Pension Problem: Achieving the ROA
Solution: Cash Flow Matching

by

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The pension return on assets (ROA) assumption is a critical calculation since it affects both assets (asset allocation) and liabilities (discount rate). Most plan sponsors and their consultants focus on the ROA as the assets hurdle rate. Asset allocation models use the ROA as the target return for total assets. Public and multiemployer pension plans tend to also use the ROA as the liability discount rate.

Asset Allocation

The ROA is usually calculated by first looking at the average historical returns of the index benchmark for each allowable asset class except bonds and cash where the current yield is used. Each asset class is then weighted to come up with the ROA calculation for the total pension fund. The ROA has to be verified by auditors and/or actuaries that such return assumptions used for each asset class are realistic. The range of return assumptions usually stretch from a high of 12% for Private Equity and Alternatives to a low of 4% today for cash and fixed income.

As a result, each asset class is asked to earn the ROA assigned to them by using their index benchmark as the target return proxy. They are **NOT** required to earn the total pension fund ROA assumption (@ 6.50% - 7.00% today). This is an important fact to remember in asset allocation. We at Ryan ALM often hear the criticism and question… how can we invest in 4% bonds to earn our ROA (of 6.50%)? The answer is bonds do **NOT** need to earn the pension ROA… just their assigned ROA for the fixed income asset class in the asset allocation model.

Please note that the ROA is usually calculated *annually or even tri-annually.* Most asset allocation models use the Bloomberg Barclay (BB) Aggregate as the fixed income index benchmark (initially the Lehman Aggregate I designed as the head of Fixed Income Research at Lehman in the late 1970s and early 1980s). This index is **heavily skewed to lower yielding Government securities**. If you buy a fixed income portfolio that outyields the BB Aggregate with a similar duration, you are in a good position to earn the ROA assigned to fixed income. Remember… the asset allocation model uses yields not returns for the fixed income ROA. In fact, if you could buy a one-year bond at the yield of the BB Aggregate… you could achieve your annual fixed income ROA objective!

But bonds can do better… much better:

1. **Cash Flow Matching** – if bonds were used to cash flow match and fund net liabilities (after contributions) ***chronologically*** they would produce the liquidity needed to fully fund such net liabilities. Cash flow matching works best with longer coupon bonds where you use semi-annual interest income to partially fund shorter liabilities. A 10-year bond has 20 interest cash flows + one principal cash flow all priced at a 10-year yield. Cash flow matching would

eliminate the need to do a *cash sweep* of other asset classes which is a common liquidity procedure. According to Guinness Asset Management, the S&P 500 has 47% of its historical returns from dividends and reinvestment since 1940 on a 10-year rolling period basis. Wouldn't you want to reinvest dividends back into growth assets rather than spend it on funding benefits + expenses? By using bonds as the liquidity assets, the growth assets are left unencumbered to grow. The longer the cash flow matching period, the more time the Alpha assets have to compound their growth. This could significantly enhance the ROA of equities.

2. **Yield on Bonds –** As described previously, the ROA forecast for fixed income is based on the current yield of its index benchmark. The Bloomberg Barclay Aggregate is most favored as the bond index benchmark. The Aggregate is a very large, diversified and high-quality portfolio of bonds with the following summary statistics as of May 31, 2024:

# of issues	**13,632**	Treasury	**45.52%**	AAA	**72.60%**
YTM	**5.10%**	Agency	**1.69%**	AA	**2.47%**
Duration	**6.03 yrs.**	Mtg. Backed	**29.91%**	A	**11.50%**
Avg. Maturity	**8.43 yrs.**	Corporates	**25.55%**	BBB	**13.43%**

As a result, most asset allocation models would have a ROA for bonds of about **5.00%**. If you build a bond portfolio that outyields the Aggregate index with similar duration, it should enhance the ROA for fixed income and as a result… total assets. Ryan ALM Advisers, LLC has created a cash flow matching product we call the **Liability Beta Portfolio™ (LBP)**. The LBP is a cost optimization model that cash flow matches liability cash flows chronologically at the lowest cost from a corporate bond portfolio skewed to A/BBB+ bonds.

Based on the actuarial projections of each client we initially build a Custom Liability Index (CLI) to calculate **net liabilities** ((benefits + expenses) – contributions) chronologically. The CLI provides all the data needed for the LBP to function efficiently. Based on the allocation to the LBP will determine how far out the LBP can fully fund net liabilities. Usually, a 15% allocation to the LBP can fund 1-7 or 1-10 years of net liabilities. Typically, the longer the term structure of the LBP, the higher the yield. The LBP should outyield the Aggregate index by >50 bps based on the LBP skewness to A/BBB+ corporate bonds.

3. **Cost Savings –** bond math tells us that the longer the maturity… the lower the cost or present value. The Ryan ALM Liability Beta Portfolio™ will reduce funding costs by about 2% per year so if we fund the 1-10 years of net liabilities, we should be able to reduce funding costs by about 20%. This is a significant cost savings and benefit of the LBP. Because the LBP produces certainty of cash flows, the cost savings is known upfront at the time of the LBP implementation unlike the uncertainty of total returns.

4. **Higher Interest Rates –** bonds are interest rate sensitive as to their market value (present value). Rising US interest rates may or should cause will negatively impact returns. However,

cash flow matching is focused on funding B + E (Benefits + Expenses) which are future values. Future values are not interest rate sensitive. Bonds are the only asset class with the certainty of cash flows (future values). That is why bonds have always been used as the methodology to defease (cash flow matching) liabilities. Moreover, if interest rates trend upward any reinvestment of excess cash flow can buy future value at a lower cost. As a result, cash flow matching sees higher interest rates as an opportunity to further reduce funding costs.

5. **Cash –** many pension plans have a cash allocation of around 1% to 3%. Cash is usually the lowest yielding asset. Since the LBP becomes the liquidity assets to fully fund benefits + expenses chronologically, there is little need for cash to fund B+E. Cash might only be needed for capital calls on Private Equity and other Alternative Investments. The LBP should significantly increase the yield margin versus cash since the LBP is using coupon income from all maturities of the LBP and is skewed to A/BBB+ corporate bonds. With the LBP fully funding B+E, the cash allocation can be reduced to around 1%. Replacing most of the cash allocation to fund B+E with the LBP allocation is another ROA enhancement… it all adds up.

"Where is the knowledge we have lost in information"
T.S. Eliot