



Paul Erlich

Senior Research Associate

Paul Erlich has over 20 years of professional experience in quantitative finance and joined New Frontier in 2012 as Senior Research Associate. He holds a B.S. in Physics from Yale University.

Viewing Your Client's Portfolio As a Whole

by Paul Erlich

August 3, 2017

New Frontier Advisors creates and maintains diversified investment solutions for long-term wealth accumulation and preservation. Clients and advisors often raise concerns about individual assets or asset classes held in these portfolios – concerns that are based on looking at the performance, or attempting to assess the potential dangers, of those components in isolation. But the portfolios consist of closely interrelated parts whose roles in each portfolio cannot be understood separately from one another. New Frontier's expertise in investment technology allows its portfolios to benefit from several synergies between different assets' performance characteristics. These synergies include diversification, correlation, resampling or Michaud optimization, and rebalancing.

While it is easy to second-guess the inclusion of a particular fund in a portfolio with the benefit of hindsight, a far more challenging and meaningful endeavor is to develop and implement an investing approach that will meet a client's goals under a wide variety of unforeseeable future market scenarios. One of the most basic principles of investing – diversification – is already embodied within virtually every one of the funds that comprise New Frontier's allocations. While the occasional outsize returns from an individual stock or bond can be exciting to a speculative investor, the corresponding events on the downside will do great harm to the compounded return an investor concentrated in that asset will see over time. Thus the wide adoption of diversified index funds (including, most recently, ETFs).

A similar principle applies to a diversified portfolio of many different types of index funds, spanning multiple asset classes, geographical regions, and risk exposures. When circumstances in certain currency markets, regional political developments, or central bank policies have deleterious effects on the value of one or several index funds, other index funds will almost always be doing very well at the same time due to the different particular circumstances affecting their prices. In this way, overall volatility of the portfolio is dampened considerably relative to that of any of its constituents. This benefits the diversified investor's long-term compounded return, as well as his or her peace of mind, by smoothing over the severe dips in wealth that a more narrowly focused investor would inevitably experience.

Diversification among a broad array of investment vehicles is a first step towards constructing a portfolio suitable for meeting a client's long-term goals. However, achieving an appropriate balance that allows risks in various parts of the portfolio to most effectively cancel one another out requires a good estimate of the correlations between assets. Simply put, the correlation between two assets

indicates whether they are likely to move in the same direction or opposite directions, and how strong this relationship between their returns is. Correlations can range between -1 and 1. Using a combination of historical data and a statistical estimation procedure pioneered by renowned academic Olivier Ledoit¹, New Frontier estimates the correlation between every pair of assets among the 20-30 included in each of its strategies. With this many assets and hundreds of correlation estimates, the interrelationships affecting portfolio performance and risk become difficult for an unaided human mind to grasp and reason with. This is where appropriate investment technology comes into play, as even a complete mental handle on all the individual assets' characteristics is no longer sufficient for an understanding of the problem of constructing or assessing a portfolio as a whole. The correlations among the assets in New Frontier's portfolios vary widely, but the absolute value of the estimated correlation between one asset and another averages around 0.374. This means that for any two assets in the portfolio, there is likely to be a very meaningful tendency to move in either the same direction or opposite directions – with concomitant implications for how best to weight the two assets relative to one another, and relative to the rest of the assets in the portfolio, to best dampen the effects of individual asset volatilities. With 20 or more assets this becomes a complex multidimensional problem which unaided human intuition cannot fully get a handle on. Harry Markowitz won a Nobel Prize in 1952² for pioneering optimization technology that excels at solving this problem. Using such technology, a portfolio manager may find the portfolio that minimizes risk at a given level of return, or assess the (often counterintuitive) effect of adding, removing, or constraining an asset in terms of the impact on the risk and return characteristics of the portfolio as a whole.

Even the advanced Ledoit methodology, however, cannot remove the limitations of using a finite sample of historical data to estimate asset correlations, volatilities, and average returns. Regardless of the true distribution of asset returns and their interrelationships, data from any given historical period will only paint a noisy picture of that truth, since each time period only contains a random draw from that distribution. Markowitz's procedure, however, treats the estimates of risk and return it takes in as certain, error-free measurements – an unrealizable ideal in finance. New Frontier's Michaud and Michaud³ found that portfolios constructed using Markowitz's recipe applied to estimates constructed from data in one period of time will typically perform significantly worse than expected in another period of time, as both time periods will have their own noisy deviations from the true distribution. They have invented and patented a technique for addressing this shortfall by resampling the historical data numerous times, with the effect of diminishing the poor characteristics – such as lack of diversification and over-optimistic performance predictions – that result from taking historically-derived estimates as certain knowledge about the future.

Markowitz has acknowledged⁴ that this technique reliably improves upon his optimization method. In this context it's appropriate to see the whole portfolio as a sophisticated multidimensional hedge against both known risks and unforeseen future risks, rather than just a collection of assets based on the available historical sample of performance data with all its period-specific idiosyncrasies.

Finally, New Frontier employs a patented rebalancing rule⁵ which provides a signal of when a portfolio has drifted significantly away from the Michaud-optimized target and needs trading to restore statistical optimality. Typically this means selling some assets that have appreciated and buying those whose price has declined, roughly once or twice per year. Over time, this disciplined rebalancing not only keeps the risk level of the whole portfolio in line with the specific needs of the client and advisor, but also enhances returns in a well-diversified portfolio. Because of the periodic rebalancing, less-risky assets with typically low returns have an important role to play even in a portfolio targeting high return: they can be a safe store of value for gains realized when risky securities appreciate rapidly, offering some protection from the risk of those securities dropping back down again; and they can be a source of funding to replenish allocations to high-return, high risk securities after such securities have dropped significantly.

The individual assets making up New Frontier's portfolios should not be viewed as investments to be held or recommended in isolation. They form part of a holistic approach in which every asset's relationship to every other is carefully taken into account, and the assets participate synergistically in an investing approach with reduced risk and enhanced return compared to any other intuitively- or technologically-derived portfolio available today.

¹Ledoit, O. (1997). "Improved Estimation of the Covariance Matrix of Stock Returns with an Application to Portfolio Selection." Anderson Graduate School of Management at UCLA, Working paper (March).

²Markowitz, H. 1959. Portfolio Selection: Efficient Diversification of Investments. 2nd ed. Cambridge, MA: Blackwell; 1991. Original edition published by Wiley.

³Michaud, Richard and Robert Michaud. "Estimation Error and Portfolio Optimization: a Resampling Solution", Journal Of Investment Management, Vol. 6, No. 1, (2008), pp. 8–28

⁴"Markowitz Says Michaud Has Built a Better Mousetrap", Pensions & Investments, December 22, 2003, and Markowitz and Usmen, Journal Of Investment Management, 2003.

⁵Michaud, Richard, David Esch, and Robert Michaud, "Portfolio Monitoring in Theory and Practice" Journal Of Investment Management, Vol. 10, No. 4 (2012).

This note was posted as an entry on New Frontier's investment blog on August 3, 2017. Read this entry and other posts at: newfrontieradvisors.com/blog.