

FEATURE ARTICLE I



THE RISE OF THE HUMANS[©]

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ABSTRACT:

A few years ago, mathematical finance models were all the rage. Quantitative hedge funds were drawing in large amounts of capital. Most were running computer algorithms and performing "program trading". In risk management, the automatic tool of Value at Risk (VaR) was being used. After August 2007, these processes are no longer the case. Mathematical models are being dismantled or at the very least used in conjunction with a subjective analysis by a human. In risk management, subjective scenario analyses and stress tests have become at least as important as the automatic tool of VaR. This article examines both of these trends.

HEDGE FUNDS:

It is well documented that during the years 1994 - 2006, the number of equity hedge funds has grown from several dozens to several thousands. The amounts under management by these funds have grown as well. Many of these funds were purely quantitative. As recently as September 2006, Dan Jelicic, a principal at Sabre Fund Management released a piece entitled "Why Quant". He makes the point that "The implementation is model driven and therefore emotionless".

Further, there was a perception that trading that relies on human traders is not scalable and can't easily be transferred to other markets. For example, an expert in US equities might find it difficult to trade stocks in Hong Kong.

It is well known that many of the most admired quantitative long/short hedge funds suffered significant losses in August 2007.

For example, the *Wall Street Journal (WSJ)* reported in their August 10, 2007 article entitled "Impact of Mortgage Crisis Spreads; Dow Tumbles 2.8% as Fallout Intensifies, Moves by Central Banks" that: "After the close of trading, Renaissance Technologies Corp., a hedge-fund company with one of the best records in recent years, told investors that a key fund has lost 8.7% so far in August and is down 7.4% in 2007. Another big fund company, Highbridge Capital Management, told investors its Highbridge Statistical Opportunities Fund was down 18% as of the 8th of the month, and was down 16% for the year. The \$1.8 billion publicly traded Highbridge Statistical Market Neutral Fund was down 5.2% for the month as of Wednesday... Tykhe Capital, LLC – a New York-based quantitative, or computer-driven, hedge-fund firm that manages about \$1.8 billion – has suffered losses of about 20% in its largest hedge fund so far this month...", and on August 14, 2007, *WSJ* reported in another article entitled "Goldman Wagers on Cash Infusion to Show Resolve" that the Goldman Sachs Global Equity Opportunities Fund "lost more than 30% of its value last week...".

These losses prompted the release of a seminal paper by Andrew Lo and Amir Khandani. "What Happened to the Quants in August 2007?" was released in September 2007. The causes of these collapses have been described as overreliance on quantitative models, leverage and the "crowded trade" phenomenon. It turns out that many of the proprietary models developed and deployed by the hedge funds were, in fact, variation of the same model. In many of the funds, the long and short positions were nearly identical. Recent years have seen a rapid growth in both the numbers of hedge funds and the capital allocated to them. Since so many players and so many dollars are chasing the same opportunities the

returns of the strategy has been steadily declining. The method used by many of the funds to maintain the high returns of past years has been to increase the leverage ratio of the trades. Lo and Khandani state that the leverage has been steadily increasing from a ratio of 2 in 1998 to as much as 9 in 2007. They conclude that one hedge fund was forced to liquidate its holdings via a "fire sale" that resulted in severe mark to market losses in many of the other hedge funds. The losses occurred because many of the funds were holding leveraged positions in the same stocks.

It is our belief that there may have been a backlash against purely quantitative long short strategies. Investors now are interested in having a human trader in the loop. They will refuse to invest in strategies that are purely mechanical.

Indeed, on December 17, 2007 Bear Stearns filed a SEC application for the BEAR STEARNS MULTIFACTOR 130/30 US CORE EQUITY FUND. If Bear Stearns hadn't been acquired recently, this fund would've operated using a combination of quantitative and qualitative methodologies. The application states that: "Investment decisions are based on a quantitative process encompassing the Adviser's proprietary multifactor model as well as qualitative due diligence. The proprietary model ranks companies based on three themes: momentum, valuation and quality on both sector and individual stock levels. Due diligence is then performed on top ranked companies to verify favorable business momentum and valuation of individual stocks. Relative attractiveness of investment ideas is balanced with market capitalization and other risk considerations."

A similar statement applies to the short side. Thus, here is an example where the quantitative process by itself is deemed to be insufficient and must be tempered with human judgment.

RISK MANAGEMENT:

In the past several years, banks and other financial institutions have been using a statistically based measure called Value at Risk (VaR) to manage their market risk. VaR quantifies the potential loss to the firm that can occur within a pre-specified probability. The VaR output is designed to tell senior management something like: "we are 99% certain that we will not lose more than \$X in ten trading days". The VaR system is completely automatic. The portfolio of the firm is

entered into the system and the result is a dollar amount.

In October 2006, the Financial Services Authority has released its "Stress Testing Thematic Review". They mandate that firms perform Stress Testing and Scenario Analysis.

Stress Testing consists of verifying how the portfolio would have behaved under events that have happened in the past. This process consists of measuring the changes that the portfolio would have endured during catastrophic events (e.g. World Trade Center Attack, Black Monday and Asian Crisis of 1997).



Scenario Analysis, on the other hand, is all about how the portfolio would perform under severe but plausible scenarios. These situations are events that have not happened but may happen in the future.

It is clear that the choice of scenarios to be used relies on human analysis, understanding and intuition. The FSA report states so emphatically: "Close engagement by senior management resulted in the most effective stress testing practices." Furthermore, the report actually mandates that senior management will choose the relevant scenarios and says that "Senior management will take an active part in identifying potential stress scenarios."

In contrast to VaR, with Scenario Analysis, there is no attempt to measure the probability of the scenarios occurring. However, the scenarios must be carefully chosen to actually stress the profitability of the firm.

Indeed, the FSA letter states that: "We were struck by how mild the firm-wide stress events were at some of the firms we visited. On the evidence of our review, few firms were seeking out scenarios such as those that

might require a dividend cut, generate an annual loss, or result in shortfalls against capital requirements while still remaining plausible."



SUMMARY:

It seems that fully automatic trading systems have resulted in massive losses to many of the most admired hedge funds. The best use of such a system is to sift through the many stocks in the universe and recommend trade ideas to a human expert who will then decide about the merit of the recommendations and trade the relevant stock or reject the idea and take no action. In the risk management field, we are witnesses to a reduction in the importance of fully automatic value at risk systems and an increase in the emphasis placed on stress tests and scenario analysis methods. These methods are more intuitive as it is clear that human beings must choose the appropriate scenarios. Obviously, the correct choice of stress tests and scenarios is paramount. That factor is precisely why top management must be closely engaged in such efforts.

Dr. Izzy Nelken

Dr. Izzy Nelken, a world renowned expert on derivatives, founded and is president of Super Computer Consulting, Inc., a firm that specializes in complex derivatives, structured products, risk management, and hedge funds. His consulting clients include several regulatory bodies, major broker-dealers, banks and hedge funds. Izzy holds a PhD in Computer Science from Rutgers University and was on the faculty at the University of Toronto. He is a lecturer for the Graduate Program on Mathematical Finance for the University of Chicago and a member of CBOE's new products committee.

Dr. Nelken is author/editor/co-author of 8 books—The Handbook of Exotic Options, Option Embedded Bonds, Volatility in the Capital Markets, Handbook of Hybrid Securities, Hedge Fund and Investment Management, Volatility as an Asset Class, Implementing Credit Derivatives, and Pricing, Hedging and Trading Exotic Options. He has also designed an exotic options portfolio manager, a weather derivatives, and a convertible bond and hybrid instrument software packages and has given numerous seminars for Reuters, FRA, and other premier organizations. Izzy can be reached at izy@supercc.com.



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***QUANT ALERT*®**

The requirements for successful capable-of-being-promoted quantitative analysts, modelers, researchers, etc... have changed. No longer is having outstanding mathematical, computer, and statistical finance skills enough. Dr. Izzy Nelken, himself a world renowned quantitative expert, covers the reason for this transformation quite succinctly in this article.

The 2 new requirements are:

- (1) You need to communicate these complex processes and products to individuals in simple every day, used-every-where language.
- (2) You need to understand what other finance professionals who are not quants want your skills and tools to deliver.

How do you gain these competencies if you have trouble being understood by or understanding non-quants?

It's pretty easy if you practice it enough as the solution is to:

- (1) Find family members or friends who are not quantitative. Every day explain something you're working on professionally in a way that they can actually paraphrase correctly back to you what you just said. Ask them to explain what they don't understand when you talk with them and keep working with them until you achieve two-way communication.