To analyze the top Indian Equity Mutual Fund Schemes performance using various statistical measures.

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Introduction

The size of Indian mutual fund industry is at Rs. 39.5 lakh crores of which Rs. 14.9 lakh crores are in pure equity funds and around Rs. 6 lakh crores are in ETFs. Given this size and importance as a savings vehicle for investors, it is imperative that common investors should be able to analyze and choose the most appropriate funds based on their individual objectives.

Unlike bank deposits which offer a guaranteed rate of return on deposits based on tenure, mutual fund returns are subject to market risk and hence need to be evaluated using other metrics. In this project I have focused on equity mutual funds only and an equity ETF (exchange traded fund). The evaluation of these funds can be done using various statistical measures, each of which gives an insight to the performance and help in choosing the right fund for the investor and her objective.

Statistical measures to evaluate equity mutual funds

1. Returns: Historical returns of the fund over time. These are computed by taking the ending point value (Net Asset Value (NAV) of the fund or stock market price of the ETF or the value of the index) and subtracting the starting point value and dividing the same by the starting point value and then multiplying it by 100 to give the returns over that period in percentage terms. Here is the formula for the same

$$\text{Return percent } (r\%) = \{(V_E - V_S)/V_S\} * 100$$

$r\%$ is the return over the period in percentage

V_E is the value on the period end date of evaluation

V_s is the value on the period start date of evaluation

   a. Returns for various historical periods ending with the latest value. This will give an idea of what returns the fund has generated in the past.
      i. Last 1 month return
      ii. Last 3 months return
      iii. Last 6 months return
      iv. Last 1 year return
      v. Last 3-year return
      vi. Last 5-year return
      vii. Last 10-year return
   b. Returns over fiscal year periods: These will give an idea of how the fund fared over twelve-month periods in the past.
      i. 31-March-2021 to 31-March-2022 (FY22)
      ii. 31-March-2020 to 31-March-2021 (FY21)
      iii. …
      iv. 31-March-2013 to 31-March-2014 (FY14)
   c. Benchmark returns for each of the above corresponding periods. For the purpose of this study, Nifty 50 Index Total Return is considered a benchmark.
   d. Alpha of the fund: This is the difference in the returns between the fund and the benchmark over similar period. This gives an idea of how the fund fared compared to its benchmark
      i. The difference between the fund returns and benchmark returns help one understand if the fund has done better than the benchmark or not. Typically investing in an index fund/ETF carries low fees and is a better vehicle to invest if the active managers, who charge higher fees, are not able to beat the benchmark consistently.
2. Risk. There are various measures of risk. Financial literature talks about standard deviation as a measure of financial risk. It shows the variability of returns of the fund over a period. The formula used for calculating the standard deviation is as follows.

$$\sigma = \sqrt{\frac{\Sigma(x-\mu)^2}{N}}$$

σ is the Standard Deviation of daily returns
x is the daily return of the fund/ETF/benchmark
μ is the average of daily returns over the period
N is the total number of data points i.e., number of x

Some investors like high risk as there is a potential for higher return while others prefer low risk accepting low returns. For example, a bank deposit has zero risk but also low returns.

Choice of equity funds to evaluate.

The choice of the funds was determined by the following characteristics

1. They should be pure equity funds
2. They should invest in large capitalization stocks and S&P Nifty 50 Total Return should be a good benchmark to compare them.
3. They should have at least a 5-year history.
4. They should be open end funds with daily NAV.
5. If it is an ETF, then it should be based on S&P Nifty 50 Total Return.
6. The latest assets under management should be at least Rs. 20,000crs.

Based on the above and using AMFI and Bloomberg the ETF and the list of top five funds which met the above criteria were as follows

1. SBI – ETF Nifty 50
2. Kotak Flexicap Fund
3. Axis Bluechip Fund
4. ICICI Prudential Bluechip Fund
5. SBI Bluechip Fund
6. Mirae Large Cap Fund

And the benchmark/index used was S&P Nifty 50 Total Return Index.

Data for evaluation

Bloomberg was used for taking out the historical data for computation for each of these funds.
Microsoft Excel was used for tabulations and calculations.

Results and observations

A. Returns over various periods

Returns (%)	1-month	3-months	1-year	3-years	5-years	10-years
SBI-ETF NIFTY 50	4.2%	5.4%	11.6%	55.7%	88.3%	NA
KOTAK FLEXICAP-GROWTH	2.2%	4.3%	10.3%	50.6%	71.4%	337.4%
AXIS BLUECHIP FUND-RG	1.5%	1.2%	-1.1%	42.8%	84.4%	278.8%
ICICI PRU FOCUS BLUECHIP-RG	3.2%	6.3%	12.5%	62.9%	81.1%	291.3%
SBI BLUE CHIP FUND-RG	2.9%	4.6%	9.6%	58.6%	73.7%	301.1%
MIRAE ASSET LARGE CAP FD-RG	3.3%	5.0%	7.9%	53.5%	77.1%	353.5%
NIFTY 50 TR	4.2%	5.8%	11.9%	61.2%	95.3%	260.9%

Alpha = Return of fund -Return of index	1-month	3-months	1-year	3-years	5-years	10-years
SBI-ETF NIFTY 50	0.1%	-0.4%	-0.3%	-5.5%	-7.0%	NA
KOTAK FLEXICAP-GROWTH	-2.0%	-1.5%	-1.6%	-10.6%	-23.9%	76.4%
AXIS BLUECHIP FUND-RG	-2.7%	-4.5%	-13.0%	-18.4%	-10.9%	17.8%
ICICI PRU FOCUS BLUECHIP-RG	-1.0%	0.5%	0.5%	1.7%	-14.2%	30.3%
SBI BLUE CHIP FUND-RG	-1.3%	-1.2%	-2.3%	-2.6%	-21.6%	40.1%
MIRAE ASSET LARGE CAP FD-RG	-0.8%	-0.8%	-4.0%	-7.7%	-18.2%	92.5%

Legend: Green shows when the fund/ETF return is more than the index and red shows when it is less than the index over the same period.

Observations:

1. For 1-month, only the ETF has done better than the index.
2. For 3-months, only the ICICI has done better than the index.
3. For 1 -year, only the ICICI has done better than the index.
4. For 3-years, only the ICICI has done better than the index.
5. For 5-years, no fund has done better than the index while the ETF is the best among them with the lowest negative alpha.
6. For 10-years all funds (ETF was not there 10 years back) have done better than the index.

B. Returns over financial years.

Returns (%)	FY22	FY21	FY20	FY19	FY18	FY17	FY16	FY15	FY14
SBI-ETF NIFTY 50	19.7%	67.0%	-25.2%	17.3%	11.5%	19.6%	NA	NA	NA
KOTAK FLEXICAP-GROWTH	15.6%	66.5%	-23.9%	11.5%	10.7%	29.7%	-2.8%	51.5%	23.6%
AXIS BLUECHIP FUND-RG	15.7%	48.9%	-8.1%	14.5%	18.1%	14.6%	-6.5%	34.3%	19.8%
ICICI PRU FOCUS BLUECHIP-RG	22.3%	68.7%	-24.7%	9.2%	12.5%	24.8%	-6.6%	36.3%	22.5%
SBI BLUE CHIP FUND-RG	16.1%	74.1%	-24.1%	5.3%	10.9%	20.2%	-1.6%	48.3%	18.5%
MIRAE ASSET LARGE CAP FD-RG	18.2%	68.7%	-24.1%	14.2%	12.3%	28.3%	-4.1%	47.0%	25.9%
NIFTY 50 TR	20.3%	72.5%	-25.0%	16.4%	11.8%	20.2%	-7.8%	28.2%	19.5%

Alpha = Return of fund -Return of index	FY22	FY21	FY20	FY19	FY18	FY17	FY16	FY15	FY14
SBI-ETF NIFTY 50	-0.6%	-5.6%	-0.2%	0.8%	-0.3%	-0.5%	NA	NA	NA
KOTAK FLEXICAP-GROWTH	-4.7%	-6.1%	1.2%	-4.9%	-1.1%	9.5%	5.0%	23.3%	4.2%
AXIS BLUECHIP FUND-RG	-4.6%	-23.7%	16.9%	-1.9%	6.4%	-5.5%	1.4%	6.1%	0.3%
ICICI PRU FOCUS BLUECHIP-RG	2.0%	-3.8%	0.4%	-7.3%	0.8%	4.6%	1.2%	8.1%	3.1%
SBI BLUE CHIP FUND-RG	-4.1%	1.5%	0.9%	-11.1%	-0.9%	0.1%	6.2%	20.1%	-1.0%
MIRAE ASSET LARGE CAP FD-RG	-2.1%	-3.9%	0.9%	-2.3%	0.6%	8.2%	3.7%	18.8%	6.4%

Legend: Green shows when the fund/ETF return is more than the index and red shows when it is less than the index over the same period.

Observations

1. FY22: Only ICICI did better than the index
2. FY21: Only SBI Bluechip did better than the index
3. FY20: All funds except SBI ETF did better than the index
4. FY19: Only SBI ETF did better than the index
5. FY18: Axis, ICICI and Mirae did better than the index
6. FY17: Except SBI ETF and Axis all the other funds did better than the index
7. FY16: All funds did better than the index
8. FY15: All funds did better than the index
9. FY14: All funds except SBI Bluechip did better than the index

C. Standard deviation as a measure of risk

Standard Deviation (SD) of daily returns	Mean of daily returns (μ)	No. of data points (N)	Sum of (x-μ)^2	{Sum of (x-μ)^2}/N	[{Sum of (x-μ)^2}/N]^(0.5) or SD
SBI-ETF NIFTY 50	0.05%	1813	0.2360	0.0001302	1.14%
KOTAK FLEXICAP-GROWTH	0.07%	2479	0.2655	0.0001071	1.03%
AXIS BLUECHIP FUND-RG	0.06%	2479	0.2352	0.0000949	0.97%
ICICI PRU FOCUS BLUECHIP-RG	0.06%	2479	0.2591	0.0001045	1.02%
SBI BLUE CHIP FUND-RG	0.06%	2479	0.2618	0.0001056	1.03%
MIRAE ASSET LARGE CAP FD-RG	0.07%	2479	0.2753	0.0001110	1.05%
NIFTY 50 TR	0.06%	2489	0.2894	0.0001163	1.08%

Observations

1. The highest daily standard deviation is of the SBI ETF. It fluctuates the most.
2. The lowest standard deviation is of the Axis Bluechip fund which fluctuates the least.

D. Standard deviation and returns

Name	Standard Deviation	1-year return	3-years return	5-years return	10-year return
SBI-ETF NIFTY 50	1.14%	11.6%	55.7%	88.3%	NA
KOTAK FLEXICAP-GROWTH	1.03%	10.3%	50.6%	71.4%	337.4%
AXIS BLUECHIP FUND-RG	0.97%	-1.1%	42.8%	84.4%	278.8%
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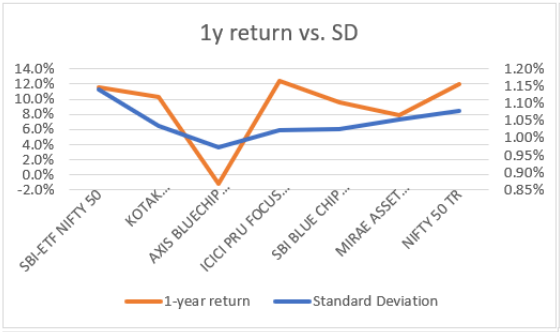

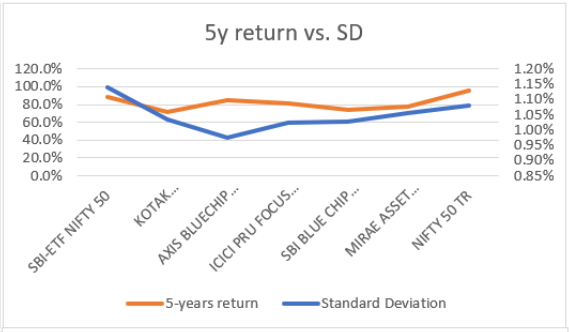

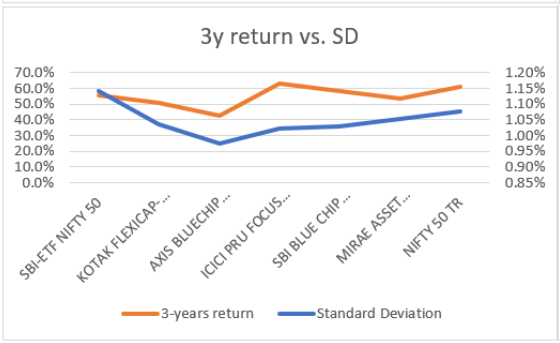

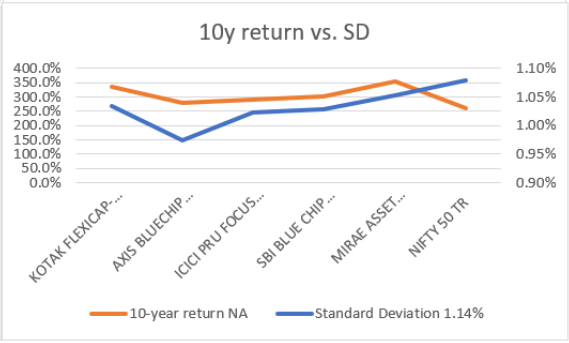

Observations

1. As can be seen from the above charts, there is a good correlation between high standard deviations and returns for the above periods of evaluation.
2. There are some exceptions where even as standard deviation is high, returns are low (Index over 10 years) and where standard deviation is low, but returns are high (Axis over 5 years).
3. The theory that standard deviation is a measure of risk is partially true as it alone does not explain the difference in returns for the various funds and hence more research needs to be done to determine other factors which can help one choose the right fund for investment.

Conclusion

1. As demonstrated above, there is a clear theory of how to measure returns of funds over a period.
2. One can then compare the returns of funds against the index to determine which funds are doing better than an index.
3. One can also measure risk by computing the standard deviation of daily returns.
4. One can then plot the returns against the standard deviation and see if any fund stands out in terms of delivering higher returns for lower risk and choose those while avoiding the funds which show lower returns for higher risk.
5. If there are no clear-cut winners against the index or if it is hard to choose which fund is better, then the best option could either be to distribute the money across many funds or invest in an ETF which closely mirror the index.

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https://en.wikipedia.org/wiki/Standard_deviation

Data file source

Please see PDF titled “statistics data”