How Risky Is Your Smart Beta?

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In my nearly 40 years in the investment management business, I've seen a lot of economic, market and product cycles. The investment management industry has not stood still and has created advancement in techniques as well as numerous investment fads that have come and gone. Investment capabilities and skills have grown tremendously since the introduction of the IBM PC in 1981 that brought processing capacity to the desktop. The explosion of available information and the ability to process vast quantities of data has transformed the investment business since then, particularly in the evaluation of risk and in the use of derivative securities to both presumably manage risk and leverage it.

One problem with all of this, however, is the concurrent growth in the difficulty in identifying the "signal" in the midst of an extraordinary amount of "noise" – the noise of worthless "information." The investment industry has focused attention and resources on gaining access to vast amounts of data and supposed information – before competitors – and on evaluating it faster. At times, this may be a winner's game, but just as often today, reacting to information flows is or becomes a loser's game. The world has failed to differentiate between gaining an inferential edge and gaining an informational advantage. The former is a source of sustained competitive advantage whereas the latter creates only a transitory advantage. The introduction of "Smart Beta" is **NOT** likely to become one of those sustained advances.

Ex post analysis via data mining is a constant activity of the investment community, and with everyone mining the same deep mine (financial databases), the supposed truths discovered are often not lasting. Data mining alone is always subject to reverse engineering by competitors resulting in the subsequent reduction of excess returns. Furthermore, it is also true that the statistical relationships of the past often fail to become predictors of the future. Quantitative factor models have been around for a few decades, but the derived quantitative relationships are repeatedly altered by unanticipated economic regime shifts.

A firm, however, cannot generate repeatable successes without employing a disciplined process. Experienced investment professionals in active management realize how often they've been humbled by the market. Surely firms desire to employ smart, creative thinkers as analysts, but smart thinkers alone ("read" Long-Term Capital Management) are not enough. Without a disciplined process (not based on today's fads), an investment manager is likely to be left behind from one cycle to the next.

Data mining and repetitive empirical testing certainly generate ex post excess or even risk-adjusted returns, but they also create strategies that work for a period of time before self-destructing. Here is a sample:

1. 1972 - Faith in the "Nifty Fifty" growth stocks.
2. October 1987 – "Portfolio Insurance" combined with "Program Trading" – the entire market suffered from the folly of the interaction of these quantitative strategies on Black Monday!
3. 1989 – The confidence in the diversification of risk in junk bonds (the first real crisis of defaults).
4. 1998 – Long Term Capital's leverage strategy for boosting Treasury bond returns (and the crisis that ultimately led to its unwinding).
5. 1999 – The "new growth paradigm" of the internet economy leading to the purchase of tech stocks at any price.
6. 2007 – The segmenting of subprime mortgages into risk tranches, creating mortgage-backed derivatives with low theoretical risk.

7. 2008 – The blow up of risk budgeting to protect against market declines and the movement of all supposedly uncorrelated markets to a correlation of near 1.0 during the decline.
8. 2015 - Risk parity failures.

So what kinds of risks are created by investment products created around the general concept of "Smart Beta" and the use of five to seven typical factors (i.e. volatility, value, momentum, quality, and market-cap size)?

While it's not difficult to observe that the historical use of such factors, individually and/or together, may produce alpha, little attempt is made to establish a set of a priori beliefs about why they might work and when they might fail. Back testing that produces huge alphas during general periods of significantly rising markets (or to the 30-year declining trend in bond yields that has driven market valuations higher) ought to be held in great suspicion, not with a belief that such return advantages are sustainable, particularly when rebalancing creates high portfolio turnover ratios.

Back-tested models used to predict future time-series returns will eventually fail because financial markets:
1. Experience heteroskedasticity (or characterized by instability of the distribution of outcomes around those time series returns),
2. Are economic scenario and regime path dependent,
3. Are subject to valuation extremes,
4. May cause mean reversion of factors at high market valuations to produce unacceptable low absolute returns relative to actuarial assumptions,
5. Require a priori or ex ante active judgments rather than ex post analysis.

Let's see how Smart Beta may miss the mark on these points.

How far back should one go to test a new strategy? Generally longer is always better, but in this case it doesn't really matter because the distribution of returns around a time series of returns is not stable. *This is the problem of heteroskedasticity*. No matter what back-testing produces in terms of model factors, the raw factor values (i.e. valuation, volatility, and size) are not stable, and the normalized factors and/or their weights in the model will at some point become suboptimal and either break down, or worse produce disastrous results. We used to call this a change in the "rules" of the market – when the market, for example, goes from believing only momentum matters in the new paradigm of 1999 to only value matters in the recession of 2001-2002. If you believe you can predict this shift in advance with a quantitative model, lucky you, but your smart beta won't pick this up! How long will it take for the fixed weights model to identify the change has occurred and tell you it's time to adjust your model? Even out-of-sample testing to make such changes is likely to move too slowly.

How then do you fix the heteroskedasticity problem? This leads to *the second problem*: real world outcomes are path dependent upon the economic or financial market scenarios/regimes that are non-stationary, and the shifts from one regime to another create much of this heteroskedasticity problem. Yet the determination of a regime or scenario shift inserts an active management decision into your model to adapt to the changing conditions, even if back testing by scenario is useful. At least then you might know how the factors would best interact in each scenario.

Therefore, no fixed blend of factors will erase these problems, even if factor "A" compared to factor "B" has a long-term inverse correlation in excess returns compared to the benchmark. There's no guarantee that relationship is stable over time or scenario.

Furthermore, there's the old adage, "value tells you nothing about timing," but as highlighted in *problem number three*, the real world is subject to valuation extremes in the market and in individual securities. Since these

extremes are often created by endogenous factors in the stock market (such as waves of simultaneous investor selling on bad news) that routinely cause stock prices to overshoot the true change in underlying fundamentals, at true valuation extremes, virtually no other factors should matter. At most other times, valuation information is less valuable. This implies that the weighting structure assigned to each factor should not be fixed, but variable. Unfortunately, at the time a low-valuation extreme occurs, other inversely correlated factors (like momentum) may be near zero, nullifying the opportunity created by the valuation extreme.

Problem number four relates to assumptions about mean reversion. Almost all investment techniques depend in some way on the phenomenon of mean reversion. Valuation extremes revert back to more normal levels as do fundamentals such as revenues and profits, declining from cycle peaks or recovering from recession levels. Yet the question always arises, "What path or level are we mean reverting to?" If one identifies factors that determine the attractiveness of Treasury bond yields over the last 35 year bull market in bonds that started out with 30-year Treasury yields at 15.5% in 1981 compared to today's 2.6%, the mean-reversion process would have always had to conclude the factors (say inflation rates) were heading lower. After seven consecutive years of positive stock market returns (based on the S&P 500 through the end of 2015), the scaling of your smart beta factors is likely to hide the fact that the underlying measures have inherently become expensive! The most common goals of owning a smart beta strategy are to enhance return and/or reduce risk. Unfortunately, both goals may be subject today to the inherent assumption that overall market returns remain high. A factor ranking that is inherently expensive (such as low volatility) possibly offers the false promise of downside protection upon its mean reversion.

Are the "poor" relative results of active managers during a seven-year bull market responsible for the shift of assets into smart beta strategies? Partly. Or, are actuarial assumptions that are difficult to achieve (even 7% may be a tough bogie over the next five years) driving pension plans to desperately reach for relative return? Likely. Yet, as stated in *problem number five*, the "real world" needs to be understood to adapt to an environment that shifts from high rates of return to low rates of return. While we could return to the high real growth, low inflation rate period of the 1960s or back into the trade wars of the 1930s, success in this endeavor requires at least ex ante or a priori notions of how the world works, not simply ex post analysis. Only active management has a chance to perceive such changes in a timely manner.

So if you're looking for theoretically cheap, transparent way to disrupt your portfolio returns, go with Smart Beta. Returns may look great until those supposedly "low-vol" stocks turn out to be "high-vol" as the economic scenario shifts. Count me out, however; I'd rather spend my time trying to understand which of today's high-volatility value stocks might create tomorrow's low-beta portfolio.
