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Longevity Risk Solutions for Small Canadian Pension Plans

by John Melinte

Executive Summary

Over the last several decades, mortality trends and life expectancies in developed countries have been improving and are expected to continue to improve in the future.

This paper discusses issues of longevity risk and volatility faced by small defined–benefit (DB) pension plans in Canada and outlines the opportunities available for entrepreneurial insurance companies interested in providing solutions to address these issues.

Due to the nature of the current solutions available, insurance providers are targeting their product development at larger plans, aiming for transactions based on $100 million or more of liabilities. **What is needed for small plans is a simple solution which combines the benefits of pooling, low implementation costs and efficient administration.**

Background

Longevity risk (uncertainty regarding future mortality and life expectancy) can affect employer–provided DB pension plan liabilities and their funding requirements. These "present value" liabilities are calculated based on certain assumptions, including pension liability discount rates and a "mortality" assumption that dictates the length of time for which payments are expected to be made.

Longevity poses relatively higher risk and volatility for smaller pension plans as a result of having fewer members. As such, this paper deals mainly with the treatment of Designated Plans and Individual Pension Plans (IPPs). These plans are usually set up for company owners or highly–paid employees in order to allow tax–deductible company contributions over and above the normal retirement savings limits. **For**

the remainder of this paper, I will refer to these plans simply as "small plans."

Plan Sponsor's Perspective

The main sources of volatility for the funding of large DB plans are the asset rate of return and the liability discount rates–longevity risk, while visible, is less likely to cause significant volatility for larger plans. As an example, consider the following comparison:

	Plan A	Plan B
Number of Pensioners:	1,000	2
Expected mortality experience (over next 20 years) used for liability calculations:	500	1
Likely mortality experience:	450–550	0–2
Likely "gain-loss" range as a % of liabilities:	**0%–10%**	**0%–100%**

As you can see, for "Plan B," should both members survive the next 20 years (which is not unlikely), the plan would experience a relatively large loss, portions of which would be realized **(and likely require extra funding from the employer)** at each plan valuation performed during the 20 year period.

Many small pension plan sponsors are either not positioned to absorb the potential funding volatility or are not interested in retaining these longevity risks. Having said that, as in any financial scheme, there is a flip–side to the above scenario–there is a potential "gain" to the plan should the pensioners die sooner than expected. However, as I will show later, this upside potential need not be entirely sacrificed.

Entrepreneur's Perspective

Many small DB pension plans in Canada have reached (or will soon reach) a "mature" stage. First, due to baby boomer demographics, many plan members are either already retired or close to retirement. Second, many small plans have already been (or will soon be) closed to new (younger) entrants. These factors exacerbate the longevity risk faced by small plans.

Due to the recent turmoil in the financial markets, many of these plans are now severely underfunded, with asset to wind–up liability ratios as low as 50–60 percent. Given that many plan sponsors are also experiencing a downturn in their core business, finding the additional cash necessary to fund a wind–up of their pension plan (and avoid future longevity risks) is difficult.

The combination of these conditions creates a perfect marketing opportunity for the longevity risk management solution discussed in this paper.

Current Solutions

Options are being developed to hedge longevity risk either via cashflow or value hedges. For example, Babcock International has become the first UK company to use a "longevity swap"–the deal covers liabilities of over $1 Billion CAD.

Other current developments are also focused on large plans and revolve around a stochastic approach. Examples include using Monte–Carlo simulation to model mortality and using the Lee–Carter model as a tool to develop a risky coupon "survivor bond." **Although longevity risk is much greater for smaller plans, none of the currently available solutions are practical for small plans.**

A Quantitative Cost–Benefit Analysis

What this paper proposes is a deferred annuity product which can be purchased by a plan sponsor upon the retirement of a member to cover that pensioner's payments after a "trigger age." A few examples will serve to demonstrate the mechanics and cost of these **"Tail–End Annuities"** *TEA).

Consider a member of a small plan, set to retire immediately with a pension of $7,500 per month and a trigger age 85:

1. Assuming he is 57 years old at retirement, his total liability in the plan is approximately $1.3M. The cost of the TEA (before expenses, profit and taxes) would be estimated at $57,000, about 4.5 percent of his current liability.

2. At age 60, that same TEA would cost 5.6 percent of the current liability.

3. At age 63, that same TEA would cost 7.0 percent of the current liability.

The assumptions used in the above examples are typical of those currently being used to value the wind–up liabilities of a small Canadian pension plan, specifically:

> A discount rate of 5 percent per annum The UP 1994 mortality table (with projections to 2020)

Note that I have set the trigger age to 85–this is the age to which a 60–year–old male would be expected to live using the above assumptions. As such, this TEA would remove ALL of his longevity risk from the plan's liabilities, **but there would still be a gain to the plan should**

the member die sooner. For example, should he die at 75 instead of 85, the present value of the remaining 10 years of payments saved by the plan would be approximately $243,000, which represents 20 percent of the liabilities **(more than triple the cost of the TEA).**

As you can see from the above calculations, **TEA premiums could be developed to include appropriate loadings for expenses, profit and taxes and still provide value for pension plan sponsors.** Consider the first example with the addition of total margins of 30 percent–the gross premium would still be 10 percent of the liabilities (or less) in all three scenarios.

The age range of 57–63 was chosen for these examples because this is where most of the business would come from—baby boomers that are nearing retirement.

Clearly, for current pensioners who are older, the cost of the TEA would be higher, but this could be offset by one of two methods:

1. Increasing the trigger age to better reflect the pensioner's life expectancy. For example, using the above assumptions, a male currently aged 75 is expected to live to 87. In this case, the premium (without loadings) of a TEA starting at 85 would be 22 percent of his liabilities, while one starting at 87 would only cost 15 percent.

2. Increasing the trigger age further to strike a balance between the cost of the TEA and the amount of risk reduction to the plan. In the above example, if we increased the trigger age to 90, the cost of the TEA would be further reduced to 7%, **and the plan would still be "tail–end" protected against the more than 33 percent chance of the member surviving beyond age 90.**

Why are insurance companies uniquely positioned to provide these solutions?

- With a few modifications, the pricing, marketing and administration infrastructure currently being used for deferred annuities can be adapted for TEAs.

- Many of the risks that TEAs would pose to the issuer are similar to those posed by deferred annuity products. These are risks which insurance companies already have experience managing.

- TEAs could help offset the risk of high mortality insurance companies face in their core lines of life insurance products.

A final important consideration is the size of the potential market. As at

Jan. 1, 2008, Statistics Canada reported that small DB plans (with less than 10 members) represent a total asset base of over $5.2 billion CAD.

For illustrative purposes, a conservative estimate using the Jan. 1, 2008 asset base as a proxy for current liabilities and assuming an average premium of 10 percent of liabilities would result in **a potential market of over $500 million in premium revenue in Canada alone.** Furthermore, this is a solution that could potentially be modified for small plans outside of Canada and also for slightly larger plans that may not be quite large enough to benefit from other solutions.

The initial goal would be for an insurance company to become established as a leading edge TEA solution provider in Canada and try to capture as much of the market as possible. In order to increase market penetration for cash–strapped plan sponsors, a payment plan could be structured (instead of a lump–sum premium) based on the current age of each member in question and the trigger age of the TEA.

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