

# Closing the Gap: Addressing the Liability Challenge

*The interest rate environment over the past several years has made plan sponsors acutely aware that the duration mismatch between their assets and liabilities poses a significant risk to the solvency of their plans. Indeed, for many plans, nearly half of the surplus risk<sup>1</sup> can be derived from this mismatch in interest rate exposure. Both the new pension legislation and proposed changes in the accounting structure provide incentives for plan sponsors to pay closer attention to this risk when designing investment policy.*

Fortunately, this liability challenge comes at a time when sponsors have access to many new financial instruments, such as interest rate derivative contracts, and a wider array of investment opportunities. These new instruments provide an expansive toolkit for managing assets relative to liability exposures. The issue most plan sponsors face is not the arithmetic of structuring an optimal investment policy, but rather, managing the transition from their current policy to a liability-driven policy.

In this article, we explore three approaches plan sponsors can take as they move along the path towards greater awareness of their pension liabilities.

## A Starting Point: Managing to the True Benchmark

Any liability-driven approach to investment policy requires pivoting from an asset-only to an asset-liability focus. Once plan sponsors make that shift and treat the risk and return characteristics of the liability stream as the true benchmark, the measurement of overall risk and return must change as well. The impact of changes in these measurements becomes more pronounced as the plan sponsor moves to a mark-to-market environment – a movement that is driven by changes in pension regulations and accounting, both approved and pending.

Most investment performance is reported as total return. From a liability-driven perspective, though, what matters more is the asset's investment performance relative to changes in liability values. A simple first step that most plan sponsors can follow is to report investment performance in total return terms and relative to liability returns. As a proxy for liability returns,

plan sponsors can use a long-duration bond index, with a duration comparable to the liability stream.<sup>2</sup> This step provides observable evidence of any changes in the asset-liability surplus.

Furthermore, by conducting a performance attribution on the surplus, plan sponsors can highlight the consequences of the duration mismatch between the existing investment policy and the liability stream.

Usually, once plan sponsors understand the implications of the interest rate mismatch, they will want to consider changing their investment policy. The following three investment alternatives provide concrete directions to help plan sponsors make that change.

### Option One: Immunization

One approach is to invest the vast majority of the portfolio in bonds that are cash-flow-matched or duration-matched to the plan's liabilities. While taking this approach can clearly reduce the plan's risk, it has a few limitations. First, it will not generate any excess returns over the liabilities and it requires a significant reallocation of assets. Only plans who are fully funded would find this option suitable.

The following two approaches attempt to solve the liability challenge by hedging some or all of the unwanted interest rate risk of liabilities, while at the same time preserving and achieving long-term growth of plan assets in excess of liabilities.

### Option Two: Extending Duration

In a duration extension strategy, a plan shifts its existing fixed income core-plus exposures to a "core-plus portfolio with long duration," with investment objectives, constraints and derivatives usage left largely intact. This option fits neatly into the traditional framework with little to no disruption to the overall plan – the plan

simply switches to a long-duration benchmark, and simultaneously allows for an expanded use of fixed income derivatives to manage the increased duration risk.

Duration extension also involves a risk-management trade-off. For example, a typical plan that doubles its bond duration from 5 to 10 years would see its overall plan duration also double from 1.5 to 3 years.<sup>3</sup> While three years of plan duration is still a lot less than that of a typical liability (average liability is 12 years), it is certainly a move in the right direction.

A less appreciated benefit of extending duration is a potential increase in expected returns relative to liabilities. Usually, long-duration assets carry a premium, called the term premium, which compensates for taking the risk of longer maturity assets. The duration mismatch between assets and liabilities results in a negative exposure, or short position, to that term premium, which acts as a drag on the expected return on assets relative to liabilities. Closing a plan's asset-liability duration gap (even by a couple years) reduces a plan's surplus risk and moderates the drag from being short the term premium.

An attractive feature of duration extension is that plan sponsors can choose from a wide array of benchmarks, ranging from traditional indices such as the Lehman Long Gov/Corp Index (with an 11-year duration) to customized benchmarks that could combine bonds, long-dated swaps and complementary exposures such as inflation-linked securities. Using customized benchmarks, plans can further tighten the duration match between assets and liabilities.

To be sure, duration extension strategies applied to less than half of plan assets cannot be viewed as a final solution. Rather, it presents a viable means to begin moving the dial, without revisiting the plan's entire asset allocation strategy.



**Asset  
Management**

<sup>1</sup> The surplus risk is simply the uncertainty or volatility of the difference between the asset and liability valuations, divided by the asset valuation itself. <sup>2</sup> If no directly comparable bond index is available, then plan sponsors can simply adjust to account for the difference in duration between the next best index and the liability stream. <sup>3</sup> Duration of a typical plan: (30% fixed income x 5 years) + (60% equity x 0 years) = 1.5 years. Duration of a plan that has extended duration: (30% fixed income x 10 years) + (60% equity x 0 years) = 3.0 years.

# liabilities assets

## Option Three: Total Portfolio Solution

To achieve the benefits of the third option, plan sponsors are required to restructure their investment policy design to create two sub-portfolios: one that hedges the interest rate exposures inherent to liabilities and another that generates returns in excess of those liability streams.

The purpose of the hedging portfolio is to minimize the impact of changes in interest rates on the volatility of changes in the surplus. Ideally, the risk characteristics of the portfolio would exactly match those of the liability stream. The return-generating portfolio, on the other hand, is not correlated to the liabilities. The main advantage is that it can increase diversification, lower risk and improve potential returns. This approach, which requires the use of derivatives, can be implemented through the following four steps:

**1. Find the target return on assets relative to liabilities.** This is determined by the current funding ratio and the investment horizon. Holding all else equal, when the funding ratio is less than one, the assets must generate a return in excess of liabilities in order to restore fully funded status (assuming no contributions). In general, the longer the time horizon, the lower the target return.

**2. Find an optimal return-generating portfolio.** Plan sponsors can use the futures markets to obtain equity market exposure, freeing up capital to invest in active strategies such as overlay, currency overlay, global tactical asset allocation (GTAA) and hedge funds. By including the broadest number of asset classes, an optimal portfolio will be created.

## Impact of Implementing Liability-Driven Investment Strategies<sup>4</sup>

	Typical Current Plan	Immunization	Extend Duration	Total Portfolio Solution
Active Equity	65%	0%	65%	35%
Active Fixed Income	30%	100%	30% US Long Duration	30% US Long Duration 40% Long Bond Overlay
Cash	5%	0%	5%	5%
Absolute Return Strategy	0%	0%	0%	30%
Plan Duration	1.35 years	11.0 years	3.30 years	7.70 years
Annualized Expected Excess Return vs. Liabilities	2.21%	0.0%	2.24%	3.10%
Surplus Risk	11.75%	2.00%	10.93%	6.89%

**3. Find the size of the allocation to the return-generating portfolio necessary to achieve the target return over liabilities.**

**4. Allocate the remaining cash to the hedging portfolio.** The surplus risk of an optimized portfolio (one that includes the use of active strategies) is much lower than that of a more standard portfolio (one that has a higher bias to equity holdings, does not have significant allocations to active strategies and does not manage the interest rate mismatch). Moreover, the contribution to surplus volatility from the interest rate mismatch can be significantly lower in the optimized portfolio.

Many institutional investors are faced with constraints, imposed either internally or externally, that do not give them the flexibility to fully implement this type of solution. Nevertheless, investors can make incremental improvements to portfolio efficiency by applying portions of this approach. For example, the efficiency of the return-generating portfolio can be improved by:

adding exposures to overlay strategies and/or market neutral hedge funds, swapping public equity for private equity exposure, or incubating an LDI solution with a portion of a portfolio and implementing it as if it were being applied to the whole plan.

## Conclusion

Although the appetite for liability-driven investment policy has increased, deciding how to implement it is not easy. There isn't a one-size-fits-all solution that is right for every plan. Each plan is likely to have important, unique differences that require a different LDI approach. Whether an investor opts to simply extend duration or takes more substantial steps towards reframing their investment policy design, we've outlined a roadmap to follow to create greater awareness of pension liabilities.

For more information, visit  
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<sup>4</sup> Typical Current Plan assumes a 65% global equity, 30% fixed income, 5% cash portfolio with the fixed income portion benchmarked to the Lehman Brothers U.S. Aggregate Index. Immunization assumes a 100% fixed income portfolio benchmarked to the plan's liabilities and passively managed; remaining surplus risk reflects mortality and other non-interest-rate actuarial risks. Extended Duration assumes fixed income is benchmarked to the Lehman Brothers U.S. Long Government / Credit Index. Total Portfolio Solution assumes a 30% fixed income asset allocation plus derivative positions that, collectively, effectively hedge 70% of the plans' interest-rate-related liability risk. Total Portfolio Solution also assumes a 35% allocation to global equity and 30% allocation to absolute return strategies where the latter are assumed to have a low correlation to global equity markets and to carry an 8% risk with 0.7 Sharpe ratio. The correlation between pension liabilities and global equity is assumed to be zero.

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