



## In LDI, Active = Healthy

As liability-driven investing (LDI) makes deeper inroads among sponsors of corporate defined benefit plans – often through the implementation of a dynamic de-risking program or glide path – the old debate about the appropriateness of active management in LDI space has resurfaced. While the need for active management of LDI strategies is now much more widely accepted than when the LDI settlers put their first dollars into the strategy, the discussion has shifted to determining the appropriate degree of active risk in LDI portfolios. In our view, active LDI strategies with an annual alpha target of approximately 100 basis points (bps) are necessary in an attempt to overcome structural problems in the way liabilities are valued and minimize asset-liability risk for a given return target.



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Mr. Martel is an executive vice president and pension and insurance solutions strategist in the Newport Beach office. He focuses on liability-driven investments and is also a member of PIMCO's investment solutions team. Prior to joining PIMCO in 2006, he was responsible for conducting asset-liability modeling and recommending risk management strategies for pension plan sponsors at Mercer Investment Consulting. He also advised institutional clients on asset allocation, investment policy and investment manager selection. Previously, Mr. Martel was in the actuarial practice of Mercer, advising pension plan sponsors on funding, accounting and plan design matters. He has 14 years of investment experience and holds an undergraduate degree in actuarial science from Laval University. Mr. Martel also holds the Fellow of the Society of Actuaries (FSA) designation.

When the first LDI wave hit the corporate defined benefit plan market (ca. 2006), many were expecting those strategies to be implemented either passively or with a relatively low degree of active risk. After all, if the main objective of LDI is to reduce overall funding ratio volatility, why add risk with active management?

However, as market participants, from plan sponsors to consultants and investment managers, refined their understanding of liability valuation methodologies, it became more evident that passive LDI strategies were condemned to meaningfully underperform liabilities – even when thoughtfully constructed to achieve a very tight match to those liabilities – for several reasons.

### Liability valuation methodologies implicitly assume active management

Bond universes used to construct most liability discount curves have established credit quality criteria (Corporate AA for accounting liabilities and Corporate A or better for funding liabilities). However, discount curve methodologies are fairly lenient when it comes to the treatment of

downgraded securities. When a specific bond ceases to meet the quality criteria (i.e., when it is downgraded) it is simply removed from the universe used to construct the curve. Therefore, while a passive liability-matching portfolio typically takes a hit due to the downgrade event, the liability will most likely go up on the same news, all else being equal, as one of the lowest-quality (and thus highest-yielding) bonds would no longer factor in to determining the average discount rate; the discount rate would then fall, sending the liability higher.

This effect can be even more significant for the numerous plan sponsors who use discount curves that truncate “outlier” bonds. For these plans, mere spread widening could dispatch a bond to outlier territory and lead to the same contradictory impact on the liability-matching portfolio relative to the liabilities (the portfolio goes down, liabilities go up).

In other words, liability valuation methodologies for corporate plans not only assume that the matching portfolio is managed actively, but also that the manager is “perfect” at credit selection (i.e., able to avoid exposure to any downgrade or bond that rotates out of the universe on the back of spread widening). In that context, a passive LDI approach or even a semi-active approach that does not allow sufficient flexibility to target a healthy amount of alpha is likely to underperform the liability that it is seeking to match.

### There is no perfect match

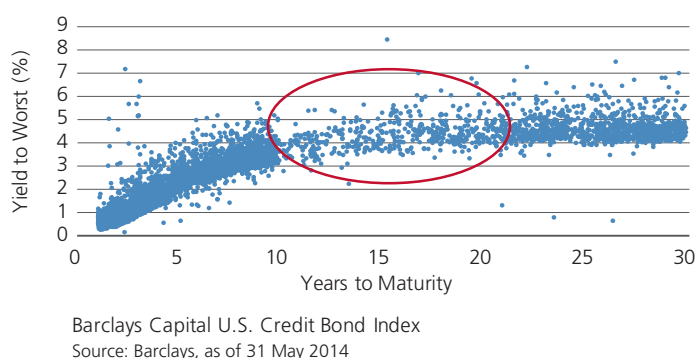
While it is possible to construct an LDI portfolio that will provide a tight fit to key liability risk factors (duration, spread exposure, curve risk, etc.), the match is never perfect for several reasons:

First, plan sponsors seeking to match the duration of a pension liability expected to be paid out over 60 years to 80 years confront a basic problem: the lack of corporate bonds with maturities greater than 30 years. Relative to liabilities, sponsors typically must accept an overweight to the 30-year sector of the curve and an underweight to shorter maturities to achieve the desired duration match.

Second, some sectors of the curve have fairly tight supply. The 10-year to 20-year maturity range is a good example.

Figure 1 shows the supply of these corporate bonds is relatively small, making it more difficult for plan sponsors to precisely match the liabilities in that part of the curve.

**FIGURE 1: INVESTMENT GRADE CREDIT BOND SUPPLY ACROSS MATURITIES**



Then there is issuer concentration. The universe used to construct liability discount rates typically exhibits a level of concentration well beyond the comfort zone of most plan sponsors (see Figure 2). Thus, LDI portfolios often deviate from that universe and look to include a broader and better diversified portfolio.

**FIGURE 2: LONG CORPORATE AA UNIVERSE CONCENTRATION RISK**

Weight of Largest Issuers in the Barclays Long Corporate AA Index	
Wal-Mart	27.3
Florida Power & Light	10.3
Royal Dutch Shell	8.8
IBM	6.6
General Electric	5.7
<b>Total</b>	<b>58.5</b>

Source: Barclays, as of 31 May 2014

These dynamics are likely to ultimately lead to curve, convexity and issuer mismatches, which may at times create further underperformance for a passive or semi-active LDI portfolio relative to liabilities.

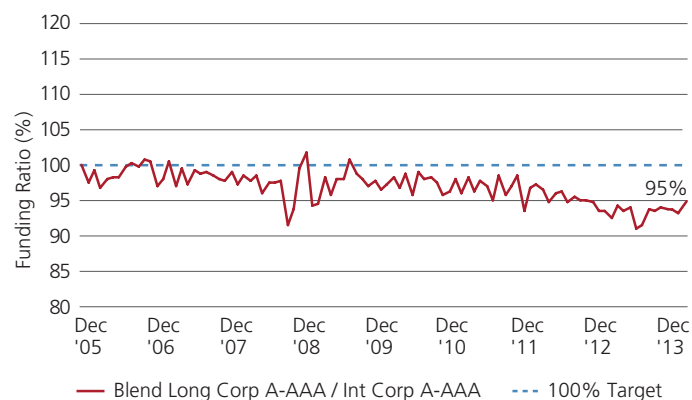
## Quantifying the impact

We can quantify the combined and cumulative effects of these forces. Figure 3 compares the performance of a typical pension liability discounted using the unsmoothed Pension Protection Act of 2006 (PPA) curve with that of a duration-matched portfolio constructed with a blend of intermediate and long corporate bonds rated A or better (a universe consistent with the pool of bonds used to construct the PPA curve).

Hypothetically, the funding ratio of a fully funded plan that invests all of its assets in a passive LDI portfolio of duration-matched corporate bonds rated A or better (theoretically, the tightest match to the PPA liability) would have fallen from 100% to 95% over eight years ending December 2013. This represents an average of approximately 60 bps of annual underperformance.

In an attempt to cover that gap and significantly reduce the number and length of periods of potential underperformance relative to liabilities, we believe plan sponsors should not only employ active management in LDI portfolios, but also allow the required flexibility to seek significant alpha targets. The exact magnitude of the alpha target will depend on a number of considerations including some that are plan-specific. However, as a general rule we believe that alpha targets in the neighborhood of 100 bps strike the right balance between addressing the potential underperformance of passive approaches and what may reasonably be achieved in long-dated credit markets.

**FIGURE 3: PASSIVE LDI APPROACHES ARE LIKELY TO UNDERPERFORM LIABILITIES**



Source: PIMCO, Barclays, IRS, as of 31 January 2014

**Hypothetical example for illustrative purposes only.**

The allocation in the blended index is not static, and is rebalanced on a monthly basis to match the liability duration. The plan is assumed to be 100% funded on 31 December 2005. Composition of the blend: long corporate A-AAA (Barclays Long Corporate A-AAA Index); intermediate corporate A-AAA (Barclays Intermediate Corporate A-AAA Index). Liability duration has fluctuated between 9.2 years and 11.7 years over the period covered in the graph.

Refer to Important Disclosures for additional hypothetical example, index and risk information.

## Spend your risk budget wisely

Plan sponsors who maintain meaningful allocations to return-seeking assets may be tempted to rely on these investments to potentially cover gaps that result from passive and semi-active LDI approaches. In our opinion, this is sub-optimal.

## Avoid making your return-seeking portfolio a jack-of-all-trades

When plan sponsors determine how much capital to allocate to return-seeking strategies, they typically consider how much return is required to achieve specific objectives like gradually reducing the plan funding deficit, offsetting service cost accruals or building a reserve against potential longevity-improvement costs, etc. Yet diverting excess returns generated by return-seeking portfolios to cover potential underperformance from a passive or semi-active LDI approach would reduce the amount left to reach the objectives of the return-seeking portfolio. Ultimately, it would diminish the

likelihood that those objectives would ever be realized.

Put simply, it is not the role of the return-seeking portfolio to match liabilities. In our view, this goal is best achieved within the LDI portfolio with an active approach.

### Optimizing your risk-return tradeoff relative to liabilities

There are different approaches to targeting a specific return that is in line with the sponsor's objectives. Investors should select the approach designed to minimize risk relative to liabilities (funding ratio volatility or surplus volatility) among those that meet the return target.

For example, assume that a liability is expected to grow at a rate commensurate with its 5.0% discount rate and the plan's objective is to outperform the liability return by one percentage point (i.e., a target return of 6% on plan assets). Let's also assume the plan sponsor can construct a passive LDI portfolio that closely matches the liability risk factors and has a 4.5% hypothetical return. If the expected return on equities is 7.5%, then there are two different ways to seek to achieve the 6.0% return target:

1. Allocate 50% to equities and 50% to a passive LDI strategy
2. Allocate 25% to equities and 75% to an active LDI strategy designed to deliver a potential 1% of alpha with a tracking error of 150 bps to 200 bps relative to the passive approach

As Figure 4 shows, while both strategies may achieve the same return, the active approach results in significantly lower tracking error to liabilities.

Bottom line: The cost of generating excess return over the liabilities – if cost is defined as incremental risk to liabilities – may be much lower with active management of the LDI portfolio than with a higher equity (or other return-seeking) allocation. Thus, to optimize their risk budget, plan sponsors should seek as much added value as they reasonably can from their LDI portfolios to reduce the required allocations to return-seeking asset classes.

Ultimately, we believe most sponsors will have to allocate some amount to equities or other return-seeking assets to achieve their return target. But by employing active LDI approaches with significant flexibility they may be able to trim the allocation to return-seeking assets and significantly reduce asset-liability risk for the same return target.

**FIGURE 4: ACTIVE LDI MAY ACHIEVE SIGNIFICANTLY LOWER FUNDING RATIO VOLATILITY**

Passive LDI Approach			
Asset Class	Weight	Hypothetical Return	Estimated Funded Status Volatility <sup>1</sup>
Equity	50%	7.5%	
Fixed Income	50%	4.5%	
<b>Total</b>	<b>100%</b>	<b>6.0%</b>	<b>11.0%</b>

Active LDI Approach			
Asset Class	Weight	Hypothetical Return	Estimated Funded Status Volatility <sup>1</sup>
Equity	25%	7.5%	
Fixed Income	75%	5.5%	
<b>Total</b>	<b>100%</b>	<b>6.0%</b>	<b>5.7%</b>

Assumptions: Hypothetical Return and Estimated Volatility			
Asset Class	Asset Class Proxy	Hypothetical Return	Estimated Volatility <sup>1</sup>
Equity	MSCI ACWI	7.5%	18.5%
Fixed Income (LDI passive)	Barclays Long Gov't/Credit	4.5%	11.8%
Fixed Income (LDI active)	Barclays Long Gov't/Credit*	5.5%	11.9%
Liabilities	14-Yr Duration Liability	5.0%	12.7%

\*Fixed income portfolio actively managed against Barclays Long Gov't/Credit  
Source: PIMCO

**Hypothetical example for illustrative purposes only.**

Hypothetical return assumptions do not reflect PIMCO's views as to the potential returns of those asset classes. These assumptions are used for illustrative purposes only and were selected based on PIMCO's market observations and the range of assumptions we have typically seen used by many plan sponsors.

<sup>1</sup> See Important Disclosures for additional information on volatility estimates.

Refer to Important Disclosures for additional hypothetical example, index, return assumption and risk information.

### **Conclusion: Active = Healthy**

It is important to recognize the significant drawbacks and risks associated with a passive or semi-active approach in an LDI strategy. Because of lenient treatment of downgrades, structural issues in the U.S. long duration corporate bond market and the inherent imperfections of the asset-liability match, passive and semi-active approaches are likely to underperform liabilities over time.

While active LDI strategies may not completely offset the issues associated with passive approaches and may also entail their own risk of manager underperformance relative to their targets, we believe that they improve the likelihood that an LDI strategy will closely track liabilities. As such, we recommend allowing sufficient active management flexibility to seek alpha in the neighborhood of 100 bps. This approach may also enable plan sponsors to reach their return targets with a lower allocation to return-seeking assets. The result would likely be significantly lower asset-liability risk exposure for the same return target.

In LDI, we believe active is the clear winner of this match.

## IMPORTANT DISCLOSURES

**Past performance is not a guarantee or a reliable indicator of future results.** Investing in the **bond market** is subject to risks, including market, interest rate, issuer, credit, inflation risk, and liquidity risk. The value of most bonds and bond strategies are impacted by changes in interest rates. Bonds and bond strategies with longer durations tend to be more sensitive and volatile than those with shorter durations; bond prices generally fall as interest rates rise, and the current low interest rate environment increases this risk. Current reductions in bond counterparty capacity may contribute to decreased market liquidity and increased price volatility. Bond investments may be worth more or less than the original cost when redeemed. **Corporate debt securities** are subject to the risk of the issuer's inability to meet principal and interest payments on the obligation and may also be subject to price volatility due to factors such as interest rate sensitivity, market perception of the creditworthiness of the issuer and general market liquidity. **Equities** may decline in value due to both real and perceived general market, economic and industry conditions. **Diversification** does not ensure against loss.

**Alpha and return targets** are not a prediction or a projection of return. There can be no assurance that any portfolio will be successful in meeting its proposed targets. Targets are not guaranteed and actual results may be lower.

**Hypothetical and simulated examples** have many inherent limitations and are generally prepared with the benefit of hindsight. There are frequently sharp differences between simulated results and the actual results. There are numerous factors related to the markets in general or the implementation of any specific investment strategy, which cannot be fully accounted for in the preparation of simulated results and all of which can adversely affect actual results. No guarantee is being made that the stated results will be achieved.

**Return assumptions** are for illustrative purposes only and are not a prediction or a projection of return. Return assumption is an estimate of what investments may earn on average over the long term. Actual returns may be higher or lower than those shown and may vary substantially over shorter time periods.

We employed a block bootstrap methodology to calculate **estimated volatility**. We start by computing historical factor returns that underlie each asset class proxy from January 1997 through the present date. We then draw a set of 12 monthly returns within the dataset to come up with an annual return number. This process is repeated 25,000 times to have a return series with 25,000 annualized returns. The standard deviation of these annual returns is used to model the volatility for each factor. We then use the same return series for each factor to compute covariance between factors. Finally, volatility of each asset class proxy is calculated as the sum of variances and covariance of factors that underlie that particular proxy. For each asset class, index, or strategy proxy, we will look at either a point in time estimate or historical average of factor exposures in order to determine the total volatility. Please contact your PIMCO representative for more details on how specific proxy factor exposures are estimated.

PIMCO has historically used factor based stress analyses that estimate portfolio return sensitivity to various risk factors. Risk factors are the underlying exposures within asset classes that, we believe, justify a return premium and drive the variations in asset class returns. Asset classes are simply "carriers" of various risk factors.

**The Barclays Intermediate U.S. Corporate Index** is designed to measure the performance of U.S. corporate bonds that have a maturity of greater than or equal to 1 year and less than 10 years. The Index is a component of the Barclays U.S. Corporate Index and includes investment grade, fixed-rate, taxable, U.S. dollar-denominated debt with \$250 million or more par amount outstanding, issued by U.S. and non-U.S. industrial, utility and financial institutions. **Barclays Credit Investment Grade Index** is an unmanaged index comprised of publicly issued U.S. corporate and specified non-U.S. debentures and secured notes that meet the specified maturity, liquidity, and quality requirements. To qualify, bonds must be SEC-registered. **The Barclays Long Corporate AA Index** is a component of the Barclays U.S. Long Credit index. Barclays U.S. Long Credit Index is the credit component of the Barclays US Government/Credit Index, a widely recognized index that features a blend of US Treasury, government-sponsored (US Agency and supranational), and corporate securities limited to a maturity of more than ten years. **Barclays U.S. Aggregate Index** represents securities that are SEC-registered, taxable, and dollar denominated. The index covers the U.S. investment grade fixed rate bond market, with index components for government and corporate securities, mortgage pass-through securities, and asset-backed securities. These major sectors are subdivided into more specific indices that are calculated and reported on a regular basis. **Barclays Long Term Government/Credit Index** is an unmanaged index of U.S. Government or Investment Grade Credit Securities having a maturity of 10 years or more. **Barclays U.S. Long Credit Index** is the credit component of the Barclays US Government/Credit Index, a widely recognized index that features a blend of US Treasury, government-sponsored (US Agency and supranational), and corporate securities limited to a maturity of more than ten years. The MSCI ACWI Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets. **The MSCI ACWI** consists of 45 country indices comprising 24 developed and 21 emerging market country indices. The developed market country indices included are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom and the United States. The emerging market country indices included are: Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Morocco, Peru, Philippines, Poland, Russia, South Africa, Taiwan, Thailand, and Turkey. It is not possible to invest directly in an unmanaged index.

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