Small is beautiful: high frequency trading and "venture capital" investments in hedge funds

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August was the cruelest month for hedge fund investors. The Credit Suisse Tremont Hedge Index recorded negative returns for all hedge fund categories, with an average of -1.54%. Quantitative strategies were particularly badly hit: Morgan Stanley lost half a billion in the last quarter due to proprietary quantitative trading, and Goldman Sachs' Global Alpha fund lost 22.5% in August. So the media says that the verdict is in: quantitative strategies are getting too smart for their own good.

What the media has not reported, and what no hedge fund index that I know of measures, is the performance of high frequency trading strategies. This is the category that, based on anecdotal evidence and personal experience, has had one of the best months ever. (If you are a potential hedge fund investor, you don't have to take my word for it: just ask privately for the August returns of hedge fund managers who claim their strategies are "high frequency".)

What are high frequency trading strategies, and why do they have superior returns even during the worst crisis? In general, I would regard any strategy that does not hold a position overnight as high frequency. Many of the early high frequency strategies were applied to the foreign exchange market, and then later on to the futures market, because of their abundance of liquidity. In the last 6 or 7 years, however, with the increasing liquidity in the equity market and the availability of historical tick database for stocks, this type of strategies has become wide-spread for stock trading as well. To anybody who has heard of "day-trading", all this is nothing new. The only new element is that the new generation of high frequency traders typically employ strictly algorithmic strategies carefully backtested against historical data, and are therefore unafraid to deploy large amount of capital over the entire investable universe of stocks. The reason why these strategies have high consistency in returns (*i.e.* Sharpe ratio) is simple: based on a statistical fact called "Law of large numbers", the more bets you can place, the smaller the percent deviation from the mean return you will experience. With high frequency trading, one can potentially place hundreds if not thousands of bets all in one day. Therefore, provided the strategy is sound and generates positive mean return, you can expect the day-to-day deviation from this return to be minimal. With this high Sharpe ratio, one can increase the leverage to a much higher level than longer-term strategies can, and this high leverage in turn boosts the return-on-equity of the strategy to often stratospheric levels.

Of course, the Law of large numbers does not explain why a particular high frequency strategy has positive mean return in the first place. In fact, it is impossible to explain in general why high frequency strategies are often profitable, as there are as many such strategies as there are fund managers. Some of them may trade in the same direction as

the short-term market disequilibrium triggered by news events, while others expect mean-reversion from this same market disequilibrium. Some are market-neutral pair traders, while others are long-only directional traders. I certainly don't believe the myriad high frequency strategies were all profitable in August, but I believe at least the mean-reverting high frequency equity strategies were.

Now you may ask, if high frequency strategies are so excellent, why aren't everybody employing them? In fact, why bother with the factor models that infamously generated most of the losses in August? The reason is that high frequency strategies can only be profitable if they are nimble and can get in and out of positions without having much market impact. It is impossible to not have market impact and therefore incurring unacceptably high transaction costs if each position consists of millions of shares. It is therefore unlikely that a single high frequency equity strategy can have a capacity of over $100 million, which translate to a maximum equity capacity of only $25 million at best. (This is based on the leverage available to a day-trading account in compliance with SEC Regulation-T.) An equity fund that has such small capacity is generally overlooked by institutional investors, as it is deemed not worth the due diligence effort. (Funds that trade futures or foreign currencies at high frequency certainly have much larger capacities and have no trouble attracting institutional investors.) Funds of funds, on the other hand, have not neglected such small high frequency strategies, nor have banks' proprietary trading desks. Both types of investors have the operational infrastructure to take a "venture capitalist" approach to investing in high frequency strategies: a small amount in a lot of them. Granted, the analogy with venture capitalism is not exact here. A venture capitalist would expect a few of the investments to earn multiple times their investments and the rest would fail, while a high frequency fund investor should expect to earn small profits (but high returns) from the majority of their funds and very few of them should fail.

How does the future look for high frequency strategies when increasing amount of capital are being allocated to them? Would they suffer the same stampede during a financial crisis suffered by the factor-model funds? My guess is that they won't. Without large positions to unwind, risk management for high frequency funds is fairly easy: "deleveraging" can be done very quickly in the face of losses, and certainly one can stop trading and be completely in cash when the going gets truly rough. The worst that can happen as these strategies become more popular is a slow death as a result of gradually diminishing returns. Sudden drastic losses are unlikely, nor are contagious losses across multiple funds. Certainly those who traded high frequency models ten years ago were reaping much higher returns then; but from what I observed recently, it is still not too late in the game.

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