Goldman Sachs(quant case study)

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Problem statement :

We'd like you to propose a quantitative framework to select funds from a universe, and monitor them on an ongoing basis, with criteria for removal from the AIMS platform. It can be assumed that all historical returns are available for all funds and their benchmarks. Returns are the change in price of an investment. We will have a time series of returns for each fund every month from when the fund started. Similarly, there are time series of returns for each benchmark in question. Along with this, we also have a set of time series that try to capture some market and macroeconomic factors. (for example – interest rates, commodity prices, benchmarks for different sectors, etc) A naïve approach to selecting managers is to look at the funds with maximum absolute returns since inception. However, this quickly fails since we could have funds that launched in different time periods, and comparing their performance directly, would not make sense. So we need an approach that considers various concerns such as different time periods of

funds since inception, how they performed during different periods of the business cycle, adjustments for risk taken by them to enumerate a few.

Objective :

In this report we will be focussing on developing the quantitative framework for selecting funds(**may be stocks ,mutual funds, hedge funds, venture capital etc.**) from the universe (**A universe of funds generally refers to a set of funds that share a common feature.**) for alternative investment groups (**An alternative investment is a financial asset that does not fall into one of the conventional investment categories.**)also with criteria of their removal from the portfolio and we will be monitoring them on an ongoing basis .

Key points regarding Alternative investment groups (AIMS):

- An alternative investment is a financial asset that does not fit into the conventional equity/income/cash categories.
- Private equity or venture capital, hedge funds, real property, commodities, and tangible assets are all examples of alternative investments.
- Private equity or venture capital, hedge funds, real property, commodities, and tangible assets are all examples of alternative investments.
- While traditionally aimed at institutional or accredited investors, alternative investments have become feasible to retail investors via alternative funds.

Factor that we should consider during selection of funds

1) Performance Against Category:

Another factor which is equally important to assess while selecting a mutual fund scheme is its performance in comparison to its active peer group. This helps in getting a holistic understanding of the fund's performance.This comparison should only be among the same type of fund scheme .For instance, a large cap equity mutual fund can only be compared with other large cap mutual funds and not against mid cap funds or debt funds.

Returns of some large cap funds:

Fund name	1 year return (%)	3 year return (%)	5 year return (%)	7 year return (%)	10 year return (%)
HDFC top100	44.41	11.31	15.85	13.89	11.45
IDFC large cap	37.56	12.58	14.02	12.59	10.71
Franklin bluechip	48.52	11.45	13.96	13.05	11.20

Here we have data of some of the mutual funds having best returns in previous years and if someone is interested in investing in large cap mutual funds ,this might be one of the possible ways for selection of one fund .

2) Consistency of performance :

A good fund is one which is able to generate good returns for its investors consistently over a period of time and not just whirlwind returns. The fund

should be capable of providing consistent returns in both bullish and bearish periods of the stock market.

3) Ratio Analysis :

It is equally important to consider the risk analysis tools before selecting the funds for one's portfolio. It gives you an overview to analyze the risk tolerance capacity as well as the extent of rewards earned by taking a risk in an investment. There are many risk analysis tools out of which ratios like SD (Standard Deviation), and BETA measure the volatility factors. On the flip side, the Sharpe, Sortino and Treynor ratios help you calculate the risk-reward figures. Along with these ratios, one should also analyze the alpha of the fund. Alpha indicates the outperformance of the fund against its given profit margin, i.e., the difference between the average profits it may earn and the actual profits earned. Therefore, every investor should give equal weight to such risk factors and make a selection of ratios according to their preference.

4) Total Expense Ratio :

Expense ratio is the very important parameter to be looked at before selecting any mutual fund scheme. Many investors do not find the expense ratio as important, but they should know the fact that higher expense ratio affects fund's returns to a great extent. The expense ratio includes a fee charged by the fund managers, commission paid to the brokers, and other related expenditures.

5) Diversification:

Diversification is an important part of building and maintaining a quality investment portfolio. This is the process of spreading your investments across various funds and other securities across various industries and markets.

Before including a fund in our portfolio, it's important to consider the level of diversification that already exists within your portfolio.

6) Volatility

Volatility describes the rate of fluctuations in the price of a stock or other financial asset. The higher the volatility, the faster the stock will rise and fall, while lower volatility assets will move at a slower, steadier pace.

It's important to remember that volatility describes the rate of fluctuations in price — it doesn't determine the direction of those movements.

Stocks that experience high levels of volatility will climb dramatically on good days, and fall like a brick on bad days. As a result, these investments come with significantly more risk than stocks that don't move quite as fast.

After all, if you have a low-volatility stock that moves more slowly and a recent uptrend begins to reverse, you'll have plenty of time to cash in on your profits before they disappear.

Algorithm for selection of fund :

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/HERE WE ARE CONSIDERING THE FUNDS OF A PARTICULAR CATEGORY/

/on the basis of previous year returns/

Let N1……..Nk are return percentage of various funds in previous years

return(index max of(N1…..Nk);

/on the basis of PE ratio /

Let N1……..Nk are the PE ratios of various funds in previous years

return(index min of(N1…..Nk);

/on the basis of ROE ratio/

Let N1……..Nk are the ROE ratio of various funds in previous year

return(index of max of(N1…..Nk);

/on the basis of Debt to equity ratio /

Let N1……..Nk are debt to equity ratio of various funds in previous year

For (1 to k);

If any of (N1….Nk)<1 and having index i.

return (i)

REMOVING CRITERIA OF ANY FUND:

Let N % is the target gain of any fund;

If at sometime fund is in loss with >= 20% of N;

remove that fund from portfolio;

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//WE WILL COMPILE ALL RESULTS SIMULTANEOUSLY AND WE WILL BE ABLE TO SELECT THE FUND OF PARTICULAR CATEGORY.

THANK YOU!

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CHEMICAL ENGINEERING

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