

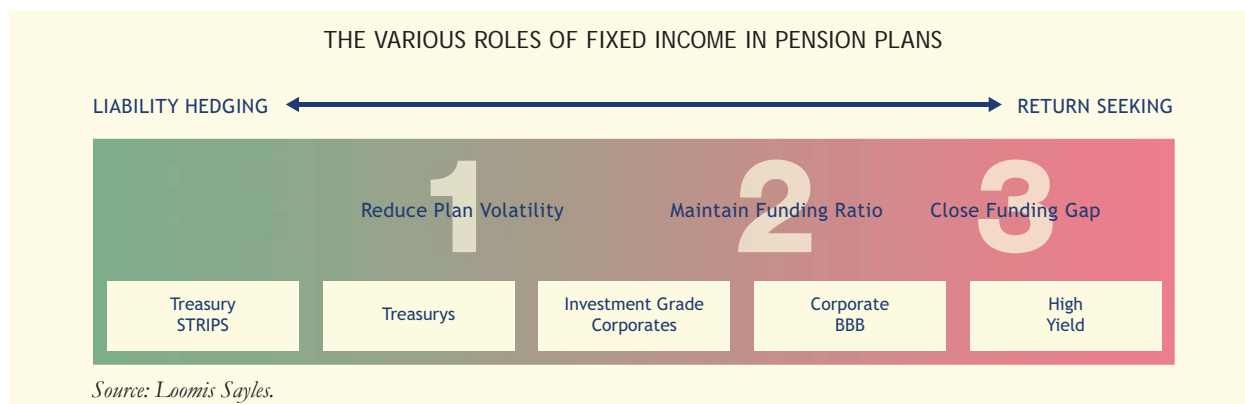


# the various roles of fixed income in pension plans

june  
2012

By the Loomis Sayles LDI Solutions Team

A defining characteristic of a liability driven fixed income mandate is the alignment of a portfolio's objectives with the specific role it is designed to play in an overall investment plan. Pension plans typically decompose assets into two groups: "liability hedging" and "return seeking." While a fixed income allocation is most commonly associated with liability hedging, it can cut across both dimensions to satisfy distinct plan needs, as shown in the chart below. Fixed income assets can help pension plans reduce overall plan volatility, maintain funding ratios and close funding gaps. Plans must consider the different risk/return tradeoffs of these three roles when determining an optimal fixed income portfolio structure.



## EXPLORING THE VARIOUS ROLES OF FIXED INCOME

For fixed income assets to function effectively in any role, proper portfolio structure is essential. Standard third-party benchmarks are often insufficient for defining this structure. To construct liability driven fixed income mandates that best match a plan's objectives, we suggest using the risk exposures implied by the liabilities and discount curve as a blueprint, with particular consideration for the liabilities' duration. Consistent with this principal, the analyses that follow adjust index returns for their term structure mismatch to the discounted liabilities. For the liabilities themselves, we used a hypothetical 12-year duration cash flow stream discounted with the *Citigroup AA Pension Discount Curve*.<sup>1</sup>

### ROLE 1: REDUCE PLAN VOLATILITY

In the context of liability driven investing, fixed income assets are most commonly used to reduce a plan's overall funding ratio volatility. Yet even in this seemingly simple role, a fixed income allocation can take many forms. To illustrate this concept, we measured the performance of various fixed income "liability hedges" under three equity-allocation scenarios.

The table on the following page outlines the results for each scenario during the period December 29, 1995 through December 31, 2011 using two risk metrics: tracking error and maximum funding ratio drawdown in any one-year rolling period. As the results show, with zero allocation to equities, a AA-rated long corporate bond portfolio offered the lowest tracking error and lowest drawdown. This is not surprising since the liabilities were discounted using AA-rated securities. However, with fewer than 20 longer-dated AA issuers, investment managers cannot construct a properly diversified portfolio using this segment of the market.<sup>2</sup> For practical considerations, a long government/credit or long corporate index appeared to be the next best alternative. A long corporate index excluding BBB-rated bonds may be better still.

<sup>1</sup>We used the Russell Standard Cash Flow Generator model to create a cash flow stream with a duration of 12 years at a discount rate of 5%. Cf. Collie, Bob. "The SCG Standard Cashflow Generator: Parametrizing pension cash flow projections as the basis for LDI." Russell Viewpoint, March 2012. Historical availability of the discount curve (12/29/1995-12/30/2011) dictated the period of study.

<sup>2</sup>As of 12/30/2011.

In scenarios with greater equity exposure, even if a concentrated portfolio of AA-rated bonds were acceptable, it ceased to be the lowest-volatility option (as shown in the table below). In fact, for a 30% allocation to stocks, a long government/credit portfolio was the least volatile option. In the case of a 60% equity allocation, liability-matched Treasuries or long-dated Treasury STRIPS were the least volatile option. These changes occurred because higher-quality fixed income assets tended to be less correlated with stocks—in fact, correlations can be negative in times of distress, such as late 2008. As equity allocations increase, minimizing credit exposure and focusing on higher-quality-longer-duration fixed income assets may be the most effective means of reducing funding ratio volatility.

RELATIVE PLAN VOLATILITY UNDER DIFFERENT EQUITY-ALLOCATION SCENARIOS  
12/29/1995-12/31/2011

	0% IN STOCKS		30% IN STOCKS		60% IN STOCKS	
	Tracking Error	Max 1-yr FR drawdown	Tracking Error	Max 1-yr FR drawdown	Tracking Error	Max 1-yr FR drawdown
Treasury - STRIPS 30-yr	18.9%	-52%	11.4%	-37%	9.7%	-26%
Treasury - Liability Matched	6.1%	-25%	6.5%	-23%	11.1%	-30%
Gov't/Credit Long	3.2%	-13%	6.2%	-19%	11.4%	-33%
Corporate Long	3.2%	-13%	7.1%	-25%	11.9%	-36%
AA Long	2.8%	-5%	6.3%	-20%	11.5%	-33%
A Long	3.1%	-14%	6.8%	-25%	11.8%	-36%
BBB Long	4.3%	-15%	7.8%	-26%	12.3%	-36%
High Yield	8.3%	-25%	10.3%	-33%	13.5%	-40%

Sources: Loomis Sayles, Barclays.

Hypothetical fixed income indices were derived by adding the relevant Barclays-provided index excess returns to the Treasury component of the liability return. For "Treasury STRIPS 30-yr," the return of 30-year Treasury STRIPS was used and does not assume term structure alignment. For "stocks," the S&P 500 Index total return was used.

## ROLE 2: MAINTAIN FUNDING RATIO

The fixed income portion of a plan can also be used to maintain a targeted funding ratio on a pro-rated basis. To achieve this, the fixed income allocation must seek the lowest-possible tracking error in the short term while *also* generating a sufficient return in the long run. Since the liabilities are discounted using a AA curve, the minimal-tracking-error AA portfolio described previously would seem well suited to meet both of these objectives. In reality, it is not. How does this paradox emerge? When a constituent security used in the liabilities' pricing function is downgraded or defaults, it no longer meets the criteria of the pricing function and is simply removed. Unlike the methodology for calculating the return of a portfolio or an index, the removal of a higher-yielding security has the biased effect of increasing the value of the liabilities.

The resulting increase in the present value of the liabilities creates a headwind for the portfolio as it attempts to track the liabilities. This can cause the plan's funding ratio to deteriorate. How can portfolio managers actively compensate for this headwind and avoid underperforming the return of the liabilities over time? In the context of a pure fixed income portfolio, we believe there are three potential solutions to this challenge:

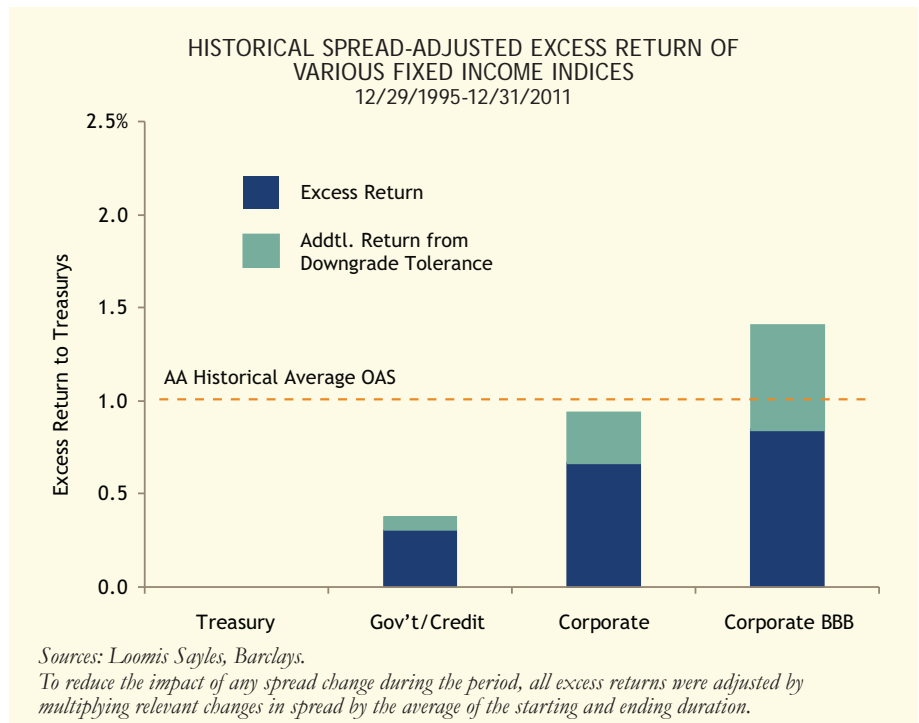
1. Purchase lower-quality corporate securities (seek to capture a higher risk premium).
2. Allow downgraded bonds to remain in the portfolio (avoid selling bonds at inopportune times).
3. Use active skill (seek to generate alpha).

To demonstrate the first two solutions, we compared the excess return required to fund the liabilities with the historical excess returns of fixed income indices of varying credit quality for the period December 29, 1995 through December 31, 2011. As a proxy for the liabilities' required excess return, we used the historical average spread of the *Barclays AA Corporate Index*. For the fixed income indices, we relied on standard *Barclays* index excess returns adjusted for spread changes and a custom *Barclays* study, which illustrated the incremental benefit of allowing downgrade tolerance.<sup>3</sup>

The following chart demonstrates the results. Not surprisingly, an all-Treasury portfolio fell short because it does not include any corporate spread premium. The government/credit and corporate indices, the two lowest-tracking-error solutions, also fell short, as both generated excess returns below the AA spread. This occurred for a number of reasons, including the fact that the indices were forced to sell downgraded bonds. However, as shown below, by employing a lower-quality-all-BBB portfolio or allowing downgrade tolerance in the corporate index, this shortfall could have been reduced.

In addition to the solutions above, we believe active investment managers can employ skill and a number of strategies to help ensure a portfolio does not underperform its liabilities. The targeted amount of additional return is often a function of investment guidelines and the amount of guideline flexibility afforded to a portfolio manager. Strategies such as avoiding downgrades, sector rotation, security selection, and duration positioning can allow skilled managers to generate additional excess return. In our view,

if the objective of the fixed income mandate is to maintain a targeted funding ratio, some combination of an allocation to lower-quality bonds, downgrade tolerance in the investment portfolio and active skill is necessary.



### ROLE 3: CLOSE FUNDING GAP

Due to a confluence of factors over the last few years, most pension plans today are underfunded. To make matters more challenging, many of these plans rely on discount curves offering higher yields than the *Citi*group *AA Pension Discount Curve*, thus requiring even more excess return. As a result, sponsors are increasingly looking to their assets to generate performance beyond what would be required to simply maintain a funding ratio. To achieve this, plans typically employ some mix of equity and fixed income assets. We believe an all-fixed-income portfolio can also be utilized to meet these funding and volatility objectives.

To demonstrate this, we compared an all-high-yield portfolio with a portfolio comprised of 50% stocks and 50% liability-matched Treasuries. We evaluated performance using the metrics from previous examples—excess return to Treasuries, tracking error and drawdown. In order to estimate the excess

<sup>3</sup>The Barclays downgrade tolerance study assessed the incremental benefit of relying on an upgrade/downgrade tolerant index for the US Corporate and US Corporate BBB Indices. The downgrade tolerant Indices were constructed as of 12/31/1989. Results for the Gov't/Credit Index were implied based on the average starting and ending weights of corporate securities in that index. The entire analysis was performed using standard indices as opposed to long-maturity indices, as was dictated by the parameters of the Barclays study. We believe the conclusions would apply to long indices.

return for equities, we compared historical stock returns with those of a long maturity government index. Given the unique market environment of the past 16 years, and in order to avoid unfairly penalizing equities, we calculated equity excess returns using data from 1926 through the end of 2011.

HISTORICAL EXCESS RETURN & RISK OF ALLOCATION ALTERNATIVES 12/29/1995-12/31/2011				
	RETURN		RISK	
	Excess Return		Tracking Error	Max 1-yr FR drawdown
50% Stock / 50% Treasury	2.0%		9.3%	-25%
High Yield	2.0%		8.3%	-25%

Sources: Loomis Sayles, Barclays, Ibbotson.  
Stock excess return based on Ibbotson data from 1926-2011.

The table above illustrates the results of the analysis. Both solutions offered roughly 2% excess return over Treasuries while exhibiting similar tracking errors and drawdowns. The high yield solution, therefore, appears to be a reasonable alternative to a 50%/50% mix of equities and Treasuries.<sup>4</sup> However, as we will discuss in the following section, there are additional considerations that may make the fixed income solution more attractive.

**ADDITIONAL BENEFITS OF FIXED INCOME**

All of the standard performance metrics used throughout the discussion above are cash flow agnostic. However, when considering liabilities, cash-flow-generating securities enjoy a benefit over their non-cash-flow-generating counterparts. Namely, volatile, non-cash-flow-generating instruments must often be liquidated during periods of underperformance in order to fund liabilities. Thus, despite their higher return potential, depending on rebalancing methodologies, equities can in fact increase the likelihood of plan impairment. By contrast, the coupon and principal cash flows that fixed income assets generate can help a plan avoid liquidating securities at undesirable times. All else being equal, we believe this attribute makes fixed income assets better suited for liability management.

**CONCLUSION**

Fixed income can embody multiple roles within a pension plan: it can help reduce the overall plan volatility through its hedging and diversification capabilities; it can effectively fund the liabilities using lower-quality securities, downgrade tolerance and skill; and, finally, it can be used to close reasonable funding gaps by capitalizing on the risk premium of high yield. Given this variety of roles, getting the most out of fixed income demands careful assessment of its objectives in the context of the overall plan.

<sup>4</sup> High yield is primarily available in the shorter end of the maturity spectrum. As a result, in order to maintain duration neutrality to the liabilities, a significant derivatives overlay may be required. For plans that do not allow for the use of derivatives, this may limit the benefits of such an approach.

LDI SOLUTIONS TEAM		
Neil Burke Portfolio Manager	John Hyll Portfolio Manager	David Waldman Portfolio Manager, Dir. Quantitative Research Risk Analysis
Nicholas Savoulides, PhD, CFA Senior LDI Strategist	Ankit Agarwal Quantitative Analyst	Neil Katuna Quantitative Associate
Christopher Harms Co-Head Relative Return Group		Shephali Sardinha Product Manager

This material is for informational purposes only and it should not be construed as investment advice. Investment decisions should consider the individual circumstances of the particular investor. Any opinions or forecasts contained herein reflect subjective judgments and assumptions of the author and do not necessarily reflect the views of Loomis, Sayles & Company, L. P. Investment recommendations may be inconsistent with these opinions. There can be no assurance that developments will transpire as forecasted. Accuracy of data is not guaranteed but represents our best judgment and can be derived from a variety of sources. Opinions are subject to change at any time without notice.

Data and analysis does not represent the actual or expected future performance of any investment products. The ability of an actual portfolio to deliver the required cash flows is not guaranteed and is subject to a variety of factors including, but not limited to, the availability of bonds, active management and trading, transaction costs, default risk, reinvestment risk, rebalancing risk, management risk and liquidity risk.

Certain information uses comparisons to one or more market indexes which are unmanaged and are generally unavailable for investment. Individual accounts are actively managed, will have different investment guidelines, and carry expenses and fees, all of which would negatively impact results.

The analysis is limited to certain recent periods for which data is available. We make no representation that the experience of any other periods is comparable.

**Past experience does not guarantee future results.**

MA.LR009313