Response to Larry Swedroe's Article, "How AQR's New Fund Adds Value"

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In November 18’s Advisor Perspectives, Larry Swedroe published an article titled “How AQR's New Fund Adds Value An Alternative Approach to Alternatives: Investing with Style”. His article was followed by a lively discussion on APViewpoint. I eventually joined that discussion. The running commentary quickly devolved into a debate, largely between Larry and me, but involving several additional intelligent and insightful contributors as well.

I salute Larry along with the other contributors for pursuing the discussion at such length. Some of my interest was to try to understand what Larry was talking about, because I find much of his language jargonesque – typical of that part of the investment field that tries to use what it believes to be scientific methodology based on academic research.

With Larry's last contribution to the APViewpoint discussion, I feel that I understand at last what he is trying to say – or at least, what I think he must mean. Perhaps I can make a useful contribution to a wider readership by clarifying the issues. I will of course invite Larry to correct any misstatements I make in this effort. I will also, however, having clarified the issues, state why I think the claim in the title of his article is very likely to be mistaken.

Summary of the article’s argument

Larry’s article argues that allocating a portion of a portfolio to a fund called the AQR Style Premia Alternative Fund (QSPIX) will be beneficial, in spite of the fund’s 1.5% expense ratio and high turnover (which will incur additional fees, as well as taxes if not held in a tax-advantaged account). His reason for recommending this fund is that it invests in four engineered “style factors” that have had high “premia” in studies of historical data. This creates what he calls an “expected return” averaging about 7%. (But since “a fund’s past performance does not necessarily predict future results,” presumably what he means is not an expected but a historical return of 7%.)

What is more important however, as Larry says, is that these style factors have historically not correlated with the market, either the stock or bond market (or with each other). If that non-correlation, and the previously cited historical average return, persist in the future, then as we shall see, allocating a portion of a portfolio to the fund could substantially move the portfolio’s performance toward some maximally-attainable efficient frontier – either by reducing the portfolio’s risk (i.e., volatility of returns)
for a given expected return, or by increasing its expected return for a given level of risk.

**What are style factors?**

Put simply, style factors are anything with which, one may conjecture, a portfolio’s returns will correlate. If a multiple regression appears to show that returns have indeed correlated with these factors historically, then the conjecture may be judged, at least tentatively, to be correct. The coefficients of the factors in the regression are presumed to measure the strength of the dependency of the portfolio’s performance on each of those factors.

Robert Novy-Marx, a professor at the Simon Graduate School of Business at the University of Rochester, recently showed that ‘predictive regressions find that the party of the U.S. President, cold weather in Manhattan, global warming, the El Niño phenomenon, atmospheric pressure in the Arctic, the conjunctions of the planets, and sunspots, all have "significant power" predicting [market] performance’.

Hence, those variables could all be judged style factors upon which the market’s performance depends.

The original factor model is the Capital Asset Pricing Model (CAPM). In the CAPM, a portfolio’s performance is presumed to depend on only one factor, the stock market’s performance as a whole, with a regression coefficient called beta. (The residual of performance that is not correlated with the market is, of course, the famous alpha.) Additional factors, such as changes in interest rates, were added to models later. The Fama-French papers of 1992 and 1993 added to the stock market as a whole two supplementary factors: market cap (“smallness”), and book-to-market ratio (“valueness”). They found that those factors’ coefficients tended to eat up the dependencies in regressions, leaving little for market beta and almost nothing for alpha. (However in my opinion, the world of finance research has not adequately examined the assumptions on which its regressions crucially depend.)

It is obvious that potential style factors could be conjectured and explored endlessly, given the possible number of them and the extensive historical data. The ease of running multiple regressions, together with the professional and often handsome financial rewards for obtaining positive results, ensures that this will happen. The nature of statistical data then ensures that given the running of a large number of multiple regressions, a substantial number of apparently positive results will be obtained.

**Risk premium or alpha?**

In his article, Larry refers numerous times to the “premia” to be had from the four style factors. By premium does he mean a reward for risk, or does he mean the elusive alpha?

I felt that his language conflated these two premia, and I wasn’t sure which he meant. But at last in our APViewpoint discussion he made it crystal clear to me: “I never claimed alpha, and don’t think I ever said anything remotely like that.”

So he is not saying that adding the AQR fund to your portfolio will provide you with the investment
field’s first-class version of a free lunch – an alpha. He must therefore be saying that adding this fund to your portfolio will provide you with the only free lunch that is theoretically available to an investor, in the absence of alpha: the benefit of diversification or non-correlation.

**How to measure the benefit of non-correlation**

There is indeed a measurable benefit accruing to non-correlation, at least in the framework of modern portfolio theory (MPT), in which risk is boiled down to a single measure: standard deviation of returns. (Larry made it clear in the discussion that standard deviation was in fact his measure of risk – as it is, for better or for worse, for virtually all practitioners who apply these models.)

Given this simple framework, and the fact that the claim of alpha is eschewed, there is only one possible benefit that adding the AQR fund to your portfolio could provide.

I will now explain how this benefit can be measured, within the MPT expected return / standard deviation framework. But I will explain it using not the AQR portfolio, but another asset – catastrophe bonds – because I think the result will be less debatable.

The catastrophe bond example will show how adding an uncorrelated asset to a portfolio moves it closer to the efficient frontier; but it also illustrates the challenge in identifying a truly uncorrelated asset that can be purchased at an attractive price.

There are good reasons why catastrophe bonds should not be correlated with either the stock market or the bond market. Catastrophe bonds – usually issued to insure against an event like an earthquake or windstorm – default if the catastrophe defined in the issuing document occurs; for example winds above a certain high threshold, or an earthquake above a certain number on the Richter scale.

Therefore, it is reasonable for theoretical – that is to say, in this case, common sense – reasons to assume that the value of a catastrophe bond is uncorrelated with the level of the stock market.

Now let us assume you hold a broadly-diversified stock market index fund whose expected real return is 5%. Let us further suppose that you could invest in a portfolio of catastrophe bonds whose expected real return is also 5%, and whose return is uncorrelated with the stock market.

Suppose that the volatility of your stock market index fund’s returns – that is, their standard deviation – is \( \sigma \) (sigma), and suppose that the standard deviation of the catastrophe bonds’ returns is also \( \sigma \) (this is unrealistic, but no matter). Now suppose you mix your market portfolio and the catastrophe bond portfolio in proportions \( p \) to one minus \( p \). Then because of the zero correlation between the two portfolios, their combination will have a standard deviation not of \( \sigma \), but of \( \sigma \) times the square root of \( p \) squared plus (1 minus \( p \)) squared.

This combined portfolio standard deviation is less than \( \sigma \) itself. For example, if the mix is 60%/40% (thus, \( p \) equals 0.6), then the square root of \( p \) squared plus (1 minus \( p \)) squared is \( \sqrt{0.6^2 + 0.4^2} = 0.72 \). The standard deviation is therefore 0.72 times \( \sigma \). The diversification offered by the catastrophe bond portfolio reduces the standard deviation measurably, yet the portfolio's expected
Now, you could also reduce the standard deviation by combining your stock index fund with risk-free securities having a real expected return of zero percent. This is, let us say, a pure “market beta” strategy – reducing your market beta to reduce your standard deviation. In what combination would you have to mix them to bring your combined portfolio’s standard deviation down to the 0.72σ level of the 60%/40% stock index to catastrophe bond mix?

The answer is that you’d have to add risk-free securities until they became 28% of your combined portfolio. Then the stock index fund would comprise 72% of your combined portfolio, and the combined portfolio’s standard deviation would therefore be 0.72σ – just like the 60%/40% stock index to catastrophe bond mix.

But adding that much in risk-free securities will reduce the combined portfolio’s expected return to 0.72 times 5%, or 3.6%.

That is 1.4% less than the 5% expected return of the 60%/40% combined stock index to catastrophe bond portfolio with the same risk. Therefore even if the expense ratio of the 40% of the portfolio allocated to catastrophe bonds were 1.5% higher than that of the index fund, it would be well worth paying the extra 0.6% (40% of 1.5%), for the diversification.

This is a somewhat simplistic analysis, but it is precisely the analysis called for by the MPT framework. It is a useful one, though it ignores many intricacies that are obscured by the simplifications of standard deviation, correlation, and expected return.

If the AQR portfolio’s correlation with the market portfolio will truly continue to be zero in the future, and if its expected return will continue to be what it was historically, then it would be worth the extra expense ratio (and the fees incurred by its higher turnover) to add it to the portfolio.

The flies in this ointment

But no free lunch is ever entirely free, even the free lunch of diversification. The yield on catastrophe bonds has declined, in part because investors have flocked to them recently because of their non-correlation with the market.

In the case of the AQR portfolio, although correlations do have some tendency to persist, we have no reason to believe its historical return of 7% (what Larry calls, either mistakenly or without basis, its “expected return”) will persist in the future.

And we must look at how this portfolio is composed. Its composition of four “style factors” may make it sound like it combines four kinds of assets. But that is far from the case. In fact, Larry’s article says, it combines 2,000 stocks of 20 countries, 10-year bond futures in six developed markets, short-term interest rate futures in five developed markets, 22 currencies in developed and emerging markets, and eight commodities futures. It holds these in both long and short positions, and borrows to add leverage on top of that.
If you are of a technically credulous bent and believe that complexity means that something sophisticated and therefore value-adding is being done, you might be impressed by this. But the record showing that complexity in financial strategies and instruments often results in instability, crashes, and poor performance, in addition to high fees, suggests that may not be the correct inference to draw (reference Long-Term Capital Management, the CDO crisis, the failures of quantitative and “absolute return” strategies, etc.).

How are all these securities placed in their various long and short positions, supplemented by leverage? How are their positions determined?

Why, how else but by fitting the historical data so as to provide a backtest yielding a 7% return for the portfolio with zero correlation to the broad stock and bond markets. I’m not saying this was done cynically. I’m just saying, how else would you do it? You can’t fit to the future, you have to fit to the data you have – and that is past data. There’s no guarantee at all that the combination that backtested just as you would like it on the historical data because you fit it that way would “foretest” well on the unknown future data.

And if it doesn’t, then that 7% may turn out to be some other number entirely – especially considering that the positions are both long and short and leverage is used. And even the correlation coefficient of zero may turn out to be a figment of the historical record. (This sort of data-fitting will inevitably turn up correlations that are not intuitively obvious. It is worth perusing the correlations presented at this site – will they continue?)

In short, catastrophe bonds are likely to have a near-zero correlation to the market in the future because there’s a good reason for it; and there’s a good reason why their yields should be reasonably attractive too, though they may be pushed down due to the sheer appeal of the instruments for their non-correlation value.

With the AQR concoction, on the other hand, there’s no fundamental reason inherent in the composition of the fund why it should continue to produce even a zero correlation to the market, much less a 7% return. These things are just a product of data mining. Now I’m not saying that’s necessarily a bad thing – outside of the field of finance, where it generally deserves its pejorative tinge, data mining is regarded as a meaningful and productive pursuit. I’m not saying it’s impossible for the AQR fund’s numbers produced and created in backtests to persist in the future.

But I am skeptical that one can expect the AQR fund to produce the benefit found in past data. It can, however, be relied on to charge the same fee.

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