NEW FRONTIER

DECONSTRUCTING BLACK-LITTERMAN:
HOW TO GET THE PORTFOLIO YOU ALREADY KNEW YOU WANTED

BY
RICHARD O. MICHAUD, DAVID N. ESCH, ROBERT O. MICHAUD
NEW FRONTIER ADVISORS, LLC
BOSTON, MA 02110

EXECUTIVE SUMMARY

Since the publication of their original article in 1992, Black-Litterman (BL) has become a popular method in practical finance for creating superficially stable portfolios, adjusted to investor views. A popular perception is that BL can solve the instability problems of portfolios on Markowitz efficient frontiers. In fact, the instability issues of Markowitz portfolios are caused by estimation error (Michaud 1998, 2008), which BL does nothing to explicitly handle. The BL method assumes a perfectly known market portfolio in a state of undisturbed equilibrium, a perfectly known covariance matrix, and correct investor views numerically calibrated to perfectly quantify the exogenous knowledge of the investor. On top of these heroic assumptions, the BL formula itself is built on faulty statistical theory and is not optimal in any mathematical sense. Besides, since it is equivalent to a maximum Sharpe ratio Markowitz optimization with specific inputs, it inherits all of the instability of Markowitz optimization, especially when the frontier is extended beyond the BL portfolio.

Black and Litterman (1992) give a tuning parameter to adjust the strength of the views. This parameter may be fixed or adjusted, and is in practice often used to guarantee investable portfolios. Adjusting τ for investability amounts to either adjusting the data to fit the desired solution or adjusting one's "exogenous" views, and is a violation of fundamental principles of statistical analysis. Like the unadjusted BL portfolio, the τ-adjusted portfolio can also be found on a Markowitz frontier with particular inputs and inherits the properties and shortcomings of that method.

In our article, we provide a simple but detailed example of a realistic Black-Litterman analysis and show the corresponding Markowitz inputs and frontiers which contain the BL portfolios. Moving away from the BL portfolios at their maximum Sharpe ratio points, these frontiers veer quickly into uninvestable portfolios with short and/or leveraged positions in some assets and are not useful to managers who require access to multiple risk profiles tailored to investors' risk preferences. The BL portfolios and frontiers in our

example are compared with better solutions created with methods that explicitly account for estimation error. Michaud efficient portfolios are better diversified and more intuitive, have superior out-of-sample performance by design, and do not rely on false assumptions or dial in a preordained result.

Users of Black-Litterman or its implied returns should be mindful of these methods' limitations. BL does not solve but rather conceals the instability and estimation error problems of Markowitz mean-variance optimization. Because it is not a proper optimization method and tends to assign too much confidence to personal views it may often miss useful information while exposing investors to unnecessary risk. The simplicity and apparent adequacy of the procedure comes at the peril of ignoring better statistically-based methods that merge all of the available information into a more effective portfolio creation process.

Draft August 22, 2012. The full article "Deconstructing Black-Litterman: How to Get the Portfolio You Already Knew You Wanted" is forthcoming in the *Journal Of Investment Management*.