



# Long Duration Swaps: New Tools for Plan Sponsors in Liability-Driven Investing

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## Summary

- ▶ New federal legislation and FASB regulation are sparking increased interest in “liability-driven” investing (LDI) – strategies that help pension plans better match assets and liabilities. This paper outlines how long duration, zero-coupon swaps can play a key role in LDS strategies.
- ▶ Treasury Strips are a common way to extend duration in LDI strategies, but the longer-term issues typically have relatively low yields.
- ▶ Zero-coupon swaps provide a higher yielding alternative to Treasury Strips, but are more complex investments.
- ▶ Swap Long Duration (SLD) funds offer zero coupon bond swaps through a pooled vehicle and reduce some of the complexity and risk associated with direct swap investments.

## Introduction

In the wake of the recently enacted federal Pension Protection Act, of 2006, and ongoing regulatory action of the Financial Accounting Standards Board, normal market volatility may now be a bigger source of concern to pension plan sponsors. Fluctuations in the values of plan assets and liabilities will now “flow through” more rapidly to the corporate income statement, plan funded status, as well as future funding requirements. In this environment, a growing number of sponsors are considering “liability-driven” investing strategies, as a way to mitigate any impact plan-level volatility may have on corporate financial results. This paper introduces long duration swaps as key tools for sponsors in developing liability driven strategies.

## Why Long Duration?

Pension plans are essentially long-term liabilities owed by the plan sponsors. These future obligations are funded by the current assets of the plan. Interest rate changes affect the present value of both the plan assets and liabilities, and in the new legislative and regulatory environment, those changes are likely to affect corporate financial statements more quickly and directly. As a result, plan sponsors face a significant challenge: how to minimize the impact of the plan on the corporation while maintaining sufficient and prudent funding levels.

The prime cause of volatility for many sponsors is the duration mismatch of assets and liabilities. This stems from the fact that pension fund liabilities typically have very long durations – that is, their value is extremely sensitive to interest rate movements.

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**Longer-term Treasury Strips are useful for extending duration but typically have relatively low yields.**

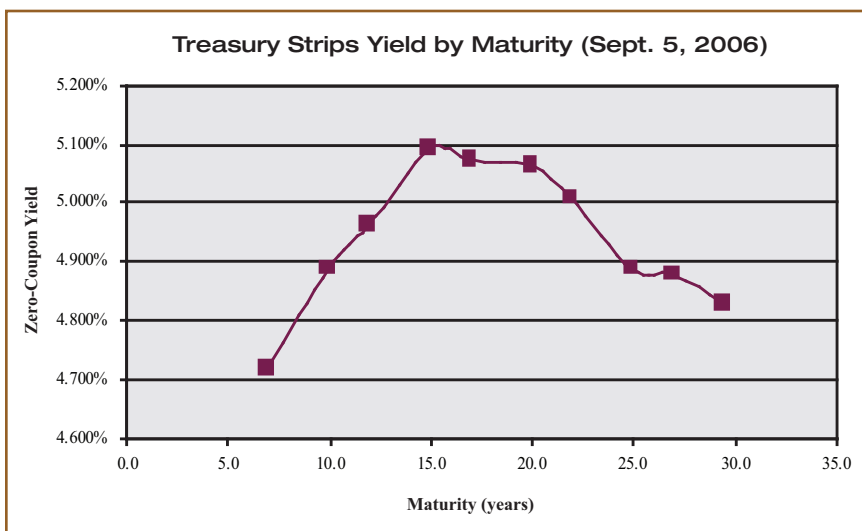
But on the asset side of the equation, many common asset classes in use by pension sponsors – such as equities, real estate or alternatives – have little or no duration to counterbalance this risk. Since bonds are also sensitive to interest rate changes, sponsors have typically used an allocation to a fixed-income benchmark to fill this gap. However, it is arguable whether a common 20%-30% allocation to fixed-income is enough to have an impact. This is where long duration strategies really shine – they can be used to match more of the liabilities’ duration without necessarily increasing the total allocation to traditional fixed income products.

A typical way of achieving long duration in the pension’s fixed income allocation is buying Treasury Strips. They have long duration, high convexity and are reasonably cheap in maturities of less than 15 years. In addition, they generally are viewed as credit risk free and they are extremely liquid. These properties make Strips particularly attractive instruments for extending duration or hedging long-dated cash flows like those in a typical pension liability stream.

**The Drawbacks of Treasury Strips**

Strips do have shortcomings, however, related to supply and demand dynamics. As of September 2006, the current 30-year Treasury has just over \$15.5 billion in principal and coupon from which to strip zero-coupons securities. Given that a significant portion of the 30-year issue is bought by buy-and-hold investors, the supply of 30-year bonds from which to create Strips is limited. These supply/demand dynamics help to explain why long-dated Strips have a high price (low yield). The Treasury Strips curve as of September 2006 is shown in Exhibit 1, below. The drop-off in yields beyond 20-year maturities is evident, dropping more than 25 basis points from 15 to 30 year Treasury Strips maturities.

**Exhibit 1**



Source: Bloomberg

**Zero-coupon swaps are a convenient, higher-yielding alternative to Treasury Strips.**

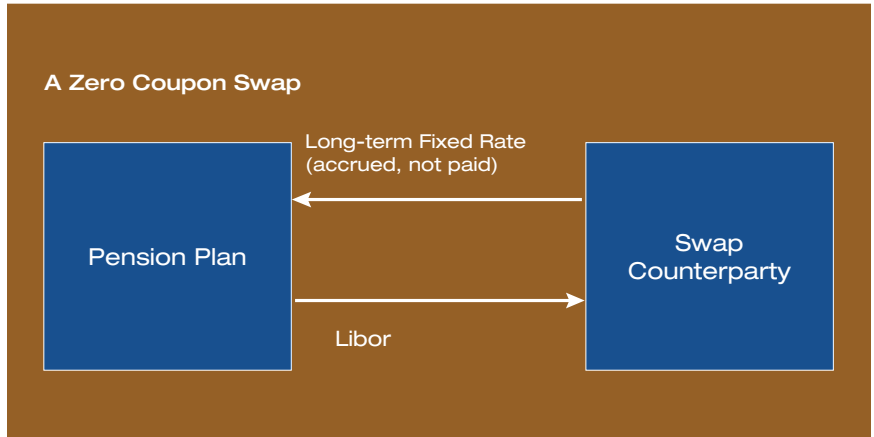
**Is there an alternative to Strips?**

After deciding that an allocation to long duration instruments is desirable, the next step is to find an optimal financial instrument to achieve the long duration. While using Strips is a simple, convenient approach, there are more efficient ways to achieve long-duration exposure. One particularly attractive alternative is using long-duration, zero-coupon swaps, see Exhibit 2.

The primary advantages of using swaps are:

- ▶ Typical yield advantage of 35-65 basis points versus a comparable Treasury Strips, see Exhibit 3.
- ▶ available in maturities up to 40 years
- ▶ significantly smaller yield fall-off in long durations
- ▶ not particularly subject to supply/demand dynamics

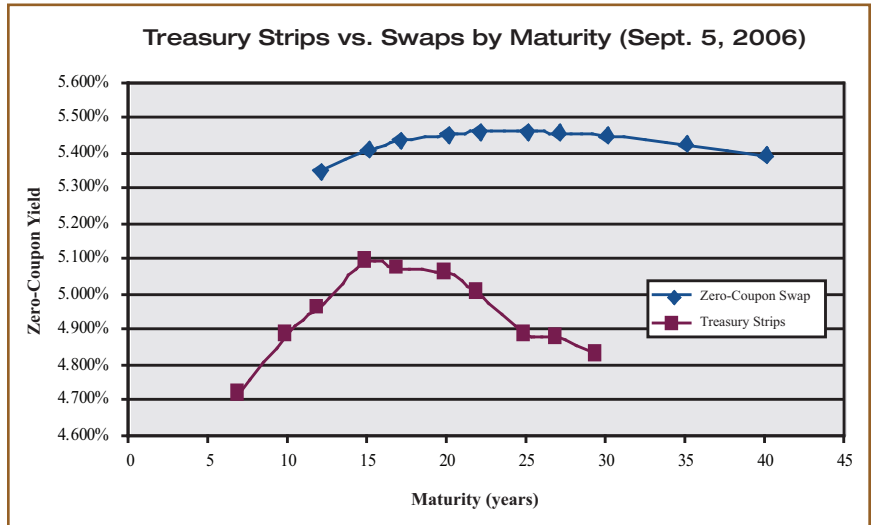
**Exhibit 2**



Source: Standish Mellon

While transaction cost will lower the effective yield of both the Strips and the swaps, the yield advantage of swaps holds. Swaps generally are considered riskier than Strips, but even on a risk-adjusted basis, the 50-70 basis point advantage over Strips is still attractive.

**Exhibit 3**



Source: Bloomberg

**In a zero-coupon swap, the plan makes floating-rate payments based on Libor, in return for a fixed long-term rate that accrues like a zero coupon bond.**

Despite the numerous advantages of swaps, some investors are not comfortable with them due to their unfamiliarity. Additionally, there is a perception by many that derivatives should be avoided by prudent investors. The description below is intended to allay those concerns.

Zero coupon swaps are a type of fixed-for-floating interest rate swap. In a traditional interest rate swap, one party makes periodic floating-rate payments and receives periodic fixed-rate payments from the other party. A zero-coupon swap modifies these terms in one important way – the fixed side does not pay periodically, only at the end. (Exhibit 2) The terms of a zero swap are as follow:

- ▶ A notional amount is set for the swap. All payments on the swap are based on this notional.
- ▶ The floating-rate payer makes quarterly floating-rate payments based on a short-term benchmark, typically Libor.
- ▶ The fixed-rate payer accrues interest at a fixed rate for the life of the swap, but does not make any payments.
- ▶ At the maturity of the swap, the fixed-rate payer pays all of the cumulative accrued interest in one large payment (similar to a zero-coupon bond).

The main advantage of the zero-coupon feature is that the duration and convexity of the instrument is significantly higher for the same maturity – allowing for instruments with up to 40 year duration. Some additional information about interest-rate swaps:

- ▶ \$172 trillion in open interest, according to Mellon research.
- ▶ Typical counterparties are large AA-rated investment banks.
- ▶ Accrued interest in the swap, which is especially important in the zero-coupon form of swap, is collateralized.

## Exhibit 4

**The risks associated with zero coupon swaps can be identified and managed.**

Sources of Risk in Long-Duration Swap Financed by Cash		
Risk Source	Description	Potential Mitigants
Market	The strategy is extremely sensitive to interest rate changes. Large mark-to-market losses are possible.	<ul style="list-style-type: none"> <li>• Unhedged – the target clients specifically want to take these risks</li> </ul>
Credit	The cash account is exposed to the risks of default and credit downgrades.	<ul style="list-style-type: none"> <li>• AA credit quality, minimum A</li> <li>• 5% Issuer exposure limit</li> <li>• Credit research and reviews</li> </ul>
Counterparty	The swap transaction will carry counterparty risk.	<ul style="list-style-type: none"> <li>• Collateral agreement</li> <li>• Biannual swap restructuring</li> <li>• Quarterly counterparty reviews</li> </ul>
Liquidity	Swap liquidity is not guaranteed.	<ul style="list-style-type: none"> <li>• \$172 trillion market size</li> <li>• Seven existing counterparties</li> <li>• Several available hedge instruments</li> </ul>
Cash Tracking	The difference between 6m Libor and cash return will add volatility to the product returns.	<ul style="list-style-type: none"> <li>• 0 bp expected tracking, over the long-term</li> <li>• 2 bp potential short-term additional volatility</li> </ul>

Source: Standish Mellon

## What is the risk compared to Strips?

Undoubtedly, Treasury Strips risk is very low – this is the reason that these securities are used as a proxy for the risk-free rate. Swap securities have higher risk mostly due to the risk of default by the swap counterparty. The fact that the mark-to-market exposure of the swap is fully collateralized by the swap counterparty, however, substantially mitigates this risk. When the floating leg of the swap is fully funded by a cash position earning a Libor-flat return, there is no leverage involved in the swap trade. That is to say, gains and losses due to the interest rate exposure will have exactly one-for-one effect on the value of the supporting cash portfolio. Given this assumed arrangement of a supporting cash portfolio and a swap, the risks due to the total position are listed in Exhibit 4 above.

## Exhibit 5

**Swap Long Duration (SLD) funds are collective funds that purchase swaps. They offer the advantages of zero coupon bonds, but can reduce the complexity and risk for the investor.**

Advantages of SLD vs. Direct Swaps		
Step Description	Investor's Tasks Using Direct Swap	Investor's Tasks Using SLD Collective Funds
Step 1 - Legal	Negotiate ISDA master agreement  Negotiate collateral documents  Needs to be done separately with every broker/dealer  Usually takes 3-6 months	Review and accept fund documentation
Step 2 - Execute Swap	Receive quote(s)  Compare terms and pricing (pricing will be less favorable for small transactions)	Buy units of the fund
Step 3 - Ongoing Swap maintenance	Manage swap funding to minimize the tracking of floating payments  Monitor collateral based on current mark-to-market  Remark positions to reduce counterparty exposures	N/A - handled by fund
Step 4 - Exit Swap	Receive quote(s)  Compare terms and pricing (pricing will be less favorable for small transactions)	Sell units of the fund

Source: Standish Mellon

## SLD - A New Tool to Access the Benefits of Swaps

While swaps are a convenient way to extend duration without substantially raising risk, the process of entering into and managing swap positions can be complex. Mellon Bank has created a collective fund structure called Swap Long Duration (SLD) that simplifies the process of using swaps. Exhibit 5, above, compares the process of doing a swap directly with the process of using an SLD fund.

## Conclusion

In the new regulatory environment, plan sponsors are increasingly shifting their return objective from total return to liability-driven, to achieve better asset-liability matching. In this context, a long duration allocation, typically in the form of Strips or swaps, can substantially reduce the total interest rate risk. In light of this, many plan sponsors are considering fixed income mandates with much longer durations than traditionally thought adequate.

Sponsors seeking long duration exposures up to 40 years may also consider Mellon's SLD collective funds. SLD's offer the benefits of traditional swaps, while reducing much of the complexity and ongoing maintenance that traditional swaps require. SLD's typically yield more than 0.5% over a government-only long duration portfolio with the potential for very little additional risk.

**For more information on how long duration strategies may help you reach your plan's objectives, please contact Jim McInerney at 617-248-6195.**

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