# The Smartest Beta

**By**
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***Ryan ALM, Inc. is a Solutions company specializing in Custom Liability Indexes (CLI) and Liability Beta Portfolios™ (LBP). Mr. Ryan won the William F. Sharpe Index lifetime achievement award and the Money Management Letter lifetime achievement award for his work in indexing.***

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 of a security or portfolio with that of the market portfolio divided by (2) the variance of the return on the market portfolio. 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.

Thus, beta is a measurement based on a market or objective index. Without the index benchmark there is no applicable beta calculation. Back in 1964 there was the absence of market indexes, so beta was a limited measurement. The first bond index was introduced by Kuhn Loeb in 1973 (merged into Lehman in 1977). Since the advent of ETFs in 1993 there have been numerous indexes created to feed the explosive growth of ETFs.

## Smart Beta

Smart beta is the optimization of the risk/reward behavior of a market index usually by changing the weights of the index's constituents. Popular smart beta schemes have been fundamental weighting, equal-weighting, risk-clusters, and diversity weighting (combines equal and cap weighting). By changing the index's weights the goal is to enhance returns or reduce volatility or both. Smart beta products have grown well but for the most part are still equity index derivatives. 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. What is important is to have the objective defined by a rules-based index. If this reweighted index is the stated objective, then beta is the portfolio that matches the risk/reward of this revised index version. It also follows that alpha is the excess return versus this modified index objective. As a result, all comparisons to the 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, pensions, OPEB, etc.). The *absolute* level of volatility of returns is not risk given a liability objective. Indeed a

10-year liability 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 risky given it has 39 reinvestment moments of uncertain reinvestment rates. Although the 10-year STRIPS would be much more volatile in returns, such a return pattern would match the present value behavior of the 10-year liability (if priced at a STRIPS discount rate) and thus be low risk or even risk-free (defeasance).

Given any liability objective, it is critical to create a *Custom Liability Index* (CLI) as the proper benchmark. It must be a custom index because liabilities are like snowflakes… you will never find two alike. The CLI is a portfolio of liability payments based on the unique liability projections of each client. Most institutional liabilities are calculated by actuaries. This CLI liability schedule is a term structure or yield curve when priced at discount rates. As such, the CLI is weighted by the actuarial projections 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 institution there are accounting rules (ASC, FASB, GASB, IASB, PPA, etc.) that apply as the discount rate methodology.

Most, if not all, liabilities are priced as zero-coupon bonds since this is the best methodology to connect present value to future value. As a result, liabilities behave like a yield curve or portfolio of zero-coupon bonds weighted by the actuarial projections. Usually, such liabilities have long durations (i.e. pensions) and can be extremely interest rate sensitive on their present value calculations. However, the future value of these same liabilities is normally quite static and are not interest rate sensitive. This suggests quite clearly that in order to reduce interest rate risk… match future values. This is commonly called *cash flow matching* where asset cash flows match and fund liability cash flows with certainty. Defeasance would be the classic cash flow match where the liabilities can be removed from the balance sheet (if such asset and liability cash flows are certain).

A Liability Beta Portfolio™ (LBP) is a cash flow matching model that should match and fund with certainty the liability cash flows as calculated by the CLI. In essence the smartest beta portfolio is a custom liability index fund or LBP that mitigates interest rate risk by matching and funding the CLI liability cash flows or future values while reducing cost. The difference the present value and future value of an LBP is the cost savings. Generally, this can be around 2% per year or roughly 60% on a liability cash flow schedule of 1-30 years. This cost savings is not only dependent on the length of the liability cash flows but also the quality of the LBP asset portfolio. A 100% Treasury STRIPS LBP would reduce cost less than a single A corporate bond portfolio because of the lower yield but would still provide a significant cost savings.

In summary, **the smartest beta portfolio is the one that matches and funds the true client objective (liabilities) at the least risk and cost**. The most appropriate and smartest beta portfolio is a Liability Beta Portfolio™. The key point here is that the client objective dictates relative risk and reward (beta and alpha). An S&P 500 index fund or any generic market index fund could never represent the smartest beta portfolio for a liability objective since it cannot match and fund liability

cash flows with certainty. Cash and money market index funds could be very risky for most liability objectives that have long average lives (duration).