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Insight Statement

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Protecting Pensioners of Traditional Defined Benefit Plans: A New Approach to Solvency Funding and Benefit Reductions on Plan Wind-up

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Executive summary

The current system for winding up underfunded defined benefit (DB) pension plans[1] involves dividing the segregated pension fund among all plan beneficiaries on a pro-rata basis according to the value of their pension entitlement. This means that if the available funds represent, for example, only 90% of the value of the collective promises, then each beneficiary sees a 10% reduction in their pension. This begs the question: Is there is a better approach to addressing underfunded pension plans?

This paper suggests that retiree pensions would be better protected if the solvency funding regime framework and the benefit reduction rules on wind-up recognized the premise that younger workers can tolerate greater risk and have more opportunities to recover from pension losses. As workers age and, in particular, after workers retire, they can tolerate less risk since there is much less time and many fewer options available to remedy the negative impact of lost pensions. The following changes could be considered:

1 Defined benefit (DB) pension plans sponsored by a single employer are becoming less prevalent in the private sector as they give way to other arrangements involving fewer guarantees and less risk on the side of the employer, such as defined contribution (DC) arrangements (including group RRSPs), target benefit pension plans and jointly sponsored pension plans. However, there remain many traditional single-employer DB plans, which are the focus of this paper. Unless otherwise specified, when discussing pension plans in this paper, we are addressing single-employer DB plans in the private sector.

- Change solvency funding rules to target different solvency ratios for different categories of members and to determine different "tolerable" cutback levels in case of plan wind-up.
- Implement new risk sharing measures to reflect different risk levels tailored to different age groups.
- Allow entities to continue administering assets and benefits for any interested member who is retired or eligible to retire on plan wind-up.
- Implement a pensioners guarantee fund in all jurisdictions to limit cutbacks to prescribed "tolerable" levels.
- Allow interested members to make optional contributions or transfers from another vehicle to restore any portion of their benefit cutback on plan wind-up.

Although there is no "silver bullet" that can solve all problems in the case of underfunded DB plans at wind-up, adopting some or all of these changes could help to better protect older workers and retirees.

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1. Introduction

In Canada, pension promises made to employees by their employer are not guaranteed through an insurance contract. Rather, pension promises are secured by requiring that the employer set aside assets in a pension fund that is independent from the employer and is intended to deliver future pension promises in the event the employer loses the ability to support the pensions with the assets of the enterprise.

The rules for funding the pension promises by transferring assets from the employer to the pension fund on a periodic basis are complex and vary by provincial and federal jurisdiction. It is important to note that because of the volatile nature of pension fund investments and annuity prices, the pension fund rarely equals exactly the estimated immediate cost of providing all the promised pensions. This is not a design flaw of the funding system, it is a necessary feature that allows plan administrators[2] to invest the pension fund in risky assets for long-term gains that can either increase the benefit available to employees or lower the cost of the pension promise, which could leave more funds for other forms of compensation.

Unfortunately, inherent in this design is the fact that when an employer goes out of business and the pension plan is wound up, there is a risk that the assets set aside to deliver the promised pensions may not be sufficient. In these cases, pension reductions are an inevitable but undesirable outcome and they can have very negative consequences on plan members, especially on retirees who are without the means to replace lost retirement income from other sources.

When businesses become insolvent and leave behind an underfunded pension plan, invariably it is the plan members that lose some portion of their promised pension. This circumstance is particularly difficult for retirees who are without employment income to offset the loss of pension income. In many cases younger retirees must return to work and older workers must postpone retirement unless they are prepared to accept a reduction in the standard of living that they expected in retirement. Older retirees have few options as returning to work may not be an option. Furthermore, non-retired members who receive a lump sum transfer have the opportunity to invest that sum over a number of years and obtain investment returns that may compensate to a certain extent for the original cutback of their pension benefits.

The purpose of this paper is to:

- revisit the history of pension plan funding and investments;
- review the challenges in balancing the interests of all stakeholders; and
- discuss an alternative approach that can be considered to improve the outcomes for pensioners who rely on the promises made to them by their employers.

2 It is important to distinguish the role of a plan administrator versus a plan sponsor, even though it may be the same entity in some jurisdictions. The administrator is the entity that determines the investment policy and thus the investment risk that results potentially for both the plan sponsor (who is responsible for funding the plan and therefore for making up investment losses with additional contributions) and the plan members (who may end up being imposed benefit cutbacks upon plan wind-up in case the plan sponsor is not able to fund the wind-up deficit).

Pension funding involves tradeoffs between affordability, predictability of costs, and security of benefits. This paper does not purport to precisely answer the question of how these tradeoffs should be balanced, which ought to be addressed by governments overseeing public interest. Rather, the focus is to shine a light on these tradeoffs and to allow readers to consider the advantages and disadvantages of an approach that would provide greater protection to older workers and retirees.

Throughout this paper, readers are reminded that providing workers with a pension plan is voluntary by plan sponsors, in many cases as a result of bargaining with employees the conditions of employment and elements of remuneration. Accordingly, it is appropriate that the rules for funding pension promises should provide some flexibility in the timing of contributions, particularly the additional contributions that might be needed in response to adverse plan experience. In the absence of some level of flexibility, it is reasonable to expect that virtually all plan sponsors would prefer to migrate to a DC model for pensions, which might generate less favourable pension outcomes for workers and retirees.

2. History of pension funding and investment

The fundamental nature of a DB plan is to make a promise to plan members that they can expect to receive the benefit defined in the plan provisions under various defined conditions. It is a promise made by a sponsor that is concerned mainly with carrying out its business in whatever sector it is involved, as a component of the remuneration paid to employees for providing their services. However, there are some caveats to that promise that tilt it toward a highly likely fulfilment rather than an ironclad guarantee.

2.1. Pension funding

The key mechanism for DB plans to deliver on promised benefits is a pool of assets segregated from the assets of the plan sponsor. In this regime, assets are accumulated in an orderly fashion over time and are invested with some degree of risk with the objective of achieving attractive returns. Over the long term, the investment returns earned often represent an even greater sum than the cumulative contributions that have been made.

Should an employer become insolvent, these assets do not revert to the employer or its creditors but stand separate for the benefit of the members of the pension plan. In case of plan wind-up, where the available plan assets are distributed to plan members in lump sum transfers, it is up to each plan member to continue taking some investment risks on their own to generate their future stream of pension income. Those who receive an insured annuity have no more future risks (but no future rewards either).

Historically, most jurisdictions followed a similar funding model, which included the following features:

- required actuarial valuations triennially at minimum;

- permitted use of actuarial surplus to reduce contributions required of employers;
- required the funding of going-concern actuarial deficits within the 15 years following the valuation date; and
- required the funding of solvency deficits (since the 1980s) within the five years following the valuation date.

The fact that funding rules allow plan sponsors to fund deficits over a number of years (such as the 15 years following the valuation date) also represents a risk for plan members in case the plan were to wind up during that period while the employer might be unable to fund any remaining deficit.[3]

Rules regarding the funding of DB plans are specified in Canada's various provincial and federal statutes on the subject. This patchwork of legislation has historically held that the rules for funding followed the rules in the jurisdiction in which the pension plan is registered (i.e., where there is a plurality of active plan members).

In addition to the rules above, the *Income Tax Act of Canada* provides overarching rules that limit the amount of pension benefits that can be provided and that restrict employer contributions when the amount of surplus exceeds a certain limit.

In the past decade or so, several jurisdictions have introduced "solvency relief" measures to lessen the impact of rising employer contribution requirements due to steep stock market corrections and the cyclical decline of interest rates. In more recent years, several jurisdictions have sought to rebalance the funding requirements for pensions by strengthening the long-term going-concern funding goal while reducing (or even removing) the short-term solvency funding goal, in many cases at a new level of 85% solvency ratio. These changes have largely been designed to reduce the volatility of required employer contributions from one year to the next. Since this was accompanied by a strengthening of the going-concern valuation basis with the imposition of greater provisions for adverse deviations, it may result in more or less risk of benefit cutbacks for plan members in case of wind-up to the extent that contributions end up being lower or higher than they would have been under the prior rules.

There are different sources of risks involved in a DB plan and their impacts are illustrated in successive actuarial valuations through the gain and loss analysis. This analysis shows the difference between experience that has materialized since the last valuation versus the expectations that were incorporated into the actuarial assumptions. Those gains and losses may be separated between demographic factors and economic factors. Usually, the most significant gain or loss to the plan comes from investment returns that deviate from the long-term assumption.

3 Note that in the past, some jurisdictions allowed employers to wind up a DB plan without having to fund the deficit, but this has been changed in practically all jurisdictions.

2.2. Investments

A certain degree of investment risk is taken by the plan administrator in order to seek a probable better outcome for plan members. Managing that risk professionally is actually one of the great strengths of many DB plans, helping to make the retirement system more efficient in yielding better retirement outcomes from the sums contributed during the member's career. Taking investment risks results in a lack of an ironclad guarantee for the promised benefits, as the invested assets at any point in time might be less than the plan's liabilities.

Pension funds supporting DB plans have their assets commingled and each plan member does not have their name attached to any portion of the fund.[4] All the assets are available to support all liabilities. In this framework, there is an assumption that liabilities that come due will be paid from the pension fund and should the fund be insufficient to pay liabilities that will come due in the future, then additional contributions by the plan sponsor would be required to bring the assets and liabilities into balance. Conversely, there was also an assumption that if the assets exceeded the liabilities, then the plan sponsor would be eligible for a "contribution holiday" and if surplus assets remained after settling all liabilities, then such surplus could revert back to the plan sponsor.

As a result of this commingling of assets, plan administrators were free to invest the entire pension fund based upon the presumed risk tolerance of the plan sponsor (who supports the risk while the plan is ongoing) and of the plan members (who suffer the consequences if the plan is wound up with a deficit while the sponsor is insolvent). The objective of most plan administrators in setting the asset mix was to seek maximum investment income over the long term subject to an acceptable level of investment volatility – which was the key driver of contribution volatility.

In the 1980s, the issue of surplus ownership was tested in the courts, with court rulings and subsequent regulatory policies making it unclear that plan sponsors owned the surplus assets in the pension fund. As a result of this changing dynamic, plan sponsors often started to focus on funding a pension plan at the minimum level required by legislation. This focus on minimum funding at a time when interest rate declines mostly drove pension liabilities higher has contributed to two decades of chronic underfunding for many pension funds.

When a pension plan is wound up and the pension plan has surplus assets, decisions are required to determine who owns the surplus assets and/or how those assets should be shared between plan members and the plan sponsor. In contrast, when a pension fund is wound up and the pension plan has a deficit, if the employer is not able to fund the deficit, decisions are required to determine which pension promises will be delivered and which promises will be reduced as a result of insufficient assets. In the absence of a priority schedule for liabilities within a plan's foundational documents, the most common practice has been to liquidate an underfunded pension plan at wind-up by providing each plan member a share of assets proportionate to their share of liabilities.

4 This is the case even with respect to each member's accumulated contributions, i.e., even though they each have an amount specified on their annual individual statement, this is not earmarked but commingled in the overall fund.

While cutting back benefits at the same rate for every member might seem fair, this paper presents a different view since not all members have the same risk tolerance nor the same opportunities to offset those cutbacks in the future.

3. Traditional approaches to securing pensions

High-profile insolvencies (in addition to numerous smaller cases) have shined a light on the inability of the pension funding rules in Canada to ensure that every pension promise that was made is ultimately delivered. The difference between "highly likely" and "guaranteed" can materialize in tragic consequences when a plan sponsor becomes insolvent and its pension plan has a wind-up deficit. What we face then is an uncertain event that in most cases has a low probability but can also have a high impact. As you would expect, this reality appears unacceptable to the workers and retirees who have relied on these pension promises. At the same time, there is little surprise in government and the pension industry at large, where the funding rules and the risks of underfunded pensions are better understood.

In response to repeated failures of pension plans to deliver on all of their promises, governments continue to review the funding rules and seek alternatives that might result in more benefit security without a considerable increase in costs to employers, workers, or taxpayers. In 2018, partly in reaction to the tragedy of significant reductions in pensions paid to retirees and termination benefits paid to non-retired members involved in a few high-profile plan wind-ups like Nortel Networks and Sears Canada, the Federal government launched a consultation on benefit security to identify possible reforms that could help avoid such tragedies in the future. The new measures that resulted from that consultation focused mainly on governance and communication, and while they may help to reduce the number and severity of such events in the future, they cannot prevent them entirely.

Four commonly proposed solutions to improving the security of workers' pensions are:

- funding through fully insured annuities;
- increased funding levels;
- universal guarantee fund programs and government guarantees; and
- higher prioritization of pension promises in insolvency proceedings.

Each of these proposals has its merits and its drawbacks, as discussed below.

3.1. Annuities

One of the most obvious solutions to guarantee pension promises might appear to be a requirement that all pension promises be fully insured through annuities guaranteed by Canadian life insurance companies, with their guarantees backed up (to certain limits) by the whole insurance industry through Assuris.[5] However, guaranteed annuities require the backing of very conservative

5 Assuris is an independent not-for-profit compensation organization funded by the Canadian insurance industry since 1990. Its mission is to protect policy-holders (including beneficiaries of insured life annuities) if their life insurance company fails.

investments, which makes the cost of such a guaranteed pension promise relatively high.

The fact that very few workers in DC plans choose an annuity at retirement indicates that most workers are willing to take some investment risks to increase the likelihood of a greater lifetime income in retirement. Therefore, it can be presumed that DB plans have been set up with the understanding that there is a certain level of risk involved in foregoing the available security of insured annuities in order to seek better outcomes, while taking measures to manage the risks carefully.

3.2. Increased funding

A commonly recommended solution is to create stricter rules for accumulating pension plan assets to decrease the chances that an insolvent employer would leave behind an underfunded pension plan. This solution has a clear problem: a strong bias away from insufficient assets is a strong bias towards surplus assets. Since the 1980s it has become unclear who owns surplus assets in a pension plan. If surplus assets cannot be retrieved by an employer, then those assets can be considered employee compensation at the time they are contributed. However, the employees who ultimately enjoy the benefit of those surplus assets may be a different cohort (decades into the future) than those who sacrificed wages and other benefits to accumulate them. In this regard, very conservative rules for funding pensions would very likely lead to substantial inter-generational transfers of wealth.

In the 1980s, recognizing the importance of securing pension promises, many jurisdictions introduced "solvency funding" intended to increase the chances that all benefit promises would be paid even if a viable employer was no longer available to contribute any further amount to the pension fund. Unfortunately, this legislation came into force at a time when a long-term cyclical decline in interest rates started to drive up pension liabilities. Combined with new rules on minimum ancillary benefits (such as earlier vesting and Ontario's grow-in) as well as periodic pull backs in investment markets, this led many pension funds to enter the 2000s with a chronic problem of underfunding.

While the solvency funding rules drove contribution rates for sponsors higher, business challenges meant that regulators were sometimes forced into a choice of lessening pension funding requirements or forcing weaker employers into insolvency. This latter choice does little to serve pension fund beneficiaries and a series of "one-off deals" and rounds of "solvency relief" ensued for the first decade and a half of the 21st century.

3.3. Guarantee funds and government guarantees

Guarantee funds are sometimes seen as the ideal approach to protect plan members, where the guarantee fund comes into play to make up shortfalls once the catastrophic event occurs. Ontario is the only jurisdiction in Canada that has set up such a mechanism for pension plans, and though most observers can agree that the results have proved very beneficial for plan members at the receiving end, most of them also acknowledge real difficulties in properly funding this mechanism.

The Ontario Pension Benefit Guarantee Fund (PBGF) is designed to emulate an insurance program

where each DB plan sponsor not exempted from the program is required to pay an assessment (premium) to the fund each year and through which benefits payable to plan members are partially protected should the plan sponsor be unable to fully fund the pension plan at the time it is wound up.

In the balance between the affordability of premiums and the costs to protect all pensions, there are limits to the amount of pension benefit that is guaranteed. For many years, this limit was a monthly pension of $1,000 and in 2018 it was increased to $1,500, while at the same time the premiums paid by plan sponsors were substantially increased.

One difficulty in funding the PBGF has been the calculation of premiums charged to all sponsors based on a formula that does not properly reflect the risk represented by their plan. Basing the levy on number of plan members and amount of solvency deficit does not consider the probability of incurring a claim. It would be difficult to assess such probability, especially since analyzing business risk of privately held entities is not a usual function of government authorities. Accumulated premiums often have not sufficed to cover the cost of guaranteeing certain plan wind-ups and the provincial government (i.e., taxpayers in general) had to inject substantial sums to deliver the promised guarantee. Injections of contributions from taxpayers into a guarantee fund are especially controversial when only a small minority of workers in the private sector have DB plan coverage.

Another drawback of Ontario's guarantee fund has been to encourage bargaining of benefit improvements that ended up not being properly funded by the employers, thus taking advantage of the guarantee system. It should also be noted that the PBGF does not cover indexing benefits because funding rules do not require plan sponsors to make contributions to fund those types of benefits on a solvency basis. New problems funding the PBGF may emerge soon given that new solvency rules in Ontario have recently reduced the solvency ratio that is required to be funded by special employer contributions from 100% to 85%.

Although not strictly a "guarantee fund," another type of guarantee that has been offered by a provincial government but to a much lower extent, and without having a fund set up, was when Quebec introduced around 2009 the option for retirees of wound-up plans to get their pension administered by Retraite Québec for a few years before insured annuities are eventually purchased, in the hope of ending up with an increased pension amount. When this option was introduced, the government guaranteed that this would never produce a lower pension than the amount that could have been annuitized at wind-up (i.e., the usual settlement method), so virtually everyone who was eligible chose the new option, since they could only end up winning and not losing.

However, after just a few years, even though that guarantee never actually kicked in (at least to our knowledge), as practically all retirees who had selected that option ended up "winning" by receiving pension increases, the government changed that rule and advised retirees in subsequent plan wind-ups that this option would no longer come with such a guarantee. Unsurprisingly, the take-up levels reduced drastically among the subsequent groups of retirees, although they usually

remained in a significant majority. Unfortunately, no analysis has been provided regarding the reasons why it was removed or the theoretical cost of such a guarantee (which is not nil *a priori*, even though it turned out to be nil *a posteriori*).

3.4. Priority in insolvency

Many advocacy groups argue that the Bankruptcy and Insolvency Act (BIA), as well as the Companies' Creditors Arrangement Act (CCAA), should be amended to change the priority of unfunded pensions. Currently, under the BIA, pension deficits rank after secured creditors, which means that in most insolvencies there is nothing left to top up a pension fund after the secured creditors are paid.

Unfortunately, there are two serious impediments to changing the BIA and CCAA. First, changing the status quo would be unfair to current lenders and would, to one degree or another, reduce the willingness (or increase the cost) of lenders going forward to support businesses with potential unfunded pension plan liabilities. Second, the BIA and CCAA are federal statutes and so the provinces have no say in this legislation. Integrating the BIA and CCAA with the pension funding standards of the provinces would be a massive undertaking and given the lack of success of the Canadian Association of Pension Supervisory Authorities (CAPSA) to achieve harmonized pension legislation across Canada, there is no reason to expect that this larger endeavour would be fruitful. Past attempts of provincial pension benefit legislation to impose deemed trusts to secure unfunded pension plan liabilities have been overruled by proceedings under the federal BIA or CCAA.

4. New approach to securing pensions

Before considering alternative approaches to pension funding that would provide retirees with greater security for pension promises made to them, it is useful to consider the key priorities of members of DB plans. These likely include the following:

- Outsourced management of pension delivery: DB plan members appreciate that their pension promise is being managed by professionals, including investment experts, which allows them to concentrate on their work and personal lives without the burden of investment decisions, including whether to purchase annuities or stay invested in market securities.
- Pooling of mortality risks: DB plan members appreciate that they don't need to make guesses around their life expectancy and to try to budget their savings to last an uncertain period of time.
- Investment in risky assets: Like their counterparts participating in DC plans, DB plan members want the benefit of higher benefits that are possible with the higher investment returns generated by taking investment risks, although their risk tolerance typically diminishes with age.
- Predicable and reliable income: DB plan members desire a pension promise that is reasonably predictable for planning purposes and that can be relied upon to be delivered, especially when they approach retirement.

4.1. Rethinking the allocation of investment risk to members of DB plans

Considering the priorities of DB plan members, there is a conflict between the goal of taking investment risks to build better pensions and wanting pensions fully guaranteed. Looking back at the history of pension funding, the pension industry moved away from funding pension promises through annuities in order to generate increased pensions and/or lower pension costs. However, this change in approach to pension funding came at a time where pensions only vested at retirement, even before the stricter vesting of age 45 with 10 years of service was introduced in the 1960s. As a result, little attention needed to be paid to the issue of a plan wind-up and to ensuring sufficient assets to pay for all benefits that would be owed at that time.

Today, however, minimum benefit rules seek to ensure that virtually all members of a pension plan receive the value of their pension promise. In fact, in Ontario the "grow-in" rules provide workers who are part of a wind-up with benefits greater than those that would be paid on voluntary termination.

If members of DB plans were to expect that their pension promises be "fully guaranteed," then by definition they would expect the assets supporting those pensions to be invested conservatively to ensure with a high degree of certainty that their pension payments will not be reduced. But they are willing to accept a certain degree of risk in order to improve their expected outcome.

It is often assumed that the preferences of workers for taking investment risk is relatively high when they are young and decreases as they age and approach retirement. Workers who have retired typically have the lowest tolerance for risk. Simply put, administrators of more mature plans usually take lower investment risks compared to administrators of pension plans with less maturity.[6]

It is important to note that DB plan funds are not divided into individual member accounts as is the case for DC plans. In a DB plan there is one commingled fund with all assets available to pay all benefits. Historically many architects of DB plans believed that all plan members benefited equally from the pension fund gains achieved by taking the risk of investing in equities or in bond investments that are mismatched with the liabilities. However, as the industry has evolved, DB plan investment policy has migrated to a model of liability-driven investing, where the aggregate investment policy for the plan reflects to a certain extent the reasonable risks that can be taken on behalf of the aggregate of plan members, representing a combination of various degrees of risk that could be taken by different categories. Typically, relatively less mature plans tend to invest more heavily in equities while relatively more mature plans tend to increase their exposure to fixed income to reduce the risk and better match assets and liabilities. In the last decade, many ongoing pension plans have purchased buy-in annuities[7] to perfectly match liabilities for a cohort of retirees, thus reducing the overall investment and mortality risk borne by the plan.

6 Guidelines published by CAPSA state that plan administrators should take into account plan member demographics in setting up the investment policy and managing risks.

7 Buy-in annuities represent an investment by the plan in insured annuities that guarantee pension payments to the plan matching pension payments being made by the plan to retirees who are covered by the buy-in contract.

In this newer investment framework, more equity investments in a pension fund tend to be justified by the presence of younger workers with longer time horizons while more fixed income investments in a pension fund tend to be justified by the presence of older retirees with little ability to take any material risk in seeing their pension income reduced. Notwithstanding this theoretical division of pension assets in a DB plan, in law the fact remains that all assets are held in one pool to pay all benefits. This commingling of assets creates a fuzzy picture of how much risk each plan member is taking and how much reward should be theirs should investment gains arise.[8]

Recognizing that all plan members do not have the same appetite for the risks taken by the plan as a whole could lead to risk management measures that attribute experience gains and losses differently to different subgroups of plan members. This means a plan could differentiate the risk levels desired on behalf of retirees in a certain age group versus active workers in a certain age group, and then determine different funded ratios for each group based on the experience gains attributed in reference to those desired risk levels.

An extreme application of such an approach would be to split the plan in two in order to place retirees in a separate group for which less risk is taken, while the original group that offloaded retirees may then take even more risk, reflecting the greater tolerance of younger members having a long-term horizon. Alternatively, a plan could set up various subgroups within the same plan on a notional basis to attribute various levels of investment risks (and rewards) that reflect each group's presumed risk appetite and tolerance levels. See the appendix for a more detailed discussion of this topic.

It should be understood in our proposal for a new approach to pension funding that a plan does not have to invest more conservatively if it is more mature. Plan administrators would remain free to take investment risks that they consider appropriate in order to fund pension promises most effectively. Likewise, our proposal is not to divide the assets of the fund by members, which would be more in line with the DC model of pension funding.

Taking into consideration the consequences of managing an underfunded pension plan and the risk appetites of different sub-groups of plan members, this paper presents a new approach that features changing the solvency funding regime to attribute a lower risk for older workers and retirees and implementing a consistent approach to reduced benefits at wind-up.

4.2. Revised solvency funding targets

Rather than requiring pension plans to fund all solvency liabilities at 85%, solvency funding rules could define targets that are not uniform for different categories of members. Instead of a one-size-fits-all approach, this could involve differentiations based on certain eventual benefit reductions that could be mitigated by the members continuing to take some investment risk for the remainder of their life, considering that younger members have more capacity to make up larger cutbacks than

8 DB plans also commingle other risks, such as mortality, which in aggregate are smaller in impact but for any one individual member can represent a significant cross subsidization to/from other members of the plan.

older members. This is consistent with the view that a plan member who has been retired for many years needs better protection than a plan member who is still many years away from retirement.

Here is an illustration of such differentiation based on varying the level of eventual benefit cutback that might be considered "tolerable" for different subgroups of members, given their presumed capacity to compensate those cutbacks by taking future investment risks:

Age of member	"Tolerable" cutback	Target solvency ratio to fund
85 and over	0%	100%
75 to 84	5%	95%
65 to 74	10%	90%
55 to 64	15%	85%
45 to 54	20%	80%
44 and under	25%	75%

For example, the solvency valuation for a retiree who is 70 years old would include only 90% of the benefits expected to be paid in the future, while for an active member who is 40 years old, the solvency target for that member's future expected benefits would be 75%. Each actuarial valuation would need to calculate the target solvency liabilities separately for each member and then the total target solvency liability would be compared to the total plan assets to determine the deficit that is required to be funded and the amortization payments.[9]

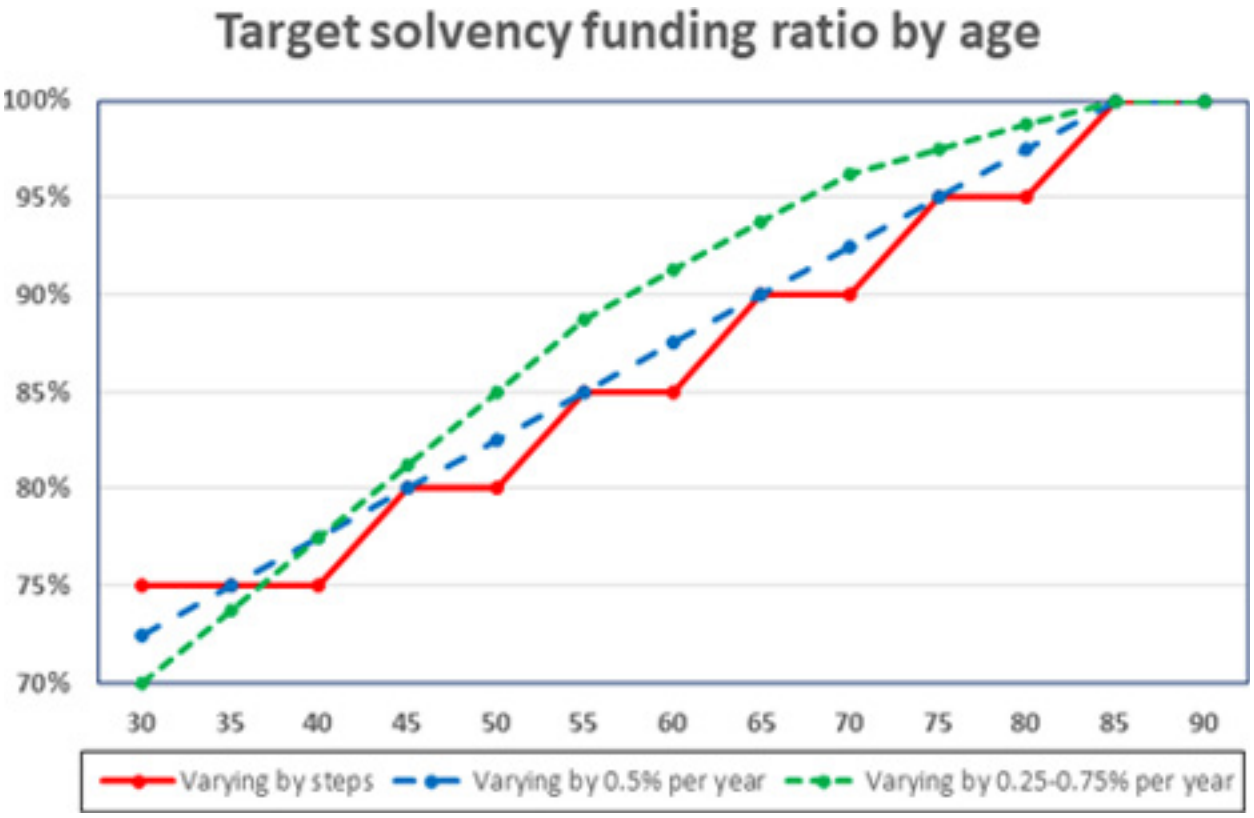
Alternatively, the rules could stipulate that the tolerable cutback for each member is to be calculated as 0.5% times their remaining life expectancy (assuming most plan members are currently expected to live up to approximately age 85). For example, in a rather simplified fashion, someone at age 65 expected to have approximately 20 years left to live would be assigned a 10% tolerable cutback, while someone at age 35 expected to have approximately 50 years left to live would be assigned a 25% tolerable cutback. Such a tolerance of 0.5% per year left to live means that members would be assigned a target of 0.5% in average yearly investment gains to achieve over their remaining life expectancy, compared to the discount rate used to calculate their wind-up liability, representing the present value of their expected future pension payments.

However, we have already noted that younger members are usually willing to take more investment risk than older members, which means they would have a better chance of achieving future investment gains in early years than older members taking more limited risks. It might be more appropriate to vary the tolerance in benefit reduction over different stages of each member's remaining life

9 An additional variation could be to use shorter amortization periods for older cohorts of members (e.g., three years for those who reached age 70 or 75, 6 years for those between 55 and 69 or 74, and 9 years for those who have not reached age 55).

expectancy. Therefore, rather than using a fixed percentage of potential investment risk and gain for all future years, another variation that might be preferred by regulators could be to vary the annual percentage to reflect an investment mix that is more conservative at older ages. For example, the annual target investment gains used to calculate the tolerable cutback could vary from 0.75% below age 55 to 0.25% above age 70, with an intermediate rate of 0.50% between ages 55 and 70.

The following graph illustrates the different approaches mentioned above:



The resulting target to be funded by different plans would obviously vary depending on each plan's distribution of liabilities by age groups (and depending on the levels of targets that are prescribed). Generally, a relatively more mature plan could have an overall target close to 90% while a relatively less mature plan could have an overall target close to 85%.

The following table shows the estimated results for two plans with substantially different liability distributions (based on the above option with targets varying by steps):

Age group of members	Percentage of plan liabilities in each age group for a mature plan	Percentage of plan liabilities in each age group for a less mature plan
85 and over	8%	2%
75 to 84	25%	5%
65 to 74	35%	15%
55 to 64	20%	40%
45 to 54	10%	30%
44 and under	2%	8%
Resulting overall solvency target:	90%	84%

4.3. Revised benefit reductions on wind-up

As a result of the fact that solvency funding does not target 100% of the solvency liabilities and that the funding target can be met over a period of time, there is a risk that a plan facing wind-up will have insufficient assets to fund all pension promises. Focusing on how to handle the situation after a plan wind-up, when there are not enough funds available to settle in full every member's promised benefits, the challenge is mainly to allocate reductions among the different members. The traditional approach has been to determine the plan's wind-up ratio by dividing the market value of assets, net of remaining expenses, by the liabilities to be settled, and then to apply that wind-up ratio to settle each member's benefit determined on the same basis used to calculate the liabilities for the wind-up ratio.

An alternative approach would be to reduce pension benefits at wind-up in a manner that reflects the "tolerable" cutback applied in setting solvency funding contributions as discussed above. This approach would mean that a higher priority is given to the benefits of members who have fewer opportunities to make up their cutbacks with future investment gains.[10]

Therefore, in case of plan wind-up with a solvency deficit and without an employer that can fund the deficit, the portion of benefits that is considered to have a higher priority, given lower opportunities for future investment gains, would take precedence over remaining benefits. This means that in addition to calculating an overall solvency ratio (by dividing assets over total liabilities), we would calculate a prioritized ratio (by dividing the prioritized liabilities over the total liabilities) and compare both ratios to determine what portion of each member's "tolerable" cutback would be applied.

10 A variation of this approach could be to give a similar higher priority to certain types of benefits (e.g., pension payments that exclude all or a portion of ancillary benefits such as early retirement subsidies or future indexing, or that exclude recent benefit improvements as done in Quebec in case of a wind-up with a deficit).

The following table shows examples:

Prioritized ratio (P=PL/TL)	Solvency ratio (S=A/TL)	Actual cutbacks applied as a percentage of "tolerable" cutbacks (1-S)/(1-P)
90%	95%	50%
	85%	150%
	75%	250%
80%	95%	25%
	85%	75%
	75%	125%

Note: P = prioritized ratio, PL = prioritized liabilities, TL = total liabilities, S = solvency ratio, A = assets

This would produce benefit cutbacks that vary by age group (or at each age depending on how the target solvency funding was determined), reflecting proportionally the presumed tolerability levels that were prescribed. If the overall solvency ratio happens to be exactly the same as the prioritized ratio, it means that the plan has assets equal to the sum of the target solvency liabilities and that in case of plan wind-up, the benefits are cut back at the same level as the tolerable cutbacks prescribed for each category of plan members. Otherwise, the cutbacks for each category are a percentage of the tolerable cutbacks reflecting to what extent the actual solvency (wind-up) deficit deviates from the deficit produced with the tolerable cutbacks for each category or their target solvency ratio. In this fashion, if the overall solvency ratio is 85% (i.e., 15% actual deficit) and the prioritized ratio is 90% (i.e., 10% target deficit), we would apply 150% (i.e., 15%/10%) of the tolerable cutbacks for each category of members, which would lead older retirees to have a reduction of 7.5% (vs. their 5% tolerable cutbacks) while younger workers would have a reduction of 37.5% (vs. their 25% tolerable cutbacks). Inversely, if the actual deficit is less than the target deficit, then each category of members is imposed cutbacks that are less than their tolerable cutbacks (all in the same proportion).

Some observers might object that implementing such an approach could produce an inter-generational transfer, but it would reflect more explicitly the level of risks being taken by the plan on behalf of the various cohorts of members.

5. Alternate post-wind-up funding arrangements

In addition to requiring better protection for retirees through a higher priority during funding and proportionately smaller cutbacks upon wind-up, governments could implement rules that help retirees make up part of those cutbacks through run-out schemes that seek to generate experience gains over a number of years.

For the most part, the wind-up of a DB plan results in either the purchase of an insured annuity or the transfer of a lump-sum to a beneficiary for investment. Those who receive a lump sum transfer have the opportunity to make up part of their cutback (or possibly all of it, if not even more in certain cases) by investing that sum in investments that are riskier than the bond yields used to determine their lump sum transfer, but that may produce rewards over the long term. However, for a retiree, purchasing an insured annuity locks in any reduction of the pension. Depending on circumstances at the time of wind-up, it could be in the interest of retired members to forego the guarantee of an insured annuity and have their funds invested prudently by an organization charged with the delicate challenge of investing partly in riskier investments than bonds that replicate their expected benefit payments (as done by insurers who quote insured annuities) in order to create greater investment returns (or bond mismatch gains) that would help to recover some (or possibly all) of the reduction in their pension benefits.

This approach would not anticipate investment gains. Rather, pensions would start at their reduced level and increases in pensions would be delivered as experience gains are realized. This is precisely what has been done in Quebec (on an optional basis) for over a decade with great success, as well as for certain cases in other provinces.

After a number of years, somewhere between 10 and 20, depending on the maturity of the retirees included in the group, the level of risk considered reasonable will probably diminish greatly and therefore insured annuities should represent the objective, once the advantages of the scheme may be considered to run out. Annuitization could happen gradually, either by purchasing a block for older members or for part of the pensions payable to younger members, in many cases to take advantage of pricing variations that occur frequently in this market.

A reasonable objective might be to aim for annuitization roughly by the time members reach their life expectancy. For example, if we consider that most members would have a life expectancy up to approximately age 85, the timeframe for the run-out scheme could be approximately 10 years for 75-year-old members and 20 years for 65-year-old members.

Such a run-out scheme could be offered either by a government-run agency or by alternate providers willing to set up new mechanisms managed carefully to deliver potential efficiencies, especially if they can attract large volumes that may generate economies of scale and further pooling of

different risks. Also, perhaps public authorities could examine how benefits from wound-up private sector DB plans could migrate to large public arrangements administered on an ongoing basis, with appropriate adjustments that reflect the unfunded level, while still allowing to take advantage of future efficiencies available through such arrangements.

An attractive approach for such run-out schemes would be the new variable payment life annuities that were recently proposed for DC plans and that are currently being implemented under various pension statutes.

6. Additional sources of funding on wind-up

Historically, the plan sponsor has been the sole source of funding for an underfunded pension plan, with the exception of Ontario, where the PBGF offers supplementary funding. However, there may be an opportunity to rely to a greater degree on government-run guarantee funds, letters of credit and/or additional contributions by plan members themselves. These avenues of potential additional funding are discussed in the subsections below.

6.1. Government guarantee fund

If governments believe that it is important to protect pensions at wind-up to a greater degree than is demanded by the rules required for pension funding, then a government-run guarantee fund remains an option. Should governments wish to take this approach, we highly recommend that only benefits for which funding is "targeted" be guaranteed. That is, in a regime where only 85% of benefits are targeted to be funded on a solvency basis, then guarantee funds should only fund benefits to this threshold and not to 100% of the benefit promised by the plan.

However, if governments are not willing to guarantee benefits to all DB plan members, they could limit guarantees to categories of plan members that may be considered more vulnerable, such as retirees. If governments implement the above system of higher target solvency ratios and proportionately reduced cutback, as well as the proposed run-out scheme (in Section 5), then the level of cutbacks for retirees that would need to be covered by the guarantee fund would be much smaller and more manageable.

Nevertheless, as noted in an earlier section (in Section 3.3), government-run guarantee funds are not well suited to properly set premiums based upon the unique risk of insolvency for each plan sponsor. This means that any guarantee fund is likely to result in a cross subsidization of weaker employers from stronger employers, which may not be good public policy, and which may be a further motivation for employers to exit DB plans altogether.

6.2. Letters of credit

In lieu of (or in addition to) using government-run guarantee funds, a system using letters of credit might better place the cost of protecting pensions on each plan sponsor based upon their unique

financial circumstances and the amount of benefits that might remain unfunded at the time a wind-up might occur.

Letters of credit issued by a bank or insurance company represent an instrument that seems to be ideally structured in protecting a pension plan and its members from facing a wind-up deficit in the event the employer may become insolvent, since the issuer of the letter of credit would actually deposit sums into the pension plan in that event. While those sums are taken into account when calculating the latest solvency ratio, their amount cannot suffer investment losses (and even increases with interest in certain jurisdictions).

For this instrument to have an attractive price tag for the employer, it is clearly preferred when the employer is in a very good financial situation. If that situation were to deteriorate, the issuer could be expected to increase its price (maybe drastically) upon renewal, but it is structured in a fashion that is secure for the plan members because the issuer would simply advance the letter of credit's face value to the plan if it is not renewed for any reason, and then would turn on the plan sponsor to obtain its reimbursement.

The issuer determines the availability and pricing of a given amount of the letter of credit after careful analysis of the credit worthiness and business prospects of the employer. Therefore, it seems that banks issuing a letter of credit would be ideally suited for assessing the risk faced by the plan and its members in relying on funding from the employer. We might even say that private sector financial institutions are able to accomplish what a public guarantee fund as in Ontario is not able to, namely determine premium levels that correspond to the risk involved in guaranteeing the promised benefits.

Incidentally, it may seem rather strange that current rules in most jurisdictions limit such instruments to 15% of plan liabilities, ever since their inception – possibly because of uncertainty with a novel approach when they were brand new – while in fact this value has no relationship to the employer's financial capacity. It might be appropriate to let the issuing bank and the employer determine themselves what ought to be a reasonable limit, regardless of what percentage this might represent in relation to the pension plan liabilities (even if that might be a very high percentage…).

6.3. Member contributions

It might sound counterintuitive to consider getting plan members to pay more contributions to offset DB plan deficits in case of plan wind-up, but there could be attractive opportunities to allow some of them to redirect part of their other savings toward their terminating DB plan in a manner that makes such savings produce retirement income for them more efficiently and on a more tax-effective basis.

For example, a member who is near retirement or recently retired, and who has little or no remaining RRSP room available, might benefit from an opportunity of voluntarily funding the pension cutback, especially since the contribution could exceed the equivalent pension adjustment (or past

service pension adjustment) based on the prevailing factor of 9, thus allowing greater tax sheltering than through an RRSP, while also taking advantage of group annuity pricing that is usually more competitive than in the individual market, and possibly also benefitting from some of the attractive alternative settlement methods presented above.

Any such option obviously would need to be on a voluntary basis and would require adequate communication, but it could be useful to allow such approaches.

7. Conclusion

This paper highlights the impact, particularly on older workers and retirees, of DB plan wind-ups where the plan assets are insufficient to pay all of the promised benefits. It suggests that policy-makers should consider the various degrees of risk taken on behalf of different categories of plan members and the capacity of members to bear such risk.

Although there is no "silver bullet" that can solve all problems in the case of underfunded DB plans at wind-up, this paper suggests that the following changes could be considered to help to better protect older workers and retirees:

1) Change solvency funding rules to target different solvency ratios for different categories of members, with the objective to better protect those who can be considered to have less risk tolerance, as they have less opportunities for future improvements through investment gains, and then use these new targets to determine different "tolerable" cutback levels in case of plan wind-up.
2) Allow pension plans (if they wish) to implement new risk sharing measures that attribute experience gains differently among subgroups of plan members in a manner that reflects different risk levels tailored to different age groups, such as those described in the appendix.
3) Allow entities (either publicly or privately run) to continue administering assets and benefits for any interested member who is retired or eligible to retire on plan wind-up, taking on minimal investment risks with an objective of increasing their benefits with experience gains, until benefits are insured either by a certain maximum age (such as 85) or up to a certain time limit (such as 15 years later). If such an entity is controlled by a government, then it should guarantee that those benefits will never be reduced since the level of risk is minimal and since the protection of those retirees may be considered in the public interest. Variable payment life annuities could also be used for such run-out schemes.
4) Implement a pensioners guarantee fund, which would include only members who already retired or who elect to retire at wind-up, while excluding members who are not eligible to retire or who choose to receive a lump-sum transfer, and which would cover the target solvency ratio and thus limit cutbacks to the prescribed "tolerable" levels. Ideally, such a fund should be implemented in all jurisdictions. In combination with the above measures, the level of coverage (and resulting costs) would be expected to be more affordable than under the current

PBGF in Ontario, although costs would increase in periods of great market variations, which is when such a protection is considered more critical. The Ontario government might consider replacing its PBGF with such a more limited guarantee fund.

5) Allow interested members to make optional contributions or transfers from another vehicle (such as an RRSP) to restore any portion of their benefit cutback on plan wind-up.

Appendix – Risk-sharing through a "life-cycle" DB plan

In a traditional DB plan, all members are affected similarly by the investment risk related to the plan assets, without distinguishing their different tolerance to investment risk, since there is only one fund for the whole plan. There is no distinction made between members, even though the overall investment risk is usually based on the total group characteristics. Indeed, a plan that is more mature is more likely to hold more conservative investments (i.e., more bonds and less equities) than a plan that is less mature.

In contrast, in most DC plans, individual accounts bear investment risks based on the investment choices selected by each member, thus reflecting their individual risk tolerance. Over the last 10 to 20 years, the concepts of "life-cycle" and "target date" funds have gained popularity. Those funds are designed by professionals who take into account the fact that most people have a higher risk tolerance when younger and a lower risk tolerance when older. This allows members to choose their fund (or for default funds to be determined) simply by reference to their current age or their future retirement year. Since age is not the only factor affecting risk tolerance, it is possible to offer slight variations for each age group (i.e., either average risk or a bit more or less risk than average), or to let an individual choose a tolerance that is more typical of others who are slightly older (i.e., if the individual's tolerance is more conservative than average) or younger (i.e., if the individual's tolerance is more aggressive than average).

If a traditional DB plan is wound up with a solvency deficit and an insolvent employer that is unable to cover that deficit, members will face a cutback in their benefits, which in part might be attributable to recent investment losses. Even though part of the deficit may have resulted from liability increases when interest rates have fallen recently, such reductions in interest rates would have also caused bond investments to increase in value. As a result, the primary factor producing a deficit is often the investment losses resulting from non-bond investments (e.g., equities), with a secondary factor being the losses resulting from reductions in interest rates if the duration of bonds differs significantly from the duration of liabilities (i.e., the mismatch risk). There are other factors that may produce experience losses, such as early retirement subsidies or longevity risk, but those are typically less significant.

Basics of a "life cycle" approach

Rather than subjecting all members to the same percentage cutback in such a situation, it might be preferable to allocate the impact of investment risks distinctly to subgroups of members based on the level of investment risk that was taken on behalf of each subgroup (to arrive at the overall risk for the group as a whole). Although it would be complex to administer individual investment accounts reflecting different asset allocations, we could devise some simpler methodology to model such an approach.

One such methodology could be to calculate (separately) the recent investment losses on non-bond investments as well as the recent duration mismatch losses on bond investments, then allocate each of those in different proportions to different subgroups of members with different risk tolerances. This would require that actuarial valuation reports disclose separately those two sources of experience losses (or gains), which should not be too complicated nor costly. Then allowing for the portion of those past losses that can be assumed to have already been amortized by special contributions, we could arrive at how much unamortized losses contributed to the wind-up deficit. It is understood that there would also be other sources of experience losses (or gains), but this somewhat simplified methodology needs not produce an overly refined risk allocation (i.e., even an imperfect allocation can be preferable to the current global approach).

To separate members into subgroups reflecting their risk tolerance, we could differentiate the following:

1) those who are younger than the earliest possible retirement age (say 55), who would be assumed to have a relatively high tolerance to investment risk;
2) those who are older than the latest possible retirement age (say 71), who would be assumed to have a relatively low tolerance to investment risk; and
3) all the others between the earliest and latest retirement age, who could be assumed to have a tolerance that gradually decreases from high to low with age (and this group could even be broken down into subgroups by age or age bands).

One could argue that there can be significant differences in risk tolerance within the younger group (e.g., between 35-year-olds and 50-year-olds), and within the older group (e.g., between 72-year-olds and 87-year-olds), but this relatively simple methodology would already achieve significant improvements in risk sharing fairness. One could also argue that we should differentiate those in the middle group between those who have already retired or not, but this refinement can be reflected to a certain degree when we focus later on the bond mismatch risk separately from the non-bond investment risk. However, the present methodology is only meant to illustrate a concept in a fashion that is not overly complicated, and later a more refined methodology could be devised if desired.

There could also be various ways of differentiating the treatment of the various groups. One approach would be to assume that the different age groups could be expected in theory to consider a certain non-bond investment allocation as representative of their average risk tolerance (or a given percentage could be set for a few pivotal ages and an intermediate percentage could be interpolated for each age), and then a plan's actual deviation from such target allocation could be distributed proportionally among the different subgroups. Another approach would be to allocate to each age group (or at each age with interpolation) a different portion of the plan's actual non-bond investments. The following table shows two examples:

Age of member	Assumed target allocation of non-bond investments	Portion of the plan's non-bond investments allocated to each group
49 and under	70%	50%
50 to 59	50%	30%
60 to 69	30%	15%
70 and over	10%	5%

But keep in mind that this would not need to affect the plan's overall investment policy – it would only be a mechanism to attribute investments risks (after they materialize) differently to various subgroups.

Possible refinements of the approach

It would be possible to allow some flexibility with the allocation percentages. For example, with the first approach presented above, the regulations could allow plans to fine-tune them based on their risk preferences, such as +/– 5% for the older group (i.e., as low as 5% for a more conservative plan and as high as 15% for a more aggressive plan), +/-15 for the younger group (i.e., as low as 55% and as high as 85%), and +/-10% for the middle groups. With the second approach presented above, the rules could allow plans to vary each bracket by up to 5% or 10%.

Regulations could even allow plans, if desired, to offer members the option to indicate whether their personal preference would be to take slightly more or less risk than average (which would allow them to tilt one way or another by 5%, 10%, or 15% depending on which age group they are in) – such a choice could be made upon enrolment and then changed no more than once a year afterwards, although we could expect that the majority of members simply would stick to the average level. Such an approach would move the plan rather close to a DC design.

Based on those percentages, each age group's liabilities and assets could be separated into portions backed by bond investments and non-bond investments. The bond investments could be further divided among subgroups to reflect their different durations in order to differentiate the bond duration mismatch risk. If desired, this is where the retired status of the middle age group could be taken into account in order to further split their bond investments. There could be different ways to achieve this bond duration mismatch differentiation, but one way would be to start by allocating the bonds to produce the best matching possible for the duration of retiree liabilities and then to allocate the remaining bonds (if any) to the non-retired group.

A simpler approach might be to make calculations only for the two extreme groups (young and old) in order to calculate their two solvency ratios, and then to interpolate between those two

ratios for all members in the middle group (splitting that group in any desired gradation, such as 3 tiers or even 15 tiers).

A somewhat equivalent (and possibly simpler) methodology could be to separate the plan into two modules (either notionally or into totally distinct plans) to track separately the results for the two extreme groups, i.e., those under age 55 and those over age 70. Then the members between those two extremes could transition gradually (i.e., partially a bit more every year or every three years), so that halfway through the transition, half of their liabilities and assets would be in each module. Such a transition could also help to reflect the retirement of the member – for example, instead of transitioning from 70% to 10% in non-bond investments by shifting 4% annually over the 15-year transition, a plan could apply annual shifts of 3% plus a significant jump of 15% at retirement. Then each member in the transition process would be assigned an individual ratio resulting from their own combination of the two separate ratios.

Obviously, complex calculations should not be imposed on any given plan, especially the relatively small ones. Rather, a framework could be made available to those plans that desire to implement such a customized approach in order to produce an allocation of risks that may be more consistent with members' tolerance levels.

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