



Investment Strategies 2015

Practical De-Risking Solutions: Asset Duration and Interest Rate Risk

The funded positions of pension plans have improved significantly since the 2008 credit crisis, and plans now face the potential for an extended period of modest investment returns, low interest rates, and higher capital market volatility. In this environment, many defined benefit (DB) plan sponsors and trustees recognize the need to review their investment policy in order to better support the long-term objectives of their pension plans.

Relevant drivers of investment performance and funded status volatility in pension plans include asset duration (and its counterpart, interest rate risk), diversification of equity risk, and overall return-seeking portfolio structures. (For a detailed discussion on diversification of equity risk and equity portfolio structures, please see our paper *Practical De-Risking Solutions: Low Volatility Equity Strategies*.) De-risking, as part of an overall liability-driven investment (LDI) framework, is intended to mitigate many of the risk factors to which a pension plan is typically exposed, and to help preserve funding improvements. De-risking also provides an opportunity for plan sponsors and trustees to consider a much broader range of investment strategies available across global markets.

This paper will focus on asset duration and specifically, how to best manage the mismatch in interest rate exposures of a plan's assets and its liabilities. We argue that managing this particular risk is an important step in any interest rate environment, and present practical approaches to implementing policy decisions.

Background

Three decades of declining bond yields have highlighted how the long-term sustainability of a DB pension plan is affected by mismatches between a plan's assets and liabilities. Simply put, declining interest rates increase the market value of plan liabilities. If plan assets do not have comparable exposure to interest rate changes, then the market value of the assets will not increase by the same magnitude, resulting in funding deficits. These deficits must be rectified either by offsetting performance from other investments, or through supplementary contributions. In extreme cases, required funding payments could exceed the annual employee payroll and render the pension plan an enterprise's biggest cash drain, and biggest risk.

Quantifying a Plan's Net Interest Rate Exposure

One way to quantify the degree to which the interest rate exposure of a plan's assets and liabilities are matched is through the plan's interest rate hedge ratio. The hedge ratio measures the proportion of a change in the plan liabilities that is covered by a change in the plan assets due to interest rate movements. The higher the hedge ratio, the better the match, and the less changes in interest rates will influence the funded status of the plan.

For example, a 100% hedge ratio (a theoretical concept), would mean that any change in the value of the liabilities that results from changes in interest rates would be matched by a corresponding change in the value of the assets. In other words, any changes in interest rates (expected or unexpected) would have no impact on the relative value of the assets to the liabilities. Figure 1 illustrates the hedge ratio calculation for a plan with a 40% allocation to long bonds. In this example, the hedge ratio is calculated to be 35%, meaning that when liabilities move by \$100 due to a change in interest rates, the assets will only move by approximately \$35.

Figure 1: Hedge Ratio Calculation

(A) Fixed Income Allocation	40%
(B) Fixed Income Duration	14 yrs
(C) Funded Ratio	93%
(D) Liability Duration	15 yrs
Interest Rate Hedge Ratio $(A \times B \times C) / D$	35%

The Case for De-Risking

The degree of net interest rate exposure that currently exists in many plans implies that plan sponsors and trustees have extremely strong convictions about the future level of interest rates.¹

If a plan has a 35% hedge ratio, for example, plan sponsors are clearly expecting interest rates to rise. If their prediction is correct, the funded status of the plan will surely improve; however, the plan is significantly exposed to the risk that interest rate increases either do not materialize, or take a meaningful amount of time to do so.²

In our estimation, the uncertainty associated with forecasting the future level of interest rates means that the magnitude of the mismatch risk observed in many plans is not sufficiently compensated by higher return expectations.

The most common way to increase a plan's hedge ratio is by extending portfolio duration and/or increasing overall fixed income exposure. These are two relatively straightforward undertakings, and have formed part of most plan sponsor policy decisions in recent years. Given the relative ease of implementation, why then do many plans continue to maintain low hedge ratios? The answer we hear most often from investors is concern over rising interest rates that would "lock in" a high cost for the hedging of this risk.

¹ As an active fixed income manager engaged in the interest rate markets every hour of every day, our limit for interest rate mismatch within client portfolios relative to their respective benchmarks is typically one to two years.

² Refer to the Appendix for a more detailed analysis of bond returns in a stable or rising interest rate environment.

This concern is understandable given the current interest rate environment, however we generally encourage plan sponsors to establish a target asset duration policy and to implement policy decisions fairly quickly, for the following reasons:

- **Ability and willingness to accept risk:** Some pension plans represent a significant cost to the sponsor, and therefore cannot afford a high degree of mismatch between assets and liabilities in the event that interest rate forecasts turn out to be incorrect.
- **Economic costs vs. regret risk:** Unless the hedge ratio is increased to 100%, most plans that increase interest rate sensitivity remain short duration relative to their liabilities and therefore will still benefit if rates rise, just not to the same extent. Conversely, if rates decline, the plan is exposed to considerably less risk. It is important to consider the potential risk vs. reward when determining an appropriate exposure to this risk factor, regardless of interest rate forecasts.
- **Risk/reward trade-off is asymmetric:** Rate convexity causes outcomes to be skewed to the downside, and this effect is more pronounced in a low interest rate environment. What this means is that the funded status deterioration that results from a 50 basis point drop in rates is greater than the funded status improvement that results from a 50 basis point increase in rates.
- **Opportunity cost:** If interest rates remain low for an extended period, a short duration position would result in lost accrual on longer duration bonds that could become significant over time. Moreover, reducing interest rate risk creates an opportunity to increase allocations to other sources of return that are more predictable and manageable (e.g., reduce interest rate risk and introduce more credit risk). This consideration is often overlooked in the evaluation of a plan's duration policy.

The next section of this paper will discuss a method of implementing a de-risking program that balances the desired long-term positioning of the plan with short-term implementation issues – a strategy that has come to be known as a glide path.

The Glide Path Approach

From a long-term strategic standpoint, it is hard to refute the merits of eliminating interest rate risk. However, implementation timing can be an issue for a variety of reasons, most notably due to plan sponsors' concern about interest rate direction. If an immediate restructuring of the plan's asset allocation to reflect some desired long-term hedge ratio is not ideal, a de-risking glide path remains a viable implementation strategy.

A glide path can be formally defined as a dynamic asset-allocation strategy that aims to *gradually* reduce risk over time according to predefined triggers. As triggers are activated, the mismatch between assets and liabilities (i.e., the hedge ratio) is reduced. The benefits of this strategy are multifold, with the particular advantage of balancing strategic policy positioning with tactical implementation. Other benefits are outlined below:

- **Objective decision framework:** Risk reduction becomes a formal investment policy decision that is a function of a predefined set of circumstances that are both logical and tangible.
- **Reduces point-in-time risk:** De-risking occurs incrementally based on pre-established triggers, effectively mitigating the risk of mistiming or second-guessing a decision.
- **Avoids inaction:** The design and implementation of a glide path constitutes a formal commitment to de-risk, backed by a systematic process that will ensure it actually happens. This is in stark contrast to ongoing affirmations of the desire to de-risk but only at some future time when more favourable circumstances arise – circumstances that are often vaguely defined, redefined, and ultimately never occur.
- **Manages regret risk:** Nobody wants to look back on a decision with regret. A glide path removes emotions from the equation and is a constant reminder of long-term risk-management goals, even when short-term noise distracts us.

Elements of a Robust Glide Path Design & Implementation

As with any robust investment strategy, a good glide path will be customized to the circumstances and objectives of the plan sponsor, taking into consideration a plan's maturity, status, funded position, and/or risk tolerance, among other things. Furthermore, implementation is as vital as customization, as improper execution can potentially negate all of the benefits of an otherwise well-conceived glide path. We briefly describe the key issues that should be considered when adopting such a strategy below:

- **Clear determination of the end state:** The end state of a glide path should reflect the plan sponsor's strategic objectives. This usually takes the form of long-term economic sustainability (open plans) or plan termination (closed or frozen plans), and will typically be associated with a risk profile that best supports the plan's desired long-term objective.
- **Appropriate trigger points:** The triggers that will drive the de-risking process should be consistent with end-state objectives. The most common triggers are interest rate levels, interest rate spreads, funded status, plan maturity, and time. Some of these triggers may be more or less appropriate depending on each plan's unique situation. For example, using only yield triggers may not result in any de-risking if interest rates do not attain specific levels. If the sponsor has a strong desire to de-risk, time triggers may be more appropriate.
- **Trigger distance and monitoring frequency:** The distance between triggers and the frequency at which they will be monitored are very important practical considerations. If the increments between triggers are too small, the glide path could induce an unnecessarily large number of trades, resulting in excessive transaction costs. Conversely, if the increments are too large, good opportunities to capture small gains could be missed.
- **Formalized governance framework:** Having a carefully thought-out policy and de-risking plan is meaningless if the execution does not appropriately consider the relevant risks. Outlining and documenting a formal process governing the way in which the glide path will be executed, including accountability for execution breakdowns, is of paramount importance.

Illustration of a Glide Path in Action

Figure 2 illustrates how an interest rate glide path might have worked over the past two years. This particular type of glide path might be appropriate for a plan seeking to increase the hedge ratio, but only after yields reach levels where the sponsor feels comfortable extending duration.

The first half of 2013 was characterized by a noticeable upward trend in interest rates. As a result, the glide path would have triggered three stages of de-risking

and the fixed income portfolio would have transitioned from 100% universe bonds to 40% universe bonds and 60% long bonds. However, from September 2013 onward, interest rates went through a fairly steady decline so no additional triggers would have been activated.

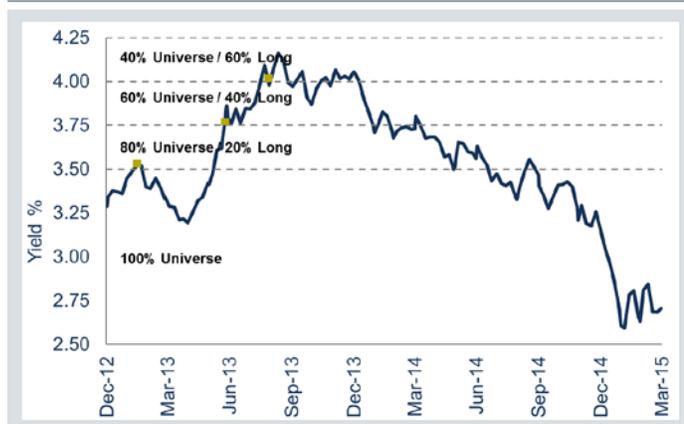
As a result of the decline in interest rates since September 2013, much of the gains earned by pension plans due to falling liability values were erased. It is under precisely these sorts of market conditions that a glide path can be a very powerful investment strategy. If rates rise consistently, the glide path will take the plan to its desired end state portfolio without sacrificing too much return because the de-risking was done gradually. However, if rates decline after a partial de-risking – as was the case in 2014 – the plan will be better positioned to offset the effects of higher liability values on the funded status, and the glide path will have dampened what would otherwise have been a downside event. Therefore, in the absence of absolute certainty on the precise path of future interest rate movements, the glide path becomes a reasonable compromise between lost upside and undesirable downside.

Conclusion

The funded position of pension plans has improved dramatically over the past several years due to strong investment performance and additional funding contributions. Addressing interest rate risk – the magnitude of which remains considerable for many plans – is one of several key policy considerations that plan sponsors and trustees must take into account to promote the long-term sustainability of their pension plans.

With interest rates near all-time lows, reluctance to increase fixed income allocations and fixed income portfolio durations is understandable. However, a glide path gradually reduces interest rate risk as certain triggers are activated. The triggers are typically set in relation to the desired end state of the plan and correspond to moments when risk-taking becomes increasingly unrewarded and/or when capital market conditions are more favourable. A glide path is therefore a way for pension plans to commit to de-risking while managing the risk of regret associated with the timing of the implementation.

Figure 2: FTSE TMX Canada Long Term Overall Bond Index Yield



The degree of net interest rate risk remaining in many plans today, and the resulting opportunity that reducing this risk provides to expand investment opportunities within the plan, represent strong motivations to reduce interest rate risk, notwithstanding today's low yield environment.

Appendix: Do Low or Rising Interest Rates Preclude De-Risking?

Figure 3 illustrates the historical evolution of the 10-year U.S. Treasury yield.³ The 10-year treasury yield peaked in 1981 and has been declining ever since, thereby dramatically increasing the market value of pension plan liabilities. With rates hovering around historical lows, many plan sponsors are concerned about “locking in” past losses and as a result, are somewhat reluctant to reduce interest rate risk. However, as with any decision that must be made in the face of future uncertainty, there is always a risk/reward trade-off to be considered.

Figure 3: Historical 10-Year Treasury Yields



Arguably, the risk associated with the implementation timing of a de-risking program is offset by the reward associated with increased plan stability and a more sustainable risk profile, even in today’s environment. We support this view for two reasons. First, a plan’s de-risking policy should not be determined by timing considerations that depend on uncertain capital market outcomes – some pension plans simply represent too much risk to a sponsor’s business operations, and present an issue that must be addressed regardless of current interest rate levels. Second, any expectation of interest rate increases needs to be put into a meaningful context and considered in light of *to what level* and *when* interest rates will likely rise.

Let us return to Figure 3 to examine the question of *to what level* interest rates might rise. Over the 145-year history illustrated in the chart, the 10-year treasury yield has mostly hovered in the 3–5% range. This would tend to suggest that the run-up in interest rates from 1968 to 1981 during a period of stagflation and geopolitical unrest, as well as the subsequent decline from peak levels, was an outlier relative to the preceding 95 years. In fact, we would argue that a “normal” level for the 10-year yield (both in the U.S. and in Canada) is approximately 4%.⁴ At March 31, 2015, the 10-year Government of Canada yield stood at 1.36%,⁵ which means that realistically, one might expect eventual interest rate increases of approximately 2.5%.

Now let us consider the question of *when* interest rates might rise. The five-year forward rate for the 10-year bond at March 31, 2015, was approximately 2.2%, only 0.8% above the current yield. This suggests that interest rates will rise slowly on their way to a 4% equilibrium level,

³ U.S. interest rates have historically set the tone for Canadian interest rates and we believe that this is likely to continue. Consequently, we look at U.S. interest rate data due to its longer history.

⁴ The 4% estimate is based on an analysis of a variety of different factors including history, the link between interest rates, and economic factors such as inflation, demographics, and productivity, as well as the current economic environment. For more information, please refer to *Economic Compass: Estimating a “Normal” Yield* (November 2013) available in electronic or hard copy by contacting institutions@phn.com

⁵ Source: Bank of Canada.

potentially over several years. Consequently, the impact of capital losses resulting from declines in bond prices would be spread out over a longer period of time, lessening the impact on a plan's year-over-year change in funded position.

When we address the questions of *to what level* and *when* interest rates will likely rise to establish a logical and probable scenario for interest rate direction, we believe the decision to not de-risk becomes significantly less compelling.

For additional details, please contact your PH&N IM institutional portfolio manager,
or call 1-855-408-6111 or email institutions@phn.com

VANCOUVER

Waterfront Centre, 20th Floor
200 Burrard Street
Vancouver, British Columbia
V6C 3N5 Canada
T 604-408-6000

TORONTO

22nd Floor
155 Wellington St. West
Toronto, Ontario
M5K 3K7 Canada
T 416-974-2710

MONTRÉAL

6th Floor, North Wing
1 Place Ville Marie
Montreal, Quebec
H3B 1Z5 Canada
T 514-876-1256

This document has been provided by Phillips, Hager & North Investment Management (PH&N IM) for information purposes only and may not be reproduced, distributed or published without the written consent of PH&N IM. It is not intended to provide professional advice and should not be relied upon in that regard. PH&N IM takes reasonable steps to provide up-to-date, accurate and reliable information, and believes the information to be so when printed. Information obtained from third parties is believed to be reliable, but no representation or warranty, express or implied, is made by PH&N IM, its affiliates or any other person as to its accuracy, completeness or correctness. We assume no responsibility for any errors or omissions. The views and opinions expressed herein are those of PH&N IM and are subject to change without notice. This information is not intended to be an offer or solicitation to buy or sell securities or to participate in or subscribe for any service.

This document may contain forward-looking statements about general economic factors which are not guarantees of future performance. Forward-looking statements involve inherent risk and uncertainties, so it is possible that predictions, forecasts, projections and other forward-looking statements will not be achieved. We caution you not to place undue reliance on these statements as a number of important factors could cause actual events or results to differ materially from those expressed or implied in any forward-looking statement. All opinions in forward-looking statements are subject to change without notice and are provided in good faith but without legal responsibility.

PH&N IM is a division of RBC Global Asset Management Inc., an indirect, wholly-owned subsidiary of Royal Bank of Canada.

®/™ Trademark(s) of Royal Bank of Canada. Used under licence.

© RBC Global Asset Management Inc., 2015. Publication date: May 12, 2015. IC1505297

