



# GLOBAL STRATEGY & INVESTMENT CONSULTING

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## LIABILITY DRIVEN INVESTMENTS

### A BRIEF OVERVIEW

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## INTRODUCTION

The confluence of several years of sub-par performance at the stock market, a marked increase in pension liabilities due to the impact of sharply lower interest rates and the failure of several large pension plans have spurred regulators and legislators to make long overdue changes to the pension regime. According to the U.S. Treasury Department, unfunded pension plan liabilities increased from \$286 billion to \$450 billion between 2001 and 2005. The failure of major pension plans resulted in a sharp decline in the net financial position of the Pension Benefit Guarantee Corporation (PBGC) as the PBGC assumed these plans' unfunded liabilities. The collapse of Enron and WorldCom, which enraged the public, compounded the situation by destroying 401(k) in savings.

Congress responded and passed the Pension Protection Act of 2006, which President Bush signed into law on Aug. 17, 2006. The new legislation impacts almost every aspect of retirement savings. In tandem with the passage of this new law, the Financial Accounting Standards Board (FASB) completed the first phase of its comprehensive project to improve the accounting and reporting standards governing defined benefit pensions and other post retirement plans with the issuance of FASB 158. The new standards result in significantly more transparency and accuracy in measuring a plan's position. Also, for the first time, they require shortfalls to be reflected in the balance sheet.

In Europe, changes in the regulatory and accounting regime governing retirement benefits are more advanced and even more pressing and have driven many pension plans to radically alter the way they manage pension assets. Under the widely adopted International Accounting Standards and U.K.'s FRS, assets and liabilities are valued at market rates and are reflected in the balance sheet. As a consequence, European plan sponsors are acutely sensitive to mismatches between asset and liability durations and many have moved aggressively to reduce this mismatch.

The new regulatory and accounting regime will increasingly force plan sponsors to re-evaluate their focus on total return management of plan assets over a medium- to long-time horizon and force them to concentrate more on managing the surplus (deficit) of the plan. Investment strategies that focus on managing the surplus (the difference between the fair value of plan assets relative to projected plan benefits) are generally referred to as liability driven investments (LDI).

The new regime has effectively compressed the time frame that plan sponsors operate in. Under the previous regime, plan sponsors could take a long-term perspective and be confident that equities would outperform bonds over long periods of time. Under the old regime, they could afford to focus on higher expected return asset classes and virtually ignore the mismatch between asset and liability durations. Funding shortfalls were only recorded in footnotes to the balance sheet and obfuscated by the treatment of credit balances. Now, with the compression in smoothing periods for asset and liability valuations and the requirement that funding shortfalls be reflected in the balance sheet on a current basis, plan sponsors will, of necessity, be more sensitive to the mismatch between assets and liabilities and the funding volatility that is generated as a result.



### DEFINITION

Liability Driven Investment (LDI) is a form of investing which aims at gaining sufficient assets to meet all liabilities, both current and future. This form of investing is most prominent with defined-benefit pension plans, whose liabilities can often reach in billions of dollars for the largest of plans.

A Liability Driven Investment (LDI) strategy is any strategy that manages the assets of a fund relative to its liabilities. An LDI strategy effectively sets a risk budget so that assets closely match the liabilities of the fund in order to minimize the associated risks. Invariably, the LDI strategy uses some form of hedge to isolate and remove unwanted risk. Essentially, an LDI strategy seeks to isolate distinct sources of alpha and beta and may or may not address specific cash flow requirements.

This type of investing strategy focuses on managing a plan's liability risk while providing multiple sources of excess return, or alpha, for investors seeking out performance. It recognizes that meeting a plan's future cash payments is a true measure of investment success. While solutions will vary according to a plan's funding status, risk appetite, and mandate constraints, liability-driven investing offers plans of all descriptions, a more efficient and transparent way of managing risk in order to hedge – and potentially outperform – liabilities. As regulatory and accounting changes focus more attention on plan funding and its balance sheet effects, liability management has assumed new urgency.

### REGULATORY AND ACCOUNTING DRIVERS OF LDI STRATEGIES

#### *Financial Accounting Standards Board (FASB) Statement No. 158*

- *Defined benefit pension plan funding shortfalls must be reflected directly in the company balance sheets*

#### *Pension Protection Act of 2006*

- *Funding requirements increased to 100%*
- *Seven year funding shortfall catch-up*
- *Asset and liability valuation smoothing reduced from five years to two years*
- *Valuations constrained to fall within 90% to 110% of valuations on the financial statement date*
- *Liabilities grouped and discounted using a segmented, high quality corporate yield curve*

### Need

Traditionally, asset managers have focused only on the assets side of their clients' business, and the management of liabilities was seen as an actuarial role. But the present has many institutional funds existing to support a stream of more-or-less committed cash outflows, or liabilities. This is true for pension funds, insurance funds, credit unions and charities. Even retail funds which are aimed at providing for school fees or pension top-ups have cash outflow targets to meet. The funds' assets therefore have to exist to cover their liabilities over time, rather than as an end in themselves. The real concern of the asset manager's client (the corporate plan sponsor, trustee, insurance provider etc) is not the value of the assets in isolation, but the adequacy of the assets to meet liabilities. Assets' relativity to benchmark is often irrelevant in a liability-driven context, and at best will be a crude approximation to the factors, which impact the liability side.

Thus, the need of a strategy arose which can take responsibility for matching asset values to liabilities. Discussions of asset and liability matching (ALM) and immunization are now common with the growing requirements to report against funding surpluses or shortfalls, and to provide confidence measures on funding, as well as on asset values.

### TRADITIONAL APPROACH

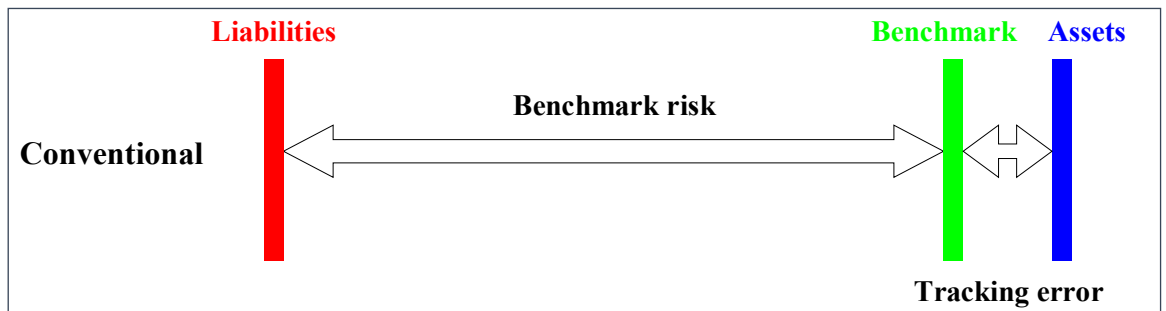
Historically, the best practices for pension scheme investments have involved:

1. Constructing an asset-liability model (ALM) of the scheme
2. Using this model to derive an allocation to each considered asset class
3. Setting a benchmark for each asset class
4. Hiring managers to invest with respect to the chosen benchmarks.

Steps (1) and (2) ensure that the strategic benchmark, at the asset class level, is “liability driven”. This represents a major step forward compared to the previous practice of using a “one-size-fits-all” pooled fund.

At the implementation stages (3) and (4), schemes typically revert to manager benchmarks for each asset class.

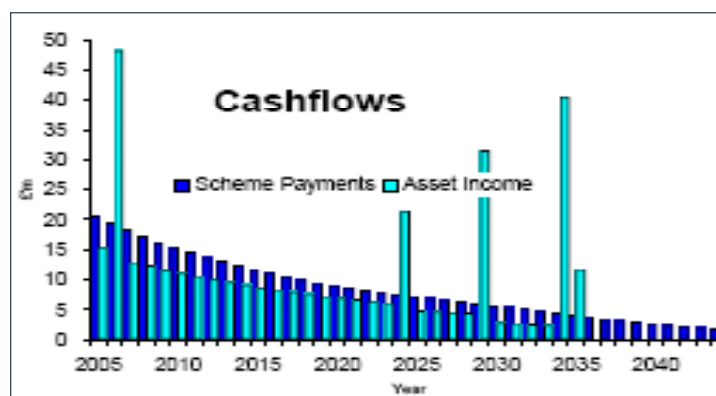
For example, a bond portfolio might use the FTSE over a 15 Year Gilt Index. These indices may not provide a good approximation to the scheme liabilities and so, as inflation and bond yields change, liabilities and index behave differently. This is known as a “tracking error” between the assets and



liabilities and is often unwanted risk.

### Constructing the liability benchmark

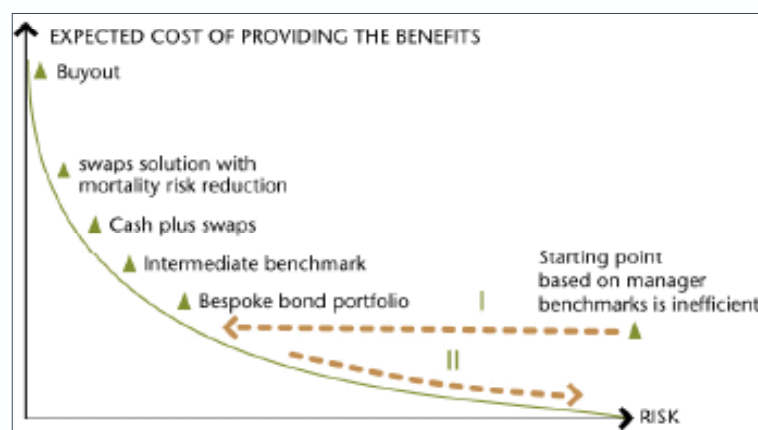
A pension scheme’s liabilities are a series of benefit payments stretching far into the future (typically 70 years or more). They include payments to various members that can be fixed level amounts or can increase in line with inflation or salary growth. Projected benefit payments from a typical mature scheme are shown by the series “Scheme Payments” in the graph below.



We can put together a portfolio of assets – using instruments of varying degrees of sophistication that more closely replicate the characteristics of the scheme payment profile. The simplest approach is to draw up a portfolio of bonds. An example income stream is shown in the graph. One can see that it is not possible to achieve a perfect match; bond portfolios are typically for a shorter term than liabilities and include lumpy redemption payments. The next level is to overlay the above portfolio with a portfolio of interest rate swaps that extend the term and reduce the lumpiness of the asset income.

### ANALYZING THE RISK-REWARD POSITION

The graph below illustrates the process. The curved line indicates the best portfolio at each level of risk portfolios.

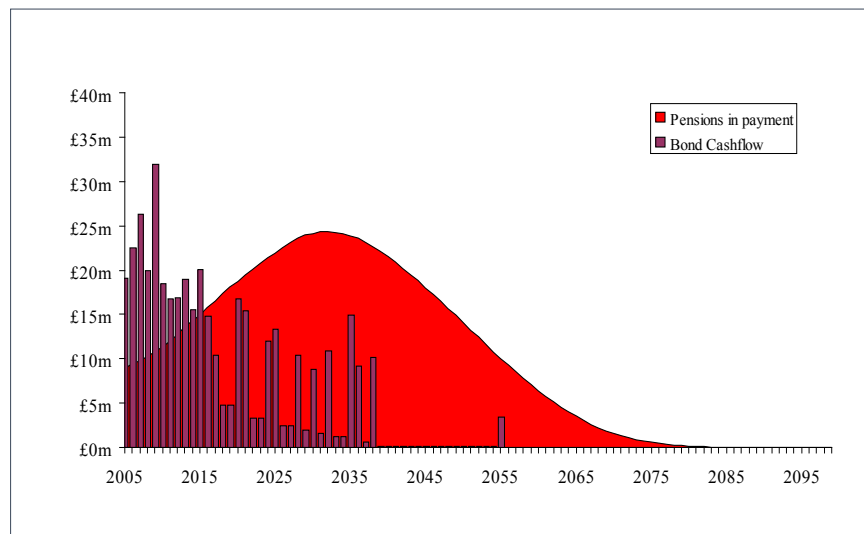


Arrow I illustrates how the expected return was maintained while the level of risk was reduced. In general, the final solution will depend on the client’s objectives. For example, it would be possible to take out more risk with a more sophisticated solution at a higher expected cost. Alternatively and moreover at the given current funding levels, clients can add back some risk to increase the expected return.

## WHY TRADITIONAL APPROACH DID NOT WORK?

The early years of this decade witnessed a perfect storm for pension funds as equity markets collapsed and interest rates fell, resulting in substantial increases in pension liabilities and substantial decreases in pension assets.

Damage was not immediately evident due to the common practices for accounting and funding purposes of discounting liabilities at unrealistically high interest rates and the smoothing of asset values rather than recognizing market values. While such practices are permissible under accounting and funding rules, they are inappropriate for asset-liability management purposes. They lead to mismatch in the cash flows and would result in a weakened degree of economic benefit security for participants.



Efficient asset management requires detailed knowledge of the true economic values of both assets and liabilities. Asset managers who only seek relative performance against an asset benchmark are failing to recognize the significance of liabilities and the need to manage assets and liabilities in an integrated manner. Unfortunately, most published pension plans' funded ratios are not based on true economic values, but on overstated smoothed asset values. Typically averaged over five years, these ratios are based on understated liability values that are derived from applying non-economic discount rates to liability cash flows where the rates are significantly above true economic market values of interest rates. The use of non-economic values for assets and liabilities presents a distorted picture of the real state of funding and benefit security.

A pension plan that reports a 100% funded ratio based on smoothed asset values and liabilities (computed with a discount rate related to Expected ROA), may in fact have a significantly lower funded ratio on a true economic basis of market values of assets and liabilities. Research studies performed by New York-based asset management firm Ryan ALM have established that if a hypothetical pension fund with a standard assumed liability distribution had a 100% market value funded ratio as of January 1, 2000, and if no changes were made to assets or liabilities over the next five years, with assets invested in an index portfolio of 65% equities and 35% fixed income and cash, the market value funded ratio would have declined to 53% by December 31, 2004. Other researches at Ryan ALM disclosed that five-year averaging of smoothed asset values resulted in an overstatement of asset values by 29% as of December 31, 2004 and the use of an ROA of 8% to value liabilities resulted in an understatement of liabilities compared to the market values of 35% and that using the discount rates specified in the Pension Equity Act of 2004 understated liabilities by 15%.



### LDI APPROACHES

Approaches to LDI typically fit three broad categories.

#### 1. Close matching

If a scheme is well funded, it is possible to adopt the lowest-risk investment strategy available. The scheme would, therefore, invest in fixed- and index-linked bonds designed to match the cash flows of corresponding liabilities. In practice, the precision of matching can vary between an annual cash flow match on the one hand, to broader match of average exposure on the other. If it is accepted that liability projections are fairly accurate, and if the local bond market is liquid and well developed, then a more precise match is possible. However, in less favorable circumstances, increased transaction costs can outweigh the risk-reduction benefits of a closer match.

A close-match strategy can either be passively or actively managed within agreed risk limits - allowing the asset manager to take active positions; for example, on the shape of the yield curve or corporate bond exposures or even overseas bonds exposures.

In practice, having determined the scope of securities to be considered, it is helpful to use an optimizer program to determine the best fit between the available assets and liabilities. Therefore, it is common to see the significant exposures to the maximum maturity to balance the ultra-long-term exposure, especially where the maximum maturity is shorter than the liabilities.

#### 2. Optimized conventional solutions

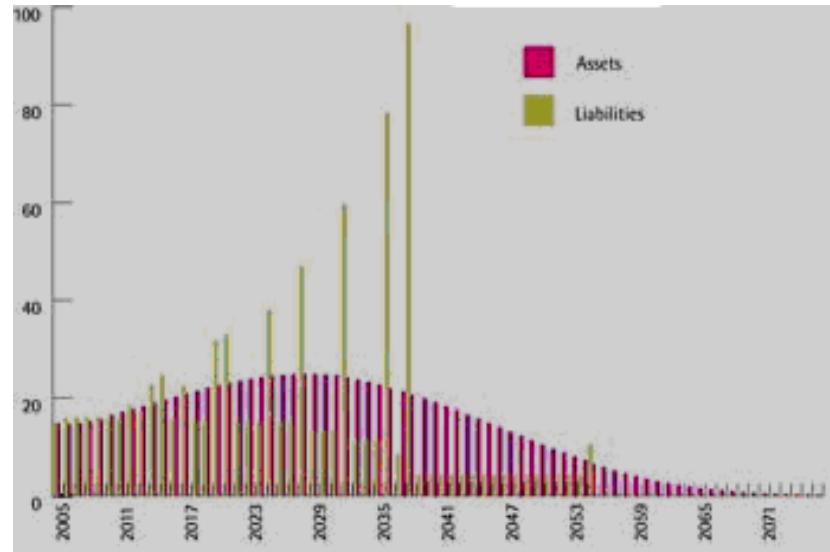
Unless a pension fund is very substantially over funded, a narrow match will only deliver liability return and will not exceed it significantly. Many funds are willing to bear a greater risk in order to increase their expected return. By using an optimizer, it is possible to estimate the efficient frontier of a range of investment strategies; determining for different levels of targeted return (over the liability proxy), the optimal investment mix that has the lowest expected risk. Optimizer models can be quite sensitive to the quality of the input assumptions, and in practice there are usually a range of broadly efficient strategies clustered around the optimal strategy that will be effective.

The basic process is similar to the traditional strategy-setting mechanism. But because of the focus on the position relative to liabilities, the outcome is likely to differ as follows:

- The strategy will have a lower exposure to equities and a greater exposure to bonds;
- The strategy will be highly diversified into a broad range of alternative asset classes;
- Long-maturity bonds will be favored over shorter maturity bonds because they have a lower risk relative to liabilities and yet provide a higher expected return.
- A swap overlay permits management of interest rate and inflation exposures and allows greater flexibility in the strategy for the underlying assets
- The strategy will not rely on competitor benchmarks and will place less reliance on index benchmarks, which will be as broad as possible.

The strategy will seek to make use of all available sources of out-performance by asset managers within their market. Clearly, if added value can be generated by active managers, there is less need to take market risks in order to meet the required returns. It follows that any market risk will be a smaller in proportion to the total risk. This is particularly advantageous because any over or under performance by an asset manager does not tend to correlate very strongly with the market risk, thereby providing diversification benefits. Techniques that have aroused interest in the marketplace are developing in the realm of portable alpha and permit the independent selection of market exposure and manager skill.

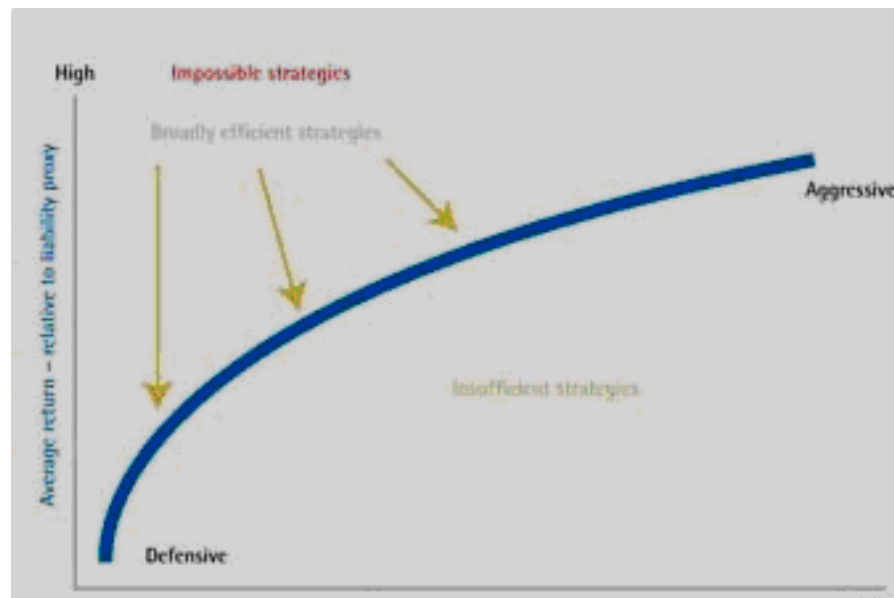
Illustrative optimized cash flow match using eurozone bonds



**3. Holistic solutions**

If, for example, the liability return is broadly equivalent to long-duration bond returns, investment objectives can be expressed as ‘bond returns plus a bit’. Holistic-solution approaches are where this type of objective is directly defined as an explicit benchmark for the asset manager. The assets are then managed in a process designed to deliver this benchmark.

Efficient frontiers in an LDI context

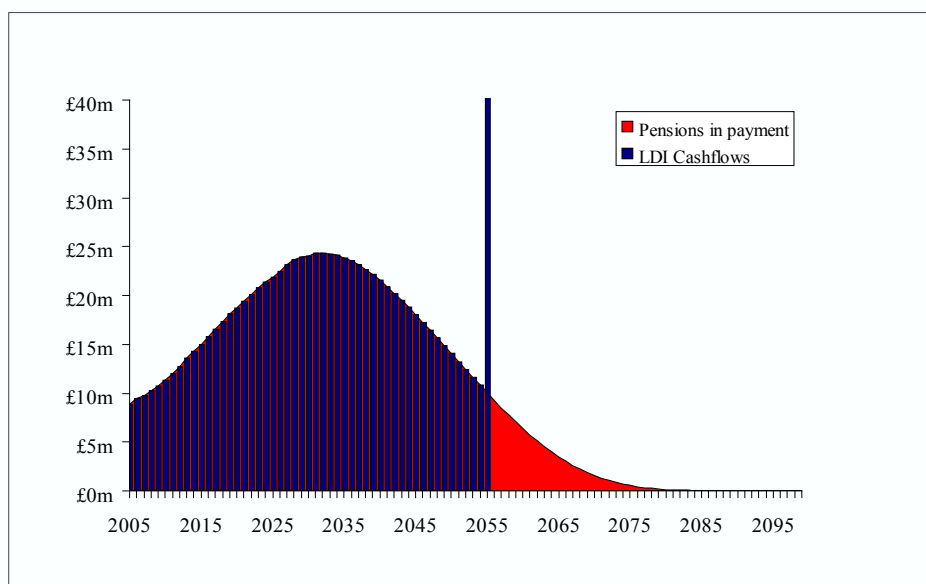


Such a process could be operated in a wide range of different ways. Assuming that the liability proxy has been properly defined, the important factors to consider in assessing such an approach are:

- The process is truly aligned to generate the target (and is not merely a re-branded process that aims to beat an irrelevant market index); and
- The number and quality of sources from which performance exceeding the benchmark will be derived.

### LDI STRATEGIES

There is a change sweeping over pension fund investment management as asset managers realize the problems associated with investment strategies that focus exclusively on performance relative to an asset benchmark. Managers now embrace the concept of Liability Driven Investment (LDI) Strategies. LDI establishes a closer match of assets and liabilities and reduces volatility in the progress of funded ratios from year to year as measured on a market value basis. Moreover, LDI avoids the risk of substantial deterioration in funding status and supplemental funding to redress deficits caused by mismatches of assets and liabilities. A major feature of LDI strategies is the use of a specially constructed liability benchmark that describes the precise nature of liabilities based on the projected cash flows for future benefit payments.



This liability benchmark is constructed using market discount rates (ideally is a series of risk-free rates represented by a zero-coupon treasury yield curve). The benchmark is revalued continuously to reflect changes in liability cash flows and market interest rates. LDI strategies then involve the construction and active management of a portfolio of securities that will match or outperform the liability benchmark.

### CONCLUSION

In conclusion, liability driven investing is a risk preference based approach and can be used to complement or even totally replace current strategies. The low risk narrow approach is ideally suited for mature, well-funded pension schemes, while the broader approach is more applicable to under funded schemes seeking a higher long-term return.



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