

## The Alpha Generation

*Dear readers, let us continue the journey of Quant...um leap by delving deeper into the world of Algo trading. Continuing to build momentum from my last article where I gave a detailed insight into back-testing, I would like build upon the framework and this month and talk about alpha generation. Alpha is finance world usually describes the return in excess of the risk borne by a trader / investor. But in the Algo world it describes your ability to use filters and conditions which will reduce your peak to trough draw downs – without sacrificing your returns. In addition the alpha should be able to boost the returns of the existing strategy.*

Like always, let me start this topic too with an example. In all my workshops, the most common topic which people like to get an answer to is the success in trend following systems. Not long ago, we had one of our clients stating to me that in Gold and Silver in MCX, he has been using a 120 min candles with 5-20 Moving average crossover with strikingly good success ratio. All through 2011, the strategy was able to generate great returns. Suddenly towards the end of Jan'2012, Gold started hovering around Rs. 29,000 and Silver started hovering at Rs. 53,500. The movement in Gold and Silver had become greatly restrained and range bound. Needless to say, the next 3 months for the client was a disaster and he lost 50% of the P&L of 2011 in the next 3 months. Sounds familiar! – Welcome to the tricky world of systematic trading. My client knew that the model is good and can run for a very long period of time. What he didn't know was – when to start the model, when to stop the model. Alpha generating filters does exactly that – it details out the area / phase in the life of Algo trading when you should run your models with larger quantity and phases or periods when you should probably not be running the model or be running it with highly reduced quantity and leverages.

Now comes a million dollar question – what are those Alpha filters? Ofcourse there are filters and conditions

which traders come across everyday – which can be so useful – but it skips their eyes. The key to trade a trend following system is to identify if the market in general is not in mean-reverting mode – for you to get whip-sawed. There are lots of mathematical and statistical tests available to make sure that we can use some of these techniques to identify areas of mean reversions in market (and hence avoid trading on the these areas. One such technique which we will discuss in this month's article is called Variance Ratio Test (VRT).

The basic logic of a VRT test is simple and very intuitive. It says that if a series is mean reverting in nature then the variance of the series is not increasing over time. Hence, if we compare say 1 period variance of a time series to say a 5 period variance – and 5 period variance turns out to be less than 1 period variance – it says that in any given 5 periods the series has got a mean reverting nature. The exact formula of this test is as under

$$VR(k) = \frac{\text{Variance}(r_{k\Delta t})/k}{\text{Variance}(r_{\Delta t})} \begin{matrix} = 1 \text{ under random walk} \\ < 1 \text{ under mean reversion} \\ > 1 \text{ under mean aversion} \end{matrix}$$

Where, k represents the period for which the Variance Ratio Test is conducted and VR(k) represents the outcome of the variance ratio test.

As evident from the formula above, we are looking for time series of nature where, VR(k) > 1, to identify spots in the cycle of an asset class, such that they are in mean aversion / trending mode. When the outcome of this Variance Ratio Test value is 1 or less than 1, then the time series is under mean reversion / range bounded and hence any sort of trend following system fails on these kinds of asset classes. Tests of these natures are very simple and can be easily done using an Excel spreadsheet or Matlab / R tools and can

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immediately help us realize the soft spots where a certain kind of trading strategy needs to be best avoided to curtail severe drawdown. Other statistical tests which are fairly common and used widely are, cointegration, Absolute Return Ratio tests, Granger causality etc.

Filters need not always be mathematical in nature. Traders across arena have always worked on more logical filters based on their experiences – then use rote mathematics. For example a trader might use a simple filter saying that if he is doing a trend following system then he will take position in a fresh trade, only after 3 consecutive trades based on the same strategy has gone wrong. This way, he does not lose money in range bound markets and increases his chances of making money by putting capital on the 4th trade, after 3 of them have gone wrong in simulations. Again plain yet intuitive manners on making sure that you reduce drawdown in the markets.

Alpha can also be derived, by using a combination of more than one technical parameter – to further strengthen the signal strength and hence reduce the probability of a drawdown. For example a trader might use say a close of the stock, above its 20 day's high to enter into the trade. But at the same time he might want to also see that the RSI of the stock is more than 50 – so that it shows strength in terms of prices, for the stock to keep moving ahead. Additional technical filters, like RSI, Bollinger, Stochastic, William % R etc. are only re-confirmation of the fact that already existing trade shall have a higher probability to keep moving in the favorable direction rather than dying away.

Apart from filters, many traders are also smart to identify the equity curve of their strategy and form their trading strategies accordingly. For example if in a given month the returns have been quite good in a strategy and more like a 2-sigma event, then the

following month – a smart trader might not run the same strategy – as the chances of a pullback increases. In a vice versa fashion, incase there has been a draw down period in a strategy, then excess alpha can be generated by nominally increasing the trade size in the same strategy, so that one can benefit from the sharp recovery, which usually follows a lackluster and drawdown based period.

To put things in perspective, there is no fixed rule as to how Alpha can be derived from a quant based strategy, but the paths are enormous. The more a team stays with their strategies the more they understand the areas which need constant improvisation and the areas where alpha can be generated from an existing strategy. Some people take the path of mathematics and some judgments are made on experience and past observations. Yet, some improvisation is achieved by doing a thorough back-test of the strategies with the Alpha overlay and see their behavior in the past.

*The Quant...um leap journey will continue in the coming months with more sections, more insights and more leaps... Let the journey be the destination!*

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### About Samssara Capital Technologies LLP

Samssara Capital Technologies LLP (“Samssara”) is an investment solutions firm focused solely on developing automated algorithmic and quantitative trading and investment strategies. It was launched in 2010 by a team of IIM Ahmedabad and IIT Bombay graduates - Rajesh Baheti, Manish Jalan and Kashyap Bhargava. Samssara caters to its clients' needs of providing an alternative asset management vehicle, with the focus on 100% automated and quantitative trading strategies.

Samssara’s products vary from pair trading (statistical arbitrage), factor models, Nifty Index beating products to very high frequency trading strategies. The team at Samssara works on mathematical models and statistics that identify repetitive patterns in equity, commodity and currency markets. The addressable market for Samssara is global - as the firm can develop and build models which can function in both developing markets with limited competition and developed markets with strong competition. Samssara’s client base includes the leading international and domestic banks, international and domestic stock brokers, family offices, corporate treasuries and HNIs.

### Profile of Manish Jalan

Manish Jalan is the Chief Strategist and Director of the Algo trading firm Samssara Capital Technologies LLP. Prior to his new found Indian venture, Manish was a Quantitative Prop Trader in Tokyo, with Merrill Lynch Prop Desk handling USD 100 Mn. portfolio. Manish has worked closely with many Indian brokers and numerous International banks in algorithmic trading, trend following strategies, statistical arbitrage, factor modeling and back testing. Manish is a B.Tech and M.Tech from IIT Bombay in Mechanical Engineering.

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