Can Optimizers Think?

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Investors often raise concerns when the stock market is near an all-time high. I've discussed previously why it's not generally a good idea to sell simply because the market attains a new high, since, if anything, historic evidence points to returns going forward from a market high being superior to average market returns. But the rising 2017 US stock market is a little different from many in the past—while the market has risen year-to-date, the dollar has fallen relative to other currencies.

In a recent article, French (2017)[1] describes an intriguing property of Markowitz (1959) optimization. He notes that the Markowitz optimizer (nearly) always populates the efficient frontier with a relatively small subset of the securities in the optimization universe. Is the optimizer telling us something important about the investment value of the included assets? Can an optimizer tell us which assets are better investments?

In the mid-1970s the author was asked to create an optimized European country fund with the Markowitz optimizer. The results included a reduced set of candidate indices and a memorable 33% allocation to the Austrian market. Rather than being congratulated for selecting the best investment opportunities, the project was abandoned because the optimized solutions were considered investment absurd by experienced institutional investors.[2]

Why were many of the indices culled from the optimizer? 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 but classic example of the 20th century mathematical-philosophical conundrum associated with the crisis in mathematics in the 1930s. Modifying mathematical theory is the appropriate decision when inconsistent with informed human behavior.

Michaud (1989) explains that the failure of the Markowitz MV algorithm as a useful tool of asset management 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 small or negative (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. Importantly, the Michaud solutions do not cull the universe of assets and the resulting portfolios are often considered investment intuitive by experienced investors without adding ad hoc constraints.

Optimizers, properly used, can add investment value by managing the complexity of assigning weights to reasonable investment information. The thinking behind deciding which assets are suitable for investment is necessarily left to thoughtful investors.

Footnotes

[1]An earlier version of this note is forthcoming in: R. Michaud, 2017. "Comment on: "The Road Not Taken" by C. French, 2016. JOIM 14(4):4-13," Journal Of Investment Management, 15(3).

[2]It is important to emphasize that the universe culling behavior 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.

References

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