



Comment on:

“The Road Not Taken” by Craig W. French
Journal of Investment Management, Vol 14, No.4, 2016

By
Richard O. Michaud, Ph.D
New Frontier Advisors, LLC
Boston, MA 02110

August 2017
Forthcoming in *Journal Of Investment Management 3^d Quarter 2017*

In “The Road Not Taken,” French focuses on a paradox of mean-variance (MV) portfolio optimization in practice. Why is the Markowitz (1959) critical line algorithm (CLA) little used by investment managers if it can also be used for security selection?

Some basic information may be useful. The CLA is a quadratic programming (QP) algorithm for computing the Markowitz linear (equality and inequality) constrained MV efficient frontier, such as long-only portfolios, for a given set of risk-return estimates. In contrast most commercially available MV solvers are fast iterative algorithms that find a single MV efficient portfolio depending on a risk aversion parameter.

French observes that the Markowitz algorithm (nearly) always populates the efficient frontier with a relatively small subset of the securities in the optimization universe, assuming no additional constraints. While the observation is not common, it is not new.

In the mid-1970s the author was asked to create an optimized European country fund with the Markowitz CLA optimizer. The results included a reduced set of candidate indices and a memorable 33% allocation to the Austrian market. The project was abandoned because the optimized solutions were considered investment absurd by experienced institutional investors.

It is important to emphasize that the universe culling behavior is a characteristic of linear constrained MV optimization and is not a function of illiquidity or non-normal security risk. An optimization of liquid plain vanilla normal risk assets will also exhibit similar behavior.

Were the institutional investors wrong to reject the Markowitz solution? Should investors follow mathematical theory because it is dispassionate and ignores presumed investor behavioral biases? Or should they follow informed intuition and reject the Markowitz solution? This is a simple example of the 20th century mathematical-philosophical conundrum associated with the crisis in mathematics in the 1930s. Modifying mathematical theory is appropriate when inconsistent with informed human behavior.

Michaud (1989) explains that the failure of the Markowitz MV algorithm as a practical investment tool is that it is blind to the statistical nature of risk-return financial information. MV optimized portfolios over- (under-) weight allocations for securities with large (small or large negative) returns, small (large) risk, and negative or small (positive) correlations. This is the well-known error maximizer behavior of MV optimizers originally noted in Michaud (1989). The security culling effect is a pure consequence of estimation error maximizing and is not useful for security selection. The obvious solution (Michaud 1998) is to use Monte Carlo simulation to create estimation error sensitive MV optimization. The Michaud solutions do not cull the universe and are often considered investment intuitive by experienced investors without ad hoc constraints.

The “security culling” effect is a general characteristic of linear constrained MV optimization. It is just one example of the effect of estimation error insensitive quantitative methods and procedures that have dogged limitations of 20th century asset management and much contemporary investment practice.

References

- French, Craig "The Road Not Taken" *Journal of Investment Management*, 14(4):4-13.
- Markowitz, H., 1959. *Portfolio Selection: Efficient Diversification of Investments*. New York: John Wiley and Sons. 1991. 2nd ed. Cambridge, MA: Basil Blackwell.
- Michaud, R. 1989. "The Markowitz Optimization Enigma: Is Optimized Optimal?" *Financial Analysts Journal* 45(1):31-42.
- Michaud, R., 1998. *Efficient Asset Management*. New York: Oxford University Press, 2001. First published by Harvard Business School Press.