NIRS Innovative Pension Funding Strategies

by
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Objective

The NIRS pension objectives for this paper are:

1. Reduce contribution volatility
2. Promote intergenerational equity
3. Keep plan on sound funding trajectory

Cash Flows (Future Values versus Present Values)

Pensions are all about cash flows: asset cash flows versus liability cash flows. It is the **future value** of these cash flows that are the most meaningful and need to be monitored. Asset cash flows are pension assets (A) to grow at some ROA forecasted rate + projected contributions (C). Liability cash flows are projected benefit payments (B) + projected administrative expenses (E). The formula of: (A + C) – (B + E) is what dictates the soundness and solvency of any pension. However, funded ratios and status are based on the present value of A/B or A – B. Contributions and expenses are *not* included in the funded ratio/status. Contributions are the first source to fund B + E. Accordingly, assets fund *net* liabilities not gross. This is the **first innovative funding strategy: subtract contributions from B + E to calculate net liabilities. Have assets focus on fully funding net liabilities.** Indeed, GASB requires an *asset exhaustion test* (AET) as a test of solvency which takes cumulative projected A + C minus projected B + E on an annual basis to determine how far out is the plan solvent. The AET is truly the battlefield that the pension asset/liability game is played on and should play a major role in asset allocation.

Present values may help us understand if we are on track like a scoreboard but can be very misleading. Take for example, two portfolios: one is 100% in Treasuries yielding 1.75% and the second portfolio is 100% in corporate bonds yielding 2.50%. They have the same present values, but their future values are much different by as much as 20% to 30% depending on maturities. They have the same funded ratio and status, but they are certainly different in pension solvency. The same problem exists with *asset smoothing and actuarial valuations*. Only a market valuation will tell you the true or accurate economic value. Imagine your bank telling you that they cannot provide your current balance but only the five-year average balance. Would you be comfortable writing a check on that information? Asset liability management (ALM) requires accurate and frequent information in order to be successful.

Return on Asset Assumption (ROA)

Assets need to know what they are funding… *net* not gross liabilities. The AET can be modified to calculate the ROA needed for assets to fully fund net liabilities. This is the **second innovative funding strategy: calculate the ROA based on the AET and not asset allocation**. Currently, the ROA is calculated based on what asset allocation tells us is a high probability of achieving a target return given a certain asset allocation. This in no way tells us if this ROA is capable of achieving accurate full funding, which is the true goal of the assets. The ROA may be too high creating surpluses and higher contribution costs (too often the result). The AET can be used to calculate what ROA will fully fund residual net liabilities. This accurately determined ROA will now be the hurdle rate for asset allocation.

Assure Plan Remains on Sound Funding Trajectory

It is the future value of A + C versus B + E that counts. That is what the AET focuses on and what assets should focus on. Since we only know the future value of bonds with certainty then bonds should be the core or Beta portfolio. This is the **third innovative funding strategy: install a Beta portfolio to cash flow match net liabilities chronologically.** The Beta assets are the liquidity assets to fund B + E chronologically and buy time for the Alpha or growth assets to grow unencumbered. Asset allocation should initially focus on the weighting of Beta + Alpha assets that produce the highest probability of fully funding B + E net of C. The question of how much is allocated to the Beta assets is based on the how well funded the plan is. The higher the funded ratio, the greater the allocation to Beta assets. Logically, you want the Beta assets to fund the next 10-years since history tells us that the alpha assets need time to perform and grow. This will allow the Alpha assets to reinvest their dividends and income streams. Historically, about 48% of the S&P 500 growth on a 10-year rolling basis since 1950 comes from dividends and reinvestment.

This is *not* how asset allocation has worked for decades. Instead, asset allocation is based on achieving a target ROA which favors a high allocation to riskier (Alpha) assets no matter what the funded status is. Two plans, one at 40% funded and the other at 80% funded should have distinctly different asset allocations. But if they have the same ROA, they will have the same or similar asset allocations. This was the asset allocation mistake made in the 1990s when public pension plans had surpluses. Why didn't they secure B + E and the surplus with a high allocation to Beta assets that would have cash flow matched B + E for many years? Instead, they reduced their allocation to bonds to achieve a ROA target return as interest rates were going down in a secular trend over 38 years. The equity correction of 2000-02 sent funded ratios into deep deficits and spiking contribution costs which public pensions have not yet cured.

Reduce Contribution Cost Volatility

Cash flow matching (CDI) with bonds reduces contribution cost volatility by definition. It will fully fund B + E chronologically thereby reducing contribution cost volatility in the area it is funding (i.e., 1-10 years). CDI is based on matching and funding future values not present values. This eliminates the actuarial noise from actuarial valuations. It also mitigates interest rate risk which is the dominant risk factor in bonds. The future value of B + E is not very volatile especially on shorter projections (i.e., 1-10 years). Moreover, CDI will rebalance whenever actuarial projections change to always be cash flow matched to projected B + E. It also assures that the pension plan remains on a strong fiscal path. The certainty of their cash flows is the value of bonds and why bonds have always been used for cash flow matching, defeasance, dedication and immunization. A cash flow matching portfolio should be the anchor or core portfolio for prudent pension ALM.

Intergenerational Equity

The AET will calculate the residual or remaining assets based on fully funding B + E after C. As a result, you want AET to show an increase in assets or, at least, show the initial assets as the remainder so intergenerational equity has improved its asset position or no dilution of assets. The AET is certainly the best measurement for intergenerational equity and should be monitored annually.

Hypothetical Pension Plan

Applying our innovative funding strategies to the NIRS hypothetical pension plan, we first calculated net liabilities (B + E) – C by using the projected B + E provided by NIRS and taking contributions (normal cost) of $184.75 million and growing it at 3% for payroll inflation which creates a constant 12% of payroll contribution cost. We ran three asset exhaustion test (AET) versions (see link _____):

1. Keeping Contributions as a constant 12% of payroll with 3% inflation grows contribution costs to exceed B + E by 1/01/64. As a result, a **ROA of less than 3%** will fully fund all projected B + E thru 12/31/99.
2. Removing Contributions after 1/01/64 (crossover point where C > B + E) would result in a **ROA of 4.63%** to fully fund all projected B + E thru 12/31/99.
3. Freezing Contribution costs at the initial amount would result in a **ROA of 6.19%** to fully fund all projected B + E thru 12/31/99.

The major point of this exercise is to show and prove that the ROA is *not a calculated number* based on the funded status. If the mission of pension assets is to fully fund B + E in a cost-efficient manner with prudent risk, then assets need to know the correct ROA needed to accomplish this mission. But that is not what happens today with the ROA and asset allocation. A rounded ROA hurdle rate is commonly used based on the asset allocation model with no regards to the funded status. As a result, a surplus funded status and a significant deficit funded status could have the same ROA if that they had the same or similar asset allocation. This is not logical or in the best interest of the plan solvency. Again, my example of what happened in the 1990s which led to spiking contribution costs in the early 2000s and beyond should never be repeated.

Today, most public plans have seen an improvement in their funded status but little or no change in their asset allocation. To be true to the pension objective, **asset allocation needs to be responsive to the economic funded status based on valuing assets and liabilities on market valuations not actuarial valuations**. We ran a Custom Liability Index (CLI) to compare and calculate the present value of B + E before and after C based on both a 7% ROA and an ASC 715 discount rate of 2.61%. Here are the calculations:

	Custom Liability Index	
Assets	$7,665,500,000	$7,665,500,000
Gross Liabilities (w/o Contributions)	$40,998,000,000	$40,998,000,000
PV of Gross CLI (w/o Contributions)	$9,259,823,437	$19,351,264,070
Funded Ratio	**82.78%**	**39.61%**
PV of Net CLI (C @ 3% growth to 1/1/64)	$5,349,624, 369	$11,215,430,808
Net Funded Ratio (with C)	**143.29%**	**68.35%**

Noticeably, there is a significant difference in PV based on the two discount rates (ROA vs. ASC 715). Which one provides the best calculation of the true economic funded ratio/status? Which one should asset allocation be focused on? Certainly, the ASC 715 is based on reality… current market rates. FASB accounting rules clearly state that the discount rate should be a rate that can settle the liabilities… a rate you can buy to defease liabilities. The ROA discount rate is eliminated here since it is a rate that you can NOT buy.

Cash flow matching (CDI) with bonds focuses on future values and eliminates this confusion over discount rates and the correct present value of liabilities and funded ratio/status. **Our third innovative funding strategy is to install CDI as the core portfolio or liquidity assets to fully fund B + E (net after contributions) for as far out as makes sense**. Logically, the CDI allocation should allow for the asset allocation to achieve the new calculated ROA. Based on the AETs we ran, it looks like a **4.63% ROA is the proper hurdle rate** if C are used to initially fund B + E up to 1/01/64 leaving net liabilities to be funded by the assets. This would suggest that 47% invested in CDI yielding 2.00% + and 53% invested in residual assets earning 7.00% would earn the 4.63% hurdle rate. This is the prudent approach to a calculated ROA and a responsive asset allocation to fully funding (B + E) – C. It is also a far more conservative asset allocation than that of most plans that should lead to significantly reduced volatility of returns, contribution expenses, and the plan's funded status while keeping the plan on a sound funding trajectory.

Resume
Ronald J. Ryan, CFA

CEO and founder of **Ryan ALM, Inc.** in 2004. Ryan ALM provides a turnkey system for pensions that reduces cost and risk based on three synergistic and proprietary models:

ASC 715 Discount Rates
Custom Liability Index (CLI)
Liability Beta Portfolio™ (LBP)

The CLI and LBP cash flow matching model are both unique in the pension industry.
The index division of Ryan ALM also provides custom indexes for ETFs.

Prior to creating Ryan ALM, Mr. Ryan founded **Ryan Labs, Inc.** in 1988 which became **o**ne of the largest Enhanced Bond Index Fund managers in America. In 1982, he founded the **Ryan Financial Strategy Group (RFSG)** which was a fixed income **q**uantitative firm focused on helping bond managers outperform bond Indexes. At RFSG, he and his team created many unique financial models and index innovations. Mr. Ryan is the former Director of fixed income research at **Lehman Bros. Kuhn Loeb** from 1977–1982 where he designed most of the popular Lehman bond indexes. Prior to Lehman, he was the head of fixed income for the **First in Dallas** from 1973-1977, the largest bank holding company in Texas. From 1966-1973 he was a security analyst at **Pan-American Life Insurance** company, the largest institutional investor in Louisiana.

Mr. Ryan has many index and financial model innovations in his career. He was awarded the William F. Sharpe Indexing Lifetime Achievement Award, the MML lifetime Achievement Award, the Bernstein Fabozzi/Jacobs Levy Award and the Capital Link Most Innovative ETF Award. He authored the book “The U.S. Pension Crisis” which won the IP best financial book award in 2014.

Mr. Ryan has a CFA degree, and a MBA and BBA from Loyola University.