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Review Article

Dynamic Weighing of Long - Short Neutral Alpha Strategies in Portfolio

Vaibhav Gupta*

Indian Institute of Technology Delhi, India

***Corresponding Author:** Vaibhav Gupta, Indian Institute of Technology Delhi, India.

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Abstract

The era of algorithmic trading has already kicked in. Managing different asset classes eliminating personal bias has been a tested and of course hugely profitable in last 3 decades. Long - Short Neutral Alphas helps to eliminate any capital exposure to the group of neutralisation (will discuss below). Principle advantage of using these strategies, is to infuse less capital in totality, as we are using the major capital, which we obtained through shorting the stocks. Of course, there are some limitations. We will discuss it in this paper. We will also see, why and how we can combine long-short strategies in the best possible way to create a portfolio with a higher overall information ratio and other parameters, than either of its individual component's performance.

Keywords: Quantitative Research and Modelling; Portfolio Management; Asset Trading; Financial Analysis; Mathematical Modelling

Abbreviations

*Alpha: Mathematical model to decide buying and selling of stock of the universe; * Long - Short: Equal capital** allocation to long and short positions for a neutralised sub – universe; ** Approximate.

Introduction

Why is there a need of multiple strategies for a robust portfolio and trading system?

Why portfolios managed by quite many strategies, still not able perform well in out sample performance? We will get answers to many questions like these, in this article.

Why diversification?

Most of us interpret 'diversification' as just building strategies which are independent in their ideas, implementations or somewhat catering to different market movements and datasets, with absolutely no scope for overfitting. It is somewhat true, but if we want to understand it in terms of how it is affecting the daily positions of hedge funds, Quantitative Research and high frequency trading firms [2]. Lets understand it mathematically why we do it and then we will understand a simple idea on how to do it.

Importance of Less Correlated Alphas in the Strategy Pool:
Lets take an example

S.No.	Stock Name	Weights in Neutral Strategy I	Weights in Neutral Strategy II	Net Weight
1	A	0.7	-0.4	0.3
2	B	0.3	-0.6	-0.3
3	C	-1	1	0
Book Size	(Say in millions $)	2*	2*	0.6*

Table 1

* indicates figure proportional to million $ of book size, for an example.

PNL % = Profit or Loss over the book size of trade.

There are two ways to increase the PNL %, is to increase the net Profit in value, or decrease the denominator (book size), without much difference in the net Profit in value.

Quick pointer to discuss: If we have Long - Short Neutral Strategy I and Strategy II, say 7% ARR each independently. Is there a way to get more than 7% using these two strategies together?

Answer, is absolutely yes. That's what we are discussing. The condition here is, they should be significantly uncorrelated. Quoting the example here, initially for these two strategies, the book size was 2 million $ each. In the equal weighted combination of these strategies (weight decided for Stock A, B and C on the particular day), the book size comes out to be 0.6 million $, which way less than the individual book sizes.

See, the weight given by both the strategies were equally respected, so the Net profit in value will remain the same, in fact more, considering the transaction costs as well. For the time, let's ignore it.

Net profits remained the same and the book size decreased, so we can say, Net PNL % increased. So it is very much possible to get > r %, with individual strategies less than or equal to r %.

Important thing here is, if this hypothesis is true for all pairs of alpha, where have we used the fact of using 'uncorrelated' alphas. Is it needed at all, or just a investment industry gimmick? Answer to this question, lies in the weights of the stocks in our Strategies.

Let's understand with another example of same kind.

S. No.	Stock Name	Weights in Neutral Strategy I	Weights in Neutral Strategy II	Net Weight
1	A	0.7	0.6	1.3
2	B	0.3	0.4	0.7
3	C	-1	-1	-2
Book Size	(Say in millions $)	2*	2*	4*

Table 2

* indicates figure proportional to million $ of book size, for an example.

Can you observe a key difference in the weights given by strategies.

In example 1: You can see a contrast in the weights. If we say alphas are less correlated, how we are deducing it? Basically in short, we calculate the correlation between weights given by these alphas over a certain period of In-sample testing.

On the other hand, in example II: The weights are too similar. To avoid a confusion. It is not said, that two alphas should not give similar weights to stocks. It is the other way round. If two strategies are giving similar weights over a period of time, so why two include both the strategies into the portfolio, altogether. Basically it is a double edged sword. If your strategies performs well, the portfolio will do good, because you have included all alphas which are highly correlated. But for the time being, let's assume your alpha idea is not performing that good in certain period of time, and if all the strategies present in the portfolio, are highly correlated, you tend to see a considerable drawdown in your portfolio similar to your independent strategy drawdown [1].

How to practice it?

Triple axis method works very fine for ensuring the diversification. This method was discussed on a public forum and is personally suggested by Nitish Maini, the Chief Strategy Officer at WorldQuant, while he was the Vice President, Research at WorldQuant [3].

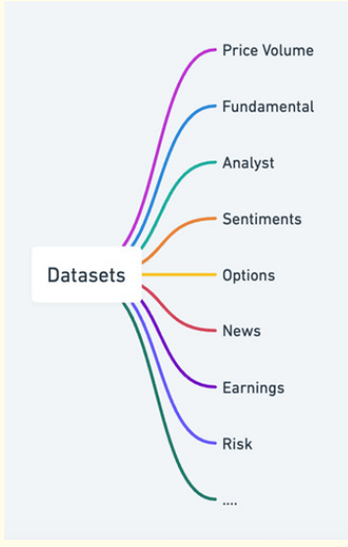
Three axes - Ideas and Datasets, Region and Universe and Performance parameter.

This Triple Axis Plan of Diversification provides a systematic approach to explore the gigantic world of alphas.

By freezing a target on one axis, gives Quant the flexibility to explore the other two axes.

This helps to identify untouched sources of alphas, add diversity and increase the efficiency.

Axis 1: Say, Reversion, Momentum, Lead-Lag, Seasonality etc.



Axis 2: Region and Universe.

Axis 3: Performance Parameter or Aim of optimization.

Based on Liquidity: Say Top 200, Top 500 or Top 3000 stocks.

Particular sector or Industry.

US, China, India, Japan Equity Markets.

Your Goal can be: Sharpe, Returns, Turnover, Drawdown or combination.

Next level of optimisation

The examples discussed above have by default given equal weight to both the strategies. In the real world, we tend to combine thousands of Alphas together in a diverse portfolio. There is always an option to give equal weight to all the Alphas. But if given an option of dynamically changing the weights, it gives a next level of optimization [1].

You can write selection expression and combination expression to do so. Excluding alphas for certain period and removing it altogether, makes very much sense, if the alpha has decayed or not working good compared to other alphas. Keep in mind, changing weights unnecessarily can lead to high transaction cost, so have a rough tradeoff calculation of other fitness parameters and cost analysis before hand.

One thing to make it clear, alpha performance should be independent to the market conditions and ideally your strategy should perform well in all cycles of the market movements.

Conclusion

It is always recommended to decrease the over reliance on few strategies. In this article we understood in deep, why so. Going extra mile, we also discussed the selection of alphas and dynamically weighing to get a combination that gets us to the most optimal fitness of the portfolio.

Conflict of Interest

These strategies and information are some what, based on ideas tested back testing results and out sample testing or obtained based on past market trends, so just to declare a disclaimer on its effectiveness in the future. Idea of writing this article is to give an idea on dynamic weighing of strategies and path towards a robust portfolio.

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