LDI PRODUCT TYPES AND IMPLEMENTATION STRATEGIES

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Introduction

This paper will outline the main types of Liability Driven Investment (LDI) products and discuss issues to consider in implementing LDI.

LDI Product Types

With the increasing focus on LDI by plan sponsors, asset managers have brought several different types of LDI products to market. And as sponsors seek creative ways to add duration to their portfolios, we expect these products to keep proliferating. Comparing LDI strategies can be difficult, as each uses a different methodology to achieve the common goal of extending duration. On that basis, we have grouped LDI products into three broad categories based on the ways they contribute duration: 1) Traditional Long Duration; 2) Capital Efficiency; and 3) Portable Alpha.

Traditional Long Duration: In this approach, managers aim to outperform a long-duration bond index, typically with a duration of about 12 years. The strategy is very similar to that of a core fixed-income manager, but with a longer targeted duration. This category also includes passive fixed-income managers who aim for longer duration. The advantages and potential drawbacks of this approach include:

Advantages

- These strategies can be easily adopted using existing managers. In most cases, a core bond manager will offer a long-duration fixed-income alternative, allowing plan sponsors to take the first step into LDI very easily.
- They are the solutions most commonly used in U.S. plans today, likely due to ease of implementation.
- Active fixed-income managers may be able to generate benchmark-beating returns, or alpha, by selecting long-dated credit issues, which have higher expected returns than comparable -duration government bonds because of their additional risk. By including only credit securities in the portfolio, this approach can best approximate credit-spread-based liability measures. However, rating downgrades pose a potential risk to the value of long credit assets, which could impact those assets' coverage of yield-based liability measures. This topic is discussed in more detail in the NEPC paper *Credit Spread Disparities Between Assets and Liabilities.* In early 2009, long-duration credit bonds carried attractive yields and some plan sponsors were able to implement long credit LDI strategies.

THE GROWTH OF LDI PRODUCT OFFERINGS PROVIDE PLAN SPONSORS INCREASED OPTIONS TO MATCH LIABILITY DURATION.

Potential Drawbacks

- Compared to other approaches, the degree to which portfolio duration can be lengthened via these strategies may be limited. Traditional long-duration managers typically aim for a duration of about 12 years, with some managers able to extend out to 20 years. Therefore, this approach could require a substantial portion of plan assets to achieve a higher target hedge ratio (50% or more), which would likely mean shifting assets out of return-generating asset classes such as equities. This reallocation may impair the portfolio's long-term earnings potential, a risk that must be carefully balanced against the need to protect the plan's funding status.

- Longer-dated securities (both Treasuries and corporate bonds) are usually not in abundant supply, potentially limiting the investable universe.
- While active management of fixed-income assets creates the potential for alpha, it also carries a risk of increased tracking error to the liability hedge, especially if duration management is a primary driver of active risk and return.

Capital Efficiency: By using derivatives, managers can generate much longer duration on the assets, allowing a lower percentage of the portfolio to be dedicated to the hedge. These solutions can be implemented through a commingled fund and/or an individual overlay. The commingled fund products offer ease of administration, while the overlay products permit greater customization.

In evaluating capital-efficient products, it is important to know how the collateral will be invested. Derivatives essentially allow managers to gain exposure (via a swap or futures contract) without physically owning the assets. Through a contract, the manager and its counterparty agree to terms and conditions of the exposure, and the collateral is invested, typically in cash. Based on market movements, the value of the derivative is "trued-up" on a periodic basis (usually daily, weekly, or quarterly.) The collateral pool allows the manager a means to settle the change in the value of the swap/future — i.e. receive funds from the counterparty when the market moves in its favor, or pay funds to the counterparty when the market moves against it. While most products are fully collateralized, some capital-efficient offerings employ leverage - that is, they add more exposure through derivatives than is covered by collateral. This approach makes possible the longest duration available (up to 45 years in commingled funds), allowing the plan to commit a lower proportion of assets for targeting a given duration hedge ratio.

Depending on the capital efficient product, assets can also be invested to more closely match the structure (that is, the yield-curve exposure) of liabilities. While the manager will not gain incremental return on assets invested within the strategy (collateral will normally earn only a cash return), this approach frees up more assets to pursue incremental return elsewhere in the portfolio. This capital efficiency may actually allow greater total-portfolio returns, depending on how the remaining assets are invested .

While capital-efficient approaches have only recently begun to gain acceptance in the United States, they have been used for several years in the United Kingdom, where they are now among the more popular means of extending portfolio duration.

Advantages

- Provides the longest duration, up to 45 years for some strategies, with the potential to exceed 45 years by using swaps/futures at the plan level.
- Minimizes the proportion of plan assets needed to achieve the target duration hedge ratio, freeing up assets for investment in higher-return vehicles.

Potential Drawbacks

- Complexity: this approach relies on derivatives and possibly leverage. Hence a solid understanding of structure, counterparty-risk management, and the cash-investment process is essential. Depending on their terms and conditions, leveraged capital-efficient products may require the posting of additional capital.
- A separate account, if chosen as the vehicle for this strategy, may carry a higher administrative burden in the form of ISDA agreements, daily collateralization, etc. However, several commingled products now in the marketplace substantially lessen this burden for sponsors.

- Products in this category typically do not provide alpha/return generation, and little or no credit protection. On the other hand, fewer assets are needed to achieve the duration hedge, allowing more assets to be invested for return and credit protection.

- Asset volatility is likely to be greater under this approach, because asset duration is maximized. This is not necessarily a negative, however, as the true measure of a plan's success should be funding status protection/improvement rather than asset returns.

Portable Alpha: In this structure, managers gain exposure to an asset class, or beta, through the use of derivatives, which require a limited outlay of cash to gain full exposure. This approach is similar to the capital-efficient model, except that collateral is not invested in cash, but rather in an uncorrelated alpha source. From an LDI perspective, portable alpha solutions can be used to combine duration-lengthening and return potential in a single product. The extra duration can be achieved either through the beta (market) source or through the alpha source.

- *Duration as alpha*: The manager turns an efficient asset class, such as large-cap equities, into a source of beta through the use of futures or options. The excess cash is then invested in an actively managed long-duration bond portfolio.

- *Duration as beta:* The manager turns duration into a source of beta by purchasing a long-duration derivative product, such as a 30-year zero coupon swap. The excess cash is then invested in an asset class with higher return or alpha (return excess of benchmark) potential, such as global asset allocation or hedge funds.

For plans that adopt this approach, performance-attribution systems must be able to identify both the alpha and beta component of returns.

Advantages

- Portable-alpha products can efficiently extend asset duration while maintaining higher return potential. For example, duration can be added to existing S&P 500 exposure.

- These products can provide duration of up to 30 years.

Potential Drawbacks

- Similar to active management, if the source of returns (alpha or beta) underperforms, the product can fail to achieve its targeted duration.

- Complexity: portable-alpha strategies rely on derivatives to achieve alpha or beta returns. A good understanding of the managers' due diligence on counterparty risk, investment of cash collateral, and how they monitor these aspects of the strategy is required .

Comparing the Approaches

Each of the above LDI solutions provides unique attributes that can help a plan address the key factors impacting liabilities, with varying degrees of capital efficiency. In the table below we summarize how each solution influences the main drivers of liability movements, as well as the level of assets required to achieve a target hedge ratio.

Which approach is best? The answer to that question depends on the plan's goals for their LDI program, the target hedge ratio it selects, how much earnings power is needed in the portfolio, and the scope of the plan sponsor to adopt complex investment strategies. NEPC typically suggests that a plan consider using two or more LDI products. A multi-pronged approach allows diversification of the methods by which asset duration is added, as well as flexibility in addressing other factors that influence movements in liabilities. However, depending on plan specifics, relying on a single

	Duration Range	Credit Spread Protection in Product	Yield Curve Protection	Capital Required to Achieve Hedge
Traditional Long Duration	12 to 20 years	Low - Medium High	Low-Medium	High
Capital Efficient	20 to 45 years	Very Low	High	Low
Portable Alpha	12 to 30 years	Low - Medium	Low	Medium

source of duration may be acceptable.

Finally, in selecting an LDI product the sponsor should also consider potential secondary sources of duration and credit embedded in the remainder of the portfolio. Some internally diverse asset classes, such as global asset allocation, may provide a degree of duration if they are permitted to include fixed-income securities. Fixed-income asset classes that may be in the portfolio mostly for purposes of generating return, such as high-yield and global bond vehicles, also add a modest amount of duration and credit spread protection.

Implementation of LDI

Once the LDI strategy and product(s) have been selected, the next and sometimes most difficult step in the LDI process is implementation. The duration extension required for most plans will likely be substantial, prompting a significant change to the portfolio's risk profile. Given the volatility of interest rates, and thus of the market value of longer-dated fixed-income instruments, attempting to time interest-rate movements is risky. For most plans, NEPC recommends phasing into the LDI solution over a period of several months or even years.

The proper pace of LDI implementation for a particular plan depends on its specific risks and objectives. In this regard, NEPC suggests that sponsors consider the following factors.

Funding status: This factor should be given the most weight, because it is the single best measure of the plan's ability and/or need to gain interest-rate exposure. Fully funded plans are less apt to have substantial exposure to interest-rate risk, and thus will be less sensitive to the level of interest rates when implementing the hedge. The upside for these plans of rising rates (that is, an increased surplus) is not nearly as great as the downside of a decline in rates (the potential to fall out of surplus). Conversely, underfunded plans usually have a greater sensitivity to the level of rates at the time of implementation. In such cases we suggest a longer phase-in period. While the funding status of underfunded plans is still vulnerable to declining rates, they benefit more than fully funded plans from rising rates.

Target hedge ratio: The higher the target hedge ratio, the longer the phase-in period needed to achieve it. A longer phase-in, executed through dollar-cost averaging, helps mitigate market-timing risk.

Equity allocation: In most plans, equity exposure represents the second-greatest risk to funding status, after interest-rate movements. If the plan has a large allocation to equities and no plan to reduce it, we suggest an acceleration of the duration-hedge implementation. Conversely, the lower the equity allocation, the more interest-rate risk the plan sponsor can handle; in this case we recommend extending the phase-in period.

Market triggers: NEPC does not advocate trying to time the interest-rate market. Given that long-term interest rates can fluctuate quickly and dramatically, plan sponsors may want to consider accelerating or decelerating the funding of an LDI strategy based on select market triggers. For many plans, the trigger points are a pre-specified increase or decrease in bond yields, in basis-point terms. Triggers based on funding status or equity-market returns can also be developed.

Conclusion

There are many LDI products available in the market today that can help a sponsor better match plan assets to movements in plan liabilities. Each product has its benefits and limitations. NEPC recommends that sponsors interested in an LDI solution carefully evaluate the array of available products for suitability to the plan's unique liability profile. Further, we typically suggest employing at least two product types to diversify the ways in which duration is added to the portfolio. For each product, investment manager and counterparty risk should also be addressed. The volatility of long-term interest rates can make implementation the most difficult step in adopting an LDI solution. To mitigate this risk, NEPC suggests a gradual pace of implementation, and can help guide sponsors in setting an implementation period appropriate to the plan.