

## Implementing High Return, Liability-Hedging Portfolios

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### EXECUTIVE SUMMARY

Surveys indicate that managing the asset/liability risk of a pension plan has become the primary measure of success. Implementation, however, of liability-driven investing (“LDI”) risk management programs has not kept pace with this rapid change in plan objectives. Underfunding and low interest rates are the two most common issues cited for delaying LDI implementation. These beliefs are rooted in the false notion that LDI is a code word for a low-return bond portfolio that locks in underfunding. These misperceptions have been reinforced by the industry’s lack of innovative solutions beyond simple duration extension strategies and often complex derivative overlay strategies.

Sponsors are searching for solutions that close funding gaps, hedge liabilities, and do so within a reasonable administrative perspective. We’ll introduce several second-generation LDI strategies that can be utilized by any corporate plan sponsor, regardless of their funded position and the level of interest rates, to begin the process of hedging liability risks without sacrificing long-term return potential. Mellon Capital has even considered a third generation of LDI products that incorporate asymmetric option-based strategies designed to reduce asset duration in a rising rate environment. The strategies discussed are generally straightforward, transparent, and liquid. They do not require all sorts of investment exotica, and can be implemented in a manner that minimizes the administrative burden on lean corporate pension staffs.

While the magnitude and timing of any LDI strategy implementation is unique to each Sponsor, we believe that every Sponsor should map out an LDI strategy. Funding levels can change radically over short horizons. Since LDI programs entail an active asset allocation program, we believe Sponsors should set a way forward, a “glide path,” that directly links risk aversion to plan funding levels, especially frozen plans.

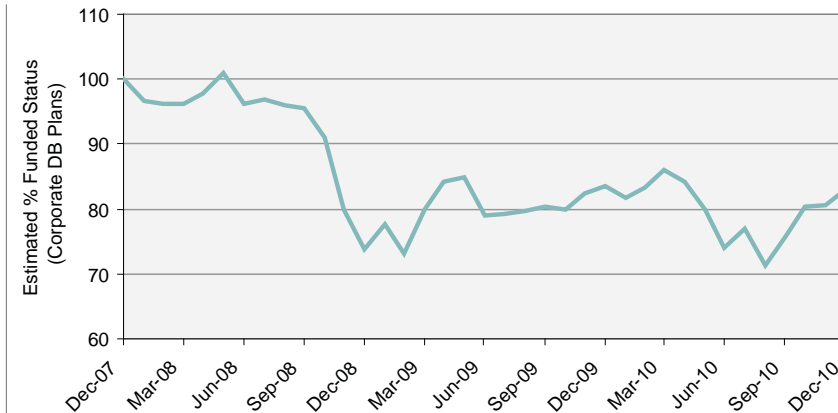
## CORPORATE PENSION FUNDS STUCK IN THE MUD

The estimated funded status of corporate pension funds<sup>1</sup> is shown in *Figure 1*. The data shows that the typical corporate defined benefit pension plan's post-crisis funded ratio has not made much progress in spite of the huge equity market rally and the enormous cash support provided by Sponsors. In fact, funded ratios hit fresh lows in August 2010 before rebounding in the fall. Falling corporate bond yields have resulted in rising liability values.

**Figure 1: Historical Estimated Funded Ratios of the Hypothetical Corporate Pension Fund**

THIS CHART REFLECTS A HYPOTHETICAL PORTFOLIO—SEE DISCLOSURES FOR MORE INFORMATION

Data Source: BNY Mellon Pension Services

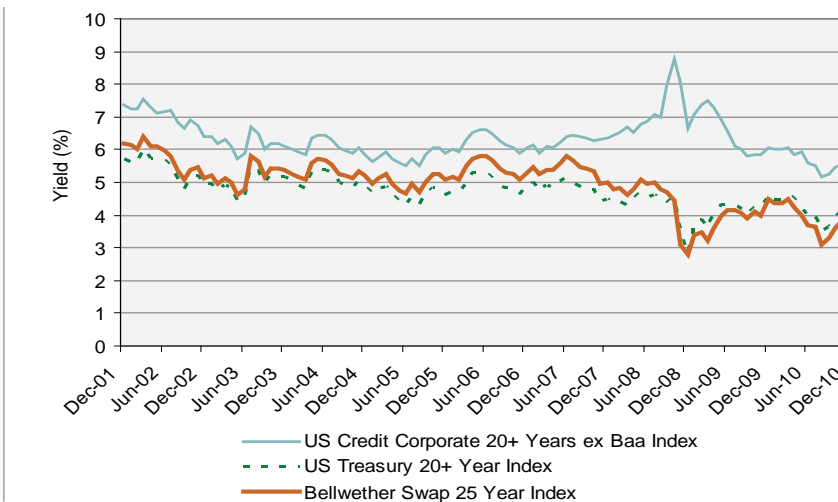


Plan Sponsors had a golden opportunity to enact a long credit exposure in early 2009 (*Figure 2*). As is typical, golden opportunities arise in the midst of exceptionally fearful markets. From the highs reached in early 2009, corporate bond yields have embarked on a significant downward trend. The approximate 300 basis point drop in nominal yields has driven up the present value of liabilities and, in the case of some pensions plans, to such a degree that it has completely offset the rebound in equities and Sponsor contributions.

**Figure 2: Long Yields**

As of December 31, 2010

Data Source: Barclays Capital



## LDI PROGRAMS: WAITING FOR GODOT<sup>2</sup>

While progress towards LDI risk management programs has been made over the last few years, it has come at a slow and ultimately expensive pace. We believe the slow adoption of an LDI framework is rooted in common misperceptions of LDI.

<sup>1</sup> Statistics for Hypothetical Corporate Pension Fund are based on assumptions from BNY Mellon Pension Services.

<sup>2</sup> *Waiting for Godot* is a play by Samuel Beckett that follows two days in the lives of a pair of men who divert themselves while they wait expectantly, and unsuccessfully, for someone named Godot to arrive. Source: Wikipedia.

### LDI Myths and False Choices

We believe there are several myths regarding LDI risk management programs:

- LDI is a code word for a low return bond portfolio
- LDI programs are not suitable for underfunded plans
- Interest rates are too low
- LDI monitoring is too difficult and expensive

We'll demonstrate that liability hedging, high return goals, and interest rate timing issues can all be successfully implemented and managed on a real-time basis. Furthermore, we'll show that these objectives are all obtainable without resorting to a high degree of investment exotica or administrative difficulty.

### DECONSTRUCTING THE LDI MYTHS

Hedging liability risk is indeed centered on matching assets with the duration and credit profile of the benefit payment cash flows and liability discount rates of a plan. However, the idea that this then infers one option – moving a vast amount of capital out of return-seeking assets into a portfolio of low-returning bonds – is a naïve conclusion. Extending this conclusion to state that LDI programs are therefore not suitable for underfunded plans because they “lock in” underfunding and/or plans with high return expectations furthers the false choice between hedging risk and seeking return. Both objectives can coexist.

As we progress in this discussion, using hypothetical illustrations, we will measure the relevant liability-hedging ratios and the assumed return of an asset/liability program that is 80% funded. The liability cash flows used in the analysis represent a typical demographic profile with an average duration of approximately 12 years (see Appendix) while we assume a typical moderate asset mix (60% equity, 40% bond) for the investments. To begin, *Figure 3* summarizes our starting asset/liability portfolio including the three liability hedge ratios of our sample corporate plan. Interest rate risk hedge measures the percentage of risk hedged due to changes in U.S. Treasury yields. Quality risk hedge measures the percentage of risk hedged due to changes in corporate bond spreads. Yield curve risk hedge measures the percentage of risk hedged due to non-parallel yield curve shifts.

**Figure 3: Hypothetical Illustration – Implementing an LDI Program Without Sacrificing Return**

THIS CHART REFLECTS A HYPOTHETICAL PORTFOLIO AND DOES NOT REFLECT ACTUAL TRADING—SEE DISCLOSURES FOR MORE INFORMATION

Data Source: Bloomberg, BNY Mellon Pension Services

Base Case – Typical Asset Mix				
Assumptions				
Asset Class	Representative Index	% Invested	Effective Duration	Return Assumptions
U.S. Equity	Russell 3000	50%	0.0	8.0%
International Equity	MSCI EAFE	10%	0.0	8.0%
U.S. Fixed Income	Barclays Capital U.S. Aggregate	40%	4.7	2.6%
<b>Total Plan</b>		<b>100%</b>	<b>1.9</b>	<b>5.8%</b>
Other Assumptions:				
<i>Data as of date: September 30, 2010</i>				
Discount rate and duration for liabilities			12	5.0%
Funded status ratio	80%			
Base Case – Hedged Statistics				
Funded Status Standard Deviation		13%		
Interest Rate Risk Hedge		12%		
Quality Risk Hedge		9%		
Yield Curve Risk Hedge		10%		

The return assumption of the starting 60/40 asset program is just 5.8%, assuming typical forward looking market expectations<sup>3</sup>. With just an 80 basis point spread over the liability return, closing the funding gap will take many years without contribution support. Funded status volatility is measured to be 12.7%.

**LDI Step #1: Duration Extension to High Quality Long Corporate Bonds**

We begin with the fact that typical corporate plan sponsors already have a significant allocation to fixed income investments, only often with the wrong liability-matching characteristics. The simplest step is to reallocate existing fixed income allocations to longer duration and high quality credit. Using our sample corporate plan, if we shift the 40% allocation away from the Barclays U.S. Aggregate Bond Index to a high quality, long duration corporate bond<sup>4</sup> index, all three liability-hedge ratios improve. Additionally, since the return assumption of the high quality long corporate bond index is currently far higher than the Barclays U.S. Aggregate Bond Index, the return assumption of the total investment portfolio rises from 5.8% to 6.9%.

**Figure 4: Hypothetical Illustration – Step 1: Duration Extension to High Quality Long Corporate Bonds**

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Data Source: Bloomberg, BNY Mellon Pension Services

LDI Step 1 – Duration Extension to High Quality Long Corporate Bonds				
Assumptions				
Asset Class	Representative Index	% Invested Step 1	Effective Duration	Return Assumptions
U.S. Equity	Russell 3000	50%	0.0	8.0%
International Equity	MSCI EAFE	10%	0.0	8.0%
U.S. Fixed Income	Barclays Capital U.S. Aggregate	40%	4.7	2.6%
Long Corporates	Barclays Capital 20+ Year Credit Corp ex-BAA	40%	14.0	5.3%
<b>Total Plan (LDI Step 1)</b>		<b>100%</b>	<b>5.6</b>	<b>6.9%</b>
Other Assumptions:				
<i>Data as of date: September 30, 2010</i>				
Discount rate and duration for liabilities			12	5.0%
Funded status ratio	80%			
Base Case – Hedged Statistics				
Funded Status Standard Deviation		12%		
Interest Rate Risk Hedge		36%		
Quality Risk Hedge		55%		
Yield Curve Risk Hedge		36%		

We’ve taken advantage of the fact that liability discount rates are determined using higher-yielding corporate bonds. Therefore, we have potentially increased both the hedge ratio and the return expectation with just a simple extension strategy<sup>5</sup>. For the remainder of this paper, we will not raise the dedicated allocation to fixed income above the current 40% while seeking higher hedge ratios and maintaining a return assumption at least as high as the modified 60/40 portfolio with duration extension.

<sup>3</sup> Analysis presented by BNY Mellon Pension Services based on its assumptions and estimates which do not reflect actual or future results. This is presented for illustrative purposes only.

<sup>4</sup> Barclays Capital U.S. Credit Corporate 20+ Year ex-Baa Index.

<sup>5</sup> There are several pitfalls of both traditional corporate bond benchmarks and conventional active/passive implementation approaches; namely market cap weighted index construction methodologies, issuer concentration risks, and rating issues. Please refer to “Designing Better LDI Portfolios: Avoiding Pitfalls of Traditional Approaches” MCM January 2011.

### LDI Step #2: Building Duration into Equity Portfolios

Non-fixed income assets have questionable duration properties. While equities are conceptually long duration assets, the short-term correlation of stock price movements with interest rate movements is unpredictable. Generally, it is best to assume very little duration contribution from equities (usually zero). So how can we incorporate reliable duration characteristics into an equity portfolio?

Our sample corporate plan has 60% allocated to equities. The investor can implement the equity portfolio in a physical index fund, for example. Alternatively, the investor can create the same exposure synthetically by investing in exchange traded futures contracts. In a synthetic exposure, the investor creates the desired exposure through a futures contract with a small initial margin, leaving the balance in a cash account to mark the futures contract to market each day.

The synthetic approach opens up a simple opportunity to add duration to the mix. Rather than hold the futures collateral in cash, our corporate plan sponsor can invest the cash in a long duration bond portfolio. *Figure 5* compares a physical investment in the S&P 500<sup>®</sup> with our synthetic long duration approach.

**Figure 5: Hypothetical Illustration – Building Duration into Equity Portfolios**

THIS CHART REFLECTS A HYPOTHETICAL PORTFOLIO AND DOES NOT REFLECT ACTUAL TRADING—SEE DISCLOSURES FOR MORE INFORMATION

Data Source: Bloomberg, BNY Mellon Pension Services

Physical Portfolio Only					Synthetic Portfolio				
Assets	Allocation	Gross Exposure	Return Assumptions	Duration (Years)	Assets	Allocation	Gross Exposure	Return Assumptions	Duration (Years)
Stocks <sup>6</sup>	100%	100%	8.0%	0	S&P Futures <sup>6</sup>	1%	100%	8.0%	0
Long Bonds <sup>6</sup>	0%	0%	4.5%	12	Long Bonds <sup>6</sup>	90%	90%	4.5%	12
Cash <sup>6</sup>	0%	0%	4.0%	0	Cash <sup>6</sup>	9%	0%	-4.0%	0
<b>Total Portfolio</b>	<b>100%</b>	<b>100%</b>	<b>8.0%</b>	<b>0</b>	<b>Total Portfolio</b>	<b>100%</b>	<b>190%</b>	<b>8.05%</b>	<b>10.8</b>

We have effectively turned an equity portfolio with little-to-no liability-hedging characteristics into an equity portfolio with liability-hedging properties. While this synthetic portfolio has more “asset-only” volatility relative to the S&P 500 index fund, the long duration bonds in the synthetic portfolio tend to reduce the surplus volatility of the plan’s balance sheet. Interestingly, this strategy could actually raise the return expectations if the spread between the long duration bond portfolio and the cash financing rate of the futures contract (LIBOR) widens. The example in *Figure 5* assumed a 50 basis point term premium, well below historical averages. As of December 31, 2010, the term premium using a long duration government bond portfolio is approximately 4%!

With regard to the liquidity profile of the synthetic strategy, we would want to invest a significant portion of the long duration bonds in government issues to ensure sufficient liquidity to meet the daily marks on the equity futures contracts. We could be conservative and use only government bonds. Alternatively, we believe we would be no more aggressive in the synthetic portfolio by using a standard Barclays Long Government/Credit (G/C) Index. Given the experience of 2008, we would be very leery of actively managed, alpha-driven bond strategies since they tend to stretch for yield in low quality securities and non-benchmark, higher-risk beta exposures.

Returning to the total portfolio, if we reallocate 20% of the assets out of physical equities into the synthetic portfolio backed by a Barclays Long G/C Index, our hedge ratios rise as shown in *Figure 6* while our total return assumptions rise slightly to 7.0% from 6.9%. Again, this assumes only a 50 basis point term premium between LIBOR and long bonds. As of December 31, 2010, the term premium is approximately 4%.

<sup>6</sup> ‘Stocks’ reflect the S&P 500 Index; ‘Long Bonds’ reflect the Barclays Capital Long Government/Credit Index. ‘Cash’ assumes a 4% return. ‘S&P Futures’ reflect S&P 500 future contracts, which deliver the return of the S&P 500 Index less the cash financing rate.

**Figure 6: Hypothetical Illustration – Step 2: The Addition of Double Beta**

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Data Source: Bloomberg, BNY Mellon Pension Services

<b>LDI Step 2 – Adding Duration Exposure to an Equity Portfolio</b>				
<b>Assumptions</b>				
<b>Asset Class</b>	<b>Representative Index</b>	<b>% Invested Step 2</b>	<b>Effective Duration</b>	<b>Return Assumptions</b>
U.S. Equity	Russell 3000	30%	0.0	8.0%
International Equity	MSCI EAFE	10%	0.0	8.0%
U.S. Fixed Income	Barclays Capital U.S. Aggregate	40%	4.7	2.6%
Long Corporates	Barclays Capital 20+ Year Credit Corp ex-BAA	40%	14.0	5.3%
Hedged Equity	S&P 500 + Barclays Long G/C - LIBOR	20%	12.0	8.1%
<b>Total Plan (LDI Steps 1 and 2)</b>		<b>100%</b>	<b>8.0</b>	<b>7.0%</b>
<b>Other Assumptions:</b>				
<i>Data as of date: September 30, 2010</i>				
Discount rate and duration for liabilities:			12	5.0%
Funded status ratio:	80%			
<b>Base Case – Hedged Statistics</b>				
Funded Status Standard Deviation		11%		
Interest Rate Risk Hedge		52%		
Quality Risk Hedge		67%		
Yield Curve Risk Hedge		51%		

### LDI Step #3: Equity Substitutes that Add Duration and Alpha

As investors reconsider equity-centric allocation approaches, one common theme is to substitute absolute return investments for a portion of the equity allocation. Similar to our hedged equity approach, it is once again possible to add duration exposure to the alpha strategy through an overlay. However, we are particular about the structure of this overlay concept given the experience of 2008.

Most alpha overlay programs require that the invested capital be employed by the alpha strategy while the more volatile long duration bond beta is obtained synthetically. When the alpha strategies turned illiquid and some beta counterparties went bankrupt in 2008, these overlay strategies failed spectacularly, both from an alpha and beta perspective. We prefer the opposite approach, specifically that the long duration bond beta should be obtained through physical investments while the alpha overlay be implemented synthetically. In this manner, only the less-important alpha stream is subject to potential counterparty failure while the investor owns the physical bonds outright. This structure rules out most alpha programs with the notable exception of global macro strategies. Global macro strategies can be implemented on a purely synthetic basis and, based on our observations, have historically maintained liquidity through many market disruptions.

For example, a GTAA overlay can be applied to several long duration bond exposures. If we utilize the return assumptions from *Figure 5*, we would need to add a 3.5% alpha component on top of the 4.5% long bond index return to achieve an objective similar to equities. Continuing our total program analysis, we could reallocate another 20% of the investments out of equities for two long duration alpha overlay investments. The first investment has a beta exposure consisting of a blended long government and long credit benchmark<sup>7</sup> with 4% expected net alpha. The second alpha overlay investment has the same 4% excess net return target with a benchmark consisting of a 30 Year Zero Coupon Bond.

<sup>7</sup> 20% Barclays Capital 20+ Year Treasury Index and 80% Barclays Capital U.S. Credit Corporate 20+ Year ex-Baa Index.

**Figure 7: Hypothetical Illustration – Step 3: Equity Substitutes that Add Duration and Alpha**

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Data Source: Bloomberg, BNY Mellon Pension Services

<b>LDI Step 3 – Equity Substitutes that Add Duration and Alpha</b>					
<b>Assumptions</b>					
<b>Asset Class</b>	<b>Representative Index</b>	<b>% Invested Step 3</b>	<b>Effective Duration</b>	<b>Return Assumptions</b>	
U.S. Equity	Russell 3000	10%	0.0	8.0%	
International Equity	MSCI EAFE	10%	0.0	8.0%	
U.S. Fixed Income	Barclays Capital U.S. Aggregate	0%	4.7	2.6%	
Long Corporates	Barclays Capital 20+ Year Credit Corp ex-BAA	40%	14.0	5.3%	
Hedged Equity	S&P 500 + Barclays Long G/C - LIBOR	20%	12.0	8.1%	
Hedge Alpha Source #1 <sup>8</sup>	20% Long Treasury + 80% Long Corporate	10%	14.7	8.9%	
Hedge Alpha Source #2 <sup>8</sup>	30-Year Zero Coupon Swap	10%	30.0	7.5%	
<b>Total Plan (LDI Steps 1 through 3)</b>		<b>100%</b>	<b>12.5</b>	<b>7.0%</b>	
<b>Other Assumptions:</b>					
<i>Data as of date: September 30, 2010</i>					
Discount rate and duration for liabilities			12	5.0%	
Funded status ratio	80%				
<b>Base Case – Hedged Statistics</b>					
Funded Status Standard Deviation		7%			
Interest Rate Risk Hedge		83%			
Quality Risk Hedge		78%			
Yield Curve Risk Hedge		50%			

Again, with no deterioration in the return assumptions of the overall portfolio, we have potentially raised all three liability-hedging ratios to significant proportions. We have also extended the asset portfolio's return assumptions to 200 basis points annually over the liability return, assuming return objectives are met.

### **Hedging *and* Returns Rather than Hedging *or* Returns**

To summarize, we transitioned from a traditional 60/40 mix yielding an expected 5.8% return with little liability hedging characteristics to an investment program with return assumptions of approximately 7.0% return with significant hedging properties. Manager diversification can be obtained by segregating individual assignments. While interest rates are low, we have demonstrated how excess returns over the liability discount rate can potentially be raised in order to close underfunded positions while achieving high hedge ratios.

## **INTEREST RATE TIMING RISK**

Throughout the last ten years, LDI programs have been delayed because of the widespread belief that “interest rates are going to rise.” Interest rates have only gone lower, each time leading to an increased chorus calling “the bottom” of the cycle. Rising interest rates that would affect liability values more than asset values would certainly close the funding gap. How can investors implement long duration strategies now yet protect themselves from poor timing if interest rates were to rise?

<sup>8</sup> The alpha strategies are assumed to generate 4% excess return.

### Hedging Rising Rates with Options

A put option allows the buyer of the option to “put” a bond to the seller of the option at a predetermined price (or yield in bond parlance) in exchange for an upfront premium payment from the buyer to the seller. In a classic sense, it is insurance. An investment strategy that could purchase this insurance would be able to extend duration at any level of interest rates with the comfort of knowing that if rates rose significantly, the option is designed to reduce the asset’s duration, allowing the funded status of the plan to improve.

Based on the following parameters:

- The approximate cost of the option protection, as of December 31, 2010, was 2% of the notional portfolio value
- The protection sought would cover the equivalent dollar duration of the liabilities to ensure a return floor

We examined the options market and were able to hypothetically secure a sufficient amount of put protection covering one year. The approximate cost of the option protection, at that moment in time, was 2% of the notional portfolio value. *Figure 8* is a graphical representation of the two scenarios. The first scenario examines the return payoff, based on varying levels of interest rates, if an investor reallocates from an intermediate duration bond portfolio to a long duration corporate bond portfolio. The second scenario examines the hypothetical return outcomes of that same intermediate-to-long duration trade but includes the option protection discussed above.

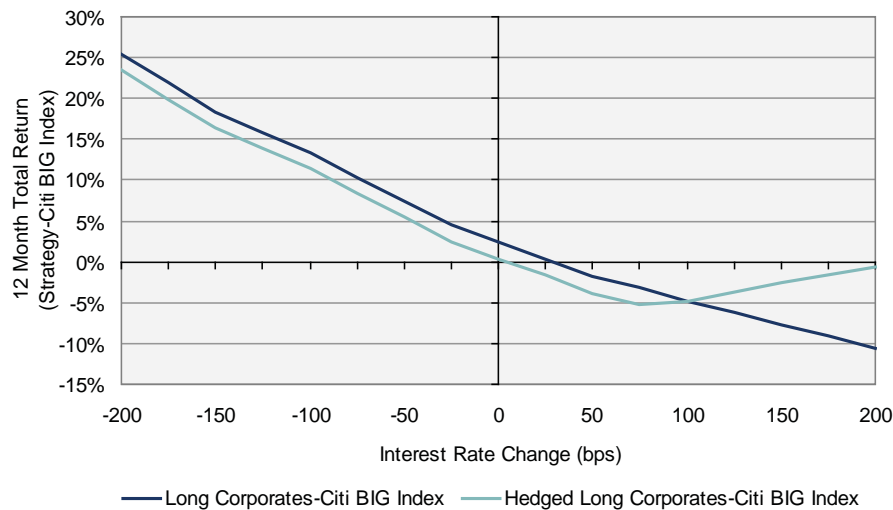
**Figure 8: Hypothetical Illustration – Sample Payoff of an Options-Based Interest Rate Hedging Program**

January 2010 to December 2010

Long Corporates = Barclays Capital 20+ year Credit Corporate Ex Baa Index; Hedged Long Corporates reflects the same index hedged to the 30 year swap rate. As of 12/31/10, the 30 year swap rate was 4.11%.

THIS CHART REFLECTS A HYPOTHETICAL PORTFOLIO AND DOES NOT REFLECT ACTUAL TRADING—SEE DISCLOSURES FOR MORE INFORMATION

Data Source: Yieldbook, Bloomberg, Mellon Capital



Remember, the cost of insurance varies daily. There is no guarantee that the conditions listed above could be obtained at those prices. When investors are complacent, insurance is generally cheap. When investor demand for insurance is high, so is the price of insurance.

### Using Alpha Strategies to Reduce Premium Costs

In the investment world, there is a reflexive notion that all insurance and tail-risk hedging concepts be “zero cost.” As a result, investors must sell off good outcomes to finance the insurance purchased in order to prevent bad outcomes via collar strategies. Now, we know that insurance is not free, yet the insurance industry is one of the largest financial businesses in the world. Insurance exists to protect policy holders from negative outcomes and they willfully pay a premium for “peace of mind.”

If an investor is worried about rising rates, why wouldn't they be willing to pay a small premium to insure against poor timing? Why must they open themselves to significant downside risk by selling off their duration in a falling rate environment? Interest rate collars don't provide an asymmetric risk hedge. They assume one tail risk (i.e. falling rates) to mitigate the chance of the opposite tail risk (i.e. rising rates).

We believe a more effective long-term premium mitigation technique is alpha generation. Since the alpha strategy must be synthetic and must generate meaningful alpha, we again turn to global macro as one of the few possible alpha solutions. *Figure 9* builds upon the payoff scenario outlined in *Figure 8* assuming 2% and 4% alpha targets are achieved. Obviously, the 2% alpha, if achieved, would pay for the insurance cost over time. As always, alpha may be positive or negative over short or long horizons, just as an interest rate collar may have horizon-dependent positive or negative outcomes.

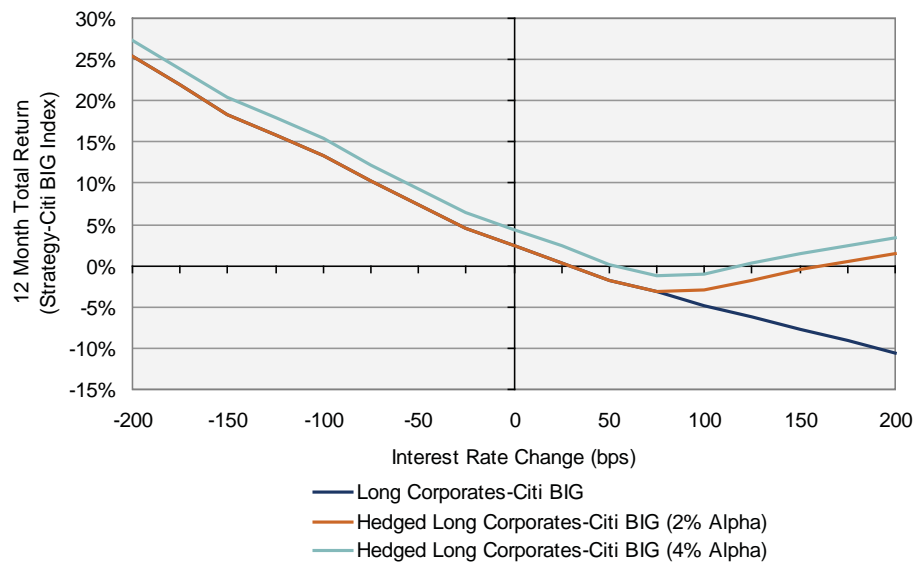
**Figure 9: Hypothetical Illustration: Sample Payoff of an Options-Based Interest Rate Hedging Program**

January 2010 to December 2010

Long Corporates = Barclays Capital 20+ year Credit Corporate Ex Baa Index; Hedged Long Corporates reflects the same index hedged to the 30 year swap rate. As of 12/31/10, the 30 year swap rate was 4.11%.

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Data Source: Yieldbook, Bloomberg, Mellon Capital



### LDI PROGRAMS REQUIRE A ROADMAP AND AN ACTIVE ALLOCATION PROCESS

The easy dismissal of an LDI approach because “interest rates are too low” and plan underfunding have negative knock-on effects. Sponsors aren't seriously considering what they will do as the future unfolds. They have no roadmap and are not prepared to act.

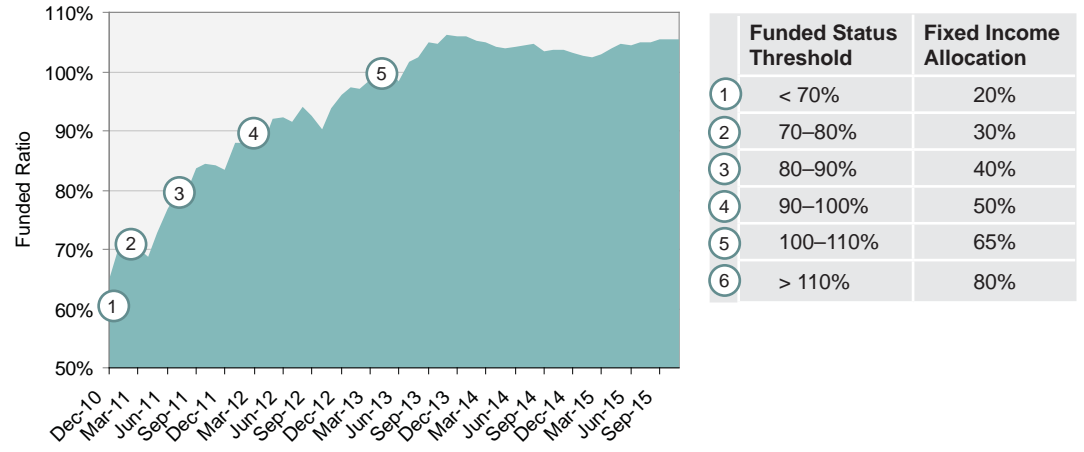
By 2007, plan funding levels had recovered from the 2002 lows much faster than anticipated. Congress had passed the Pension Protection Act (“PPA”) in 2006, effective with the 2008 plan year. PPA introduced mark-to-market liability discounting methodologies. Yet, in our observation, few investors reacted to the positive funding developments and the more onerous future regulatory environment. Then again in early 2009, high quality corporate bond yields reached 8.5% (as shown in Figure 2). We anticipated a significant increase in the adoption of LDI strategies, led by a shift towards high quality corporate bonds. In reality, actual LDI adoptions and related corporate bond flows were less than we anticipated. Without a roadmap in early 2009, investors were paralyzed by fear rather than equipped to take advantage of an opportunity.

We believe plan sponsors should outline an asset allocation policy that responds to changes in key financial variables. For example, future revisions to the asset allocation policy could be based on changes in the funded status of the plan. As the funded status improves, the allocation to liability hedging fixed income strategies could be increased. *Figure 10* shows a hypothetical future path of a plan’s funded status. The funded status will vary according to changes in many factors; including changes in interest rates, asset returns, and sponsor contributions. As the hypothetical funded status changes, the table on the right of *Figure 10* outlines a sample fixed income allocation policy that could be adopted by the sponsor which increases the allocation to fixed income as funded status improves. Each sponsor should consider a specific glide path appropriate for its circumstances.

**Figure 10: Sample Asset Allocation Glide Path**

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Data Source: BNY Mellon Pension Services



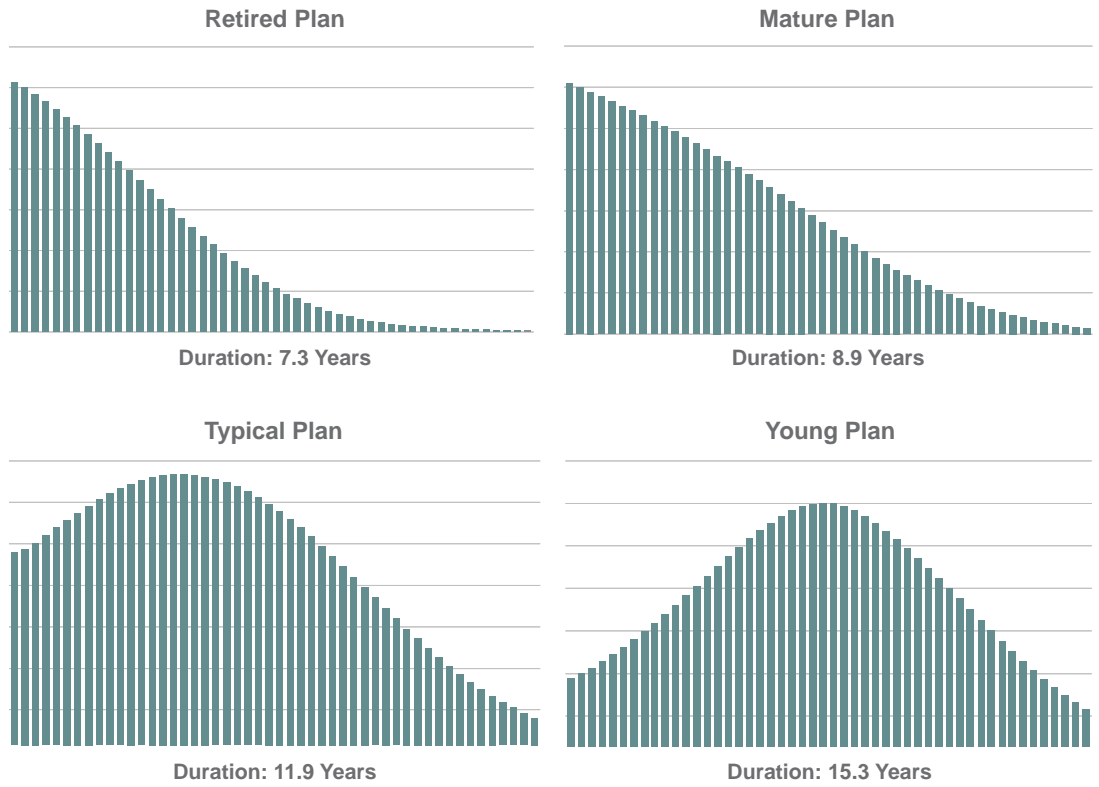
### CONCLUSION: HOPE IS NOT A STRATEGY

LDI strategies can be utilized by any corporate plan sponsor, regardless of their funded position and the level of interest rates, to effectively hedge liability risks with a goal of not sacrificing long-term expected returns.

Sponsors should begin an LDI framework by understanding the future life path of their specific plan and then mapping out a glide path for the investment program’s asset allocation. Secondly, instituting a monthly or quarterly total plan asset/liability reporting package is essential. Only when “success” is redefined in the asset/liability space will Sponsors be able to secure the benefits of LDI. Thirdly, innovative and creative investment strategies exist to hedge liabilities and maintain return expectations. Option-based LDI strategies can be put in place right now that are designed to secure the benefits of rising interest rates on plan funding levels. Answers abound for those willing to act.

## APPENDIX

### Representative Pension Plan Benefit Payment Schedules



The illustrations and groupings are based on BNY Mellon Pension Services internal database of certain corporate pension plan benefit schedules, as of 12/31/2010. The corporate pension plan benefit payments are sorted and grouped by the duration of the corporate pension plan benefit payment from lowest to highest in order to create the four categories, in order: Retired (lowest corporate pension plan benefit payment duration), Mature, Typical, and Young (highest corporate pension plan benefit payment duration). The duration shown at the bottom of each illustration is the average duration of each group shown above. The estimates and assumptions that underlie the duration calculation are from BNY Mellon Pension Services, and do not reflect actual or future results.

## DISCLOSURE STATEMENTS

This does not constitute investment advice. You should keep in mind that no allocation plan can always ensure a profit or protect against a loss.

### Liability Index Disclosure:

The BNY Mellon Pension Liability Indexes are calculated using the present values of hypothetical Retired, Mature, Typical, and Young benefit liability cash flow schedules, as calculated by BNY Mellon research. These cash flows are discounted according to a proprietary term structure model applied to every forward payment date. Pricing for the term structure model is developed from BNY Mellon internal research. Returns for each of the BNY Mellon Pension Liability Indexes are calculated from monthly changes in the present values of each index.

The BNY Mellon Pensions Liability Index valuations and return calculations are performed using two sets of data. The Reporting Basis discounting uses high-grade corporate bond yields to fit a proprietary BNY Mellon term structure model. This method is intended to provide a reasonable approximation of the methodologies generally used for accounting and funding purposes. The Market Value Basis discounting uses US Treasury bond yields to fit a proprietary BNY Mellon term structure model. This method is intended to provide a reasonable approximation of the cost to purchase annuities for the liabilities.

### Representative Pension Plan Benefit Payment Schedules

The illustrations and groupings are based on BNY Mellon Pension Services internal database of corporate pension plan benefit schedules, as of 12/31/2010. The corporate pension plan benefit payments are sorted and grouped by the duration of the corporate pension plan benefit payment from lowest to highest in order to create the four categories, in order: Retired (lowest corporate pension plan benefit payment duration), Mature, Typical, and Young (highest corporate pension plan benefit payment duration). The duration shown at the bottom of each illustration on the Representative Pension Plan Benefit Payment Schedules page is the average duration of each group. The estimates and assumptions that underlie the duration calculation are from BNY Mellon Pension Services, and do not reflect actual or future results.

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If shown, return assumptions for each of the hypothetical portfolios described in the text are calculated as the unmanaged weighted average of the applicable indexes, with monthly reset to the target asset mix.

### Hypothetical Disclosure:

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