Transitioning to LDI strategies

Beliefs, behavior, strategy and tactics for transitioning into a liability-driven portfolio

This paper provides perspective on the transition management aspects of liability-driven investing (LDI). It discusses first the context and motives for moving into a liability matched investment portfolio, and then describes two of the potential strategies for portfolio transitioning. It concludes with the tactical considerations of the transition for a plan sponsor.

Issue:
What are the transition management considerations when moving from an asset-focused, traditional portfolio strategy (e.g. 60% equities / 40% bonds) to a liability driven asset allocation?

Response:
For pension plan sponsors, the hedging of interest rate risk is comparable to eating right and exercising. While recognized as the right thing to do for the funding status health of the plan, moving the plan portfolio allocations out of higher returning assets and into longer duration bonds is not the most comfortable path of action.

In this paper we discuss the context and motives for moving into a liability matched investment portfolio, and describe two strategies for portfolio transitioning. It concludes with the tactical considerations of the transition for a plan sponsor.

Of course, the implementation of LDI is never a clean bifurcation between the ideal of complete and immediate interest rate hedging and a long drawn out dollar cost averaging approach. While recognizing that the practical landscape for plans requires a strategy somewhere between the two ends of the spectrum, we nonetheless compare to inform of their relative advantages.

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BELIEFS

One concern for plans that are underfunded is that they do not want to forego higher potential returns in assets such as equities. They would prefer that the market, not the sponsoring company provide the contributions needed to make up for funding shortfall. However with the Pension Protection Act (PPA) rules in place and requirements for funding much stricter, the potential need for company contributions may come sooner than what market returns can deliver. For most fully funded plans, the (relatively) new PPA regulations penalize risk taking - cumulative contributions generally increase when risky assets are added and decrease when risky assets are reduced. Financial Account Standards (FAS) and PPA liabilities are priced off a corporate yield curve, so a duration-matched corporate bond portfolio represents the minimum risk strategy.

Regardless of funding status, virtually all pension funds are both short duration and short on credit risk, relative to their liabilities. For surplus investors, both short positions represent a positive risk and a negative expected return over long periods. Lengthening duration and increasing credit exposure reduces contribution risk, that is the risk of the sponsor needing to make a large contribution, and increases long term expected return through higher long term asset yields.

The primary source of discomfort however is in the high prices of long securities at this time. Bonds are, relative to historic price levels, expensive. With the presently accommodative Federal Reserve policy and the long end of the yield curve arguing that current policies in public finance are unsustainable, there is the broad expectation of pending interest rate increases. If interest rates go up significantly, the value of bond assets, particularly of long duration bonds, will decline. While pension plan accounting holds that the present value of plan liabilities will also decline given an interest rate increase - and all will be well from a funded status perspective – no investment officer relishes the thought of explaining to investors why their bond holdings are now worth potentially tens, if not hundreds, of millions of dollars less.

The reality may not be as bleak. For long term investors such as pension plans, bond returns are derived significantly from coupon income. Price appreciation or loss is not as important when the bonds are held to maturity. The coupon payment typically provides a cushion and argues against big losses in prices typically associated with bubbles. Furthermore for many corporate plans, even when open and underfunded, the contribution risk as driven by interest rates dominates over the risk of contribution being driven from having lower portfolio returns.

BEHAVIOR

There are several behavioral approaches for a plan to follow when transitioning assets into a longer duration portfolio. Each represents different proclivities for intellectual consistency and risk aversion.

- **THE IDEALIST** – Once having decided that interest rate risk hedging is appropriate for the plan, the idealist goes to LDI strategy immediately. The plan makes asset allocation changes with derivatives; work into physical portfolios over time. This is the most intellectually consistent and cost effective approach for the plan, yet it incurs the risk of investor backlash if bond prices drop. Perhaps it is for that reason that very few plans have adopted this approach.

- **THE REGRET MINIMIZER** - Dollar cost average into LDI over time, use a mix of derivatives and physicals. This approach may account for the present interest rate environment, and

2 The PPA became effective on August 17, 2006.
may reduce opportunities for second-guessing the timing of LDI implementation. If not
dollar cost averaging, another path that we have seen in practice is to transition in stages.
This approach takes a given percentage hedge ratio, say 45%, and moves to that
immediately with whatever mix of physicals, futures, and swaps that is cost optimal. Then
they pick a time in the future, say in two years, for when they expect to bring the hedge
ratio up to the longer term desirable level. This allows the plan to keep a trump up its
sleeve in anticipation of a decline in the bond markets. If / when bond prices fall, the
conversation with the board will be around how they moved the plan in the correct
direction, and yet saved a portion of the portfolio for allocation when market conditions
would be more favorable.

The following chart represents the two very different strategies for transitioning a plan from
traditional assets allocation to a liability driven strategy. However, both strategies move
physical assets at the same rate, terminating old managers and hiring new managers in the
exact same three stage sequence. The asset allocation for the two strategies is altered with
derivatives, allowing the plan to manage the asset allocation independent of the physical
assets managed by the various investment managers.

Exhibit 1: Transitioning a plan from traditional asset allocation to LDI strategy
using the idealistic and regret minimize strategies

The Idealistic Strategy

<table>
<thead>
<tr>
<th></th>
<th>Initial Allocation</th>
<th>Stage 1 Allocation</th>
<th>Stage 2 Allocation</th>
<th>Stage 3 Completion Allocation</th>
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</thead>
<tbody>
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<tr>
<td>Synthetic Intl Equity</td>
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<tr>
<td>Fixed Income</td>
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The Regret Minimizer Strategy

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Provided for illustrative purposes only. Does not represent any actual client or investment. Indexes are
unmanaged and cannot be invested in directly.

Fast or slow?

**Idealistic**

**Benefits**
- More closely aligns with liabilities
- Allows for a more patient trading time horizon for physical
  securities, potentially lowering transaction costs

**Costs**
- Larger impact to assets if interest rates rise
- Increased derivatives trading costs
- Liquidity needed for collateral and margin payments

**Regret minimization**

**Benefits**
- Mutes the impact of rising interest rates on assets
- Participation in higher returning asset class over longer period
- Decreased derivatives costs
- Allows for a more patient trading time horizon for physical
  securities, potentially lowering transaction costs
- Provides opportunity to be tactical in assets allocation changes

**Costs**
- Delays the alignment of assets to liabilities
- Liquidity needed for collateral and margin
A third strategy, also staged, is what we at Russell call Liability Responsive Asset Allocation (LRAA). It is a dynamic approach to strategic asset allocation, one that is tied to changes in the funded status of the plan. With LRAA, asset allocations are designed to match the behavior of liabilities, rather than focusing on asset return and volatility management. Although different in focus, from an implementation perspective it remains largely the same as a staged response (the regret minimizing strategy). Decisions to progress along the continuum toward interest rate matching will depend more upon the plans liability levels than on views of bond market valuations.

Regardless of which strategy a plan chooses, the use of a transition manager for the extended transition period is critical. The transition manager will manage the asset allocation to the predetermined strategy, avoiding unwanted and unnecessary risk and slippage causing over/under exposure to the inappropriate asset class. Combine this risk management with the transaction savings transition managers provide and it is clear that the transition manager plays a pivotal role in the reallocation of assets to LDI solutions.

STRATEGY

First one must determine how much hedging a fund requires. The starting point is the calculation of a portfolio’s hedge ratio.

Hedge ratio calculation

Dollar duration exposure of the assets and liabilities is the primary way to assess an interest rate “hedge ratio”. This is a relatively simple calculation

\[ MV_P \times AD_P = ADur_s \]

Where:

- \( MV_P \) = Market value of the portfolio assets
- \( AD_P \) = Duration of the portfolio assets
- \( ADur_s \) = Dollar duration of portfolio assets

The next thing to do is test what the effect of a drop in interest rates would do to the present value of the assets, and compare that to the effect of a rate change on the present value of liabilities. In this case we test for a 100 basis point drop (1 percent).

So, where \( Ei\Delta_1 \) is the effect of a 100 bp change in interest rates and \( LDur_s \) is the dollar duration of liabilities, if...

\[ ADur_s \times Ei\Delta_{100} < LDur_s \times Ei\Delta_{100} \]

...then your plan has a hedging problem.

One can see that when there is a mismatch in durations, there is unhedged interest rate risk. The strategy is to move the portfolio’s “hedge ratio”, or the ratio of dollar duration of assets to the dollar duration of liabilities. So when a plan has a 50% hedge ratio, this means that fixed income assets will fall 50% less than liabilities in a rising interest rate environment. A 75% hedge ratio means that fixed income assets will fall 25% less than liabilities. Again, any hedge ratio lower than 100% will result in an improvement in funding levels for a corporate defined benefit plan in a rising interest rate environment.

Once the hedge ratio is calculated on an “as-is” basis, the plan is ready to move on to the “to-be” portfolio allocation. The next section discusses how the plan might get there.
TACTICS

Liability-driven investing is primarily a strategic decision. But, like any strategic decision, its implementation cannot be completely decoupled from tactical issues and, in particular, the question of timing. For example if a plan is moving from an asset duration of 5 years, which is roughly the duration of the Barclays Capital US Aggregate Bond Index\(^3\), to be closer to the plan’s liability’s duration of 15 years, there are several mechanisms by which to achieve this.

The manager responsible for transitioning the portfolio into longer duration positions needs to find the most appropriate instrument with which to do the hedging. The relative pricing and effectiveness of the various tools used—Treasuries, long corporate bonds, swaps, and other derivatives—vary over time, so managers must find the combination that best suits its needs at any specific moment. The best option depends on the client’s situation.

PHYSICALS – The case for purchasing longer maturing corporate bonds over other instruments is that their yield rates most closely match the rates at which liabilities are discounted. And while counterparty (or default) risk still exists for the bonds, it is more diversified in a bond portfolio than it is for a set of large swap positions. There can be a problem in that the sale of assets required to raise money to buy longer maturing bonds can come at inopportune times. Many shorter maturity credits are marked to market at a deep discount, and their sale (rather than waiting to maturity) would mean recognized losses. This leaves the portfolio manager with a dilemma. They can either sell lower quality short bonds at potentially distressed prices, or sell higher quality issues while holding the lower quality bonds to maturity.

FUTURES – it is possible to extend the duration of the portfolio overall through the use of futures. Futures offer greater liquidity than do physical securities, and because the futures are purchased on margin, the funding requirements are lower for a given exposure. In recognition of the growing institutional investor need for extending duration, the Chicago Mercantile Exchange’s (CME) "Ultra" T-Bond futures contract is a US Treasury contract that delivers a basket of cash Treasury bonds with at least 25 years of remaining term to maturity. By comparison, deliverable securities for the existing T-Bond contract are bonds with remaining terms to maturity of 15 years or more. The terms of the Ultra are useful for rapidly extending long duration exposure, while the underlying assets are transitioned into long duration physicals.

SWAPS – Interest rate swaps are another way to extend the duration of the asset portfolio. However there is the potential for swap spreads and corporate AA yields de-coupling, which is known as basis risk. Decoupling and volatility can work in favor of the plan, with a swap hedge position earning gains in times when the plan’s liability falls (as is what happened in 2008). However that will not always be the case. The higher the basis risk, the lower the quality of the hedge. While swaps may offer yet more liquidity than can be had in physical and future space, there is a more concentrated counterpart risk with swaps. Swaps should be undertaken with highly rated counterparties.

The transition manager will have visibility of the relative market prices, liquidity levels, and counterpart risk existent in each of the three paths. For instance, in the current market environment (March 2011) there are no liquidly traded credit futures. Liquid credit default swaps are in the 5 year tenor, not 10 years or more which is what a fund would need for LDI. At this time futures exposure (interest rates only) would be cost prohibitive if the ultra contract is exclusively used. The bid / ask on the CME Ultra contract is currently\(^4\) 6 ticks 123+17/32nds by 123+25/32nds. The 15 day average daily volume (ADV) on the contract

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\(^3\) Indexes are unmanaged and cannot be invested in directly.

\(^4\) The example cited gives market data as of March 25, 2011.
is 37,000, or about $4.5 billion per day, which makes it only 1/10th that of the long bond future. A combination of the long bond (adjusted modified duration around 10, and 15 for the ultra) would be best, but the cost of the CME Ultra may drive the position costs up. Interest rate swaps on the other hand are about 1.5bp wide between bid/ask, which is comparatively cheap.\(^5\)

But of course all of the preceding paragraphs may not be the case at the time of implementation. The view on optimal paths is a function of market conditions and requires the insight of an experienced exposure manager.

Which brings us to the close of this paper. We end with a list of attributes one should look for when engaging an LDI transition manager:

Skills and resources we believe are required of a good LDI transition manager:

- Full range of fixed income management capabilities across long duration physical fixed income and derivatives (to evolve as the liabilities and client needs evolve)
- Demonstrated experience with duration management for fixed income transition events
- Derivatives expertise (futures and interest rate swaps):
- Staff with experience
- Significant notional AUM
- Deep knowledge of implementation issues (liquidity, risk management of LIBOR allocation, minimizing transaction costs etc)

\(^5\) Rates quoted reflect market conditions as of the date written and are subject to current market conditions.
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Liability Driven Investment (LDI) strategies contain certain risks that prospective investors should evaluate and understand prior to making a decision to invest. These risks may include, but are not limited to; interest rate risk, counter party risk, liquidity risk and leverage risk. Interest rate risk is the possibility of a reduction in the value of a security, especially a bond or swap, resulting from a rise in interest rates. Counter party risk is the risk that either the principal or an unrecognized gain is not paid by the counter party of a security or swap. Liquidity risk is the risk that a security or swap cannot be purchased or sold at the time and amount desired. Leverage is deliberately used by the fund to create a highly interest rate sensitive portfolio. Leverage risk means that the portfolio will lose more in the event of rising interest rates than it would otherwise with a portfolio of physical bonds with similar characteristics.

Bond investors should carefully consider risks such as interest rate, credit, repurchase and reverse repurchase transaction risks. Greater risk, such as increased volatility, limited liquidity, prepayment, non-payment and increased default risk, is inherent in portfolios that invest in high yield (“junk”) bonds or mortgage backed securities, especially mortgage backed securities with exposure to sub-prime mortgages.

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