Investment Letter

German Lilleväli
President & Chairman
of GL Financial Group

I am pleased to announce the launch of our newly designed Investment Letter. The editorial team have worked hard to deliver this first edition on the views and opinions of the GL Asset Management Portfolio Managers. Frequently our clients have asked us about our markets' views, insights or our understanding of various new research ideas and investment technologies.

This Investment Letter addresses that wish by highlighting a number of newsworthy topics such as new global investment trends, the unique approach of our Statistical Arbitrage and L/S Equity strategies, or the dynamics of the commodity markets. They will decipher for you Artificial Intelligence, Deep Learning, and also Neural Networks. No significant breakthrough has ever been made without a critical review of established knowledge and thought patterns. The combination of an advance knowledge in Artificial Intelligence with the human element (fundamentals) illustrates perfectly the type of evolution the Finance industry is currently undergoing.

Early on, when we established our strategies, we recognised immediately the importance of stability, consistency and not to be at the mercy of markets' mood swings. In order to achieve that goal, it was essential to move away from traditional asset management and to develop our own methods through algorithms, technical & statistical analysis, and AI. Innovative and forward thinking became the corner stone of our approach alongside fundamentals enabling our trusted clients to preserve and create wealth at the same time.

With this Investment Letter, we are sharing with you some of our insights and views; please actively participate or interact with our PMs if you wish.

I am confident you will find the Investment Letter insightful and valuable when it comes to making investment decisions for the rest of 2017 and beyond.

I wish you a successful and prosperous year!

Market Neutral strategies. Innovations and advancements.

Quantitative Statistical Arbitrage

Petar Bozhinov, Ph.D.
Portfolio Manager

Algorithmic trading and quantitative (quant.) traders using statistical and mathematical approaches are taking over the asset management industry. Traditional investment strategies as «buy and hold», balance sheets analysis, corporate access and talking to companies' customers are losing their ground. The demand and trend for hiring successful quant. teams is strengthening again. In 2016 Swiss-based GAM announced the acquisition of Cantab Capital Partners for USD 217m, an industry-leading multi-strategy systematic manager based in Cambridge, UK. Cantab manages USD 4bn for institutional clients worldwide.

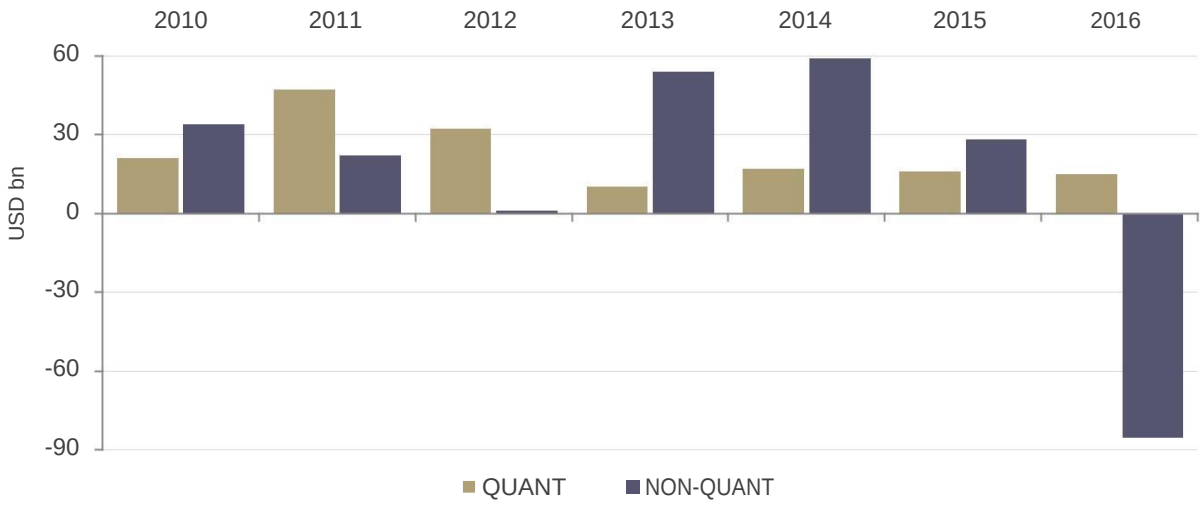
"Quantitative hedge funds are now responsible for 27% of all U.S. stock trades by investors, up to 14% in 2013, according to the Tabb Group. A research and consulting firm in New York", wrote the Wall Street Journal (WSJ)[1]. At the end of Q1 17, quant-focused hedge funds held USD 932bn of investments, twice the amount in 2009 (USD 408bn). "The computers are outperforming humans at picking investments. In the past five years, quant-focused hedge funds gained about 5.1% a year on average."[1]

Quantitative trading diverges from High Frequency Trading (HFT), which tends to focus on very short-term trades. As portfolio manager, I am responsible for managing equity portfolios with focus on market neutral statistical arbitrage and systematic trading across US equities. For over a decade, I have been responsible for managing statistical arbitrage and systematic trading across US equities and trading complex risk-averse quantitative strategies. GL Asset Management implements different approaches while managing assets, including quantitative analysis and multi-factor models. Statistical Arbitrage is not just a single trading strategy. As things stand today, it is an umbrella term used for a broad range of quantitative trading strategies that use sophisticated statistical and mathematical models to analyse price differences and price patterns between securities to generate a higher than average profit. The genesis of Stat Arb can be traced from a quantitative trading strategy «pairs trading». And 25 years after its birth, this strategy, which exploits price discrepancies and correlation between a pair of stocks to buy and sell them and make money, still lies at the heart of Statistical Arbitrage.

References:

1. * The Quants run Wall Street now", article published in the WSJ by G. Zuckerman & Bradley Hope, 21/5/17

NET FLOW INTO HEDGE FUNDS



Source: Hedge Fund Research, Inc. (HFR)

Market Neutral strategies. Innovations and advancements.

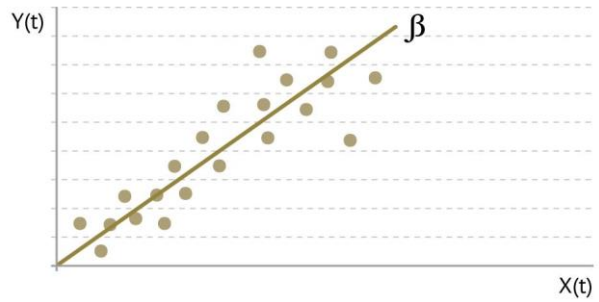
Correlation vs. Co-integration - Statistical Arbitrage

Alexey Smyvin, CQF, Ph.D.
Portfolio Manager

Statistical Arbitrage “Stat Arb” is a common term for a certain type of trading strategies based on various statistical patterns. If those statistical behaviours can be linked to a divergence between 2 time series, then it is called Pair Trading. Now, the main question resides in how to calculate the stability of those pairs?

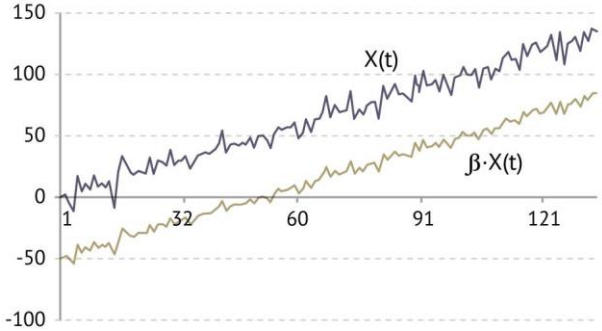
The greatest example of Stat Arb fund is Renaissance Technology – the fund that uses all known mathematical tools in order to generate profit over the last thirty years. And while the stakes are high, the price of a mistake is also huge. Long Term Capital Management (LTCM), the largest fund in the history, ended up with more than 1 trillion dollars loss in 1998 because of mathematical inaccuracies. Thus, what is the difference between math reliability and illusion?

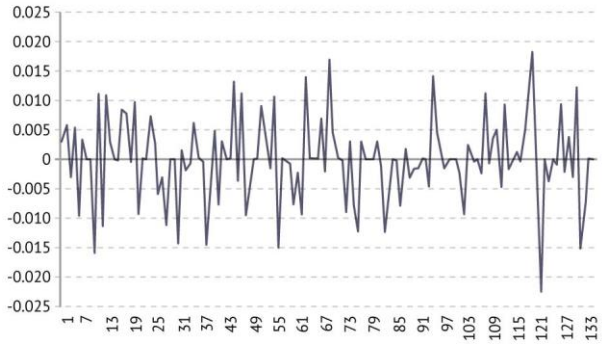
Let’s have a look at two non-stationary time series X(t)=I(1) and Y(t)=I(1), and the question of whether any interdependences between them exist. For instance, let us suppose we have two independent price-time-series X(t) and Y(t):



If we try to calculate the regression between share X and share Y, we can find them to be highly correlated. In our case they are positively correlated. It looks like this estimation has an essential statistical significance. The problem here is that company X and company Y might have nothing in common, for instance, they can be from different economic sectors. It means that in statistical arbitrage where the core is the filtration of stable pairs from the “general population” the usage of correlation become pointless.

In order to find a stationary time-series among different classes of assets the co-integration has to be calculated.





The difference between two stocks is thought to remain steady when two time-series are highly co-integrated. The divergence between those two shares is stable however might have some volatility and no trend. What does it mean for us? Well, while for long-term investors – “Trend is your friend”, we can apply countertrended tools such as Stochastic Oscillator in order to generate profit.

Robust betas in Asset Management[1]

Heiko Bailer, Ph.D.
Portfolio Manager

Despite known shortcomings of the well-known Capital Asset Pricing Model (CAPM), the CAPM remains at the core of risk and asset management. It has become standard practice of asset managers and financial data providers to compute beta estimates as the slope coefficient of the classical Ordinary Least Squares (OLS) fit of the market model to stock and market returns. Unfortunately, one or more outliers (such as erroneous data, unusual returns) in stock returns can have a substantial influence on the value of the OLS beta, leading to faulty assessment of the market risk premium[2].

This flaw of the classical OLS beta can be overcome by the use of a Robust beta estimate that is not much influenced by outliers as shown in **Figure 1**. This comparison of OLS and Robust betas for the US stock EDS (now EDSFF) shows three outliers, one on top and two on the lower left that significantly influence the OLS beta, lifting it to 2.03 – in contrast to the Robust beta of 1.4. Essentially, EDS appears to have a higher market risk than it actually has.

In a nutshell, Robust beta estimates are computed by first down-weighting outliers before the final linear regression.

Figure 2 compares the pairwise difference between the OLS and Robust betas for all US stocks with weekly returns in a given two-year interval from 1964-2009 (CRSP database), split by market capitalisation (SIZE). The differences are largest for smaller stocks and increase during market sell-offs though persist across.

This demonstrates a systematic bias that the use of OLS beta introduces in risk and asset management and also how a routine use of Robust betas can easily mitigate this flaw.

Figure 1

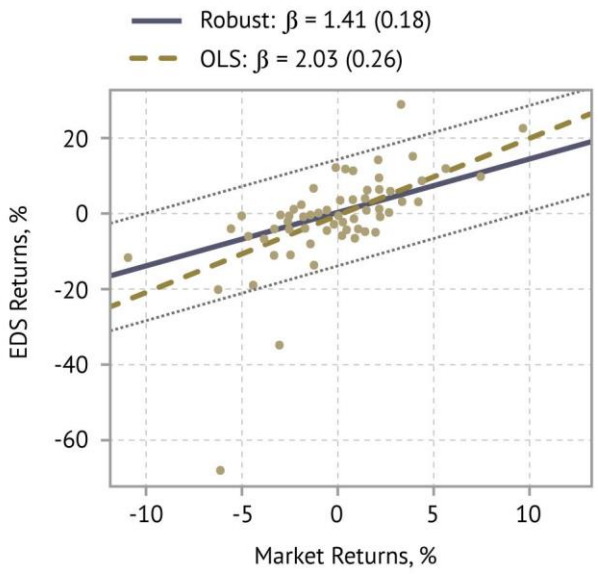
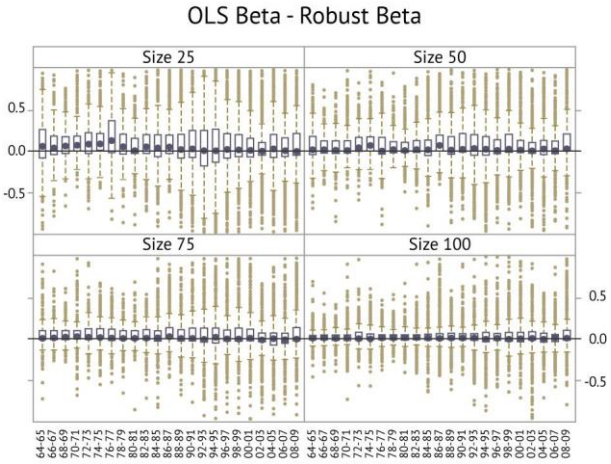


Figure 2



References:

2. Bailer, H., Maravina, T. A. & Martin D. R. (Hardback, December 2011): Cross-sections of Least Squares and Robust Betas. The [Oxford] Handbook of Quantitative Asset Management, edited by Bernd Scherer and Kenneth Winston

3. Bailer, H. & Martin R. D. (2007), Fama MacBeth 1973: Reproduction, Extension, Robustification. Journal of Economic and Social Measurement, 32, 1

New trends in Asset Management.

Convolutional (CNN) and Recurrent (RNN) Neural Networks

Bogdan Zgersky
Portfolio Manager

The fundamentals of an investment management strategy are based on forecasting future financial indicators, however, predicting such data is not an easy task.

The difficulty of accurately forecasting is rooted in the same ground as to why money does not grow on trees – there are too many people ready to rip them off. To win the competition in the long term, it is necessary to constantly advance and develop the methods and models of market senarii. As a result, the one with the best experience and methods for detecting regularities obtains the highest rate of return compared to the less-competitive colleagues.

Over the last decades, we have observed a steady growth in the popularity of Technical Indicator Analysis1 – a set of empirical rules based on various indicators and statistic linear dependencies. Linear modelling was the main principle of operation in most fields due to its well-developed procedures for precise optimisation. However, for tasks with poor approximations (such as forecasting the future), linear models are of little use, which is why the growth of computational capacities is coupled with increased interest in neural networks. Due to their nonlinear nature, they have become an exceptionally powerful modelling method, able to reproduce particularly complex dependencies, even though the data for such analysis require a different kind of structuring.

In order for Neural Networks to produce top results, it is essential to accurately understand the structure and morphology of the input data for analysis in the first place, to get the architecture of the Neural Network right for the data structure.

Implementation of such a simple Neural Network as a multilayer perception will not give noticeably accurate results in forecasting price time series. For instance, upon keying in a number of prices the network will look for dependencies in the data as if prices did not depend on each other, or as if current prices were independent of prices over the previous periods or possible price extremes. It all looks as if each price was viewed as a separate parameter in such a set of mutually independent parameters as eye colour, height, age, and sex in search for a shared dependency, influencing the future price.

However, if we assume that a dependency exists between the prices of a given time series, we must use the right architecture that allows operating such dependencies, for instance, Convolutional (CNN) and Recurrent Neural Networks (RCC).

If our study aims at identifying patterns to forecast prices, we can use Convolutional Neural Networks, used for image recognition. In so doing we assume that a chart consists of a set of patterns we still have to identify and forecast price behaviour according to a particular pattern. However, we will not be able to consider the impact patterns have on each other. To that end, it is indispensable to analyse the identified patterns using another network and another architecture. For instance, we can use the Recurrent Neural Network.

Recurrent Neural Networks (RNN) are commonly used to analyse such data as text or audio files, wherein data structure implies dependence of data entries from each other's values–for example, the meaning of a sentence can radically change depending on the context, word order, and the positions of a comma. Consequently, this Neural Network analyses and memorizes such dependencies and learns to identify regularities among them, that is why it is safe to assume such networks are best to use for price charts analysis.

One has to bear in mind that there is no universal approach for Neural Network data analysis. In order to build the right architecture capable of completing tasks at hand, it is crucial to be fully aware of the data morphology and structure and to understand how the data is organised and how it can be interrelated. If the data consists of physical parameters or image data, where the rules of data interrelation, its structure and morphology are most obvious; and if we use the data of such complex systems as text or speech, where the interrelations are variable, we have to build Neural Network clutches with specialised architecture in line with the most accurate description of the nature of the data analysed.

References:

1 – To know more about Technical Analysis (Investopedia)
2 – "A computer system modelled on the human brain and nervous system." Wikipedia: Neural Network

Bright future for Apple Inc.

Sergey Vakhrameev, Ph.D.
Portfolio Manager

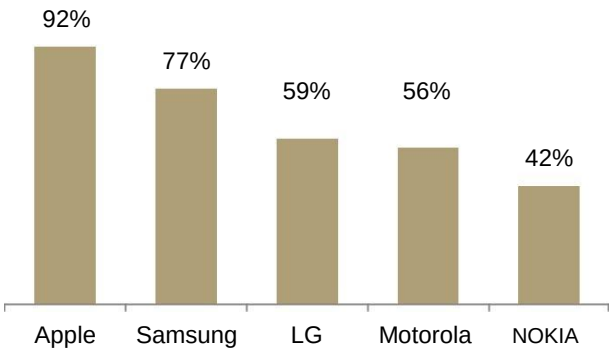
When analysing Apple Inc. business, we still see a bright future ahead of the multinational technology company.

Key drivers for Apple's growing business:

- **Strong competitive position.** While Apple takes 2nd place and has 15% share in smartphone market by unit shipments (Samsung being #1 with market share of 23%), the company took 83% of smartphone profits in Q1 2017 while Samsung has only 14% share in total sector profits.
- **Consumer loyalty to the iPhone is very high**, the company's revenue is expected to grow by 5% in 2017 despite relatively high average sales price of IPhone (USD 645 per unit) and Macintosh (USD 1'235 per unit).

MOST IPHONE USERS NEVER LOOK BACK

Smartphone brand retention rates in the United States in 2017*



April 2017 survey of 1,000 U.S. smartphone owners that are "likely" to upgrade in the next 12 months.

∗ Share that intend to replace their current phone with another from the same vendor.

Source: Morgan Stanley via media reports

- **The incremental growth in the service segment is 20%** of the total company sales incremental growth for the last 3 years. Apple is not a hardware company but a software company that lodges its operating system and products in a high-margin device. To use Apple's iOS, iTunes, App store, etc. one must buy an Apple product.
- **High margin and low valuation.** Apple operating margin is 29% which is twice higher than Samsung's 14.5% margin and remaining companies in the sector have an average negative margin. As it monetises value through the repeated sales of high-margin software, Apple will not suffer the fate of other hardware producers or Microsoft for that matter (as its products work on other people's hardware). Apple stock valuation is still low (P/E=16.8 while S&P 500 P/E = 18.9).
- **Apple intends to enter and dominate in two new product categories: television and the automobile market by 2020.**
- **A huge amount of cash on the balance sheet (USD 257bn)**, which allows the company to buy back its undervalued shares and pay generous dividends. From the inception of its capital return program in August 2012 through March 2017, Apple has returned over USD 211bn to shareholders, including USD 151bn in share repurchases. Under the expanded program, Apple plans to spend a cumulative total of USD 300bn by the end of March 2019. Recently Apple's Board has approved a 10.5% increase to the company's quarterly dividend, and has declared a dividend of USD 0.63 per share.

According to our in-house DCF model, the fair value of Apple entire business is USD 206 per share.

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