Synergy of

* 
ASC 715 Discount Rates
Custom Liability Index
and
Liability Beta Portfolio ™
ASC 715 (FAS 158 Discount Rates)

Creation 2007

Objective
Provide discount rates in conformity to GAAP accounting based on rule ASC 715-30-35-44 (same as: FAS 158 pgh. 44A; FAS 87 (Amended) and FAS 106, pgh. 186).

Methodology
Ryan ALM provides four distinct discount rate yield curves that best conform to GAAP requirements. Each curve is comprised of hypothetical AA corporate zero-coupon bonds from 0.5 -30+ years to maturity:

- **High End Select** (top 10% yielding bonds)
- **Top 1/3 Curve** (top 33% yielding bonds)
- **Above Median Curve** (top 50% yielding bonds)
- **Full Curve** (all 100% yielding bonds)

Yield curve derived from actual AA and AAA corporate bonds placed into eight maturity bands:

<table>
<thead>
<tr>
<th>Maturity Bands</th>
<th>Yields</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.01 - 3.00 years</td>
<td>9.51 – 17.00 years</td>
</tr>
<tr>
<td>3.01 – 5.00 years</td>
<td>17.01 – 24.00 years</td>
</tr>
<tr>
<td>5.01 – 7.50 years</td>
<td>24.01 – 27.00 years</td>
</tr>
<tr>
<td>7.51 – 9.50 years</td>
<td>27.01 + years</td>
</tr>
</tbody>
</table>

Parameters of Eight (8) Maturity Bands:

- **Ratings**: AA+
- **Minimum Issue Size**: $100 million
- **Currency**: U.S. Dollar Denominated
- **Coupon**: Non zero, fixed coupon bonds
- **Maturity Type**: Option Free (No putable or callable bonds)
- **Issue Type**: Publicly traded U.S. Corporate bonds

Benefits
- Consistently higher yields than Citigroup
- Enhances balance sheet + funded status
- Complete transparency of data
- Produces best fit yield curve
Custom Liability Index (CLI)

Creation 1991 by Ronald J. Ryan, CFA

Objective
To measure and monitor *monthly* the risk/reward behavior of each client’s unique liability cash flow schedule based on the actuarial projected benefit payment schedule and projected future contributions. The CLI is the proper pension benchmark index.

Methodology
The CLI starts with the client’s actuarial projected benefit payment schedule. The CLI will then calculate:

1. **Present Value** using an assortment of Discount Rates:
   - **ASC 715** = AA Corporate zero-coupon yield curve
   - **PPA** = both Spot Rates + HATFA discount rates
   - **Market** = Treasury STRIPS

2. **Present Value with and without projected Contributions.** Contributions fund liabilities initially such that current assets fund net liabilities. CLI will use projected or frozen Contributions based on client’s target cost to create a net CLI. Contributions are a future asset and should be included in Funded Ratio/Status.

3. Series of *monthly* reports:
   - **Structure** = shows vital statistical summaries (PV, YTW, MDuration, etc.)
   - **Performance** = calculates month, quarter, year and cumulative growth (return)
   - **Interest Rate Sensitivity** = calculates projected growth + ending present value based on four interest rate scenarios

Benefits
1. Calculates Net Liabilities after Contributions
2. Calculates Present Value to update Funded Ratio / Status
3. Asset Allocation should be responsive to Funded Ratio/Status
4. Asset Management needs CLI benchmark to manage assets vs. liabilities
5. Performance Measurement needs CLI to measure asset growth vs. liability growth
6. Provides *economic books* recommended by Society of Actuaries to calculate the true economic Funded Ratio
7. CLI shows great difference between gross and net liabilities (after Contributions)
8. CLI shows significant difference between accounting and economic valuations

Highlights
Ronald J. Ryan, CFA was the former Director of Research at Lehman Bros. where he designed most of the popular Lehman bond indexes. In 2007, he won the prestigious *William F Sharpe Index Lifetime Achievement Award.*
Liability Beta Portfolio™ (LBP)

Creation 2014

Objective
To de-risk the pension gradually and reduce the volatility of the Funded Ratio + Contribution costs. The LBP will match and fund liabilities at the lowest cost and risk to the pension plan.

Methodology
The LBP is a cash flow matching product. Our LBP is a cost optimization model that searches and calculates the lowest cost portfolio that will match and fund the projected liability benefit payment schedule (either before or after Contributions). This requires numerous iterations. The LBP model skews the weights to longer maturities with much higher yields whose cash flows (interest income) will fund shorter liability benefit payments at lower cost. Longer maturities + higher yields = cost savings. Cost savings estimated at 8% to 12% (back tested since 12/31/09) of present value of total liabilities, 4% to 6% vs. 1-10 year liabilities and 26% vs. Insurance Buyout Annuities and Treasury STRIPS.

LBP model is customized to comply with investment policy
Requires projected benefit payments schedule
Universe = A/BBB corporate bonds
No credit > 3% of LBP model
Skewed to longer maturities

Benefits
The LBP model will produce significant and numerous benefits to the pension plan:

Outyield liabilities by @100 bps (vs. AA corporate discount rates)
Outyield active bond management… enhances ROA
Reduces Volatility of Funded Ratio/Status
Reduces Funding costs (@ 8% to 12%)
Reduces Interest Rate Risk

Note
Duration matching and LDI strategies are not cost efficient strategies. They usually fund each liability with a bond with the same duration. A five year liability funded with a five year duration bond will cost 8% to 12% more than using the LBP model to cash flow match the same liabilities. There are no zero-coupon corporates in the bond market to use. Moreover, corporate coupon bonds duration’s peak around 16 years requiring only Treasury STRIPS to fund liabilities thereafter. The LBP model is @ 26% less costly than Treasury STRIPS and Insurance Buyout Annuities… and 8% -12% less costly than AA corporates.