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Portfolio Evaluation of Selected Large Cap & Midcap Mutual Fund Schemes

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Abstract:
"Wealth, place & power are no measure of sources. The only true measure is the ratio between what we might have been & what we have become". In this regard people should upgrade their knowledge & keep in pace with changing technology & market condition to reach their desired goal. As new opportunities are opening up in every field all over the world. The desired goal can achieve only when both theory and practical go together hand in hand.

This article is such an attempt to understand or link the theoretical concept with that of practical applicability. It provides an in-depth analysis of Mutual Funds Schemes, encompassing their benefits, various facts crucial to understand and associated risks. Furthermore, the theoretical background of mutual funds, including the types of funds available, their advantages, and potential risks have been dealt with.

The study majorly focuses on evaluating the performance of specific mutual fund schemes in the large-cap and mid-cap categories. By analyzing various portfolio evaluation models, including Sharpe, Treynor, and Jensen's alpha, as well as other metrics such as Standard Deviation, Beta, and Portfolio Return, the research aims to identify top-performing funds. The study utilizes correlation analysis and the ARIMA model to forecast the Net Asset Value (NAV) of the highest-ranked funds, providing insights into risk and return profiles, and assisting advisors in recommending suitable investment choices to investors.

The study concludes by emphasizing the importance of professional management and diversification in investment, particularly within the dynamic and unpredictable stock market environment.

Keywords: Risk, Return, Beta, Standard Deviation (SD), Net Asset Value (NAV) & Assets under Management (AUM), Autoregressive Integrated Moving Average (ARIMA)

Introduction

Investments involve allocating money to assets with aim of generating profit over time. Historically, investing was primarily a privilege of the wealthy & business class. However, it has now become popular and accessible to individuals from all walks of life. Several factors have contributed to increasing popularity of investments;

- Increase in working population, higher-family incomes, and consequently greater savings.
- Tax breaks offered for investments made through particular channels.
- An increasing number of people are seeking ways to hedge against inflation.
- A wide-range of appealing investment options is available.
- Increase in publicity related to investments.
- Investment opportunities that generate income, capital gains, and other returns.
- Investment process

The investment process outlines the method an investor should use to decide which marketable securities to invest in, the extent of the investment, and the timing of the investment. The following is a five-

step approach for making these decisions on basis of on investment process:

- Establish an investment strategy.
- Conduct security analysis.
- Build a portfolio.
- Update the portfolio.
- Assess the portfolio's performance.

Investments in general are uncertain and risky. An investor who understands the market and is able to minimize risk and optimize profits is considered efficient. He is able to safeguard his interests and avoid pitfalls. Expertise is needed for the handling of risk & return. Investing is both a science & an art, involving individuals who seek to grow their capital, earn dividends from company profits, and generate income of their investments. Engaging in stock market is consistently captivating, challenging, and rewarding.

- The stock market's dynamic nature makes it interesting.
- The one thing that's always certain is uncertainty.
- Rewarding due to possibility of large profits despite risk.
- Stock market is known for its ever-changing nature, unpredictability, & instability.

People in India usually like to save money through their investments. People save money in below ways.

- Saving A/c.
- Fixed deposit.
- Gold and jewellery.
- Real Estate.
- Stock-Market.

Three factors are involved in every investment: Time, Risk, and Return.

- Return denotes the potential profit achievable from an investment.
- Risk pertains to the level of uncertainty associated with investing & potential for complete capital loss.
- Furthermore, the timeframe denotes length of investment horizon. Achieving higher returns often necessitates embracing longer investment periods & assuming greater risk.

Review of Literature

Ms Shilpi Pala (2014), conducted research entitled "A Critical-Analysis of Selected Mutual-funds in India." This study evaluates the performance of top 10 equity Mutual-Fund schemes in a variety of categories and compares their equity Mutual-Fund performance. The evaluation employs metrics including the Treynor & Sharpe ratios, beta, alpha, & standard deviation. The data is analyzed by comparing returns from one year to the next. The CRISIL evaluations are the basis for the sampling. Midcap Mutual-funds are attractive for investment due to their potential for higher-returns, as indicated by the findings.

Aashak Thakkar (2017), The investigation determined that none of selected funds exhibited consistent returns. In particular, the Birla Sun-Life Growth Scheme demonstrated robust performance in all 3 metrics, while Tata-Equity performed well in terms of Sharpe ratio but did not perform as well in other metrics.

Chahal (Apr 2018), made a comparative analysis of performance of a variety of Mutual-Fund schemes offered by SBI Mutual-Fund in following categories: Large Cap, Small Cap, Mid-Cap, Diversified Equity Thematic, Arbitrage, and Tax Saving. The results suggest that the Mid and Small Cap categories of SBI Mutual-Fund have produced the highest returns.

Jain (2022), The author of the research paper analyzed the substantial differences between large-cap, small-cap, and mid-cap funds in order to assess their risk profiles and characteristics. The primary objective of the study was to assess performance of five Mutual-funds that were chosen from 2017 to 2021. This was accomplished by employing a descriptive research approach and utilizing secondary data sources. The results suggest investors should make investment decisions on their financial objectives and risk tolerance levels.

Khurana (2023), The author investigated and contrasted performance of selected large-cap equity funds in Indian Mutual-Fund sector from 2018 to 2022, a five-year period. The results provided valuable insights-into Mutual-funds, providing actionable information for the public, fund managers, and stakeholders to make informed-investment decisions.

Research Gap

The research gap in this study is the exclusive examination of the performance of specific Mutual-Fund schemes with the highest Assets under-Management (AUM). This analysis employs a variety of portfolio evaluation models, including Sharpe, Treynor, and Jensen's alpha, as well as metrics such as Standard Deviation, Beta, and Portfolio Return. Furthermore, it employs techniques such as the ARIMA model and correlation analysis.

Statement of Problem

Thus safeguarding the financial investments is the main concern of investors across all markets. This study focuses on identifying the top-performing Mutual-funds within a selected group of large-cap and mid-cap funds. It compares various parameters to aid advisors

Objectives of the study

- It evaluates the risk and return profiles of Mutual-Fund schemes in Large & Mid-cap categories using metrics like Standard Deviation, Beta, and Portfolio Returns.
- Utilize portfolio evaluation models such as the Sharpe ratio, Treynor ratio, & Jensen's alpha to compare performance measures for 5 large-cap & 5 mid-cap Mutual-Fund schemes based on their Assets under-Management (AUM).
- Conduct correlation analysis to comprehend the relationships & dependencies between Fund/Portfolio Returns, Risk (measured by Standard Deviation), & Market Sensitivity (Beta).
- Utilize the ARIMA methodology to forecast the NAV of the highest-ranked fund and identify top-performing funds based on their allotted ranks.

Scope of the Study

In order to evaluate performance of Mutual-Fund schemes and ascertain which funds provide superior returns to investors over a predetermined period, they are compared to their respective benchmark returns. The

performance of five large-cap and five mid-cap Direct-Plan growth funds is the focus of this study. The funds were chosen based on their highest Assets under-Management (AUM) as reported on the AMFI website. The analysis is predicated on data taken from 2019 to 2024, a five-year period.

Sources of Data Collection

The data for this study obtained as secondary data from online platforms including the National Stock-Exchange (NSE), Bombay Stock-Exchange (BSE), Association of Mutual-funds in India (AMFI), and Moneycontrol. Furthermore, information was sourced from a variety of sources, such as research papers, articles, journals, investor magazines, business periodicals, & company reports and fact sheets.

Tools and Techniques The study employs charts and tables for data representation. The techniques utilized for data-analysis include;

A. Return:

The difference lies in the current price compared to the previous price.

Return= [(Today's price-Yesterday's price)/ Yesterday's price]*100 or

Return = Closing Price/Opening Price - 1 Or Closing price - opening price/ Opening price* 100

B. Systematic Risk [Beta (β)]: The beta metric assesses the systematic risk of the portfolio. Beta represents the relationship between the stock return and index return. It is measure of stocks volatility in relation to the overall market. If β value is less, then the risk is less. If β value is high, then the risk is high. Negative beta indicates that the stock return and the market move in opposite directions. If β =+1.0 one percent change in index return causes one percent change in stock return. If β =+0.5 one percent change in index return and the market move in opposite directions.

C. Standard Deviation:

The measure of variability or dispersion within a set of values is the standard deviation. A larger SD indicates that the values are more dispersed across a broader range, while a smaller standard-deviation suggests that the values are closely concentrated around the mean. This metric is essential for evaluating the risk level of a fund, as it monitors the net asset-value (NAV) fluctuations in relation to scheme's average returns over a specified period. $\sigma = \sqrt{\Sigma Pi\,[R - E\,(R)]^{2}}$

D. Sharpe Performance Measure: The Sharpe ratio is widely recognized as a crucial tool for assessing risk-adjusted returns. It compares the historical or anticipated volatility of returns against

performance of an investment relative to a benchmark. Also referred to as the Sharpe index or modified Sharpe ratio, it evaluates investment performance while accounting for risk. This metric applies to individual securities or entire investment portfolios, quantifying the excess return generated per-unit of total risk.

$$S_p = \frac{R_p - R_f}{\sigma}$$

Where, R_p = Portfolio-return
R_f = Risk-free rate
σ = Standard-Deviation

E. Treynor Performance Measure:

The Treynor ratio, which is also referred to as the reward-to-volatility ratio, quantifies the additional return that a portfolio generates in relation to the risk it undertakes. Specifically, excess return is the return that exceeds the potential return of a risk-free investment. A higher Treynor-ratio is indicative of superior portfolio performance, as it quantifies the excess returns generated per unit of systematic risk.

$$T_p = \frac{R_p - R_f}{\beta}$$

Where, R_p = Portfolio return
R_f = Risk free rate
β = Beta

F. Jensen Performance Measure:

Jensen's measure, or Jensen's alpha, serves as a risk-adjusted performance metric assessing whether the average return on an investment or portfolio exceeds or falls short of the return anticipated by the capital asset pricing model (CAPM), factoring in the portfolio's beta and the market's overall return. It quantifies the difference between the actual return and expected return.

$$T_p \text{ or } \alpha_p = R_p - [R_f + \beta (R_m - R_f)]$$

Where, R_p = Portfolio-return
R_f = Risk -free rate
β = Beta
R_m = Market-Return

G. Correlation Analysis:

In order to evaluate intensity & direction of the linear relationship between 2 or more variables, correlation analysis is statistical technique. Its objective is to ascertain extent to which modifications in one variable are mirrored in those in another. This analysis is crucial for the identification of dependencies that affect portfolio diversification, risk management, and investment strategies. The correlation coefficient, a numerical-value that ranges from -1 to +1, quantifies magnitude of this relationship:

- A correlation-coefficient of +1 indicates a perfect positive correlation, meaning as one variable increases, the other also increases proportionally.
- A correlation coefficient of -1 indicates a perfect negative correlation, where as one variable increases, the other decreases proportionally.
- A correlation-coefficient of 0 suggests no linear relationship between the variables.

H. ARIMA Technique:

ARIMA, short for Autoregressive Integrated Moving Average, is a valuable statistical technique used to analyse & predict time-series data. It is particularly effective when the data display patterns that can be accurately represented by its components. They are widely used in economics, finance, weather forecasting, & many further fields where understanding and predicting time-dependent processes are crucial. The component of ARIMA represents:

1. **Autoregressive (AR):** This component of the model utilizes the interdependent relationship between a current observation and its preceding time-step observations.
2. **Integrated (I):** This component adjusts raw observations by subtracting each observation from the previous time step's observation, aiming to render the time series stationary.
3. **Moving Average (MA):** This aspect of the model leverages relationship between an observation & residual error within a moving average framework applied to past observations.

Together, ARIMA models are denoted as ARIMA (p, d, and q), where:

- p: number of previous time steps included in the model, known as autoregressive order.
- d: Number of times that the raw observations are differenced (I order).
- q: Size of the moving average window (MA order).

Steps to perform ARIMA Technique:

1. Testing for AR or MA Components:

ACF Analysis:

- If the ACF shows a positive correlation in lag 1, it suggests that the series can be well-explained by an AR component.
- If the ACF shows a negative correlation in lag 1, it suggests that the series can be well-explained by an MA component.

PACF Analysis:

- If the PACF shows a sharp cut-off after a few lags and then tails off, it suggests that the series can be well-explained by an AR component.
- If the PACF shows a gradual drop after a few lags, it suggests that the series can be well-explained by an MA component.

2. Perform AR or MA:

- Use the validated ARIMA model to forecast future values of the time series.

3. Data Evaluation using performance metrics:

- Use criteria such as Akaike Info Criterion (AIC) or Bayesian Info Criterion (BIC) to compare different ARIMA models & select the best-fitting one.
- Validate the final model by checking and ensuring forecasts are accurate.

Limitations of the Study

Any financial analysis has a limited shelf life. Therefore, this study also has several limitations to consider:

- The study mainly covers the Mutual-funds. Majorly focuses on selecting five large-cap and five mid-cap Mutual-funds.
- This research relies on historical data to compute expected-returns, standard deviation, & beta.
- The assessment of Mutual-Fund schemes in this study utilizes 3 portfolio evaluation indicators:Sharpe-Ratio, Treynor Ratio, and Jensen Alpha.
- The data collection pertains to a specific time period.The analysis has conducted using the available information set.

Analysis & Interpretation of data collected with relevant tables & graphs

This research focuses on selecting 5 large-cap & 5 mid-cap Mutual-funds in their direct plan, growth variants, primarily chosen based on having the highest Assets under-Management. The analysis covers a 5-year period spanning from 2019 to 2024, with data sourced on May 23, 2024.

Table 1: Overall Ranking of selected Large-Cap and Midcap Funds

Large-Cap Mutual-fund Schemes

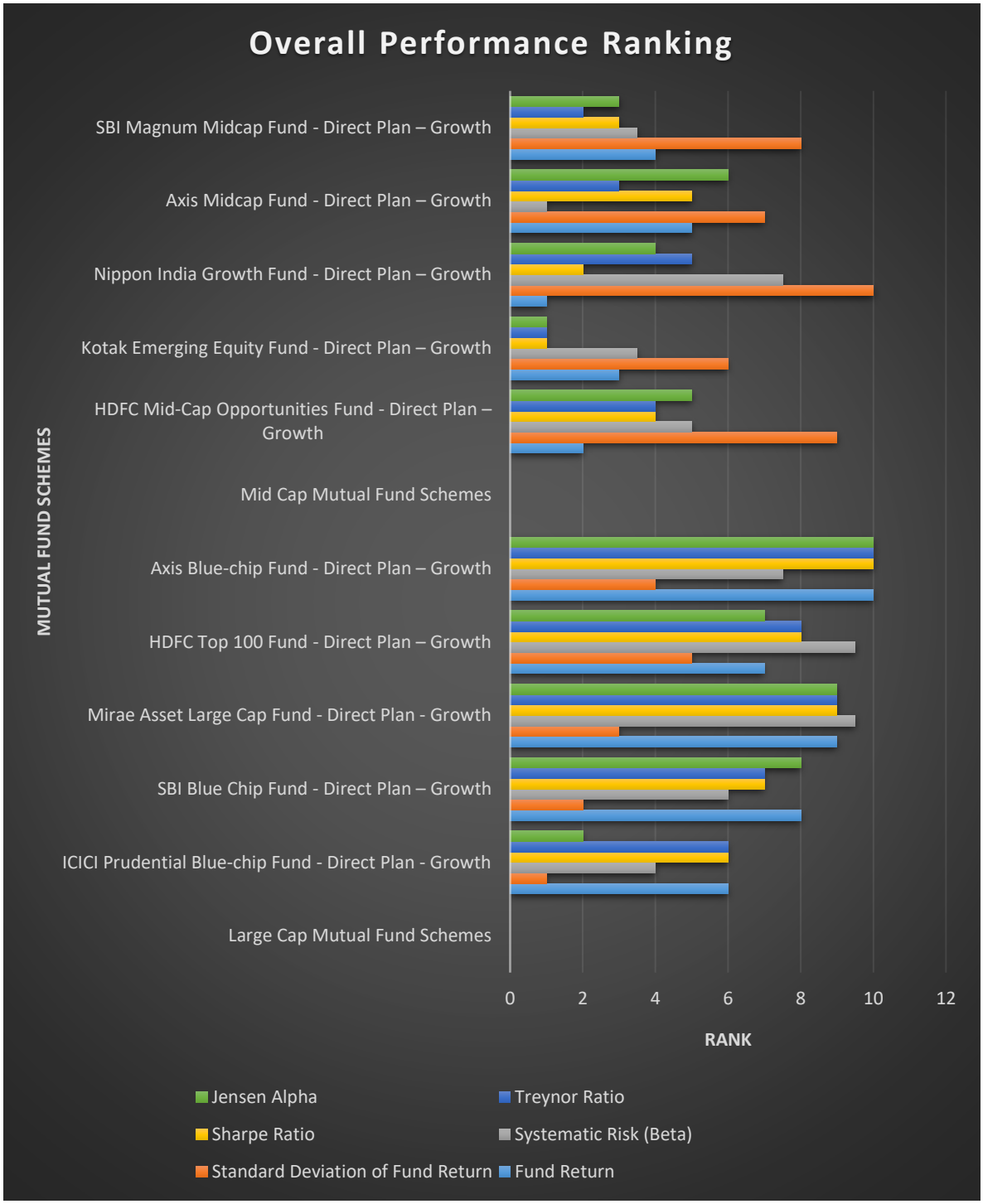
Schemes	Fund Return	Standard Deviation of Fund Return	Systematic Risk (Beta)	Sharpe Ratio	Treynor Ratio	Jensen Alpha
ICICI-Prudential Blue-chip Fund - Direct-Plan - Growth	6	1	4	6	6	2
SBI Blue-Chip Fund - Direct-Plan – Growth	8	2	6	7	7	8
Mirae Asset Large-Cap Fund - Direct-Plan – Growth	3	3	9.5	9	9	9
HDFC Top-100 Fund - Direct-Plan – Growth	5	5	9.5	8	8	7
Axis Blue-chip Fund - Direct-Plan – Growth	10	4	7.5	10	10	10

Mid Cap Mutual-fund Schemes

Schemes	Fund Return	Standard Deviation of Fund Return	Systematic Risk (Beta)	Sharpe Ratio	Treynor Ratio	Jensen Alpha
HDFC Mid-Cap Opportunities-Fund - Direct-Plan – Growth	2	9	5	4	4	5
Kotak Emerging Equity-Fund - Direct-Plan – Growth	3	6	3.5	1	1	1
Nippon India Growth-Fund - Direct-Plan – Growth	1	10	7.5	2	5	4
Axis Midcap-Fund - Direct-Plan – Growth	5	7	1	5	3	6
SBI Magnum Midcap-Fund - Direct-Plan – Growth	4	8				

The data table above details the ranks and overall performance scores of various Large-Cap and mid cap Mutual-Fund schemes, evaluated across different parameters such as portfolio return, standard-deviation of fund return (portfolio risk), systematic risk (Beta), Sharpe ratio, Treynor ratio, and Jensen alpha. It is evident from the data that mid cap Mutual-Fund schemes outperform Large-Cap Mutual-Fund schemes, excelling in 5 out of the 7 measured criteria.

Chart 1: Showing overall Performance Ranking



Correlation Analysis:

Table 2: Table showing the values of the correlation coefficients i.e., Fund Return or Portfolio Return, Standard Deviation (SD) of Fund Return, & Beta of different Mutual Fund Schemes.

Scheme Name	Fund Return or Portfolio Return	SD of Fund Return	Beta
Large-Cap Mutual-fund Schemes			
ICICI-Prudential Blue-chip Fund - Direct-Plan – Growth	19.01%	10.76	0.88
SBI Blue-Chip Fund - Direct-Plan – Growth	16.60%	11.08	0.91
Mirae Asset Large-Cap Fund - Direct-Plan – Growth	15.39%	11.29	0.93
HDFC Top-100 Fund - Direct-Plan – Growth	16.66%	11.4	0.93
Axis Blue-chip Fund - Direct-Plan – Growth	14.91%	11.36	0.92
Mid Cap Mutual-fund Schemes			
HDFC Mid-Cap Opportunities-Fund - Direct-Plan – Growth	26.78%	12.84	0.89
Kotak Emerging Equity-Fund - Direct-Plan – Growth	26.65%	11.48	0.79
Nippon India Growth-Fund - Direct-Plan – Growth	27.41%	13.12	0.92
Axis Midcap-Fund - Direct-Plan – Growth	24.40%	11.65	0.78
SBI Magnum Midcap-Fund - Direct-Plan – Growth	25.81%	11.84	0.79

(Source: All data collected from AMFI website)

Table 3: The correlation analysis table shows the correlation coefficients between Fund Return or Portfolio Return, Standard-deviation (SD) of Fund Return, and Beta.

Correlation Coefficients	*Fund Return or Portfolio Return*	*SD of Fund-Return*	*Beta*
Fund Return or Portfolio Return	1		
SD of Fund Return	0.712739711	1	
Beta	-0.613802531	0.02769222	1

Interpretation:

1. Correlation between Fund Return or Portfolio Return and SD of Fund-Return is 0.712739711, there is a moderately positive correlation (0.71) between the Fund Return or Portfolio Return and its Standard-deviation (SD). This suggests that when the Fund Return increases or decreases, there tends to be a corresponding increase or decrease in the Standard-deviation of Fund Return, though the relationship is not perfect.

2. Correlation between Portfolio Return and Beta is -0.613802531, there is a moderately negative correlation (-0.61) between Fund Return or Portfolio Return and its Beta. This indicates an inverse relationship whereas the Fund Return or Portfolio Return tends to increase, the Beta tends to decrease, and vice versa. This inverse relationship implies that when the Fund Return or Portfolio Return increases, the Beta tends to decrease, and vice versa.

3. The correlation between the standard-deviation of fund returns and beta is 0.02769222, indicating a very weak positive relationship (approximately 0.03) between these two variables. This suggests that there is little to no linear relationship between the variability of Fund Returns (as indicated by SD) and the systematic risk (Beta) of the fund or portfolio.

ARIMA Analysis:

As Kotak Emerging Equity-Fund - Direct-Plan - Growth (MidCap) has the highest rank of 1 in all 3 ratios or Performance measures with highest returns, it is taken as the best of all selected Mutual-Fund schemes. Thus NAV for this fund is been forecasted using ARIMA Technique for the period of 40 days from 23rd May 2024 to 1st July 2024, with ACF testing of 10 with a difference of 1 to achieve stationarity and then performing MA with p as 0, q as 1 and d as 2.

1. Testing

Table 4: Table showing ACF testing

Autocorrelation

Lag	*ACF*
1	-0.47579
2	0.014655
3	-0.07229
4	0.016924
5	0.07253
6	-0.07023
7	0.012452
8	0.009526
9	-0.02603
10	0.035369

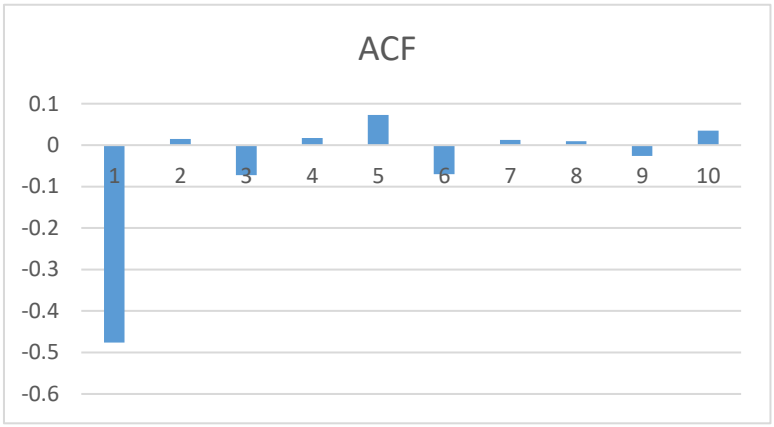


Chart 2: Showing LAGS in ACF

Interpretation:

Since the LAG 1 in ACF is in NEGATIVE will perform Moving Average (MA)

2. Performing Moving Average and Estimating Forecasts

Table 5: Summarizes the key statistics and parameters of ARIMA model and the estimated forecasts

Model statistics		
Index	*phi*	*theta*
1	0	-1.00782
Const	-0.00021	-0.00021
	SSE	543.5868
	P	0
	Q	1
	D	2
	res mean	-0.03976
	res s.d.	0.655097
	sqrt mse	0.656044
	data mean	0.000961
	data s.d.	0.885734
	size	1263
	LL	-1259.73
	AIC	-1058.78
	BIC	-1043.36
	AIC aug	2525.459
	BIC aug	2540.883

Forecast	
Date	*forecast*
24-05-2024	*133.9819*
25-05-2024	*134.1386*
26-05-2024	*134.295*
27-05-2024	*134.4513*
28-05-2024	*134.6073*
29-05-2024	*134.7632*
30-05-2024	*134.9188*
31-05-2024	*135.0742*
01-06-2024	*135.2294*
02-06-2024	*135.3844*
03-06-2024	*135.5392*
04-06-2024	*135.6938*
05-06-2024	*135.8482*
06-06-2024	*136.0023*
07-06-2024	*136.1563*
08-06-2024	*136.31*
09-06-2024	*136.4635*
10-06-2024	*136.6169*
11-06-2024	*136.77*
12-06-2024	*136.9229*
13-06-2024	*137.0756*
14-06-2024	*137.2281*
15-06-2024	*137.3803*
16-06-2024	*137.5324*
17-06-2024	*137.6842*
18-06-2024	*137.8359*
19-06-2024	*137.9873*
20-06-2024	*138.1386*
21-06-2024	*138.2896*
22-06-2024	*138.4404*
23-06-2024	*138.591*
24-06-2024	*138.7414*
25-06-2024	*138.8915*
26-06-2024	*139.0415*
27-06-2024	*139.1913*
28-06-2024	*139.3408*
29-06-2024	*139.4902*
30-06-2024	*139.6393*
01-07-2024	*139.7882*
02-07-2024	*139.9369*

Chart 3: Showing Actual NAV Values

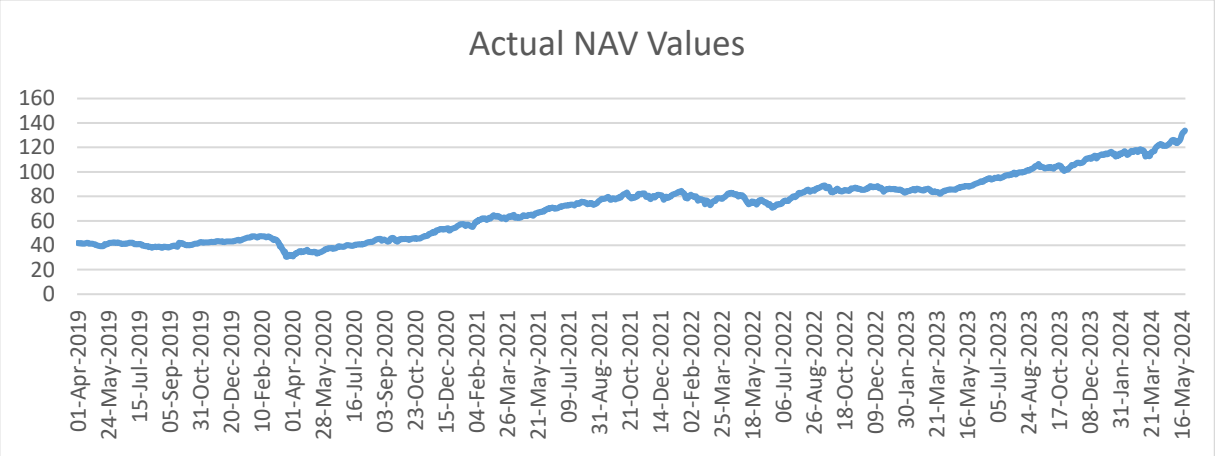
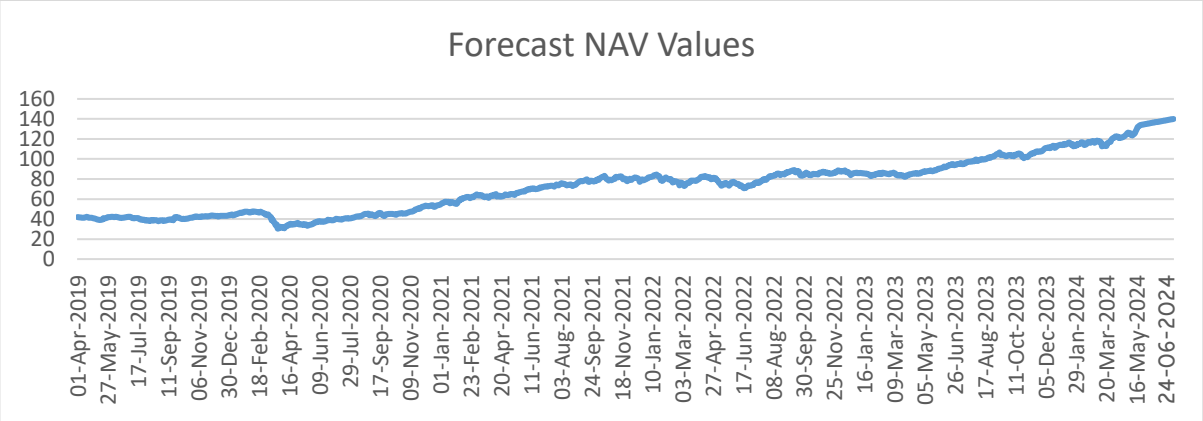


Chart 4: Showing Forecasted NAV Values through ARIMA Technique



Interpretation:

The above table contains statistics related to a time series model, likely fitted using ARIMA (Autoregressive Integrated Moving Average) methodology, it summarizes the key statistics and parameters of the ARIMA model, providing insights into its performance and the quality of fit to your time series data.

Model Specifications:

- p: Number of autoregressive (AR) terms used in the model. Here, P = 0, indicating no AR terms.
- q: Number of moving average (MA) terms used in the model. Here, Q = 1, indicating one MA term.
- d: Number of times that the raw observations have been differenced to achieve stationarity. Here, d = 2, suggesting that the data was differenced twice to achieve stationarity.

Model Evaluation using performance metrics:

- SSE (Sum of Squared Errors): This measures the overall discrepancy between the observed values and the values predicted by the model. A lower SSE (543.5868) suggests that the model fits the data relatively well.
- LL (Log-Likelihood): A measure of how well the model fits the data. Higher values of LL indicate a better fit. Here, LL is -1259.73 suggests that the model fits the data relatively well.
- AIC (Akaike Information Criterion): A metric that penalizes over fitting. Lower values indicate a better model fit, considering the complexity. Here, AIC is -1058.78. The negative AIC, value suggest that the model is performing reasonably well based on criteria.
- BIC (Bayesian Information Criterion): Similar to AIC but with a stronger penalty for model complexity. Like AIC, lower values are better. Here, BIC is -1043.36. The negative BIC, value suggest that the model is performing reasonably well based on criteria.
- AIC Aug and BIC Aug: These might refer to the augmented versions of AIC and BIC, possibly

accounting for additional parameters or adjustments. Their values are 2525.459 and 2540.883 respectively.

Data and Residual Statistics:

- res mean: Mean of the residuals (errors) from the model. The value of -0.03976 indicates that, on average, the model tends to slightly underestimate the actual values.
- res s.d.: Standard-deviation of the residuals. This is 0.655097, indicating the variability of the residuals around their mean.
- sqrt mse: Square root of the mean squared error, which is 0.656044. This represents the average magnitude of the residuals in the original units of the data.
- data mean and data s.d.: Mean and standard-deviation of the original data. These are 0.000961 and 0.885734 respectively, providing a sense of the scale and central tendency of the data.

Summary of Findings

- The performance of Large-Cap Funds was varied. Three funds (ICICI Prudential, HDFC Top 100, and Axis Blue-chip) outperformed the benchmark, while the other two (SBI Blue-Chip and Mirae Asset) underperformed.
- The performance of Mid Cap Funds was also mixed. Two funds (Nippon India and HDFC Mid-Cap) outperformed, while the other three (Kotak Emerging Equity, Axis Midcap, and SBI Magnum Midcap) underperformed.
- Overall, Large-Cap Funds performed better than Mid Cap Funds in this study of selected Mutual-Fund schemes, with three out of five schemes outperforming the benchmark.
- However, based on the portfolio returns of the selected Mutual-Fund schemes, Mid Cap funds delivered higher returns compared to Large-Cap funds within the given timeframe. The Nippon India Growth-Fund (Mid Cap) stood out as the overall leader with the highest return of 27.41%.
- Considering the standard-deviation (SD) of fund returns, Large-Cap funds appeared to be less risky than Mid Cap funds during this period, with lowest risk or lowest SD. The ICICI-Prudential Blue-chip Fund (Large Cap) emerged as the leader with the lowest SD of 10.76%, indicating potentially lower volatility.
- Evaluating systematic risk (Beta), Mid Cap funds seemed to be less risky than Large-Cap funds during this period, with lowest risk or lowest beta. The Axis MidCap-Fund - Direct-Plan - Growth had the lowest risk profile with a beta of 0.78 among all the midcap funds listed. Meanwhile, the Mirae Asset Large Cap-Fund - Direct-Plan - Growth and HDFC Top-100 Fund - Direct-Plan - Growth both tied for the highest beta of 0.93 among the Large-Cap funds listed, suggesting potentially higher risk.

- Based on the Sharpe Ratio, Mid Cap Mutual-Fund Schemes, on average had higher Sharpe Ratios, indicating better risk-adjusted returns. Kotak Emerging Equity-Fund (Mid Cap) had the highest Sharpe Ratio of 1.71, while Axis Blue-chip Fund (Large Cap) had the lowest at 0.70.
- Based on the Treynor Ratio, Mid-Cap funds also outperformed in terms of Treynor Ratio, with Kotak Emerging Equity-Fund leading with a return of 24.87. Among Large-Cap funds, Axis Blue-chip Fund had the lowest return at 8.60.
- Using Jensen Alpha, Mid-Cap funds demonstrated higher returns, with Kotak Emerging Equity-Fund ranked highest at 4.07. In contrast, Axis Blue-chip Fund (Large Cap) had the lowest Alpha at -0.98.
- Fund Return or Portfolio Return has a moderate positive correlation with its Standard-deviation (indicating they tend to move somewhat in sync).
- Fund Return or Portfolio Return has a moderate negative correlation with Beta (indicating they tend to move in opposite directions to some extent).
- There is a minimal positive correlation between the Standard-deviation of Fund Return and Beta, indicating a slight direct relationship between these 2 factors.
- The ARIMA model with parameters (0, 2, 1) provided a good fit for the data, as indicated by low SSE, AIC, and BIC values, along with a negative log-likelihood and small residual standard deviation, capturing significant variability in the dataset.

Conclusion

A thorough analysis combined with timely investments may demonstrate that Mutual-funds can be an excellent form of investment. This study evaluates the performance of 10 selected Mutual-Fund schemes, comprising 5 large-cap Mutual-funds and 5 mid-cap Mutual-funds from various fund houses. The aim is to assess the funds' performance, the level of diversification, and the ability of investors or fund managers to identify overvalued and undervalued funds among the selected ones.

The study found that large-cap funds outperformed mid-cap funds, with 3 out of 5 large cap schemes exceeding their benchmark. In contrast, when comparing portfolio returns of the selected Mutual-funds, mid-cap Mutual-Fund schemes performed better than large-cap Mutual-Fund schemes. Analyzing the standard-deviation (SD) of fund returns showed that large-cap funds less risky than mid-cap funds. However, in terms of systematic risk (Beta), mid-cap funds less risky than large-cap funds, exhibiting the lowest beta values.

When evaluating performance using the Sharpe Ratio, mid-cap Mutual-Fund schemes on average delivered higher returns compared to large-cap Mutual-Fund schemes. Similarly, the Treynor Ratio and Jensen Alpha indicated that mid-cap Mutual-Fund schemes generally provided higher-returns than large-cap Mutual-Fund schemes. Overall, mid-cap Mutual-Fund schemes outperformed large-cap Mutual-Fund schemes in 5 out of 7 measures: benchmark return comparison, portfolio return, SD of fund return (or portfolio risk), systematic risk (Beta), Sharpe Ratio, Treynor Ratio, and Jensen Alpha. Among the selected Mutual-Fund schemes, the Kotak Emerging Equity-Fund - Direct-Plan - Growth (Mid Cap) emerged as the best performer, achieving the highest rank across all three ratios and performance measures with the highest returns.

Correlation analysis revealed a moderately positive correlation (0.71) between fund return or portfolio return and its standard-deviation (SD). There was a moderately negative correlation (-0.61) between fund return or portfolio return and its beta. Additionally, there was a very weak positive correlation (0.03) between the standard-deviation (SD) of fund return and beta. The negative log-likelihood (LL), Akaike Information Criterion (AIC), and Bayesian Information Criterion (BIC) values from the ARIMA model suggest that model performs reasonably well according to these criteria.

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