LDI: 5 Steps to Success

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Introduction
This paper is a primer on liability-driven investing (LDI), focused on U.S. corporate defined benefit (DB) pension plans. We examine the recent past and the ways we believe LDI investing will evolve over the next 10 years. In particular, we highlight five key areas that we see pension plan sponsors thinking about today, and integrate our view of best practices related to these issues.

Executive summary
In our view, some fairly straightforward reassessment of current practices can yield tangible benefits as pension plans move further into the asset/liability management space and more fully adopt LDI:

1. Outcome-oriented strategies lead to investment strategies that link surplus investment risk to the status of the pension plan, most typically the funded ratio, via so-called 'glidepaths.' First generation glidepath solutions already in place can be refined and upgraded with modest additional complexity or cost.

2. Best practice asset-liability risk management is about identifying common risks and scaling back (hedging) unrewarded risks while seeking diversification among rewarded risks. This approach is more powerful than straightforward asset allocation, not least in that it breeds better understanding, but also in that it assists with logical risk and performance reporting.

3. A good liability matching bond portfolio needs to balance the characteristics of being a close proxy to the liability with a need to still be a good asset portfolio. This suggests a pragmatic blend between focus and diversification—something that calls for experience and flexibility to do well.

4. Return-generation in the context of a pension plan has some unique considerations. These range from the influence of the plan sponsor’s business model, to the degree of liability hedging, to effective time horizon due to glidepath design. Hence best practice is to not just work within the context of a 2-fund separation, i.e. one in which the return generating portion of the portfolio is considered separately from the liability hedging assets. It is the total portfolio of assets versus the liability that matters.

5. Implementation models for many pension plans are changing to embrace partnerships with providers who can assist with functional tasks, rather than just provide narrow products. Asset managers with broad subject knowledge and relevant experience have a role to play as part of a team of advisors/implementers to help deal with changing needs and circumstances over the life of an LDI investment strategy.
**Historical roots of DB asset allocation, and why this is changing**

It is fair to say that the observed asset allocation of pension plans has roots in the incentives created by accounting standards. SFAS 87, introduced in 1985, was an attempt to provide transparency to users of financial statements. In this respect, it was a great leap forward in disclosure, but there were some provisions in the standard that, perhaps, led to unintended consequences.

To gain support, the rules afforded pension plan sponsors some leeway in determining the inputs used to calculate annual pension costs. Importantly, the expected return on plan assets was under sponsor discretion. The framework meant that higher expected plan returns directly reduced reported pension costs, a desirable outcome for plan sponsors—if realized. Smoothing mechanisms that delayed the recognition of losses from poor plan performance in any given year also effectively encouraged more risk taking. These factors combined to create incentives for plan sponsors to gravitate toward high return, high risk portfolios, resulting in equity-heavy asset allocations. The result was an almost universal adoption of something close to the archetypal 70/30 equity/bond portfolio—largely created via an efficient frontier process that generally produced a high Sharpe ratio portfolio without direct regard to liabilities.

Over the years, lessons were learned and applied to this portfolio. For instance, the turndown in equities following the Technology, Media, and Telecommunications (TMT) bubble encouraged plan sponsors to diversify sources of alpha and beta generation to reduce pure equity exposure. Alternative assets took a growing share of the traditional nearly all-equity bucket. Commodities, hedge funds, structured products, and private equity were aggressively adopted by institutions in the recovery period from 2002 through 2007. But the expected diversification benefits of alternative asset classes did not materialize during the ensuing financial and liquidity crisis. The 2007 and 2008 crash in long rates coincided with the crash in all manner of risk assets, particularly credit and structured products.

So, while the mix of risk assets in pension portfolios had broadened, overall investment strategies could still be summarized as pro-cyclical. This headline long equity/short bond positioning has led to the witnessed consequence of a) highly volatile funded ratios over the past decade, and b) periods of underfunding that have coincided with weak corporate plan sponsor balance sheets and earnings. These two features can be seen in Figure 1.

![Figure 1: The uncomfortable link between pension plan fortunes and the fortunes of plan sponsors](image)

- The funded ratio of a typical U.S. corporate pension plan has been highly correlated with earnings over the past few decades.

Winding the clock forward to today, LDI has come to the forefront to address this issue, driven by an increasingly transparent regulatory and accounting structure for corporate pension plans and the realities of maturing plans due to natural aging of beneficiaries, as well as widespread plan closures.

**The emergence of LDI**

Today the paradigm has shifted from the off-market attitude of ‘it will be OK in the long run’ toward a more on-market, risk aware investment framework (see sidebar on page 4). The incentives for greater asset risk exposure are being tempered in favor of reduced funded status volatility.

In this world, the size, direction, and composition of the asset versus liability risks being taken can be seen by jointly considering the assets (held long) and liabilities (held short). Figure 2 shows the typical plan’s asset allocation coupled with its pension liability. Netting plan assets against plan liabilities reveals the net exposure of funded status to general risk factors. As the liability behaves in many ways like a corporate bond (future defined payments, discounted at a corporate bond yield), the typical negative net exposure to long duration bonds reflects the liability exposure subtracted from the bond asset exposure. Two observations spring forth:

*When assessed relative to the pension plan liabilities, there is a ‘short’ position to bonds due to a smaller (positive) bond holding compared to the larger (negative) liability exposure.*

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**Figure 1: The uncomfortable link between pension plan fortunes and the fortunes of plan sponsors**

- The funded ratio of a typical U.S. corporate pension plan has been highly correlated with earnings over the past few decades.
1. The pension plan is implicitly taking a short position on interest rates, meaning there is an expression of an expected negative return from bonds. If this is a conscious position driven perhaps by a view on the current level and shape of yield curve, then this position might be justified. In normal market environments and situations, however, we would expect pension plans to consider there to be a positive expected return from bonds, and hence, a positive or at least zero exposure should instead be held; and

2. The pension plan can be considered to be leveraged—in that it has a total net exposure to long and short positions that is in excess of 100%. Many pension plans (incorrectly) see themselves as unleveraged—but this is generally true if one only considers their assets. If consideration is also given to their liabilities, the true leveraged position is seen in its net market exposure.

**Figure 2:** Typical corporate DB plan

<table>
<thead>
<tr>
<th>Plan assets 100%</th>
<th>Plan liability 125%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Duration Bond</td>
<td>42%</td>
</tr>
<tr>
<td>Equity</td>
<td>10%</td>
</tr>
<tr>
<td>Alternatives</td>
<td>8%</td>
</tr>
<tr>
<td>Private Equity</td>
<td>40%</td>
</tr>
</tbody>
</table>

Net market exposure

-85%[^1]  
Long Duration Bond
Equity  Alternatives  Private Equity

[^1]: 40% long duration bond asset minus 125% plan liability.  
Source: The Journal of Investing, Summer 2012

Over the past decade, a number of pension regulatory changes have transpired. These range from accounting to funding to disclosure to insurance premia. The most recent changes to regulations have, on one hand, weakened the discipline of the clear mark-to-market regime established in 2006-2007 (MAP-21 and Highway and Transportation Funding Act of 2014 watered down the marking of liabilities to market through distorting the discount rate that can be used). On the other hand, they have strengthened the incentive of corporations to fully fund their plans (MAP-21 increased PBGC contributions, especially for underfunded plans).

Despite the sometimes mixed messages coming from regulators/lawmakers, it is safe to say that past practices are giving way to the current practice of thinking about assets versus liabilities much more scientifically, and structuring investment strategies that explicitly take measured risk positions in this regard. This is LDI pension plan style. In the rest of this paper, we outline some of the emerging best practices that are starting to solidify.

**What are people doing? How are best practices evolving?**

**1. Focus on an outcome, adopt a plan to get there**

Pension plan sponsors are thinking about where they want to be and how they would react from an investment risk point-of-view if they get there. This is true of all plans, but particularly closed plans. The goal in this case is generally to secure full funding and de-risk.

This ‘scenario planning’ is more than an academic exercise, as it helps to create a plan of action which recognizes that, in many cases, the appropriate degree of investment risk (either through a needs-based assessment, or a prudence assessment) does indeed vary as the plans funded status changes. Simply put, for a pension plan in surplus, there is less need to take investment risk for additional gain (surplus) than if the plan is less well-funded. This stems from a general asymmetry between the reward (or usefulness) of surplus versus the costs of deficit. It is difficult to extract value from surplus, but there are significant costs of being underfunded—not least that the plan sponsor may be required to make elevated contributions to a plan in deficit and pay higher Pension Benefit Guaranty Corporation (PBGC) premiums. The typical outgrowth of this thought process and analysis is a tapering risk profile for the plan’s assets (relative to liabilities) linked to funded status. This has become known as a ‘glidepath.’

There is a lot of science that can be thrown at the design of appropriate glidepath strategies for pension plans, but we observe that many designs are rather oversimplified and some can be flawed from an investment point-of-view. We believe that it is good to have a plan, and hence glidepaths are generally a good idea, but best practices are not always being followed. Furthermore, good practice does not have to come at the expense of elegant simplicity or ease of implementation. This is an area where we feel there is, by-and-large, still some work to be done. (Continued on page 5)

**Changing best practices in glidepath design**

<table>
<thead>
<tr>
<th>Many de-risking “glidepaths” are designed in a suboptimal fashion</th>
<th>Asset allocation based</th>
<th>Linear</th>
<th>Rigid</th>
</tr>
</thead>
</table>

| An improved structure focuses upon dynamic risk budgeting | Risk factor based | Non-linear | Adaptive and flexible |
Sidebar: Drivers of change for investment strategy of corporate pension plans

**Regulatory pressure**

**Pension Protection Act of 2006**
- Deficits to be funded in 7 years, significantly reduces smoothing
- A few rounds of easements have reduced impact to date

**FASB Accounting Reform**
- Phase I (2007) — brought pension on corporate balance sheet
- Phase II (expected 2016/7??) — remove EROA and smoothing (?)

**PBGC premium increases**
- Recent increases plus various phased increases 2015 onwards

**Changing attitudes towards pension plan**

- Painful experience of early 2000’s, 2007/8, and 2011/2012
- More and more pension plans closed
- Management increasingly viewing pension plan as a liability to manage out of
- Investors and Rating Agencies less welcoming of non-core risks

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**DB sponsor’s desire to de-risk (LDI)**

**Illustrative timeline of adoption of LDI in the U.S. Past and possible future.**

**U.S. LDI market is broadly following European trend, but with a lag due to timetable of regulatory reform**

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>2005-2007</td>
<td>Consultants/plan sponsors watched Europe LDI activity with curiosity; sponsors began having initial conversations; A few large plans made a move but due to strong markets, risk management was not a top priority broadly</td>
</tr>
<tr>
<td>2008-2009</td>
<td>Funding levels tumbled due to falling equity values and ballooning liabilities due to discount rate reduction; Sponsors acknowledged widespread regret for not having acted earlier, but more focused on return seeking asset volatility than liability hedging</td>
</tr>
<tr>
<td>2010-2011</td>
<td>Plans increasingly shifted from short bond to long bond benchmarks (e.g. Long Gov/Credit) and to liability tailored benchmarks; Hedge ratios generally below 50%; Widespread interest in progressive derisking strategies linked to improving funded ratios (i.e. glidepaths)</td>
</tr>
<tr>
<td>2012-2013</td>
<td>“Pause” in LDI adoption due to QE programs and low funded ratios until end of 2013</td>
</tr>
<tr>
<td>Today</td>
<td>LDI adoption resumes as plans put into effect their glidepaths</td>
</tr>
<tr>
<td>2016-2017?</td>
<td>Possible FASB 158 Phase II – alignment of pension accounting rules to international standards – will drive timing of shift in plan sponsor behavior</td>
</tr>
<tr>
<td>2020 &amp; beyond</td>
<td>LDI becomes conventional for pension plans; Hedge ratios approaching 100% (especially for frozen and closed plans); Little to no risk taking in closed corporate plans; Evolution of liability hedging to include longevity risk</td>
</tr>
</tbody>
</table>
2. Consider risk factors, not just assets
Pension liabilities have risk factors—they are exposed to price risk via changes in their discount rate and so emulate long corporate bonds. But it is too simple to say they ‘are’ corporate bonds or even that simply buying a portfolio of corporate bonds is a sufficient match. Peeling back the onion a little we can see that liabilities’ principle risks can be decomposed into risk related to Treasury yield movements and, separately, credit spread movements. The reason this is important and helpful is that these two risk factors can behave very differently in times of economic boom or bust (risk-on/risk-off). This separation of risk factors is therefore meaningful when designing an effective total plan asset portfolio, especially when the plan sponsor’s business characteristics are taken into account. Asset classes, while a useful and conventional way of thinking about portfolio design and construction, can fall short of helping to illuminate the true asset-liability challenge of a pension plan. This is due to the fact that risk factors are inherently packaged inside assets, rather than being made transparent and clear. Hence best practice is evolving to think first and foremost in terms of risk factors, which then at the implementation stage can be crafted back into asset class mandates for investment managers.

All in all, we believe that a risk-factor aware approach to LDI is helpful, not least because it helps downstream with risk and performance attribution reporting—forming, if you like, a single common language that ties together the asset and liability sides of the balance sheet, which can then link top-level strategy through to day-to-day management.

3. Understand the liabilities, but be pragmatic when building liability hedging portfolios
Pension plan liabilities are not that complicated, but to properly understand them analytical corners should not be cut. There is a pretty clear body of bond mathematics that can be applied to pension plan liabilities. Their risk signature can be defined in terms of characteristics that are both helpful descriptors and investable factors, which can then be used to build investable portfolios.

In thinking through what is an appropriate liability hedging portfolio, a balance needs to be struck in terms of “closeness” to liability versus diversification (specifically diversification across and amongst corporate credit issuers). As illustrated in Figure 3, being too removed from the true liability characteristics leads to an ineffective hedge, but being too focused on a precise echo of the liabilities results in a poorly diversified asset portfolio. Good experience and judgment is required to help navigate the range of choices to arrive at a solution that is well balanced, investable, and fully understandable by the fiduciaries concerned.

4. Diversify returns, but be cognizant of need to be dynamic (avoid illiquidity)
There are a host of issues to consider for pension plans wishing to take investment risk (e.g. not fully match assets to liabilities) in order to seek to grow their assets faster than liabilities. Normal best practice investment disciplines all apply—namely, focus upon efficient risk-adjusted returns by taking only intentional and rewarded risks, diversified in an optimal manner, and with full use made of active return (skill) opportunities. But there are also a few additional considerations:

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Figure 3: Degrees of precision for liability-centric portfolios

Be aware of trade off between diversification and hedging precision.

For some liability streams other risk factors can also exist, e.g. inflation for liabilities with significant COLAs, for instance.
A. The influence of any unhedged liability exposure creates a residual exposure that should be factored into the ‘return-seeking portfolio’ optimization. By this, we mean that the ideal return-seeking portfolio that would be built for an investor who sees cash as his risk free alternative should be different from a pension plan that has a net (short) exposure to bond-like liabilities due to only having a partially unhedged liability. Portfolios that look ideal for an absolute return investor, might not, therefore, be so appealing for this special type of relative return investor.

B. If the pension plan is seeking to make use of a de-risking glidepath, the implicit time horizon of that glidepath may caution against the use of illiquid asset classes which might need to be sold before their natural maturity. For instance, private equity might be appealing for ‘normal’ long-term investors, but it might not sit well within a pension plan’s asset allocation if the plan’s funded ratio improves sufficiently before the private equity exposure is easily realizable.

5. Appoint managers who can perform functional purposes and who can help the plan achieve its objectives

Traditional pension plan investment portfolios have benefited from being largely stable over time, allowing a relatively light governance touch. Historically, it has been appropriate and sufficient to work within a governance framework of periodic risk and performance oversight—often via quarterly meetings—and with limited staff/advisory overhead. The newer world outlined herein necessarily involves more detailed asset-liability risk aware positions and requires dynamic reactions to changing situations (i.e. to changing funded ratio via the glidepath). This suggests that more oversight and an ability to make more timely actions are probably required. To this end, we have seen the rise of wholly- or partially-delegated mandates, whereby day-to-day practitioners have stepped up to help pension plan sponsors implement aspects of their governance task.

Figure 4: Spectrum of degree of outsourcing

As noted, one end of this spectrum is full outsourcing—the so-called OCIO route—whereby most, if not all, aspects of running the pension plan on a day-to-day basis are passed off to a provider. But there is also another route which is growing in popularity, in which top-level oversight and coordination responsibilities are retained by the plan sponsor, but sub-components of the investment task are passed to managers. Examples of this might be the design and ongoing execution of the liability hedging portfolio. Or it might be the oversight of the whole ‘return-seeking portfolio.’ Or it might be the integration of all managers into a common asset-liability risk measurement framework with unified reporting.

Whatever the implementation model, many plan sponsors are recognizing the strategic benefit of forming a stable of advisers and investment managers that can effectively become a ‘team’ and collectively help work toward the final desired outcome. Actuaries, investment consultants, and asset managers together can bring their different particular skills, experiences, and capabilities to build a more rounded solution than any one party by itself. From our perspective, the hallmarks of investment managers that are effective in this capacity are those that have a broad-based set of investment capabilities (i.e. are not niche), possess a consultative/solutions-based orientation, and who have individuals who are focused on this part of the market and who can walk-the-talk of pension plans.
Appendix: LDI concepts outside of the corporate DB space

Our primer has summarized how LDI has gained renewed importance to sponsors of corporate defined benefit plans. However, other investor types may also think about their portfolio objectives in liability-terms. Generally speaking, portfolio objectives for LDI investors are defined by liabilities or spending goals, stated as the expected amount and timing of future payments from a portfolio to external parties. Framed broadly, LDI is inherent in most all pools of capital that have been set aside for a clear purpose (which, frankly, is most pools of capital the world over).

For these investors, liabilities are often moving targets. Complicating matters, investors depend on external sources of funding that are far from certain. Thus, the appropriateness of an investor’s investment objectives and asset allocation must be viewed in the context of both its specific spending and funding risks.

Below, we briefly highlight how these concepts might be applied by endowments/foundations or within the insurance space. This is certainly not an exhaustive list of the types of investors that might use LDI techniques, but the examples can serve to illustrate how spending and funding risks are not the specific domain of the corporate DB space.

Endowments/foundations

Liabilities for a non-profit entity, such as a university endowment, can unexpectedly vary based on future levels of taxpayer support or on future growth in financial aid and operational costs. To maintain tax-exempt status and remain competitive with other universities, the endowment must make minimum current-year distributions, yet must also preserve and grow resources for future students. The duration of the spending liability is perpetual.

Endowment funding also follows a unique dynamic; mark-to-market changes in portfolio value are correlated with levels of charitable contributions. For example, when markets and the economy are weak, alumni are making smaller gifts at precisely the wrong time (which is similar, by the way, to sponsor contributions to corporate DB plans in times of stress).

For these reasons, endowments and foundations have been pioneers in low beta, absolute return investing. Portfolio diversification solutions have obvious appeal in this context.

Insurance

For insurance companies, liability uncertainties arise from differences between estimated and actual loss experience. For example, life/annuity companies are exposed to unexpected changes in mortality. Health companies are exposed to morbidity uncertainty. Liability exposure can be significant for property/casualty insurers that underwrite risks related to natural disasters, necessitating the use of reinsurance and diversified sources of alpha generation to hedge and reserve for tail risks.

Unique to the insurance industry, both funding and future liabilities are impacted simultaneously by price competition to insure specific risks, also known as the underwriting cycle. The direct links between funding and liabilities, in combination with insurance regulation, have made LDI techniques the natural domain of insurance companies. Insurance companies have a general account and utilize external asset managers for areas where they lack investment expertise. For external asset managers, understanding the insurance company’s unique “make-or-buy” dynamic is crucial to positioning insurance solutions (of course, corporate DB plans make similar make-or-buy decisions with respect to degree of shared oversight).

Of course, LDI is perhaps most talked about in connection with corporate pension plans today because of the drastic increase in appreciation of the importance of liabilities to sponsors of these plans as well as their beneficiaries! It is not the case that LDI is a new science—it is just that their appreciation of this science is coming to the fore.
Andy Hunt, FIA, CFA
Head of LDI and Global Credit

Andy Hunt serves as the head of liability-driven investing and global credit at Wells Capital Management. In this capacity, he focuses on building out the firm’s LDI solutions, creating a cohesive global credit platform, and overseeing the portfolio management teams that have strong credit-based strategies. Andy joined WellsCap in 2014 from Blackrock where he served as the head of North American solutions for corporate pensions plans, including U.S. liability-driven investment capabilities, since 2005. Earlier, he was a partner at Watson Wyatt (now Towers Watson) in the United Kingdom since 1992 in various roles as an actuary, senior investment consultant, and head of investment consulting for defined contribution. Andy earned his degree in mathematics from Cambridge University. He has earned the right to use the CFA as well as FIA designations.

Matt Alexander, CFA, CAIA, and product manager at Wells Capital Management, assisted in the development of this primer.