SOCIETY OF ACTUARIES

Target Benefit Plans Issue Brief #2

Enhancing Security and Stability

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Target Benefit Plans Issue Brief #2: Enhancing Security and Stability

What is a target benefit plan?

Target benefit plans (TBPs) are collective pension arrangements that aspire to provide a targeted level of retirement income but actual benefits may exceed or fall short of this target. An explicit benefit/funding/investment (BFI) policy lays out the sponsor's funding commitment, how plan assets will be invested, how the affordability of the target benefit will be assessed, and what actions will be taken based on the results of those assessments. Actions may include changing the level of contributions within a predefined range, changing the asset mix, or adjusting members' benefits in respect of past and/or future accruals.

TBPs lie on a spectrum from more DC-like designs at one end, with limited risk-sharing and frequent adjustments to benefits in response to emerging experience, to more DB-like designs at the other end, with a strong emphasis on benefit security and stability and more risk-sharing among members.

The SOA's target benefit plan research project began by exploring the risk and reward characteristics of the simplest design at the DC end of the spectrum. Under this design, there is no explicit risk sharing among members aside from mortality risk. The affordability of benefits is assessed at each valuation by reference to the funded ratio determined under the Traditional Unit Credit (TUC) cost method, and action is taken immediately (by adjusting the accrued benefits of both active and retired members in the same proportion) whenever this ratio differs from 100%. The first Issue Brief on target benefit plans referred to this design as a Collective Defined Contribution (CDC) plan. Modelling revealed a high probability of shortfall events over long horizons as well as considerable instability of benefits year to year, even with relatively conservative choices of asset mix and valuation assumptions.

Introducing a corridor approach to benefit adjustments

The stability of members' benefits can be improved by delaying action on the upside and/or the downside until the funded ratio reaches certain trigger points. The corridor between these trigger points is referred to as the "no-action range". When the funded ratio falls outside this corridor, action is taken to return it to the edge of the corridor.[1] For example, if the lower and upper trigger points are set at funded ratios of 90% and 110%, respectively, and the actual funded ratio revealed by the most recent valuation is 120%, then the accrued benefits of all members (active and retired) would be increased by 120/110 – 1 = 9.09% and the funded ratio after this adjustment would become 110%. Using this corridor approach, benefit changes become less frequent and the likelihood of benefit reversals (instances where the benefit needs to be reduced right after a benefit increase was granted at the previous valuation) is diminished. The wider the no-action range, the lower the likelihood of benefit reversals.[2]

Figure 1 shows the impact of no-action ranges on the distribution of annual benefit adjustments by size, for a plan with 50% equity content using best-estimate assumptions. It compares Design 1, the simple CDC plan which has a single trigger for action, to two alternative designs:

- Design 2 with a relatively narrow corridor (triggers at 90% and 110%), and
- Design 3 with a wider corridor (triggers at 80% and 120%).

Figure 1 – Distribution of annual benefit adjustments by size (Designs 1, 2 and 3)

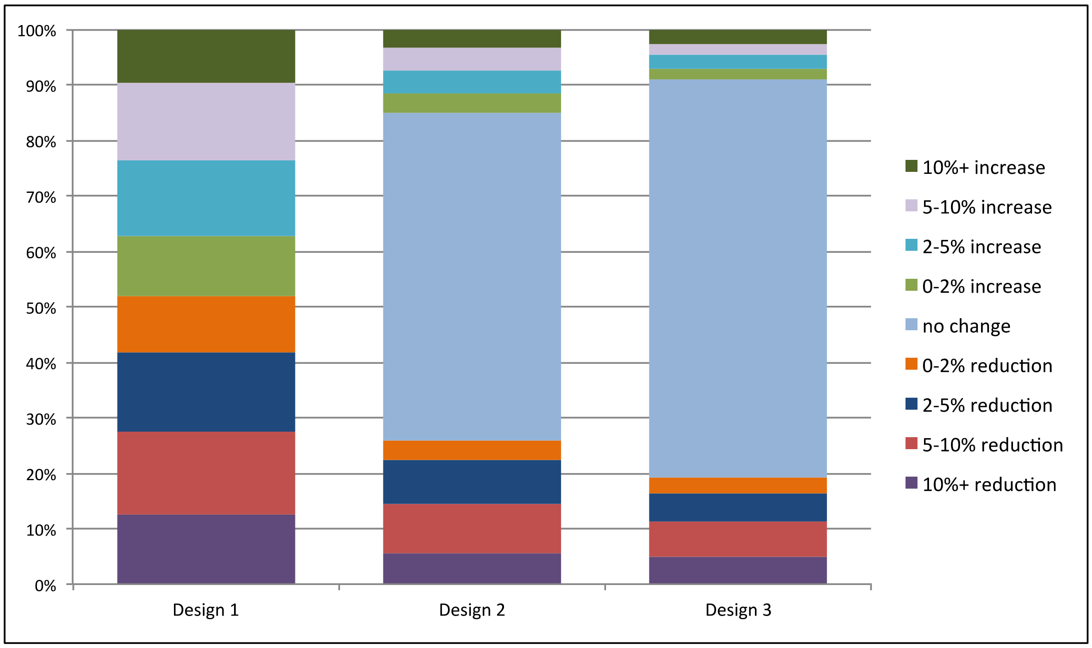


Figure 2 summarizes the key long-term performance characteristics of the same three designs. As expected, a wider no-action range provides more protection from benefit reductions; however, in the absence of other tools, the range would have to be very wide, and/or additional risk management features would need to be considered, in order to bring the kind of security envisioned for Shared Risk Plans in New Brunswick.[3]

Figure 2 – Performance metrics for plans with different triggers for action
(50% equity content, best estimate assumptions)

Design	1	2	3
Trigger point(s)	FR=100%	FR=90% FR=110%	FR=80% FR=120%
Probability of **at least** one reduction in first 15 years	100%	87%	61%
Probability of falling below 80% of initial pension: - 1st cohort of retirees - 50th cohort	 74% 60%	 64% 49%	 54% 43%
Median modified replacement ratio: - 1st cohort of retirees - 25th cohort - 50th cohort	 34% 37% 45%	 34% 37% 45%	 35% 36% 44%
Median annualized growth rate applicable to pension during retirement period: - 1st cohort of retirees - 50th cohort	 -0.4% 0.0%	 -0.4% 0.0%	 -0.4% 0.0%

In many respects, Designs 2 and 3 appear to generate more secure and stable pensions than the simple CDC plan, at seemingly no cost.[4] However care should be taken as the modeling results depend on a stable demographic profile. Plans with an aging population are likely to produce less attractive outcomes, especially for later cohorts.

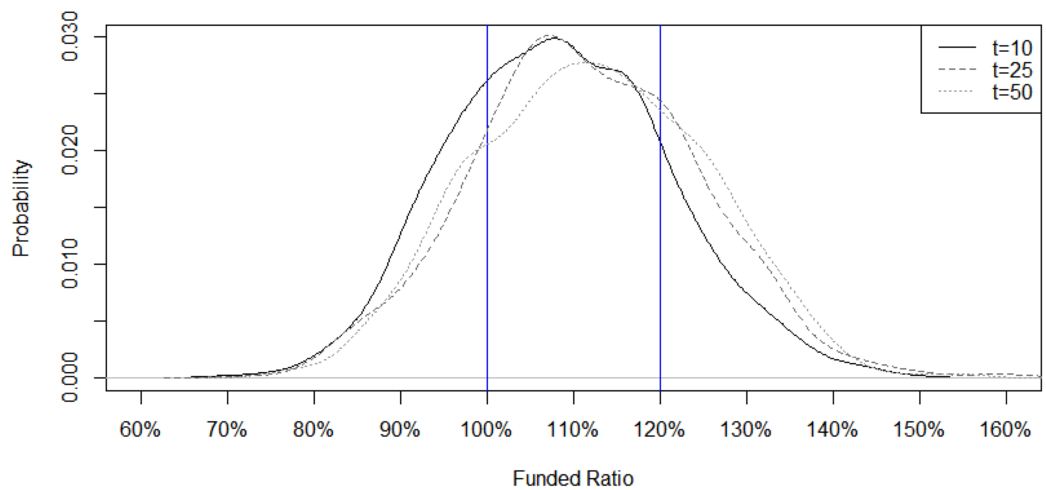
It is worth pointing out that, during the first 20 or so years of the operation of the plan, the use of best estimate assumptions together with the TUC method is projected to lead to a slow erosion of pensions under our model. This is evidenced by the negative median annualized growth rate in pensions for earlier cohorts in Figure 2.[5] By contrast, later cohorts of retirees tend to "break even" over their retirement period (0% median annualized growth rate), partly because the relationship between the target benefit and the contribution rate is not reset even after bond yields are projected to have risen (i.e., contributions remain at 10% even though the target benefit becomes much cheaper as the valuation rate is adjusted upwards). Later cohorts of members tend to benefit from the resulting gains.

Biasing the no-action range to saving

Stakeholders may be reluctant to allow the funded ratio to drop below 100% (especially on a best-estimate basis) without taking any action, and may instead choose to use a range whose lower endpoint is at or above 100%, biasing the plan to saving. This design is equivalent to a plan with a buffer that is built up in good times and drawn down in bad times. The research project looked at two variants: Design 4 with triggers at funded ratios of 100% and 120% (i.e., 20% range as for Design 2), and Design 5 with triggers at funded ratios of 100% and 140% (i.e., 40% range as for Design 3).

Given the fixed starting asset value available at the inception of the plan, all projections started with funded ratios of 100% at plan inception. Over time, the distribution of the funded ratio drifted upwards as gains were held back until the upper trigger point was reached. Eventually, the distribution of the projected funded ratio became centered around the middle of the no-action range under both designs. This is illustrated in Figure 3 for Design 4: the no-action range bounded by funded ratios of 100% and 120% is marked by the vertical lines, and the distribution shifts slowly to the right over time (having started from 100%).

Figure 3 – Distribution of funded ratio 10, 25, 50 years after inception
(best estimate assumptions, 50% equity content)



The behavior of the plan under Designs 4 and 5 differed markedly during the "transition period" (while the distribution was shifting and a buffer was expected to be built up) and the "ultimate period" (when the distribution became more stable): they both tended to deliver better results in the ultimate period than plans with equivalent no-action ranges centered on 100% funding. However, with a fixed funding commitment, there was a clear shift in rewards from early cohorts to later cohorts. The higher benefit security and stability during the ultimate period (applicable to later cohorts) was in contrast with higher downside risk during the transition period (applicable to earlier cohorts). In practice, there may be a desire for the opposite pattern (i.e., a more stable or even increasing risk profile over time), which would require changes to the valuation basis and/or more refined benefit adjustment mechanisms.

An alternative approach would be to start the plan with a funded ratio at the middle of the no-action range so the various cohorts of members have more similar risk profiles; however, given the fixed starting asset values this would result in an immediate reduction in accrued benefits at plan conversion. Earlier cohorts would be negatively affected unless additional funding was provided to preserve both the level and security of their benefits at inception.

Adjusting target accruals

A common feature of designs 1-5 is that only accrued benefits are adjusted while the target and current accruals are kept the same. The impact of unfavourable plan experience on accrued benefits can be tempered by adjusting target accruals either at the same time as, or before, adjustments are made to accrued pensions. The project report titled “Analysis of Target Benefit Plan Design Options” contains outputs and observations from such design variants, making use of open-group valuations to determine affordability.

When the adjustment is applied to both the accrued benefit and the target (future) accrual rates at the same time, there is hardly any change in the frequency of benefit adjustments but the severity of those adjustments is reduced, with less extreme outcomes on both the upside and the downside. In terms of adequacy of pensions, the median replacement ratios for each cohort remain very similar to those seen under Designs 1-5, but the variability of the projected replacement ratios is reduced. The cumulative effect tends to be favourable for earlier cohorts of retirees who experience smaller benefit reductions in the early years as active members take on more risk (having both their accrued benefits and their future accruals exposed to plan experience). With a fixed funding commitment, the improvements for the earlier cohorts come at the direct expense of later cohorts.

To provide even more downside protection to retired members, target accruals may be adjusted first, changing accrued benefits only if absolutely necessary. Under such a design the risk-reward dynamics between different cohorts become much more complex. Even when the adjustments to the target are symmetric (i.e. they are the first to be adjusted on both the downside and the upside), systematic biases may develop over time.

While the performance metrics used in this project[6] were helpful when looking at the level of stability, security, and adequacy of benefits separately, they were not well suited for determining whether such systematic biases existed. Such assessments would have required that generational differences in one area (e.g., with respect to benefit security) be combined with differences in other areas (e.g., with respect to income replacement) in a coherent and consistent matter. New methodologies rooted in financial economics combining generational accounting with option valuation techniques are currently being developed in the Netherlands and may be applied to TBPs in the future.[7] Such forward-looking, probabilistic assessments of intergenerational equity could complement traditional, backwards-looking assessments, which compare historical (realized) costs and benefits under the plan.

Flexible family of designs

TBPs are a flexible family of hybrid pension plan designs, capable of producing a myriad of risk and reward profiles for the various generations of plan members involved. However, our study suggests that basic tools such as the allocation to traditional equities versus bonds, the choice of discount rate, the use of no-action ranges, and simple adjustment mechanisms (based on either closed group or open-group TUC valuations) cannot, by themselves, replicate the reputed security and stability of traditional DB plans without significantly affecting income replacement ratios or changing the distribution of risks between generations.

Stochastic projections of the operation of target benefit plans under various designs can help actuaries and other stakeholders explore the potentially complex trade-offs between the stability, security and adequacy of benefits in order to find the unique combination most suited to a given situation. Such projections can also further our understanding of generational differences.

References:

Society of Actuaries, Pension Section. (2016, February) *Analysis of Target Benefit Plan Design Options*. Available at https://www.soa.org/Research/Research-Projects/Pension/2016-target-benefit-plans.aspx.

Notes:

[1] An alternative approach would be to return the funded ratio to 100% each time a benefit action is triggered by the funded ratio falling outside the “no-action range”.

[2] Using best estimate assumptions in the annual TUC valuation together with trigger points set at funded ratios of 90% and 110%, and assuming 50% equity content, there is a 3.5% chance of a benefit reversal over the first 15 years of the operation of the TBP (5.4% over the next 15 years). When the trigger points are set wider, at 80% and 120%, benefit reversals become very unlikely (0-0.1% chance over 15 years).

[3] The primary risk management objective of Shared Risk Plans (mandated by legislation) is a minimum 97.5% probability that base benefits will not be reduced in the 20 years following the plan’s inception (i.e., contributions need to be set at a level high enough to withstand economic stress from investment returns). For subsequent valuations, testing on the 97.5% standard over the following 20 years is required. A combination of multiple layers of potential actions including limitation on the portion of excess funds that can be used for benefit enhancements and prohibition of extra spending, if necessary, are required as part of the funding policy to maintain a high benefit security level. Any post-retirement indexing granted by the plan immediately becomes part of the base benefit.

[4] Metrics like the probability of at least one reduction over a specific horizon, or the probability of a shortfall relative to 80% of a retired member's initial pension, are improved under Designs 2 and 3 without significantly changing metrics like the median replacement ratio or the median annualized growth rate in pensions after retirement for the various cohorts.

[5] The "annualized growth rate" is the geometric average of the year-over-year growth (positive or negative) in the pension received by a member, evaluated over his entire retirement period under a single simulation path. For each cohort of retiring members, each simulation run gives rise to a different annualized growth rate; the median of the resulting distribution of growth rates is reported in Figure 2 for cohorts retiring 1 and 50 years after the inception of the target benefit arrangement.

[6] These performance metrics are described in detail in Appendix A of the project report.

[7] See, for example, R. Beetsma, Z. Lekniute and E. Ponds (2014). "Reforming American Public-Sector Pension Plans: Truths and Consequences", *Rotman International Journal of Pension Management,* (7)2, 66-74 (available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2497525) for an application of this methodology.