
Ronald Ryan, CEO, CFA

The Smartest Beta

by
Ronald J. Ryan, CFA
CEO – Ryan ALM, Inc.

Ryan ALM, Inc. is a Solutions company specializing in Custom Liability Indexes and Liability Beta portfolios. Mr. Ryan won the William F. Sharpe Index Lifetime Achievement Award and the Money Management Letter Lifetime Achievement Award.

The term "beta" is credited to William F. Sharpe, Ph.D. in his 1964 work in development of the "Capital Asset Pricing Model (CAPM)". It means (1) the covariance of the return on a security or portfolio with that of the market portfolio divided by (2) the variance of the return on the market portfolio. Professor Sharpe originally called this "market sensitivity" since you are comparing an investment to the market as defined by a market index. A beta of 1.0 suggests you have no residual risk in that you match the risk/reward behavior of the market index you are being compared against. Ideally, a market index fund should consistently have a market beta of 1.0.

Beta is a measurement based on a market or objective index. Without the index benchmark there is no applicable beta calculation. Traditionally, this has been the popular index benchmarks (i.e. S&P 500, Lehman Aggregate, etc.) but in truth it can be any index that best represents the objective of such funds (i.e. ETFs, index funds). Back in 1964 there was the absence of market indexes so beta was limited mainly to a measurement versus the S&P 500. The first bond index was introduced by Kuhn Loeb in 1973 (merged into Lehman in 1977). Since the advent of ETFs in 1993 there has been numerous new indexes created to feed the explosive growth of ETFs. Such new indexes are the stated objective of these many new ETFs.

Smart Beta

Smart beta is the optimization of the risk/reward behavior of a market index usually by changing the weights. Popular smart beta weighting schemes have been: fundamental weighting, equal-weighting, risk-clusters, and diversity weighting (combines equal and cap weighting). By changing the weights methodology the goal is to enhance returns or reduce volatility or both. Smart beta products have grown well in a short period of time but for the most part are still equity index derivatives. Rob Arnott and Research Affiliates, LLC have been a leader here introducing fundamental weighting for both bond and stock indexes as risk/reward value-added.

There is debate as to whether changing the weight methodology of a market index is really active management or an alpha strategy rather than a beta strategy or discipline. My recommendation is that the objective decides what is beta and alpha. What is important is to have the objective defined by a rules based index. If this reweighted index is the stated objective of an ETF, mutual fund or client then beta is the portfolio that matches the risk/reward of this objective index version. It also follows that alpha is the excess return versus this modified index objective. All comparisons to the traditional generic market index are just good information to know but do not determine the alpha and beta calculations.

Liability Beta Portfolio (The Smartest Beta)

The "smartest beta" portfolio is the portfolio that best matches and achieves the true client objective with the least amount of risk and cost. Risk is best measured as the uncertainty of achieving the objective. Cost is the amount required to fund the objective. The true objective of most institutions and even individuals is some type of liability (annuities, banks, insurance, lotteries, NDT, OPEB, pensions, etc.). The absolute level of volatility of returns is not risk given a liability objective. Indeed a 10-year liability payment is best matched and funded (defeased) by a 10-year Treasury STRIPS which has a certain future value. A three month T-bill would be very risky given this liability objective as it has 39 reinvestment moments of uncertainty. Although the 10-year Treasury STRIPS would be much more volatile in returns, such a return pattern would match the present value behavior of the 10-year liability and thus be low risk or even risk-free (defeasance).

Given a liability objective it is critical to create a *custom liability index* (CLI) as the proper benchmark. It must be a custom index since liabilities are like snowflakes… you will never find two alike. The CLI is a portfolio of liability payments weighted by the schedule of payments (term structure). Most institutional liabilities are calculated by actuaries who produce an actuarial projection of the liability payment schedule for each client. As such, the CLI is weighted by the actuarial projection in present value dollars. To calculate the present value of each liability payment you need to price liabilities based on a yield curve of discount rates. Depending on the type of liability there are accounting rules (ASC, FASB, GASB, IASB, PPA, etc.) that dictate the discount rate methodology.

Most, if not all, liabilities are priced as zero-coupon bonds since they produce a certain future value. Using U.S. corporate pensions, as an example, they are regulated by ASC 715 (formerly FAS 158) for GAAP accounting purposes. These rules suggest pricing liabilities as if they were AA corporate zero-coupon bonds. Since such bonds are not available in the bond market, they have to be manufactured as hypothetical zero-coupon bonds. As a result, liabilities behave like a yield curve of zero-coupon bonds weighted by the actuarial projections. This means that pension liabilities are extremely interest rate sensitive.

The CLI should calculate all of the necessary statistics to maintain and monitor a liability beta portfolio: term structure weights, total present value, YTM, duration, growth rate, interest rate sensitivity. The CLI is also the proper benchmark to measure liability alpha. If equity assets outperform the S&P 500 but underperform the CLI growth rate… did you earn alpha? In the eyes of the client you lost to liability growth which will damage the funded ratio

(assets/liabilities), credit rating and increase contribution cost. Liability alpha is the excess return versus the CLI return (growth rate) and not versus a market index return. Based on Ryan ALM indexes, liability YTD returns through November 30 should be between 12.7% (10-year duration) and 22.2% (15-year duration). Hard to believe that any pension has earned liability alpha so far in 2014.

The key point here is that the client objective is truly the focus and determinant of relative risk and reward (beta and alpha). The client objective is to fund liabilities in such a way that risk and cost are reduced and stable over a long horizon. Given a long average life (duration) based on the liability payment schedule then the liability beta portfolio needs to match these term structure weights. An S&P 500 index fund or any generic market index fund could never represent the beta portfolio for a liability driven objective. Cash or a money market fund is a very risky investment for most liability objectives that have long average lives (duration).

The most appropriate and smartest beta portfolio is the one that matches the liabilities cash flow as measured by the CLI. In essence, the smartest beta portfolio is a custom liability index fund. Such a portfolio should be the *core portfolio* for any liability objective. By matching the liability term structure the uncertainty risk of matching liabilities is eliminated and interest rate sensitivity is neutralized. By matching the liability term structure with bonds that have higher yields and lower present values (price) than the discount rates used… you have reduced costs. Since the accounting rules (ASC 715, IASB, and PPA) use AA zero-coupon discount rates then a liability beta portfolio of A and BBB will produce higher yields and lower costs. This should provide significant cost savings of 10% to 15%. This matching process is called *cash flow matching*. Beware of duration matching strategies (i.e. immunization) which do not match the liability cash flows but just the average duration. This is not an accurate or cost effective way to match liabilities. **The smartest beta portfolio is a liability cash flow matched portfolio!**