET _ASS E T_V A LUE	KOTA K_NE T_AS SET_ VALU E	L_T_ NET _ASS E T_V A LUE	NIPPO N_N ET_A SSET_ VALU E	TATA _NET _ASS ET_V ALUE	BSE_ MID CA P_150 _MA RKET_ RETU RN
Mean	22.729	32.96082	25.74087	573.7066	32.86845	29.13092	23.04885	79.47709	721.8637	84.21826	8452.451
Median	24.54	33.4165	25.642	608.609	34.587	31.45	23.6075	80.23	723.2622	90.7341	8381.335
Maximum	39.78	59.727	31.53	1040.153	61.46	52.74	42.838	155.96	1235.915	154.625	13267.86
Minimum	0	13.754	19.29	224.6989	12.006	11.47	9.201	30.67	356.7232	35.0504	4804.13
Std. Dev.	9.571678	15.38895	2.548317	278.2373	16.14118	13.62919	11.24894	40.11466	269.8831	38.70521	2310.488
Skewness	0.008137	0.262598	-0.24907	0.167418	0.204013	0.163437	0.246357	0.314944	0.262895	0.147072	0.098691
Kurtosis	1.617846	1.469713	2.962905	1.406326	1.461383	1.436976	1.447457	1.552142	1.523295	1.400361	1.656273
Jarque-Bera	173.0697	268.5232	25.59551	271.821	259.7175	261.3637	271.9485	252.3176	251.8542	271.15	189.2212
Probability	0	0	0.000003	0	0	0	0	0	0	0	0
Sum	49412.85	81149.53	63374.03	1411318	80856.38	71662.07	56700.17	193049.8	1775785	207176.9	20809934
Sum Sq. De	199083.8	582813.6	15981.54	1.90E+08	640661.9	456771.3	311158.5	3907104	1.79E+08	3683811	1.31E+10
Observation	2174	2462	2462	2460	2460	2460	2460	2429	2460	2460	2462

Source: Author's Computation using Eviews

To calculate the descriptive statistic, data does not need to be converted into at-level and intercept or first difference and trend and intercept formats. The descriptive analysis employs simply raw data and reports on

metrics of central tendency such as mean, median, and mode. Dispersion measures include range, variance, and standard deviation. Normality measurements include kurtosis, which measures sharpness, and skewness, which measures symmetry.

Table Showing Results of Augmented Dickey-Fuller Unit Root Test Results:

Axis				Franklin			
Particulars	t-statistics	Critical	value	P-value	t-statistics	Critical value	P-value
At level &		1%	-3.43309			1%	-3.43282
Intercept	0.06637	5%	-2.86264	0.9631	-0.25168	5%	-2.86252
							0.9293
	9						
		10%	-2.5674			10%	-2.56733
At 1s		1%	-3.96217			1%	-3.96178
Difference, trend & intercept	-43.3737	5%	-3.41183	0	-41.8915	5%	-3.41164
		10%	-3.1278			10%	-3.12769
	HDFC				DSP		
At level & Intercept	-0.53176	1%	-3.43282	0.8825	-0.14489	1%	-3.43281
		5%	-2.86252			5%	-2.86251
		10%	-2.56733			10%	-2.56733
At 1s		1%	-3.96178			1%	-3.96178
Difference, trend & intercept	-42.1896	5%	-3.41164	0	-42.1367	5%	-3.41164
		10%	-3.12769			10%	-3.12769
	Invesco				Edelweiss		
At level & Intercept	-0.23453	1%	-3.43282	0.9316	-3.69446	1%	-3.43281
		5%	-2.86252			5%	-2.86251
		10%	-2.56733			10%	-2.56733
At 1st		1%	-3.96178			1%	-3.96178
Difference, trend & intercept	-41.3258	5%	-3.41164	0	-46.1832	5%	-3.41164
		10%	-3.12769			10%	-3.12769
	L&T				Tata		
		1	-3.43285			1	-3.43282
At level		5%	-2.86253			5%	-2.86252

&Intercept	-0.30373	10%	-2.56734	0.922	-0.30714	10%	-2.56733	0.9215
At 1st Difference, trend & intercept	-40.7276	1%	-3.961826	0	-41.0158	1%	-3.961778	0
		5%	-3.41166			5%	-3.411636	
		10%	-3.127705			10%	-3.12769	
	Nippon				Kotak			
At level & Intercept	-0.31908	1%	-3.43282	0.9197	-0.03688	1%	-3.432816	0.9541
		5%	-2.86252			5%	-2.862515	
		10%	-2.56733			10%	-2.567334	
At 1st Difference, trend & intercept	-43.9231	1%	-3.96178	0	-40.6306	1%	-3.96178	0
		5%	-3.41164			5%	-3.41164	
		10%	-3.12769			10%	-3.12769	

		BSE S&P 150		
Particulars	t-statistics	Critical value		P value
At level & Intercept	-0.52105	1%	-3.43282	0.8847
		5%	-2.86252	
		10%	-2.56734	
At 1st Difference,trend & intercept	-17.5778	1%	-3.96178	0
		5%	-3.41164	
		10%	-3.12769	

Source: Author's Computation using Eviews

The table displays the results of the Augmented Dickey-Fuller test. The results show that the midcap funds of all AMCs like Axis mid-cap fund, Edelweiss mid-cap fund, Nippon India mid-cap fund, Franklin mid-cap fund, Kotak mid-cap fund, HDFC, L&T mid-cap fund, Invesco mid-Cap funds, L&T mid-cap fund, DSP mid-cap and Tat mid-cap funds and S&P BSE 150 benchmark index have unit root problem at a level and intercept they are non-stationary and after doing unit root test at the first difference and trend and intercept all AMCs mid-cap fund and benchm The null hypothesis is rejected because the P value is less than 5%, allowing us to proceed with Regression Analysis.

Regression analysis of Mid-cap funds:

Dependent Variable: AXIS_NET_ASSET_VALUE Method: Least Squares

Date: 11/25/21 Time: 15:05

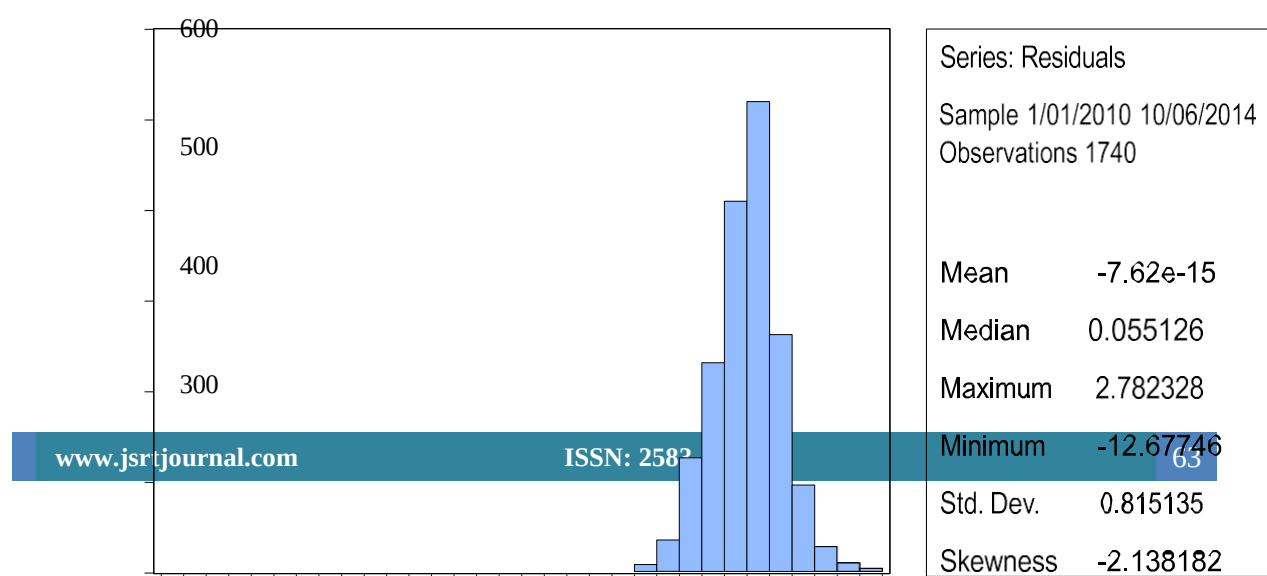
Sample (adjusted): 1/04/2010 10/24/2018 Included observations: 2174 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DSP_NET_ASSET_VALUE	0.171380	0.070595	2.427667	0.0153
EDELWISE_NET_ASSET_VALUE	-0.108906	0.018572	-5.863855	0.0000
FRANKLIN_NET_ASSET_VALUE	0.089358	0.004730	18.89180	0.0000
HDFC_NET_ASSET_VALUE	0.626125	0.061714	10.14553	0.0000
INVESCO_NET_ASSET_VALUE	0.011092	0.063355	0.175080	0.8610
KOTAK_NET_ASSET_VALUE	-2.238493	0.100923	-22.18032	0.0000
L_T_NET_ASSET_VALUE	-0.011448	0.007098	-1.612819	0.1069
NIPPON_NET_ASSET_VALUE	-0.015556	0.001960	-7.934962	0.0000
TATA_NET_ASSET_VALUE	-0.100083	0.016364	-6.116135	0.0000
BSE_MIDCAP_150_MARKET_RETURN	0.002336	6.80E-05	34.36261	0.0000
C	1.556469	0.573764	2.712732	0.0067
R-squared	0.976359	Mean dependent var		22.72900
Adjusted R-squared	0.976249	S.D. dependent var		9.571678
S.E. of regression	1.475118	Akaike info criterion		3.620400
Sum squared resid	4706.631	Schwarz criterion		3.649162
Log likelihood	-3924.375	Hannan-Quinn criter.		3.630916
F-statistic	8932.881	Durbin-Watson stat		0.110757
Prob(F-statistic)	0.000000			

Source: Author's Computation using Eviews

The probability values of L&T and Invesco Midcap funds are greater than 5% significance level, 0.8610 and 0.1069, respectively, so the null hypothesis is rejected, while all other AMC's mid-cap funds' P-values are less than 5% significance level, so the null hypothesis is accepted. The co-efficient values of dependent factors such as Edelweiss, Kotak, Nippon Tata, and L&T were negative, while all other funds had a positive influence due to independent variables. The R-square value of 0.976359 and an F-statistic value of less than 5% indicate that the model is fit.

Residual Diagnostics:



200

100

-12 -10 -8 -6 -4 -2 0 2

Source: Author's Computation using Eviews

The Jacque-Bera test is a goodness-of-fit test that examines if sample data has skewness and kurtosis consistent with a normal distribution. The exam is named after Carlos Jerque and Anil K. Bera. The test statistics are never negative. If it deviates significantly from zero, it suggests that the data does not follow a normal distribution. The residual diagnostic test shows that the P-value for mid-cap funds is less than 5%, implying that the null hypothesis is correct. If the kurtosis value exceeds 3, the curve is a peak (leptokurtic), with a right-tailed skewness.

Unit Root Test after converting time series data into the logarithmic value of Mid Cap fund:

Particulars	L Axis			L Franklin		
	t-statiscics	Criticalvalue	P value	t-statiscics	Criticalvalue	P value
At level & Intercept	-0.066479	1%	- 3.433089	- 1.59915	1%	- 3.431937
		5%	- 2.862636		5%	- 2.862127
		10%	- 2.567399		10%	- 2.567126
			0.96 2 1			0.482 9
		-			-	

		1%	3.962165			1%	3.960529	
At st Difference,		5%	- 3.411826			5%	- 3.411025	
Trend &			-				-	
intercept	-43.8737	10%	3.127803	0	-58.1648	10%	3.127328	0
	LHDFC				LDSP			
			-				-	
		1%	3.432816			1%	3.432814	
			-				-	
		5%	2.862515			5%	2.862514	
At level &			-				-	
Intercept	-0.67694	10%	2.567334	0.85 0 5	-0.14489	10%	2.567334	0.942 7
			-				-	
		1%	3.961778			1%	3.961775	
At st Difference,		5%	- 3.411636			5%	- 3.411635	
Trend &			-				-	
intercept	- 46.2059	10 %	3.127691	0	-42.1367	10%	-3.12769	0
	L Invesco				L Edelweiss			
At level&	-0.41124	1%	-	0.90 4 9	-3.69446	1%	-	0.004 3
Intercept			3.432816				3.432814	
		5%	- 2.862515			5%	- 2.862514	
		10%	- 2.567334			10%	- 2.567334	
At 1st Difference,	-45.9227	1%	- 3.961778			1%	- 3.961775	
		5%	- 3.411636	0	-46.1832	5%	- 3.411635	0
LBSE S&P 150								
t-statistics		Critical value			P value			
-0.5499		1%	-3.432793		0.8789			
		5%	-2.862505					
		10%	-2.567329					
-49.1585		1%	-3.961746		0			
		5%	-3.411621					
		10%	-3.127681					

Source: Author's Computation using Eviews

The table displays the results of the Augmented Dickey-Fuller test after converting data to logarithmic values. The results show that the midcap funds of all AMCs like LAxis mid-cap fund, LEdelweiss mid-cap fund, LNippon India mid-cap fund, LFranklin mid-cap fund, Kotak mid-cap fund, LHDFC, LL&T mid-cap fund, Invesco mid-cap funds, LDSP mid-cap and LTata mid-cap funds and LS&P BSE 150 benchmark index have unit root problem at a level and intercept they are non-stationary and after doing unit root test at the first difference and trend and intercept all AMCs mid-cap fund and benchmark The null hypothesis is rejected because the P-value is less than 5%, which is sufficient to proceed with the Granger Causality test.

The table shows the Cointegration test results:

Date: 07/19/25 Time: 12:43

Sample (adjusted): 1/11/2012 12/31/2021 Included observations: 2451 after adjustments Trend assumption: Quadratic deterministic trend

Series: LBSE LAXIS LDSP LEDELWISE LFRANKLIN LHDFC LINVESCOLKOTAK LLT LNIPPON LTATA

Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test
(Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	CriticalValue	Prob.**
None *	0.045163	423.1546	306.8944	0.0000
At most 1 *	0.033099	309.8838	259.0294	0.0000
At most 2 *	0.024150	227.3859	215.1232	0.0112
At most 3	0.019543	167.4688	175.1715	0.1180
At most 4	0.013148	119.0943	139.2753	0.4025
At most 5	0.010599	86.65475	107.3466	0.5016
At most 6	0.008010	60.53856	79.34145	0.5421
At most 7	0.007090	40.82794	55.24578	0.4776
At most 8	0.005717	23.38804	35.01090	0.4836
At most 9	0.003802	9.336349	18.39771	0.5459
At most 10	3.20E-07	0.000784	3.841466	0.9784

The trace test indicates 3 cointegrating eqn(s) at the 0.05 level

* Denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	CriticalValue	Prob.**
None *	0.045163	113.2708	73.94036	0.0000
At most 1 *	0.033099	82.49795	67.91026	0.0013
At most 2	0.024150	59.91707	61.80550	0.0752
At most 3	0.019543	48.37449	55.72819	0.2244
At most 4	0.013148	32.43958	49.58633	0.8006
At most 5	0.010599	26.11619	43.41977	0.8553
At most 6	0.008010	19.71063	37.16359	0.9124
At most 7	0.007090	17.43990	30.81507	0.7518
At most 8	0.005717	14.05169	24.25202	0.5826
At most 9	0.003802	9.335565	17.14769	0.4613
At most 10	3.20E-07	0.000784	3.841466	0.9784

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

The table shows Vector Cointegration Test Results:

Vector Autoregression Estimates Date: 07/21/25 Time: 12:07

Sample (adjusted): 1/06/2012 10/24/2021 Included observations: 2172 after adjustments Standard errors in () & t-statistics in []

	AXI S_ NE T...	DS P_ NE T...	ED EL WI S...	FRA NK LIN. ..	HDFC _NE... I	NVE S CO_ ..	KO TA K_ N...	L_T_N ET_... N	IPPO N_N... T	AT A_ NE T...
AXIS_NET _A SSET_V..	0.630 4 62	0.01 5 458	- 0.00 18 78	0.2514 28	0.0156 18	0.0140 89	0.0096 00	- 0.02 68 95	0.359 2 00	0.038 0 53
	(0.02 0 24)	(0.015 00)	(0.015 39)	(0.231 9 3)	(0.014 6 7)	(0.012 8 9)	(0.009 6 8)	(0.036 0 3)	(0.349 99)	(0.039 40)
	[31.1 49 9]	[1.03 04 1]	[- 0.12 20 5]	[1.084 06]	[1.06 48 1]	[1.09 27 3]	[0.99 18 6]	[- 0.74 64 8]	[1.02 63 1]	[0.96 59 2]
AXIS_NET _A SSET_V..	0.340 6 73	- 0.0 15 747	0.005 3 12	- 0.26 27 41	- 0.01 55 75	- 0.01 56 56	- 0.01 14 93	0.0356 89	- 0.34 80 80	- 0.04 10 38
	(0.02 0 22)	(0.014 99)	(0.015 37)	(0.231 6 9)	(0.014 6 5)	(0.012 8 8)	(0.009 6 7)	(0.035 9 9)	(0.349 62)	(0.039 35)
	[16.8 49 7]	[- 1.0 50 76]	[0.34 55 2]	[- 1.13 40 3]	[- 1.06 29 8]	[- 1.21 55 5]	[- 1.18 87 6]	[0.99 16 0]	[- 0.99 55 9]	[- 1.04 27 8]
DSP_NET_ AS SET_V...	0.006 3 43	0.89 5 208	- 0.00 38 76	- 0.79 83 60	- 0.03 86 44	- 0.04 11 35	- 0.02 39 05	- 0.10 82 34	- 1.40 15 94	- 0.09 96 73
	(0.03 6 83)	(0.027 30)	(0.028 01)	(0.422 0 7)	(0.026 6 9)	(0.023 4 6)	(0.017 6 1)	(0.065 5 7)	(0.636 91)	(0.071 69)
	[0.17 22 1]	[32.7 90 9]	[- 0.13 84 0]	[- 1.89 15 5]	[- 1.44 77 8]	[- 1.75 31 4]	[- 1.35 72 4]	[- 1.65 07 7]	[- 2.20 06 3]	[- 1.39 02 9]
DSP_NET_ AS SET_V...	- 0.01 09 39	- 0.0 81 289	0.019 8 98	0.3424 69	0.0178 30	0.0090 19	0.0158 80	0.0724 25	0.840 2 69	- 0.00 04 96
	(0.03 5 67)	(0.026 44)	(0.027 12)	(0.408 7 3)	(0.025 8 5)	(0.022 7 2)	(0.017 0 6)	(0.063 4 9)	(0.616 79)	(0.069 43)
	[- 0.30 67 0]	[- 3.0 74 70]	[0.73 36 8]	[0.837 88]	[0.68 97 8]	[0.39 69 4]	[0.93 10 2]	[1.14 06 6]	[1.36 23 3]	[- 0.00 71 4]

EDELWIS E_N ET_AS...	- 0.00 77 10	0.00 6 661	1.077 0 43	0.3836 29	0.0349 58	0.0245 03	0.0120 72	- 0.01 29 30	0.410 6 06	0.075 6 32
	(0.02 8 25)	(0.020 94)	(0.021 48)	(0.323 7 0)	(0.020 4 7)	(0.018 0 0)	(0.013 5 1)	(0.050 2 9)	(0.488 48)	(0.054 98)
	[- 0.27 29 5]	[0.31 81 5]	[50.1 43 5]	[1.185 13]	[1.70 76 4]	[1.36 16 5]	[0.89 37 1]	[- 0.25 71 4]	[0.84 05 9]	[1.37 55 1]
EDELWIS E_N ET_AS...	0.006 8 92	0.01 3 438	- 0.08 59 85	- 0.27 90 29	- 0.02 79 86	- 0.01 76 14	- 0.00 83 88	0.0220 49	- 0.19 85 65	- 0.05 01 10
	(0.02 8 31)	(0.020 99)	(0.021 53)	(0.324 4 5)	(0.020 5 2)	(0.018 0 4)	(0.013 5 4)	(0.050 4 0)	(0.489 61)	(0.055 11)
	[0.24 34 2]	[0.64 03 1]	[- 3.99 39 2]	[- 0.86 00 0]	[- 1.36 39 4]	[- 0.97 65 5]	[- 0.61 95 1]	[0.43 74 6]	[- 0.40 55 6]	[- 0.90 92 3]
FRANKLI N_ NET_ASS ...	- 0.00 42 73	0.01 1 060	- 0.00 17 04	1.0815 26	0.0076 67	0.0060 82	0.0035 57	0.0119 38	0.179 7 81	0.004 7 15
	(0.00 6 21)	(0.004 60)	(0.004 72)	(0.071 1 8)	(0.004 5 0)	(0.003 9 6)	(0.002 9 7)	(0.011 0 6)	(0.107 41)	(0.012 09)
	[- 0.68 79 2]	[2.40 24 0]	[- 0.36 08 3]	[15.19 50]	[1.70 33 5]	[1.53 71 8]	[1.19 74 8]	[1.07 96 6]	[1.67 38 2]	[0.38 99 5]
FRANKLI N_ NET_ASS ...	0.008 3 37	- 0.0 07 907	0.001 1 69	- 0.08 09 75	- 0.00 63 92	- 0.00 44 17	- 0.00 25 08	- 0.01 01 62	- 0.15 50 92	7.61 E- 05
	(0.00 6 21)	(0.004 61)	(0.004 72)	(0.071 2 0)	(0.004 5 0)	(0.003 9 6)	(0.002 9 7)	(0.011 0 6)	(0.107 44)	(0.012 09)
	[1.34 17 7]	[- 1.7 17 03]	[0.24 74 2]	[- 1.13 73 2]	[- 1.41 95 7]	[- 1.11 59 9]	[- 0.84 41 4]	[- 0.91 88 0]	[- 1.44 35 3]	[0.00 62 9]
HDFC_NE T_ ASSET_.. .	- 0.04 93 15	- 0.0 00 962	0.075 0 25	- 2.66 60 92	0.8264 86	- 0.16 44 01	- 0.09 81 54	0.1757 55	- 4.00 42 15	- 0.33 18 27
	(0.09 9 22)	(0.073 55)	(0.075 45)	(1.137 0 2)	(0.071 9 1)	(0.063 2 1)	(0.047 4 5)	(0.176 6 3)	(1.715 78)	(0.193 13)
	[- 0.49 70 2]	[- 0.0 13 08]	[0.99 44 1]	[- 2.34 48 2]	[11.4 94 0]	[- 2.60 09 1]	[- 2.06 86 8]	[0.99 50 5]	[- 2.33 37 5]	[- 1.71 81 2]

HDFC_NE T_ ASSET_...	0.057 3 51	0.07 3 988	- 0.08 65 79	2.4879 26	0.1518 07	0.1649 75	0.0869 77	- 0.15 46 92	3.562 4 18	0.3062 55
	(0.09 9 70)	(0.073 90)	(0.075 81)	(1.142 5 0)	(0.072 2 5)	(0.063 5 1)	(0.047 6 8)	(0.177 4 8)	(1.724 06)	(0.194 07)
	[0.57 52 4]	[1.00 11 9]	[- 1.14 20 5]	[2.177 62]	[2.10 10 5]	[2.59 74 8]	[1.82 43 2]	[- 0.87 16 0]	[2.06 63 0]	[1.57 81 0]
INVESCO_ NE T_ASS...	- 0.13 74 85	- 0.1 02 908	- 0.13 99 23	2.2884 27	0.1369 74	1.0692 81	0.1104 11	0.1054 01	1.730 7 20	0.3274 56
	(0.09 6 00)	(0.071 16)	(0.073 00)	(1.100 1 3)	(0.069 5 7)	(0.061 1 6)	(0.045 9 1)	(0.170 9 0)	(1.660 12)	(0.186 87)
	[- 1.43 20 9]	[- 1.4 46 16]	[- 1.91 67 8]	[2.080 14]	[1.96 87 7]	[17.4 83 8]	[2.40 50 3]	[0.61 67 5]	[1.04 25 3]	[1.75 23 3]
INVESCO_ NE T_ASS...	0.140 1 81	0.06 2 226	0.134 3 53	- 2.15 83 70	- 0.13 74 33	- 0.08 10 68	- 0.11 38 48	- 0.15 00 95	- 1.63 40 17	- 0.32 05 86
	(0.09 6 26)	(0.071 35)	(0.073 20)	(1.103 0 9)	(0.069 7 6)	(0.061 3 2)	(0.046 0 3)	(0.171 3 6)	(1.664 60)	(0.187 37)
	[1.45 62 5]	[0.87 21 0]	[1.83 55 4]	[- 1.95 66 5]	[- 1.97 00 6]	[- 1.32 19 8]	[- 2.47 32 3]	[- 0.87 59 0]	[- 0.98 16 3]	[- 1.71 09 6]
KOTAK_N ET _ASSET...	- 0.04 40 09	0.25 2 346	0.083 6 96	3.2784 48	0.1513 46	0.1529 01	1.1101 31	0.2273 26	5.016 8 82	0.5964 68
	(0.15 3 90)	(0.114 08)	(0.117 03)	(1.763 6 5)	(0.111 5 3)	(0.098 0 4)	(0.073 6 0)	(0.273 9 7)	(2.661 39)	(0.299 57)
	[- 0.28 59 5]	[2.21 20 4]	[0.71 51 9]	[1.858 90]	[1.35 69 4]	[1.55 95 1]	[15.0 84 0]	[0.82 97 4]	[1.88 50 6]	[1.99 10 5]
KOTAK_N ET _ASSET...	- 0.00 81 72	- 0.1 14 480	- 0.09 39 40	- 2.81 78 85	- 0.13 24 03	- 0.14 51 54	- 0.11 74 63	- 0.18 53 44	- 4.36 52 60	- 0.54 75 31
	(0.15 3 54)	(0.113 81)	(0.116 75)	(1.759 4 8)	(0.111 2 7)	(0.097 8 1)	(0.073 4 2)	(0.273 3 3)	(2.655 10)	(0.298 87)
	[- 0.05 32 2]	[- 1.0 05 90]	[- 0.80 46 2]	[- 1.60 15 4]	[- 1.18 99 2]	[- 1.48 40 0]	[- 1.59 98 1]	[- 0.67 81 1]	[- 1.64 41 0]	[- 1.83 20 2]
L_T_NET_ AS	- 0.01	0.01 3	- 0.00	0.1336 62	0.0031 36	- 0.00	0.0061 40	1.1702 23	0.097 6	0.0103 72

SET_VA.. ..	69 80	161	64 24			07 26			51	
	(0.01 1 97)	(0.008 87)	(0.009 10)	(0.137 1 8)	(0.008 6 8)	(0.007 6 3)	(0.005 7 2)	(0.021 3 1)	(0.207 01)	(0.023 30)
	[- 1.41 84 8]	[1.48 32 3]	[- 0.70 57 2]	[0.974 37]	[0.36 15 2]	[- 0.09 51 8]	[1.07 25 1]	[54.9 14 6]	[0.47 17 3]	[0.44 51 1]
L_T_NET_ AS SET_VA.. ..	0.014 3 12	- 0.0 10 024	0.006 0 09	- 0.00 79 75	0.0040 46	0.0068 78	- 0.00 09 41	- 0.17 41 75	0.072 2 13	0.0106 72
	(0.01 2 09)	(0.008 96)	(0.009 20)	(0.138 5 8)	(0.008 7 6)	(0.007 7 0)	(0.005 7 8)	(0.021 5 3)	(0.209 11)	(0.023 54)
	[1.18 35 4]	[- 1.1 18 34]	[0.65 35 0]	[- 0.05 75 5]	[0.46 16 7]	[0.89 28 4]	[- 0.16 27 0]	[- 8.09 09 8]	[0.34 53 2]	[0.45 33 9]
NIPPON_N ET _ASSET...	0.005 0 21	- 0.0 00 967	0.001 1 02	- 0.01 86 78	- 0.00 14 36	- 0.00 06 04	- 0.00 09 16	- 0.01 24 88	0.972 5 28	- 0.00 13 16
	(0.00 3 60)	(0.002 67)	(0.002 73)	(0.041 2 1)	(0.002 6 1)	(0.002 2 9)	(0.001 7 2)	(0.006 4 0)	(0.062 19)	(0.007 00)
	[1.39 61 2]	[- 0.3 62 90]	[0.40 31 0]	[- 0.45 31 9]	[- 0.55 09 2]	[- 0.26 37 8]	[- 0.53 24 1]	[- 1.95 04 7]	[15.6 37 3]	[- 0.18 79 4]
NIPPON_N ET _ASSET...	- 0.00 54 06	0.00 1 795	- 0.00 04 90	0.0039 85	0.0006 46	0.0003 20	0.0004 38	0.0117 95	0.003 9 02	- 0.00 02 16
	(0.00 3 59)	(0.002 66)	(0.002 73)	(0.041 1 6)	(0.002 6 0)	(0.002 2 9)	(0.001 7 2)	(0.006 3 9)	(0.062 11)	(0.006 99)
	[- 1.50 52 0]	[0.67 43 9]	[- 0.17 95 8]	[0.096 83]	[0.24 82 9]	[0.13 98 3]	[0.25 52 8]	[1.84 48 8]	[0.06 28 2]	[- 0.03 08 3]
TATA_NE T_A SSET_V.. .	0.056 7 06	0.03 1 062	- 0.00 16 23	0.1931 12	0.0131 60	0.0306 14	0.0118 57	- 0.06 05 06	0.191 2 83	1.0425 64
	(0.03 4 50)	(0.025 57)	(0.026 24)	(0.395 3 8)	(0.025 0 0)	(0.021 9 8)	(0.016 5 0)	(0.061 4 2)	(0.596 64)	(0.067 16)
	[1.64 35 2]	[1.21 45 8]	[- 0.06 18 5]	[0.48 842]	[0.52 63 1]	[1.39 28 0]	[0.71 86 5]	[- 0.98 51 2]	[0.32 06 0]	[15.5 23 7]
TATA_NE T_A SSET_V.	- 0.06 48	- 0.0 43	0.003 3 52	- 0.15 99	- 0.01 26	- 0.03 22	- 0.01 01	0.0632 81	- 0.20 05	- 0.05 32

..	51	644		12	51	53	96		43	28
	(0.034 39)	(0.02549)	(0.02615)	(0.3941 0)	(0.0249 2)	(0.0219 1)	(0.0164 5)	(0.0612 2)	(0.59471)	(0.06694)
	[-1.8857 0]	[-1.712 10]	[0.1281 7]	[-0.4057 7]	[-0.5076 2]	[-1.4721 4]	[-0.6200 0]	[1.0336 5]	[-0.3372 1]	[-0.7951 4]
BSE_MIDC AP _150_M...	7.06E-05	-4.70E-05	1.88E-05	0.000190	2.91E-06	-4.45E-06	5.04E-06	-5.01E-06	-5.61E-05	-2.37E-05
	(2.1E-05)	(1.6E-05)	(1.6E-05)	(0.0002 4)	(1.5E-05)	(1.3E-05)	(1.0E-05)	(3.8E-05)	(0.00036)	(4.1E-05)
	[3.3469 7]	[-3.004 33]	[1.1714 1]	[0.78716]	[0.1902 6]	[-0.3309 7]	[0.4992 5]	[-0.1333 8]	[-0.1536 8]	[-0.5768 8]
R-squared	0.9983 12	0.999 591	0.9858 40	0.999706	0.999659	0.999611	0.999685	0.999670	0.9992 71	0.9995 59
Adj. R-squared	0.9982 97	0.999 588	0.9857 08	0.999703	0.999656	0.999608	0.999682	0.999667	0.9992 64	0.9995 55
Sum sq. resids	335.46 24	184.3 080	193.95 75	44051.64	176.1809	136.1397	76.71079	1063.052	100312.4	1271.0 05
S.E. equation	0.3949 13	0.292 720	0.3002 85	4.525440	0.286193	0.251578	0.188846	0.703003	6.8290 00	0.7686 94
F-statistic	63615. 01	263054.9	7487.6 00	365940 .2	315435 .7	276657 .3	341094 .8	325582 .0	147427.1	243745.7
Log likelihood	-1053.4 02	-402.9 949	-458.41 44	-6350.4 84	-354.01 96	-74.016 52	548.9559	-2305.9 82	-7244.1 82	-2500.0 12
Akaike AIC	0.9893 20	0.390 419	0.4414 50	5.866928	0.345322	0.087492	-0.4861 47	2.142709	6.6898 55	2.3213 74
Schwarz SC	1.0442 70	0.445 369	0.4964 00	5.921878	0.400272	0.142442	-0.4311 97	2.197659	6.7448 05	2.3763 24
Mean dependent	22.740 73	30.32 953	25.973 71	527.6860	30.32889	26.77115	21.16677	73.78381	675.28 87	77.751 40
S.D. dependent	9.5682 69	14.41 282	2.5118 08	262.7936	15.43028	12.70319	10.58764	38.50738	251.76 14	36.433 66
Determinant resid covariance		9.16E-10								

(dof adj.)									
Determinant resid covarianc e	8.31 E-10								
Log likelihood	-8113.315								
Akaike information criterion	7.664195								
Schwarz criterion	8.213695								
Number of coefficients	210								

The table shows Granger causality test of Midcap funds:

Pairwise Granger Causality TestsDate: 11/25/25 Time: 15:59 Sample: 1/04/2012 12/31/2021 Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
LBSE does not Granger Cause LAXIS	2169	0.35180	0.7035
LAXIS does not Granger Cause LBSE		9.97534	5.E-05
LBSE does not Granger Cause LDSP	2460	4.31600	0.0135
LDSP does not Granger Cause LBSE		6.42452	0.0016
LBSE does not Granger Cause LEDELWISE	2460	7.15154	0.0008
LEDELWISE does not Granger Cause LBSE		3.75905	0.0234
LBSE does not Granger Cause LFRANKLIN	2458	3.72823	0.0242
LFRANKLIN does not Granger Cause LBSE		8.35066	0.0002
LBSE does not Granger Cause LHDFC	2458	4.50862	0.0111

LHDFC does not Granger Cause LBSE		5.40798	0.0045
LBSE does not Granger Cause LINVESCO	2458	3.69612	0.0250
LINVESCO does not Granger Cause LBSE		7.42323	0.0006
LBSE does not Granger Cause LKOTAK	2458	3.79117	0.0227
LKOTAK does not Granger Cause LBSE		8.43429	0.0002
LBSE does not Granger Cause LLT	2427	5.61918	0.0037
LLT does not Granger Cause LBSE		0.93218	0.3938
LBSE does not Granger Cause LNIPPON	2458	4.02978	0.0179
LNIPPON does not Granger Cause LBSE		7.28383	0.0007
LBSE does not Granger Cause LTATA	2458	3.67611	0.0255
LTATA does not Granger Cause LBSE		6.47174	0.0016

The benchmark index S&P BSE 150 does not Granger Causes. Franklin, HDFC, DSP, Kotak, Tata, Edelweiss, and Nippon. The probability values for mid-cap funds and daily returns of all AMCs are 0.0135, 0.0008, 0.0242, 0.045, 0.006, 0.0002, 0.0037, and 0.0016, respectively, which are less than the required significance level of 0.05. Finally, we accept the null hypothesis, implying that there is no substantial causal association between all AMC mid-cap funds and the benchmark index S&P BSE 150. However, Axis mid-cap fund and L&T mid-cap funds have unidirectional Granger causation between S&P BSE 150 benchmark index, therefore we reject the null hypothesis.

Conclusion:

According to the analysis, only a few midcap funds exhibit a one-way causal relationship between mutual fund flow and stock market return. However, many asset management organizations' mid-cap funds show little association between mutual fund flow and stock market performance. The performance metrics of standard deviation and beta value also help investors choose the best fund based on returns and volatility. They should also consider the average rate of return and the expense ratio, which will lower their returns. Investors must decide which fund is most suited for their investment objectives.

Authors Contribution:

Dr. Kavitha H: Supervision, Data Analysis and Lead the entire research work.

Mr. Lingaraja B M: Writing of Manuscript, Data Analysis and Hypothesis statement.

Ms. Ramya Ningoji: Data Collection, Review and Writing of Manuscript.

Acknowledgement: The authors are greatly thankful to RG Institute of Management Studies, Davangere, Davangere University.

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