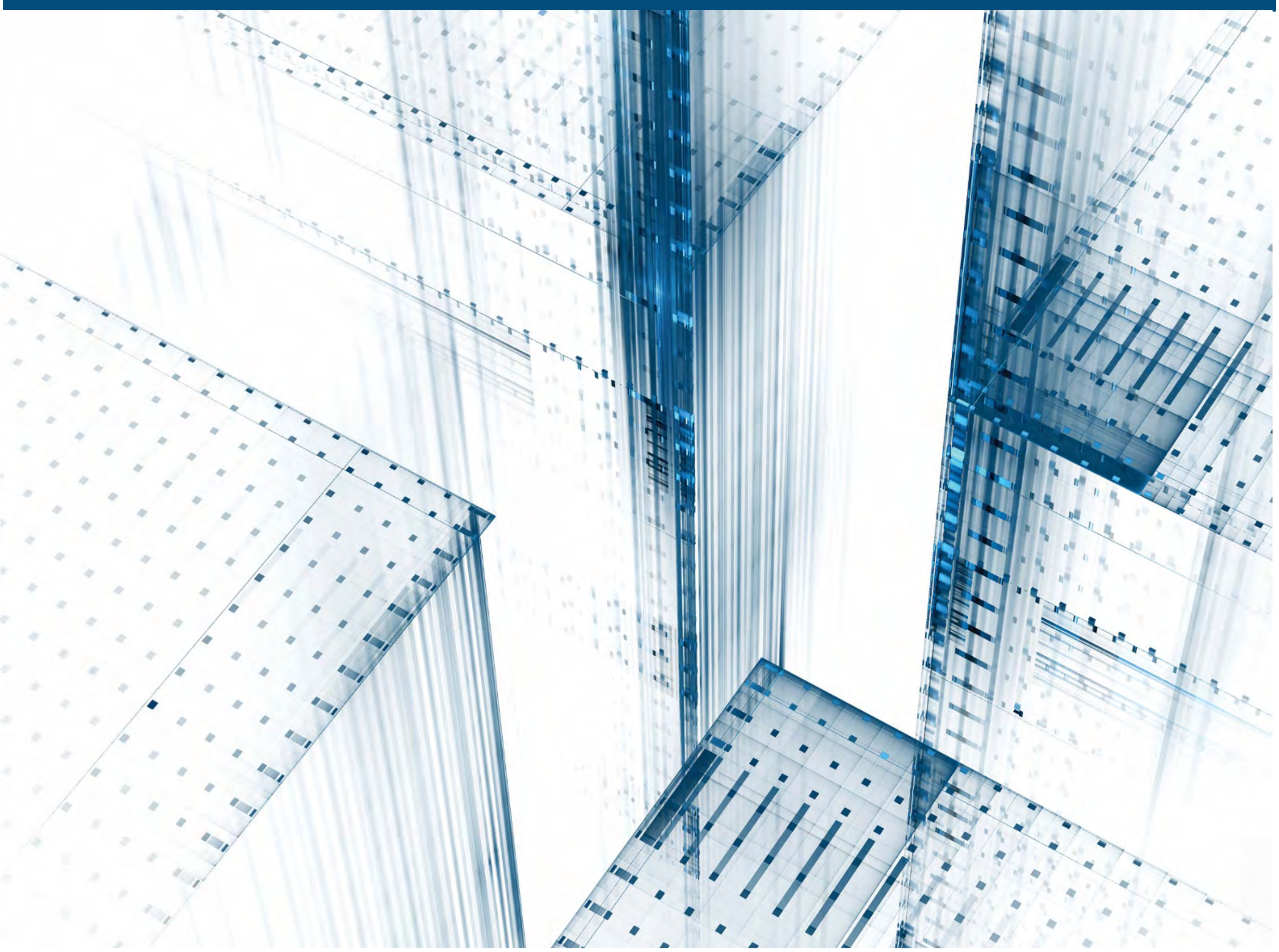
Aging and Retirement

Classification of Risk Sharing in Pension Plans

Canadian Practices and Possibilities



Classification of Risk Sharing in Pension Plans

Canadian Practices and Possibilities

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Executive Summary

The emergence of target benefit pension plans in Canada has focused attention on risk sharing in employment-based retirement income schemes. Risk sharing is not new. It exists in many forms in an array of well-established Canadian pension plans. Risks are shared between employees and employers, between pensioners and contributors and amongst individual participants within each group. Risk sharing takes the form of adjustments to contributions or benefits or both. The challenges of explaining, administering, regulating and accounting for these pension plan features have already been faced.

Despite this rich history, Canadians tend to think of employment-based retirement income plans as either "defined contribution" or "defined benefit." This has the potential to lead to misunderstandings or become an obstacle to the adoption of risk-sharing arrangements that best suit the circumstances of employers and employees. This research paper:

- Examines various pension deals and their treatment under regulations and standards
- Highlights the key features that distinguish four categories of risk-sharing deals in-between pure defined contribution and pure defined benefit
- Explores the implications for regulation and retirement benefit plan design.

Table 1

Categories of Risk Sharing

Type of Pension Plan	Nature of Risk Sharing	Key Features
Pure Defined Contribution	Employees bear own risk; no sharing of risks	• Individual accounts • Individual investment choice
Asset Share	Transparent sharing of gains and losses amongst employees and pensioners	• Individual accounts • Collective investment and longevity management • No reserves
Specified Contribution, Target Benefit	Pooling of costs amongst all current and future employees and pensioners	• Fixed contribution rate • Ongoing adjustments to benefits • Target benefit formula
Contribution Partnership	Pooling of costs amongst employees and employers; gain sharing with pensioners	• Accrued pension can only be reduced under extreme circumstances • Improvements and employer and employee contribution changes reflect gains and losses
Defined Benefit with Adjustment Mechanisms	Employer bears contribution risk; variations in pensions are possible	• Accrued pension can only be reduced under extreme circumstances • Contribution refunds, distribution of surpluses and deficits, non-market settlement options
Pure Defined Benefit	Employer bears contribution risk; no possibility of variations in accrued benefits	• No contribution-based benefits • Guaranteed or insured • Employer surplus entitlement

Pension plan designs within each category share attributes such as accounting treatment, the basis for commuted values, funding targets, income tax treatment and intergenerational equity. Different types of enterprises will find appeal in different categories of risk sharing. For example, categories of plans near the defined contribution end of the spectrum will be subject to defined contribution accounting treatment and so will be more appealing to publicly traded companies concerned with the effect of pension plans on quarterly income statement volatility.

Section 1: Introduction

Regardless of the explicit plan provisions concerning variations in costs and benefits, all pension plans will be modified over time as circumstances change. Changes to contribution rates, projected benefits, retirement ages and other features can and do occur as the cost or need for privately funded retirement income changes. When real interest rates fell at the beginning of the 21st century, the cost of prefunding retirement income rose dramatically. Levels of income replacement that were affordable and competitive in the 20th century became unjustifiable drains on total compensation in the 21st century. Alternative solutions such as later retirement and expanded Canada/Quebec Pension Plan benefits emerged while prefunded retirement income plans were curtailed – especially in the private sector. It would be unreasonable to anticipate that retirement income arrangements for workers who enter the workforce in the middle of the 21st century will survive unscathed until payments to those individuals are completed in the 22nd century. Pension plans, business models and employment contracts that cannot be adapted will be abandoned.

Thus, analysis of risk-sharing arrangements cannot simply address whether benefits and contributions will change but must address how the inevitable changes will occur. Will they occur according to predefined plan rules or through amendments to plan rules or regulatory interventions? Will changes be routine or infrequent?

When retirement income is prefunded through investments in risky assets, the primary risk that funding contributions or retirement income will turn out worse than expected is due to the investments. Other important risks include longevity, disability, loss of employment and inflation. While not a “risk” in the same sense, career advancement can lead to higher compensation and higher expectations for income during retirement.

Entirely aside from the risk that costs will turn out to be different from expected, some plan designs call for individual participating employers or employees to contribute more or less than the expected value of their benefits. This “cost sharing” is often indistinguishable from “risk sharing” due to the lack of an unambiguous measure of expected value. Nonetheless, the presence or absence of intentional cost sharing is an important factor in the classification of risk-sharing deals.

1.1 Terminology

With innovation in pension risk-sharing deals, a variety of new terms have emerged. This research paper attempts to follow common usage of these new terms, while avoiding the ambiguities that have emerged in the literature.

- "Target benefit" refers to "a collective, pre-funded pension plan pooling both economic and demographic risks, with a predefined retirement income goal (the 'target benefit'), where the employer's financial liability is limited to predefined contributions while members' benefits may periodically be adjusted upwards or downwards relative to the original target."[1]
- "Defined aspiration" and "defined ambition" are terms that emerged in the United Kingdom to broadly describe defined benefit plans with reduced risks for employers.[2]
- "Collective defined contribution" is a term used to refer to a variation on target benefit plans pioneered in the Netherlands, with no provision for variations in contributions in response to past service gains and losses.
- "Specified contribution, target benefit" is a term used in the report of the Alberta/British Columbia Joint Expert Panel to describe target benefit plans with fixed contributions.[3]
- "Shared risk" is a term introduced by New Brunswick to describe plans with a high degree of confidence that defined benefits will be paid, restricted variability in contributions and provision for benefit reductions in extreme circumstances.
- "Pooled target DB" and "commingled DC plan" are terms introduced to describe plans in-between defined benefit and defined contribution.[4]
- "Contingent pension plans" is a term introduced to describe the full spectrum of plans where some or all of the benefits depend on the financial position of the plan.[5]

In 2015, the United Kingdom developed legislation to support defined ambition pension plans as a variation on defined benefit rules. This initiative did not lead to new pension plans. In 2019, the United Kingdom developed legislation to support a collective defined contribution plan proposed

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[1] CIA Task Force on Target Benefit Plans, Report of the Task Force on Target Benefit Plans, Canadian Institute of Actuaries, June 2015. www.cia-ica.ca/publications/publication-details/215043

[2] Boulding, A., et al., Outcomes and Defined Ambition, Defined Ambition Working Party, 2014. www.actuaries.org.uk/documents/outcomes-and-defined-ambition; Defined Ambition: Consumer Perspectives, Department for Work & Pensions, 2014. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/323219/rr866-defined-ambition-consumer-perspectives.pdf; Delivering Collective Defined Contribution Pension Schemes, Department for Work & Pensions, 2018. www.gov.uk/government/consultations/delivering-collective-defined-contribution-pension-schemes

[3] Joint Expert Panel on Pension Standards, Getting our Acts Together – Pension Reform in Alberta and British Columbia, 2008. www.assembly.ab.ca/lao/library/egovdocs/2008/alz/170139r.pdf

[4] Brown, R., and Eadie, S., The Great Pension Debate: Finding the Common Ground, CD Howe Institute, 2019. www.cdhowe.org/sites/default/files/attachments/research_papers/mixed/Commentary_%20543_0.pdf

[5] Gros, B., and Sanders, B., The Quest for Sustainability in Contingent Pension Plans, CD Howe Institute, 2019. www.cdhowe.org/sites/default/files/attachments/research_papers/mixed/Commentary%20553.pdf

for Royal Mail employees and similar plans that may be proposed by other employers in the future. In a 2019 research paper sponsored by Royal Mail,[6] a distinction is made amongst:

- Individual defined contribution plans – traditional defined contribution
- Plans known in the United Kingdom as “Collective Individual Defined Contribution” (CIDC) and in the Netherlands as “Personal Pensions with Risk-Sharing and Collective Benefits” (PPR-CB) – individual accounts with longevity pooling and intergenerational collective buffers
- Collective Defined Contribution (CDC) plans – shared risks and fixed contributions.

1.2 Employment Sectors

There is no one-size-fits-all answer to the question of how risk ought to be shared amongst employees, employers and pensioners in different kinds of enterprises.

- Publicly traded companies operate in a competitive environment – for capital, for their products and for their workforce. Risk-sharing options will be limited by their preference for arrangements that provide certainty of costs for the investors who buy and sell their shares. Designs that facilitate attraction and retention of key talent may be desirable in this competitive environment – even if the risk to employees of loss of benefits upon termination of employment is increased.
- Public sector employers operate in a less competitive environment, being the only or the primary employer for many occupations (firefighter, teacher, diplomat) within their geography. Portability of pension benefits through reciprocal agreements and multi-employer plans is accepted as a means to promote mobility of labour – at least within the broad public sector. The effect of long-term pension obligations on acquisitions, divestitures and creditworthiness is less likely to be a consideration.
- Private for-profit employers can take a long-term perspective on investment and employment relationships without the quarterly scrutiny of external shareholders and securities regulators – to the extent their enterprise is secure and well-funded. Key employees and working owners of small private businesses may be supported by temporary or transient workers who are employed for the duration of a project, with a stronger connection to their profession or trade than to any one small business.
- For not-for-profit enterprises, loyalty of employees may be built on devotion to the organization’s cause, as well as pension plans and career opportunities. The ability to accept long-term financial risks may be limited for organizations that rely on grants or donations.

1.3 Economic Value

Different pension plan designs use different mechanisms to try to create economic value. As compared to simply paying cash compensation, economic value can be created in pension plans through a combination of:

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[6] Wilkinson, L., What Is CDC and How Might it Work in the UK?, Pensions Policy Institute, 2018. www.pensionspolicyinstitute.org.uk/media/2904/20181129-what-is-cdc-and-how-might-it-work-in-the-uk-report.pdf

- Pooling risks
- Transferring risks (provision of guarantees to the parties who place a higher value on avoidance of risks than the parties who are assuming the risks)
- Lengthening the investment time horizon
- Reducing administration costs
- Reducing liquidity requirements
- More diversified, sophisticated and disciplined investment strategies.

Traditional defined benefit pension plans were designed and funded using the expected return on a balanced investment portfolio and a margin of conservatism but tended to be interpreted by plan participants, regulators and courts as fully guaranteed by the employer. Settlement of defined benefit pensions could only be achieved through the purchase of deferred annuities, and so annuity prices came to be regarded as a relevant benchmark for the employer's liability. The application of financial economics to defined benefit pension plans[7] [8] [9] has exposed this gap, at least in the area of private sector corporate financial reporting. Proponents of a financial economics perspective on pensions would argue that public sector accounting practices and pension funding policies give valuable guarantees to plan members for free.

As compared to fully guaranteed traditional defined benefit pension plans, the introduction of risk sharing in pension plans reduces the strength of the employer's guarantee without reducing the actuarial present value of expected benefits. As compared to pure defined contribution plans, the introduction of risk sharing reduces risk to plan participants without reducing the actuarial present value of expected benefits. From either perspective, risk sharing has the potential to create economic value.

New risk-sharing deals have emerged in part in response to criticisms of pure defined benefit pension plans that place all the investment risks on shareholders but are predicated on investment choices that reflect the risk preferences of employees. Some of these new deals avoid transfer of risks to shareholders altogether, while others attempt to quantify the cost and value of a guarantee and provide the guarantee only when the cost to the provider of the guarantee is less than the value to the recipient:

- Employers (and, indirectly, shareholders and other stakeholders in public or private enterprises) provide guarantees through variations in employer contribution rates.
- Younger active employees provide guarantees for pensioners and older active employees through variations in employee contribution rates or future benefits.

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[7] Exley, C., Mehta, S., and Smith, A., The Financial Theory of Defined Benefit Pension Schemes, *British Actuarial Journal, 3*(4), 835–966, 1997. www.actuaries.org.uk/system/files/documents/pdf/financialtheorydefined.pdf

[8] Joint AAA/SOA Task Force on Financial Economics and the Actuarial Model, Pension Actuary's Guide to Financial Economics, Society of Actuaries and American Academy of Actuaries, 2006. www.soa.org/globalassets/assets/Files/Sections/actuary-journal-final.pdf

[9] Task Force on Financial Economics, Financial Economics and Canadian Pension Valuation, Canadian Institute of Actuaries, September 2006. www.cia-ica.ca/publications/publication-details/206102

- Pensioners (more precisely, their heirs) provide longevity guarantees by foregoing claims on retirement saving account balances or actuarial reserves released on death.

When considering the fairness of a pension deal to each stakeholder, it is important to include the value of the guarantees they are providing or receiving, as well as the actuarial present value of their projected contributions and benefits. One approach is to determine the projected contributions and benefits using a stochastic model that reflects the full range of possible outcomes and then to determine the distribution of present values of these contributions and benefits using a risk-free discount rate. Another is to assign a utility value to confidence that minimum acceptable benefits will be paid or maximum acceptable contributions will not be exceeded.

Risk sharing can be asymmetrical. That is, plan participants can benefit from favourable outcomes but be protected from unfavourable outcomes. The most common example of an asymmetrical pension deal is conditional indexation: pension increases that are provided when investment returns are favourable, with no provision for pension decreases when investment returns are unfavourable. Of course, the probability-weighted average present value of an asymmetrical pension deal is greater than that of a symmetrical pension deal with the same target benefit. This extra expected value is in addition to the extra economic value of being protected from unfavourable outcomes.

1.4 Secondary Stakeholders

Risk-sharing deals typically consider only three stakeholder groups: participating employers, active employees and retirees. This is somewhat of a simplification:

- A financial economics perspective would regard employers as flow-through entities, with the ultimate risks and costs of a pension deal borne by external stakeholders such as owners, taxpayers or (in the case of rate-regulated monopolies) customers.
- In addition to active employees and retirees, plan participants include stakeholders such as surviving spouses, beneficiaries, deferred pensioners, disabled employees and participants whose accruals have been suspended (due to a plan amendment, transfer to non-participating employment, a leave of absence or some other reason).

Each of these secondary groups of stakeholders will be exposed to risks and may participate in risk sharing in unique ways. Their participation in risk sharing could follow naturally from the choices for the three primary stakeholder groups but will need to be addressed specifically in plan design and communications.

1.5 Other Arrangements

Other types of pooling and cost sharing have emerged in Canada that do not represent risk sharing in the sense contemplated in this report. They include:

- Pooled retirement plans that allow employers to offer capital accumulation plans to their employees without all the fiduciary and administration responsibilities of sponsoring a group registered retirement savings plan (RRSP) or a defined contribution registered pension plan
- Variable benefits from a money purchase provision of a registered pension plan that permit periodic payments directly from a defined contribution account balance, like a registered retirement income fund
- Flexible pension plans that allow employees to contribute to a defined contribution account and use the proceeds of the account to purchase ancillary benefits such as post-retirement escalation, survivor pensions and subsidized early retirement.[10]

Section 2: Rules Governing Classification of Risk-Shared Pension Plans

Pension plans are governed by taxation, accounting, funding and other rules. Those regulatory regimes classify pension plans and apply different rules to different type of plans. Depending on the arrangement, a risk-shared pension plan will be classified as defined contribution or defined benefit or, in some instances, a special category with rules drawn from both systems.

2.1 Income Tax Rules for Registered Pension Plans

2.1.1 Types of Pension Plans

Under the Canadian Income Tax Act, the provisions of a registered pension plan must comply with either the defined benefit regulations or the money purchase regulations. A single registered pension plan may include both types of provisions, or different provisions for different periods of service or groups of members.

A key element of the system for holistic regulation of tax-deferred retirement saving is the determination of the Pension Adjustment (PA) – the value placed on a pension accrual for the purpose of determining each individual taxpayer's RRSP contribution room.[11] For money purchase provisions, limits are placed upon contribution rates and PAs are equal to the contributions. For defined benefit provisions, limits are placed upon the annual pension accruals and PAs are equal to nine times the normalized pension accrual (the year-over-year increase in lifetime annual pension payable at age 65 under the optional form that maximizes the annual payment).

[10] Flexible pension plans governed by CRA (Canada Revenue Agency) Newsletter no. 96-3 (www.canada.ca/en/revenue-agency/services/tax/registered-plans-administrators/newsletters-technical-manual/no-96-3r1.html) do involve an element of risk sharing, since flexible contributions that cannot be used to purchase the maximum ancillary benefits permitted under the Income Tax Regulations must be forfeited. An enhanced flex plan (defined in the CRA Registered Pension Plans Glossary at www.canada.ca/en/revenue-agency/services/tax/registered-plans-administrators/registered-pension-plans-glossary.html) is a standalone defined contribution provision with no risk sharing.

[11] Benefits from pension plans are based on earnings from employment with an employer who participates in the pension plan. RRSP contribution room reflects an individual's other employment and self-employment, alimony and other factors. For more details on income tax rules governing Canadian pension plans, see Willis Towers Watson, Canadian Pension and Retirement Income Planning, 6th Edition, Lexis Nexus Canada, March 2017.

One of the obstacles in designing new target benefit pension plans has been determining whether they will be subject to defined contribution rules or defined benefit rules.

- A “money purchase provision” requires that “the only benefits in respect of a member are benefits determined solely with reference to, and provided by, the amount in the member’s account.” Any risk-sharing features must be incorporated into the way contributions, investment returns and forfeitures are allocated to individual accounts. Employer contributions are limited to a minimum of 1% of pay and total employer and employee contributions are limited to a maximum of 18% of pay and an annual dollar limit, irrespective of the funding requirements for target benefits
- A provision that fails to meet the requirement for treatment as a money purchase plan will fall under the defined benefit restrictions on benefits, funding and PAs. Risk-sharing features must be reflected in the calculation of normalized pensions. If the normalized pensions (and hence the PAs) are not definitely determinable, then the provision cannot be registered. Contributions are only permissible if they are required to fund benefits in accordance with the provision’s current terms. Employee contributions that are used to determine employee contribution account balances and, potentially, to provide additional benefits are subject to annual limits.

There are special provisions to accommodate pension plans with risk-sharing features:

- A specified multi-employer pension plan (SMEPP) is subject to defined benefit rules for accruals but defined contribution rules for PAs. Contributions are subject to both defined benefit and defined contribution limits, except that surplus can be ignored. To qualify for this treatment, a pension plan must be collectively bargained and cover a large group of unrelated employers or members who work for multiple employers. Multi-employer plans that do not meet this requirement would typically be considered defined benefit pension plans, with PAs determined by reference to the current target accrual rate and with adjustments to the target accrual rate requiring additional Past Service Pension Adjustments if they exceed inflation.
- Employee contributions to a Quebec member-funded pension plan or a similar defined benefit plan requiring cost sharing may be approved if they are required to fund the plan on a going-concern basis.

2.1.2 Allocations to Money Purchase Accounts

In a traditional money purchase pension plan, there is a simple formula for determining contributions, such as a fixed percentage of pay, and each member’s account balance is credited with the contributions based on their pay. Investment returns are allocated according to the rate of return of the investment options elected by the member. Benefits paid after termination of employment are equal to the entire account balance, regardless of the reason for termination of employment.

Income tax regulations for money purchase plans support a broader range of possibilities – at least in theory.[12]

- Normally, contributions must be paid with respect to a particular member and allocated to that member. That is, the formula for determining each member's share of the total contributions must be known at the time the contributions are made. The Canada Revenue Agency (technically, the Minister of National Revenue) has the discretion to approve alternative methods of allocating contributions to members' accounts. Presumably, an alternative method designed to achieve a target benefit would be subject to a minimum allocation of 1% of pay and a maximum allocation of 18% of pay or the money purchase dollar limit for the year. The allocation of contributions would need to be applied to definitively establish the account balances at least annually.
- Investment earnings of the plan must be allocated to plan members no less frequently than annually on a basis that reasonably reflects the fair market value of the account's investments. All of the plan's investment income must be allocated – even if this represents a deviation from strict individual accounting. For example, if benefits for terminating employees were paid in full during the year based on estimated interim returns, then the difference between the estimated earnings on those accounts and the actual earnings must be reallocated to the remaining members. Presumably, an allocation that reflects different duration of liabilities and risk tolerances for different plan members based on their target benefit could be considered reasonable even though no specific asset allocation choice is made by the members.
- There is provision in the money purchase tax rules for reallocation of forfeitures. In the past, these forfeitures arose because vesting was not immediate. The contribution account balances of members whose employment terminated prior to meeting the service requirements for vesting could be used to pay administrative expenses, reallocated to remaining plan members or refunded to the participating employers. However, the provision is broad enough to permit reallocation of demographic experience gains in a target benefit plan due to death or termination of employment prior to early retirement age.[13]

2.1.3 Variable Pensions in Defined Benefit Provisions

There are several options for variations in pensions paid from a defined benefit provision:

- Pensions may be indexed automatically to the Consumer Price Index (CPI).
- Pensions may be increased automatically at a fixed rate of up to 4% per year.

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[12] Requirements for money purchase pension plans are largely contained in section 8506 of the Income Tax Regulations. The use of provisions for allocation of forfeitures, investment returns and contributions to satisfy the needs of a target benefit plan has not been tested.
[13] According to section 8500(1) of the *Income Tax Regulations (Canada)*, "forfeited amount" under a money purchase provision of a pension plan means an amount to which the member of the plan has ceased to have any rights, other than the portion that is payable (a) to a beneficiary of the member as a consequence of the member's death, or (b) to a spouse or common-law partner or former spouse or common-law partner of the member as a consequence of the breakdown of their marriage or common-law partnership.

- Pensions may be increased automatically to reflect the return on investments, provided the value of this approach does not exceed the value of CPI or fixed-rate increases.
- Pensions may be increased on an ad hoc basis.

A pension plan that provides ad hoc increases generally cannot provide an increase of more than the cumulative increase in CPI for the period since the last ad hoc increase, even if this is less than the cumulative increase for the period since retirement.

Increases in excess of these automatic or ad hoc approaches may be permissible, through amendments to the pre-retirement accrual formula. These kinds of amendments are administratively complex, since they give rise to Past Service Pension Adjustments.

There is an overall limit on defined benefit pensions for high-income employees that reflects increases in the CPI. This limit can prevent increases at a faster pace under a risk-sharing formula.

2.1.4 Variable Pensions in Defined Contribution Provisions

Section 8506(2)(6) of the Income Tax Regulations specifies that retirement benefits from a money purchase provision of a pension plan must be provided by purchase of insured annuities. Prior to 1988, money purchase pension plans were permitted to pay uninsured monthly benefits from the fund under an arrangement acceptable to the Minister of National Revenue. This provision was suspended in 1988 and removed in 2004 because of a concern that a shortfall in the payout fund would be funded by the employer – a contribution for former members, contrary to the intent of a money purchase pension plan.

Provision for variable payment life annuities (VPLAs) was reintroduced in the 2019 Federal Budget.[14] Under the proposed provision, amounts may be transferred from defined contribution accounts to an "annuities fund", subject to the following requirements:

- The fund must have at least 10 members.
- Pensions must begin by age 71 and continue for the lifetime of the plan member or, where applicable, the lifetime of the member's spouse or a guarantee period.
- Initial pensions must be actuarially equivalent to the amounts transferred, and actuarial adjustments must be made annually to reflect investment and mortality experience.
- Provision for future escalation must not exceed a fixed rate of 2% or a variable rate equal to the CPI.

[14] The budget measures can be found at https://budget.gc.ca/2019/docs/tm-mf/si-is-en.html. The draft regulations and explanatory notes announced on July 30, 2019 can be found at www.fin.gc.ca/drleg-apl/2019/ita-lir-0719-eng.asp. These provisions are effective January 1, 2020 but cannot be used in all jurisdictions until permissive provincial regulations are adopted.

2.1.5 Transfers Between Provisions

Income tax regulations permit transfers from one pension plan to another or from one provision of a pension plan to another. They also permit lump sum transfers to and from RRSPs and lump sum contributions to and payments from pension plans. In general, the purpose of regulations is to ensure these transfers are fair at the time they are made, and do not give rise to unintended tax advantages by undervaluing the purchase of defined benefits or overvaluing the settlement of defined benefits. These facilities in the income tax regulations permit plan members to

- Buy back past service
- Move between employers or between categories of employment within a single employer without loss of retirement eligibility service or the benefit of salary projection on accrued service (reciprocal transfer agreements)
- Contribute towards the cost of ancillary benefits on a defined contribution basis during their working career and then receive those benefits on a defined benefit basis during their retirement (flexible pension plans)
- Convert defined contributions to defined benefits or defined benefits to defined contributions when a plan is amended.

While such features address some of the risks of pension plan members and have the potential to create funding uncertainty for plan sponsors, they are not normally regarded as risk-sharing features.

2.2 Accounting Rules for Pension Plans

The balance amongst benefits, contributions, fees and investment returns will determine the ultimate risks and costs of a pension plan. However, the time required for this balance to be realized extends beyond the careers of the executives responsible for the adoption, management and continuation of the plan and far beyond the investing time horizon of most shareholders. Particularly for publicly traded companies, the viability of pension plans will be decided by the short-term impact on the sponsor's finances.

For defined contribution plans, periodic pension cost is equal to employer contributions for the period and there are no residual liabilities – either on the company's balance sheet or otherwise. For defined benefit plans, periodic pension cost is determined by actuarial estimates when the benefits are earned, with the risk that gains and losses will give rise to pension cost adjustments in later periods. Defined benefit accounting rules will not necessarily give credit to plan sponsors for their efforts to share risk with plan members. In some instances, discretionary increases to pensions due to investment gains will create pension costs when the increases are adopted, without any offset to regular income for the corresponding investment gains.

Different accounting rules apply to different types of enterprises. Some of the differences are so significant that risk-sharing deals designed for one type of enterprise will be entirely unacceptable for others.

2.2.1 International Financial Reporting Standards

International financial reporting standards (IFRS) apply to most publicly traded Canadian companies and to Canadian subsidiaries of non-North-American publicly traded companies. They may also apply to other Canadian enterprises who have elected this accounting option.

For a pension plan to be classified as a defined contribution plan under International Accounting Standard (IAS) 19, there can be no legal or business reason to fund deficits.[15] Even if a target benefit pension plan specifies fixed employer contributions, it could be determined to be a defined benefit pension plan because of the employer's involvement in plan governance or because the consequences of a reduction in accrued pensions for employees are so significant that allowing a pension deficit to be borne entirely by employees would be unacceptable to the ongoing business. Each situation would be assessed on its merits. To date, there is limited information as to the circumstances that might lead auditors to reject defined contribution accounting for target benefit pension plans with fixed employer contributions.

Normally, IAS 19 requires a balance sheet asset or liability determined by comparing the fair value of plan assets to the actuarial present value of the defined benefit obligation for the portion of projected benefits attributable to service prior to the balance sheet date. For a plan with risk sharing applied through non-guaranteed ancillary benefits, the guaranteed basic defined benefit can be substantially less than the benefit expected based on the required contributions. In these cases, the net defined benefit asset is limited to the amount that is recoverable through future contribution holidays or surplus withdrawals. Even if the only form of risk sharing is a requirement that wind-up surplus be shared with plan members, onerous funding requirements can lead to a situation in which the net defined benefit asset is limited to zero and the pension cost in comprehensive income is set equal to the contributions rather than being determined by reference to the defined benefits.

While accounting for contributions is exactly the outcome that is intended in a shared risk pension plan design, the effect of IAS 19 rules for defined benefit pension plans with onerous funding requirements will still be unsatisfactory to plan sponsors. The service costs reported in the sponsor's operating income will be determined by the accruals of expected benefits. If increases in ancillary benefits are discretionary, they will give rise to past service costs in the year they are adopted, even if they result from investment gains in prior periods that were treated as adjustments to Other Comprehensive Income. If these increases are considered to be a substantive commitment and part of the plan provisions, a best estimate of future increases will be included in the defined benefit obligation, even if this leads to a defined benefit obligation that exceeds the fair value of assets.

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[15] "Defined contribution plans are post-employment benefit plans under which an entity pays fixed contributions into a separate entity (a fund) and will have no legal or constructive obligation to pay further contributions if the fund does not hold sufficient assets to pay all employee benefits relating to employee service in the current and prior periods." IAS 19 Employee Benefits, paragraph 8.

The treatment of pension benefits that depend upon asset returns is the topic of a current project by the International Accounting Standards Board.[16]

2.2.2 U.S. Financial Reporting Standards

U.S. accounting standards are applicable to Canadian subsidiaries of U.S. companies and some major Canadian companies with U.S. securities listings. These two groups represent a significant proportion of Canadian private sector pension plans. Under FASB ASC Topic 715, defined contribution pension plans have an account balance for each member.

Like IAS 19, ASC Topic 715 requires a balance sheet asset or liability that reflects the funded status of a pension plan. Like IAS 19, gains and losses are recognized immediately through Other Comprehensive Income. Unlike IAS 19, past service benefits do not need to be recognized immediately in the sponsor's income statement. Instead, both past service costs and experience gains and losses are amortized into pension cost, with the unamortized amounts held back from retained earnings through the use of Accumulated Other Comprehensive Income. There are no explicit provisions for risk-shared pension plans or onerous contributions.

2.2.3 Canadian Private Company and Not-for-Profit Financial Reporting Standards

Financial Reporting and Assurance Standards Canada has established simplified accounting rules for Canadian for-profit companies that are not publicly traded and not-for-profit entities outside of the public sector. Accounting Standards for Private Enterprises (ASPE) 3462 of the CPA Handbook defines a defined contribution plan as "a benefit plan that specifies how the entity's contributions to the plan are determined rather than the benefits to be received by an employee or the method for determining those benefits."[17] It goes on to distinguish defined benefit and defined contribution plans in terms of the risks assumed by the employer. Classification depends on the economic substance of the plan, including cost-sharing provisions, as communicated to employees or evidenced by past practice.

For a defined benefit pension plan, the balance sheet asset or liability is determined by comparing the fair value of plan assets to the defined benefit obligation from either a going-concern funding valuation or an accounting valuation (similar to the basis required by IAS 19). Remeasurements (the change in funded status not attributable to interest and current and past service costs) are reported in current period pension cost separately from interest and service cost. ASPE 3462 is more explicit than other standards in specifying that a substantive commitment to upgrade benefits from time to time is part of the economic substance of the plan and included in the defined benefit obligation – at least if the sponsor chooses to use a going-concern funding approach to valuations for financial reporting purposes.

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[16] IFRS, Pension Benefits that Depend on Asset Returns, 2018. www.ifrs.org/projects/work-plan/pension-benefits-that-depend-on-asset-returns/; Accounting Standards Advisory Forum, Research on Pensions: Hybrid Plans, 2018. www.ifrs.org/-/media/feature/meetings/2018/july/asaf/ap7-research-on-pensions-hybrid-plans.pdf

[17] See paragraph 11 of ASPE Section 3462, promulgated by Financial Reporting and Assurance Standards Canada.

The surplus recorded as a plan asset is limited to the amount that can be withdrawn or applied towards future contribution holidays. Thus, as under IAS 19, a plan with minimum contributions that are more than sufficient to pay for the guaranteed benefits (that is, excluding discretionary ancillary benefits that are not part of the economic substance of the plan) would have a balance sheet obligation determined by the plan assets. For private companies, such a situation leads to a periodic pension cost equal to the minimum contributions, although the remeasurement component will be separately reported. For not-for-profit entities, the remeasurement component is directly recognized in the balance sheet and excluded from current period cost, and so pension cost will be different from minimum contributions.

2.2.4 Canadian Public Sector Accounting

The pension accounting provisions in Section 3250 of the Public Sector Accounting Board (PSAB) standards are currently under review.[18] Existing provisions allow for financial reporting on a basis similar to the going-concern funding valuation and are quite dated in comparison to the changes that have been made in other accounting standards since 1990. For single-employer jointly sponsored pension plans with the employer's obligation limited to 50% (or some other fixed percentage) of the plan's total contribution requirement, Section 3250 provides for the employer to determine their accounting entries using that percentage of the plan's total assets and projected future benefits.

It is worth noting that scrutiny of the shared risk pension plan for public sector employees in New Brunswick by the audit community led to the conclusion that the plan fell under the defined benefit provisions of PSAB 3250.[19]

2.2.5 Multi-employer Pension Plan Accounting

All of the various accounting standards have special provisions for multi-employer pension plans. Conceptually, these plans are regarded as defined benefit plans. The individual participating employers rarely have the information required to determine their pro rata share of the plan's assets and defined benefit obligations, and so they are permitted to set their expense equal to their contributions. Accounting standards have requirements concerning disclosure of the nature of their obligation to fund shortfalls and, where available, the funded status of the plan.

In order to qualify for multi-employer pension plan accounting treatment, a plan must be established for a group of unrelated employers. "Defined benefit plans that share risks between entities under common control, for example, a parent and its subsidiaries, are not multi-employer

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[18] Public Sector Accounting Standards: Employment Benefits, Public Sector Accounting Board, n.d. www.frascanada.ca/en/public-sector/projects/employment-benefits

[19] MacPherson, K., Report of the Auditor General 2015 Volume III, "Province of New Brunswick: Audit Observations on Pension Plans", October 2015. www.agnb-vgnb.ca/content/dam/agnb-vgnb/pdf/Reports-Rapports/2015V3/Chap3e.pdf

plans."[20] In these instances, the sponsoring entity follows defined benefit accounting rules and the individual participating entities follow defined contribution accounting rules.

2.2.6 Rate-Regulated Accounting

A government-mandated monopoly sets customer prices according to the rules of a public utilities board or other regulatory agency, while reporting to investors according to accounting standards for publicly accountable corporations. When it comes to pension plan design, it may be that the regulatory accounting basis will be more important to management than generally accepted accounting principles (GAAP). If the regulator will permit customer service charges based upon contributions, then capital markets and management may be less concerned with the volatility of the reserves that are used to capture the differences between the two sets of accounting rules.

IFRS rules concerning rate-regulated accounting are currently under review.[21] This was a consideration in the adoption of U.S. GAAP by some rate-regulated Canadian entities with U.S. securities listings.

2.3 Provincial Regulation

While rules vary across Canada, the distinction between defined benefit and defined contribution pension plans is similar to the distinction under income tax regulations. Some regulations apply to all types of pension plans (vesting, non-discrimination, disclosure, custody). Defined benefit provisions are subject to additional regulations regarding matters such as minimum funding. Minimum funding rules have historically included both going-concern and solvency funding requirements although jointly sponsored pension plans, target benefit plans (including multi-employer plans) and jointly sponsored public sector plans are often exempt from solvency funding requirements.

Recent legislative activity has addressed risk-shared pension plans:

- New Brunswick has developed new rules for shared risk pension plans, involving stochastic modeling to establish a high degree of confidence in going-concern benefits but no requirement for solvency funding.
- Alberta, British Columbia, Ontario and Quebec have adopted new rules that recharacterize collectively bargained multi-employer pension plans as target benefit plans and provide a permanent exemption from solvency funding.

[20] See paragraph 40 of IAS 19, promulgated by the International Accounting Standards Board.
[21] Accounting Standards Board, Rate-regulated Activities, 2018. www.frascanada.ca/en/acsb/news-listings/2018-rra-update; IFRS, Rate-regulated Activities, 2019. www.ifrs.org/projects/work-plan/rate-regulated-activities/; Deloitte, Rate-regulated Activities – Comprehensive Project, n.d. www.iasplus.com/en/projects/research/short-term/rate-regulated-activities

- Quebec has removed solvency funding requirements for public sector pension plans and single-employer private sector pension plans, and substituted explicit provisions for adverse deviations in going-concern funding requirements.
- Ontario has lowered the solvency funding target for single-employer private sector pension plans from 100% to 85% and introduced explicit provisions for adverse deviations in going-concern funding requirements.

There are pension plans that qualify for treatment as multi-employer plans or target benefit plans under provincial legislation but do not meet the requirements under income tax rules for treatment as SMEPPs under income tax rules.

Pension plans that are not subject to solvency regulations may be subject to additional going-concern regulations governing provisions for adverse deviations or the conditions that must be met to improve benefits or (in the case of target benefit plans) avoid reductions in benefits.

It remains to be seen whether provincial pension regulations will accommodate the full range of risk-sharing possibilities or only the specific types of arrangements that have been promoted or adopted in their jurisdiction. It also remains to be seen whether variations in provincial regulation will become an obstacle to multijurisdictional risk sharing.

2.4 Commuted Values

Provincial regulators generally defer to standards of practice set by the Canadian Institute of Actuaries for the determination of commuted values of pensions. Paragraph 3570.01 of the final CIA standards, effective August 1, 2020, introduces a distinction between defined benefit pensions and target pensions:

> "A target pension arrangement is a pension plan for which applicable legislation contemplates the reduction to the accrued pensions of plan members while the pension plan is ongoing as one of the available options for maintaining the funded status of the pension plan, and where the reduction in accrued pensions is not necessarily caused by the financial distress of the plan sponsor or sponsors."[22]

For a defined benefit, the commuted value is the economic value of the pension, based on an illiquid, risk-free discount rate. For a target pension, the commuted value is the going-concern funding target for the pension, with a discount rate that reflects the expected rate of return on plan investments. This value may be adjusted to reflect the funded status of the pension plan or to reflect the member's asset share where such an adjustment is specified in the plan provisions or applicable legislation.

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[22] CIA, Final Standard: Section 3500 of the Practice-Specific Standards for Pension Plans – Pension Commuted Values, 2020. https://cia-ica.ca/docs/default-source/2020/220008e.pdf

Adjustments are made to the economic value of a defined benefit pension to reflect conditional indexation:

- Indexing conditional on the funded status of the pension plan is determined based on the likelihood of future increases, considering both the current funded status and the projected future status.
- Indexation on an excess interest approach is determined using the expected rate of return, capped at the risk-free discount rate so that this adjustment does not increase the commuted value when risk-free discount rates are lower than the hurdle rate.

Section 3: Classification Considerations

All pension plans have assets and are expected to pay future benefits. After taking account of all possible risk-sharing outcomes, the assets, projected future benefits, expenses, investment returns and contributions are in balance. As time progresses, that balance will change – partly by design and partly because of gains and losses relative to a priori expectations. Risk-sharing arrangements can be distinguished according to the manner in which gains and losses are allocated to projected future benefits and contributions.

3.1 Intergenerational Issues

All pension plans have stakeholders who come and go over time:

- Employees come and go, sometimes taking away a commuted value and sometimes remaining as deferred pensioners or pensioners.
- In a pension plan for a publicly traded company, shareholders come and go, buying and selling their shares based in part upon the pension assets, obligations and expense reported in the company's financial statements.
- In a public sector pension plan, businesses and individuals use public services and pay taxes while they are resident in a jurisdiction and then migrate elsewhere to pursue better economic opportunities.
- In a multi-employer plan, contractors or promoters may come into existence for the duration of a project or gig while union members participate in the plan over their entire career and retirement.

Equity between generations of stakeholders is a key issue in the classification of risk-shared pension plans. In some instances, participants will accept intergenerational inequity because the economic benefits of risk sharing exceed the expected costs and it is only the size of the net economic benefit that is in jeopardy. In other instances, there may be a conscious commitment to freely improve the lot of those who come later or who came before (or willfully shirk responsibility by shifting burdens). It is possible that these considerations are simply not understood or addressed.

Some plans treat gains differently from losses. In particular, there may be plan provisions or legal precedents that require surplus to be applied to improve benefits while requiring additional contributions to fund deficits. For the purpose of classification, it is useful to acknowledge all of the "unexpected" outcomes from these asymmetrical risk-sharing deals. If there is an element of conservatism in funding (contributions that will only be needed if outcomes are unfavourable), the extra contributions can be regarded as an intergenerational transfer of risk and expected benefits. The generation of stakeholders who bears the burden of excess contributions will benefit from reduced risk, while future stakeholders will benefit from lower expected costs once adequate reserves are established, but will bear the burden of risks from prior generations as well as their own.

As long as the price each generation pays reflects the benefits they expect to receive plus (or minus) a reasonable risk premium for the risks being transferred to future generations (or assumed from prior generations), a risk-shared plan can be considered equitable. Even if intergenerational inequities are present, they may be outweighed by the value of intergenerational risk pooling. Setting a fair price for intergenerational risk transfer is far beyond the scope of this analysis. We merely seek to identify situations in which such transfers occur.

3.2 Economic Risks

The most important sources of risk affecting all plan members are economic – inflation, investment returns and prices of benefits. If the stock market crashes, the account balances of all plan members with exposure to equities will decline – at least temporarily. Even plan members without equity exposure could be affected if the economic events that led to stock price declines also lead to bond defaults, changes in inflation expectations or an increase in credit spreads. If bond yields increase, the actuarial factors used to establish commuted values, annuity prices and VPLA benefits will decrease. It is useful to regard these economic risks as a group, since a change in real or nominal yields is simply another way of expressing a change in bond prices.

All members are affected by economic risk. Nonetheless, the effect on each individual will be different, either because they have made different investment choices or because they are at a different stage in life. The effect of a 1% increase in interest rates can range from as little as a 2% reduction in the value of a pension for an older pensioner to as much as a 50% reduction in value for a younger employee. There are several ways to address this when risks are shared:

- Choice of investments can be left to individuals. An older pensioner can immunize against this risk through the purchase of fixed-income investments with payment terms that extend over their relatively short expected future lifetime. Protection against interest rate risk is more expensive and less effective for younger individuals, and so they can choose to invest in equities with higher expected returns.

- The investments of the plan can be divided into two accounts – one for pensioners and another for other plan members.

- An optimal investment strategy can be chosen for the entire pension plan, and gains and losses can be shared in proportion to the values of target pensions or account balances.

- An optimal investment strategy can be chosen for the entire pension plan and gains and losses can be shared in a way that reflects the varying risk tolerances of plan members or, equivalently, the administrator can choose a mix of the plan's investment classes for each individual based upon their individual circumstances.

Loss of purchasing power (inflation) is a risk to individuals, whether or not indexing is incorporated into the plan provisions. If a pension plan provides non-indexed benefits then immunization of projected pensions through investment of plan assets in non-indexed fixed-income securities becomes feasible for the pension plan, but the individual plan members must either accept a declining standard of living throughout their retirement or make provision outside the pension plan for expected inflation. Real return bonds and inflation-sensitive investments can be used to address inflation risk in indexed pension plans but matching of inflation-sensitive assets and inflation-linked liabilities will be expensive and imperfect.

3.3 Operational Risks

Although not central to the design of risk-sharing deals, the costs and challenges of running a pension plan should not be ignored. Administrative and investment fees are almost invariably shared across all plan members, as are the risks of those fees turning out to be different from expectations. The consequences of mistakes and opportunity losses due to the failure to promptly and correctly implement a chosen strategy are usually, but not always, spread across all the stakeholders in a pension plan.

3.4 Longevity

The premise of a pension plan (and the income tax rules) is that regular income is needed during the lifetime of a participant to meet living expenses. Preservation of wealth for beneficiaries is not a consideration. Each year a pensioner remains alive represents a loss proportional to the assumed rate of mortality for that year, while the death of a pensioner represents a gain equal to the entire remaining actuarial present value of benefits. The deceased pensioner's hypothetical share of the assets of the pension plan is forfeited and reallocated to the surviving members to offset the losses due to their survival. This pooling of longevity risk is almost always a feature of risk-shared pension plans and is a key distinction between pension plans and retirement income funds.

In some risk-sharing arrangements, the losses from pensioners who live longer than expected and the gains from pensioners who die sooner than expected are allocated solely to the surviving pensioners while the gains and losses due to emerging trends in life expectancy are absorbed by current and future employees and employers. The annuity factors used for administration of retirements will increase gradually with the passage of time due to the mortality improvement scale. It is only when the underlying mortality table or improvement scale needs to be updated that changes in annuity factors represent a gain or loss that affects both pensioners and other plan members. The administration of gradual or abrupt changes in mortality assumptions is a key distinction between risk-sharing arrangements at the defined contribution end of the spectrum and those at the defined benefit end of the spectrum.

Another risk classification consideration is the underwriting basis for annuity factors. In a traditional defined benefit plan, only pensioner age and gender are considered in the determination of transfer values and administration of retirement options. Other equally important determinants of expected future longevity such as wealth and health status are routinely ignored. Variations in retirement age (plus or minus five years from age 60) produce variations in annuity factors at retirement of up to +/-10% while variations to reflect the full range of earnings would be up to +/-5%.[23] Adjustments for disability, health or smoking habits could be as much as +/-70%.[24] If these factors are ignored in a VPLA plan, smokers will subsidize non-smokers and employees at the lowest end of the income spectrum will subsidize executives.

In its public submission on the design of CDC plans,[25] the Institute and Faculty of Actuaries distinguishes between plans that establish the same target benefit accrual rate for each employee and those that establish the same contribution for each employee. In the latter case, it takes the view that "there's a case for taking account of broad underwriting factors (at a basic level: occupation, salary, location), namely to reduce foreseeable cross subsidy between those expected to be shorter lived and longer lived. A CDC decumulation scheme … focusing on receiving transfer values at retirement to pay a CDC pension from transferred-in funds would very probably need to underwrite individual applicants, for fairness and because such a scheme's terms would naturally be compared with those in the annuity market where underwriting is the norm."

It may be possible to ignore underwriting factors such as age and socioeconomic status when all plan members are from the same union or occupational group and differences in pension amount and pension commencement age are limited by plan design. It may also be possible to continue to focus on aggregate population mortality and ignore individual factors when portability is not offered at retirement age or longevity risks are spread broadly amongst participating employers and employees. Risk-sharing plans that emphasize individual account balances and transparent pooling of longevity risk will have a difficult design choice:

- Deny lump sum transfers out of the plan at retirement, despite this being the only option in traditional defined contribution plans, and accept criticism from retiring members with impaired health

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[23] Author's calculations, using pension amount adjustments provided with the Canadian Pensioners' mortality table (4% net discount rate, MI-2017 mortality improvement scale, immediate pension on January 1, 2020, 100% male life only pension). The effects of age and income are smaller for pensions with survivor benefits or guarantee periods and for higher discount rates, although the pattern is similar.

[24] See Table 5 in Meyricke, R., and Sherris, M., The Determinants of Mortality Heterogeneity and Implications for Pricing Annuities, *Insurance: Mathematics and Economics* 53 (2013), 379–387. www.sciencedirect.com/science/article/pii/S0167668713000887. In the extreme, the life expectancy used to determine the commuted value for a plan member who has been medically determined to be terminally ill is only four months.

[25] Institute and Faculty of Actuaries, Delivering Collective Defined Contribution Pension Schemes – IFoA response to the Department for Work and Pensions, 2019. Response to consultation question #1. www.actuaries.org.uk/system/files/field/document/IFoA%20response%20to%20DWP%20consultation%20-%20Delivering%20CDC%20schemes%20-%20FINAL.pdf

- Permit portability at retirement, communicate the choice carefully and anticipate above-average life expectancies amongst members who elect lifetime pensioner
- Use all available underwriting information to estimate individual life expectancy in a way that is fair and non-discriminatory, despite the existing convention of ignoring all factors other than age.

Ideally, the choice of a retirement income fund, an insured annuity or a variable pension will be driven by considerations such as risk tolerance and flexibility in the timing of retirement income, rather than mispricing of longevity.

3.5 Increases in Pay

A flat benefit or career average pension formula will not give rise to experience gains or losses due to earnings increases different from expectations.[26] In a final or best average pension formula, the overall effect of an unexpectedly large (or small) pay increase will be an actuarial loss (or gain). In a pension plan with individual accounts, this loss (or gain) must be addressed through adjustments to future allocations to the individual account or it will lead to a pension that falls short of (or exceeds) the target.

In a pension arrangement with pre-retirement pooling of risks, an attempt to overcome an actuarial loss that affects some plan members but not others will lead to offsetting adjustments for the other plan members. In this instance, a large pay increase for some plan members will have a negative impact on plan members who did not receive the pay increase. To avoid this outcome, the shared risk pension plan for employees of the University of New Brunswick has distinguished general pay increases from “progress through the ranks” increases. Adjustments to accrued pensions attributed to the latter are excluded from the target pension.[27]

3.6 Termination of Employment

A defined benefit pension plan typically provides immediate or deferred pension benefits and pre-retirement death benefits that depend upon the employee’s age and service at the date of termination of employment. Gaps between the value of subsidized early retirement benefit and the value of benefits payable upon pre-retirement termination or death or normal or postponed retirement can produce demographic experience gains and losses that are dramatic at the individual level, even if the gains and losses balance out overall. Significant aggregate demographic experience gains and losses can arise as a result of large-scale layoffs.

3.7 Miscellaneous Gains and Losses

In addition to the main factors described above, pension plans will experience gains and losses due to differences between actual experience and other actuarial assumptions. These can include

[26] This presumes the traditional unit credit actuarial cost method is used. When career average benefits are projected and pro-rated over service, as required by accounting standards, salary gains and loses do arise.
[27] https://www.unb.ca/hr/_resources/pdf/benefits/aesrpactuarialvaluationatjuly12016.pdf

provisions for contribution refunds, the impact of income tax limits on maximum benefits and provisions for optional forms of pension on a basis different from actuarial equivalence. They also include data corrections and refinements to actuarial methods and assumptions. For risk-sharing plan designs with a transparent approach to allocation of gains and losses to plan members' asset shares, it may become necessary to explicitly specify the allocation basis for these other gains and losses in advance.

3.8 Normal Cost

The expected cost of a unit of target benefit will vary from time to time as a result of fluctuations in expected rates of return, trends in the demographic composition of the covered employees, and demographic assumptions. That is, a unit of benefit accrual will be more valuable under some circumstances than others. These variations can be allowed to flow through to employer contributions without undermining the application of defined contribution tax and accounting rules. Alternatively, the contribution rate can be fixed, and variations in normal cost rates can be reflected in adjustments to the target benefit accrual rate. Depending on the type of risk sharing, variations in normal cost can give rise to inequities amongst participating employees or employers.

3.9 Ability to Amend Plan Provisions

Risk-sharing mechanisms allow costs and benefits of a particular plan design to change automatically when the need arises. Costs and benefits can also change through amendments to the plan or transition to an entirely different type of plan. Amendments may be precipitated by accumulated surpluses or deficits, by prospective changes in costs, by changes in employee compensation priorities or by a combination of factors. To the extent they are a response to gains and losses, they represent a mechanism for transferring risk from the party with the ability to amend the plan to other stakeholders.

- For most single-employer private sector pension plans, control over the plan provisions rests with the employer. The employer's ability to reduce benefits might be restricted by union agreements, pension laws or common law concerning constructive dismissal, but this remains an important risk mitigation tool for employers.
- Some public sector pension plans are governed by legislation rather than a plan text, and so the authority to amend the plan provisions rests with the legislative branch of government, rather than the public sector employer.
- Multi-employer pension plans are governed by trustees who usually have the authority to amend the pension plan, even though in practice the trustees would not act without first negotiating with the participating employers and unions. Ultimately, the only control individual employers have over their pension contributions might be their ability to negotiate with their union for withdrawal from the plan.
- Target benefit and multi-employer pension plans may contain provisions that allow for improvements or reductions in benefits but grant discretion to the governing body to determine the nature of the changes.

Section 4: Categories of Risk Sharing

While each risk-sharing arrangement may be unique, it is helpful to group pension plans into broad categories. One possible grouping is presented below. This grouping is intended to be descriptive, not prescriptive. There are instances in which the accounting, funding, transfer value or tax treatment of a particular type of pension plan or a particular pension plan follows a different pattern from the one suggested here. This may be because of unique features or simply because of different choices by the governing authorities.

The consequences of investment returns and other future events different from expected will depend on the type of risk-sharing deal. There may be adjustments to employer contributions, employee contributions, projected benefits for active plan members, or pensions in pay, or some combination of these. An illustration of the adjustments that would arise from good, bad or neutral future investment experience is provided for each group. The good and bad scenarios are intended to represent economic outcomes roughly one standard deviation better or worse than expected, at the end of a 10-year time horizon.[28]

4.1 Defined Contribution

A defined contribution pension plan is essentially a savings plan. Each member has an account balance and all the contributions, assets, expenses and investment earnings of the pension fund are allocated to individual accounts. Projections of benefits at retirement might be reported to plan members, but they are of no consequence. They do not affect the allocation of contributions or investment earnings. After termination of employment, the former employee’s account balance is transferred out of the pension plan, either to purchase an insured annuity or for investment in another tax-sheltered retirement savings plan. Since 2003, defined contribution pension plans have also been able to offer variable benefits akin to a registered retirement income fund directly from the pension fund.

There is no risk-sharing between the employer and the employees or amongst the employees. This does not mean the employer has no risks. To the extent employers restrict the choice of investments by selecting a particular service provider, they have a responsibility to act prudently. To the extent the choice of contributions or investments is left to plan members, employers have a responsibility to provide the information and tools to allow members to make sound choices.

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[28] The magnitude of the deviations in investment returns and yields is the same in each illustration. Assets are 60% return-seeking and 40% fixed income with a duration of 10 years. The average yield on fixed income is initially 6% (4% on long government bonds plus a 2% credit spread). The premium for return-seeking investments and rebalancing is assumed to be 3% over the fixed-income yield, producing an initial best-estimate expected return on assets of 7.8% per annum. Liabilities for all plans have an average duration of 17 years, with 50% of the initial liability for pensioners and 50% for actives. Benefit payments are 13% of the initial pensioner liability and service cost is 10% of the initial active liability. After a 10-year projection, the neutral scenario is unchanged, while the good (or bad) scenario has a 0.5% decrease (or increase) in yields and a geometric average annual rate of return on investments of 11.0% (or 4.6%). The discount rate used to establish the funding target is adjusted by the full change in yields. Surpluses or deficits are amortized over 10 years.

This and other aspects of plan sponsorship and administration may give rise to potential liability for the consequences of poor choices, but these risks are not a direct feature of the plan design.

Changing circumstances could lead employers to change contribution rates or make other arrangements for the economic security of their employees in retirement. Such changes are not required by the plan design but could be justified from a business and competitiveness standpoint. Similarly, favourable or unfavourable investment outcomes could lead employees to retire sooner or later, leading to higher or lower employment and turnover costs for the employer.

Features:

- Individual accounts comprise all assets
- Allocation of contributions to individual accounts depends on individual characteristics and choices such as earnings, employee contribution election, class of employment, years of service and age, but not a predefined target pension or funding level
- Allocation of investment returns is determined by each individual member's account balance and asset allocation choices
- No forfeitures – the full account balance is used to provide member benefits
- Retirement options are a retirement income fund, insured annuity or transfer out
- Increases and decreases in the projected pension (if estimated by the plan administrator) will occur routinely due to investment returns or changes in annuity prices
- Employer is normally the sponsor and can amend the terms of the plan.

Implications:

- PA is contribution
- Accounting expense is contribution
- Transfer value is account balance.

4.1.1 Traditional Defined Contribution Plan

Most Canadian defined contribution pension plans are implemented through life insurance contracts. The insurance company:

- Maintains custody of the assets
- Keeps records of members' investment choices and account balances
- Arranges a selection of pooled investment funds managed by external fund managers or an affiliate of the insurance company
- Offers a range of tools and educational resources to assist plan members in planning for retirement and making investment choices.

Employer and employee contribution rates (or a range of choices of rates) are specified by the plan terms and, indirectly, by the employer.

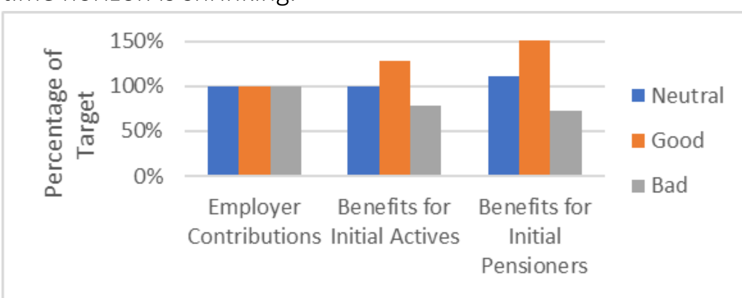
4.1.2 Target Contribution Pension Plan

Target contribution pension plans are not common in Canada but they are mentioned here for clarity and completeness because they are described in the United States as "target benefit pension plans." They are a type of defined contribution pension plan in which a participant's age is used as one of the factors in determining contributions. Contributions that vary by age or service must satisfy non-discrimination tests, essentially a demonstration that the variations are needed in order to provide the same projected pension.

The employer's average contribution rate depends upon the distribution of employees' ages, and so the employer bears the risk that contribution rates could rise if the average age of the workforce rises. As in a traditional defined contribution plan, the employer could consider this new overall contribution rate to be appropriate or could decide to amend contribution rates.

4.1.3 Illustration of Risks in a Defined Contribution Plan

Investment gains and losses and changes in market interest rates do not affect contributions to defined contribution pension plans. They produce larger swings in the annual retirement income for individuals who are already drawing down their retirement income than in the projected retirement income from account balances for active employees because the account balance and time horizon is shrinking.



4.2 Asset Share

It is possible to establish a pension plan that incorporates risk pooling while preserving essential elements of a defined contribution plan. Gains for some members will be offset by losses for other members. Net gains or losses for the plan as a whole will be promptly spread across all plan members. This process will be more transparent than in other types of pension plans.

Features:
- Individual accounts or notional asset shares comprise all assets
- Allocation of contributions and forfeitures depends on target benefits and aggregate contributions for the group
- Contribution allocations comply with income tax rules for defined contribution provisions
- Allocation of investment returns may depend on target or actual account balances and risk tolerances of categories of employees
- Retirement options include variable lifetime pension and (possibly) transfer out
- Automatic contribution increases cannot be triggered by deficits
- Increases and decreases in accrued pensions occur routinely

- Employer can amend the terms of the plan.

Implications:
- PA is contribution
- Accounting expense is contribution
- Transfer value is account balance or estimated asset share
- Underwriting factors may need to be considered to reduce foreseeable cross-subsidies.

4.2.1 Defined Contribution Plan with VPLA

A proposal for a pooled (multi-employer) arrangement of this type is currently under development.[29] As discussed in Section 2, tax registration has been an obstacle. To ensure that no pensioner risks are shared with employers or active employees, longevity and investment risks related to pensioners must be absorbed by pensioners alone.

The most commonly cited example of a plan of this type is the University of British Columbia (UBC) Faculty pension plan.[30] In addition to the usual insured annuity and lump sum transfer options, members may elect a variable lifetime pension with a choice of a 4% or 7% hurdle rate. Note, however, that the budget measures enabling new VPLA arrangements do not cite a minimum hurdle rate such as 4%. Rather, they specify that the initial indexed monthly pension must be actuarially equivalent to the defined contribution account balance. It will not be possible to establish a new plan with a fixed hurdle rate and no provision for adjustments to the mortality table. If expected returns on the plan's assets are high and expected inflation is low, then a fixed hurdle rate could lead to expected indexing in excess of the limits in the tax rules. To put it another way, the factors used to convert money purchase account balances into initial monthly pension rates will not remain fixed but will vary with market investment yields and mortality improvements. The required annual adjustments will be a combination of changes to the mortality table, adjustments to the benchmark discount rate, and increases or decreases to pensions in pay. Any smoothing of gains and losses for existing pensioners will smooth new pensions as well, through adjustments to the actuarial basis. There is no expectation that the pension increases will track the CPI and there is no guarantee that pensions will remain at or above the initial level. Under income tax rules for defined contribution pension plans, there is no facility for employers or active employees to make additional contributions in respect of former employees should benefits fall in real or nominal terms.

4.2.2 Individual Target Benefit Plan

None of the target benefit arrangements that already exist have gained wide acceptance amongst sponsors of traditional defined benefit pension or traditional defined contribution

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[29] See the description of this proposed plan at www.idealcanadianpensionplan.ca/

[30] The employee communications concerning the variable pension option can be found at https://faculty.pensions.ubc.ca/overview/. For a discussion of the merits of the UBC decumulation approach, see Gang, Y., Variable Annuities Touted as a 'Good Third Option' for DC Decumulation, *Benefits Canada*, October 2016. www.benefitscanada.com/news/variable-annuities-touted-as-a-good-third-option-for-dc-decumulation-88072

pension plans. This may be because their concerns with taxation, funding, accounting, governance, transparency and equity have not been addressed. To further the discussion, the following hypothetical arrangement is presented for comparison and consideration. It might be regarded as a CDC pension plan with no intergenerational risk sharing or capital buffers.[31] [32]

If the assumed spread between the rate of return on plan investment and each plan member's rate of salary increase (including both general average wage increases and individual seniority, merit and promotion increases) is 0%, then the required normal contribution rate for a final earnings pension plan is constant across all ages prior to normal retirement age. A defined contribution pension plan with a fixed contribution rate and no individual choice of investments, combined with a VPLA at retirement, could be regarded as a target benefit plan, with the target benefit defined according to an indexed career average formula.

There are a few of flaws in this point of view:

- Even if a 0% spread between investment returns and increases in pensionable earnings is a reasonable overall assumption at the time the plan is established, it will not remain so throughout the life of the plan or even throughout the career of an individual employee.
- Even though early retirement benefits and optional forms of pension can be provided on an actuarially neutral basis (i.e. reduced for longer life expectancy at early retirement and increased for any spread between post-retirement indexing and interest), postponed retirement benefits would be overfunded.
- Paying the full defined contribution account balance upon termination of employment or death (including projected future pay increases) might not provide sufficient incentive for staff retention and so the sponsor might prefer smaller target benefits in these situations.
- Adjustments to the factors used to convert the retirement account balance to a VPLA required by emerging market yields and mortality expectations will lead to variations in both individual and average target benefits.

Refinements of this design could provide for:

- Allocation of all plan assets to individual member account balances (as required for a defined contribution pension plan under the income tax rules and U.S. GAAP) at each valuation date
- Total required employer normal contributions that reflect the target accrual rate and current actuarial assumptions for the active membership, with no adjustment for surpluses or shortfalls in account balances relative to the actuarial value of accrued target benefits (as required for a defined contribution pension plan under IFRS and ASPE)

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[31] For a discussion of the merits of this approach, see Pielichata, P., UK Experts: Just Say No to Capital Buffer Requirement, *Pension & Investments*, 2019. www.pionline.com/article/20190121/PRINT/190129982/u-k-experts-just-say-no-to-capital-buffer-requirement

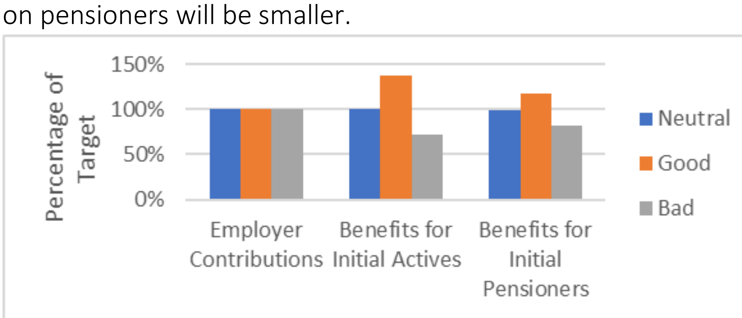
[32] For analysis of the consequences of capital buffers, see Sanders, B., Analysis of Target Benefit Plan Design Options, Society of Actuaries, February 2016. www.soa.org/globalassets/assets/files/research/research-2016-analysis-tbp-plan-design.pdf

- Allocation of contributions to individual member account balances in proportion to their normal cost on the Individual Aggregate cost method (the level percentage of pay that, taken with their account balance, will fully fund their target benefit at retirement), subject to a floor of zero
- PAs according to allocated contributions
- Transfer values or deferred pensions payable upon termination of employment or death prior to early retirement age determined as the going-concern liability for funded target benefits (as required by provincial vesting rules)
- Early retirement, normal retirement and postponed retirement benefits determined as a VPLA using the full account balance
- Annual disclosure to members of their accrued and projected target benefit, their funded target benefit, their account balance, and the portion of the account balance that would have been payable as a transfer value on termination or death at the annual statement date
- Allocation of liability return in proportion to target account balances
- Allocation of forfeitures on pre-retirement death or termination in proportion to contributions
- Allocation of gains or losses on return-seeking investments (differences between actual return and the liability return) by account maturity, with more risk to younger members and less risk to older members and pensioners (such an arrangement would need to be constructed in a way that had no cross-subsidies between active members accruing service and pensioners who participate in a VPLA).

The objective of such an arrangement would be to enable risk sharing amongst active employees relative to a target benefit, without creating any unallocated reserves or risk of variations in employer contributions attributable to past service. The challenge would be to achieve a reasonable balance of complexity, perceived equity and attainment of individual targets.

4.2.3 Illustration of Asset Share Plans

In an individual target benefit arrangement, investment returns can be allocated according to risk tolerance. Even if the overall risk of plan assets is the same for all membership groups, the effect on pensioners will be smaller.



4.3 Specified Contribution, Target Benefit

Most emerging target benefit arrangements are described as defined contribution for employers and defined benefit for plan members. Benefits can be reduced if necessary but there is a reasonable expectation that the target benefit will be realized or exceeded.

Features:

- Individual account balances comprise employee contributions only (if any)
- No individual allocation of assets, investment returns or employer contributions
- Retirement options include lifetime pension and (possibly) transfer out
- Contributions are fixed by plan terms
- Automatic contribution increases cannot be triggered by deficits
- Increases and decreases in pensions reflect emerging experience
- Plan terms can be amended by a union or by trustees who are independent of the employer.

Implications:

- PA is either nine times normalized pension or contribution depending on whether SMEPP conditions are met
- Accounting expense is the contribution (except defined benefit expense for a single-employer plan under U.S. GAAP)
- Transfer value is going-concern value of target benefit.

4.3.1 Canadian Multi-employer Plan

Most multi-employer pension plans in Canada are similar to their U.S. counterparts except with regard to deficits. It is permissible to reduce benefits, including accrued benefits, provided that the reduction to pensions in pay is not disproportionate to the reduction in benefits for active members. There are no exit charges for employers who withdraw from participation in the plan. Thus, employers do not share in pension risks beyond the extent that they are willing to pay increased contributions for current service, or are required to do so by industry-wide collective bargaining agreements with current employees.

Risks are shared amongst employees and pensioners. Risks are shared between generations of employees to the extent employees are willing to absorb deficits attributable to pensioners in order to avoid proportionate reductions in their own benefits. Favourable experience does not need to be used to improve benefits for groups of plan members in proportion to their share of the assets and liabilities. It can be used to improve benefits or reduce negotiated contributions or improve benefit security for active employees and future new entrants.

Employers participate in risks through negotiated contribution rate changes and through the relative competitiveness of the value proposition for their employees. Costs are determined for the pension plan as a whole, and so costs are shared amongst participating employers and employees in a way that does not accurately reflect the expected benefits.

4.3.2 Proposed Royal Mail Collective Defined Contribution Plan

The British post office and its main union have negotiated a new pension arrangement. The anticipated features, as described in the employee booklet,[33] are as follows:

- Members accrue a 1.25% career average benefit.
- Employer and employee contributions are fixed at 11.2% and 4.0% of pay respectively.
- Pensions are payable on a joint and 50% survivor basis from age 67, or earlier on an actuarially equivalent basis (or later with continued accrual only).
- Accrued pensions and pensions in pay will be adjusted every year by the same factors so that, at any valuation date, the actuarial value of accrued, adjusted benefits, scheduled reductions (if necessary) and the sustainable level of future cost-of-living increases would equal market value of assets.
- Actuarial assumptions will be market-calibrated best estimates, including an equity risk premium and excluding margins of conservatism.
- Commuted values for portability to other registered pension plans would be a pro rata share of assets.

While this design does not include an explicit buffer against future adverse experience, the determination of annual increases at a rate that can be sustained indefinitely represents an implicit buffer. In fact, in its public submission on the plan design, the Institute and Faculty of Actuaries states funding for future increases at the same rate as the current year increase "might typically be projected to be half of the assets – in other words, the CDC pensions without any further increases might be about 200% funded."[34] The cost of an extra 1% per year cost-of-living adjustment to be sustained indefinitely is disproportionately larger for younger members than for older members, so gains and losses are not allocated in proportion to liabilities. A larger proportion is allocated to younger members and a smaller proportion to older members.

4.3.3 Illustration of Specified Contribution, Target Benefit Plan

In a specified contribution, target benefit plan such as a Canadian multi-employer pension plan, adjustments to benefits will typically be the same for all plan members.

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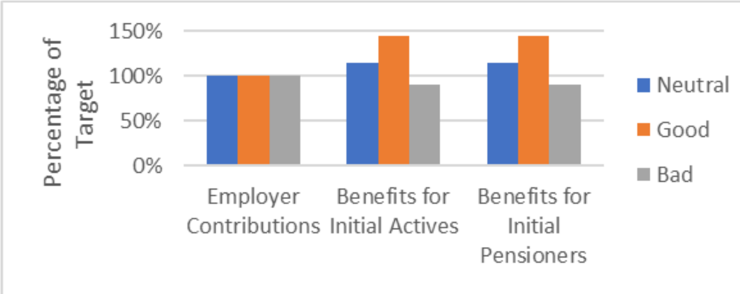
[33] Royal Mail Group and Communication Workers Union, Anticipated Collective DC (CDC) Pension Design, 2018. www.royalmailgroup.com/media/10542/scheme-design-summary-booklet.pdf

[34] Institute and Faculty of Actuaries, Delivering Collective Defined Contribution Pension Schemes – IFoA response to the Department for Work and Pensions, January 2019. Response to consultation question #10. www.actuaries.org.uk/system/files/field/document/IFoA%20response%20to%20DWP%20consultation%20-%20Delivering%20CDC%20schemes%20-%20FINAL.pdf



4.4 Contribution Partnership

A variety of pension plans make provision for adjustments to employee contributions in response to gains and losses.

Features:

- Individual account balances comprise employee contributions only
- No individual allocation of assets
- Retirement options include lifetime pension and (possibly) transfer out
- Accrued pensions cannot be reduced except under extreme circumstances
- Improvements in accrued benefits occur infrequently
- Cost-of-living adjustments to pensions in pay depend on favourable experience
- Employees and employers contribute matching amounts
- Plan terms can be amended by the legislative authority or by trustees who are fully or partially independent of the employer.

Implications:

- PA is either nine times normalized pension or contribution depending on whether SMEPP conditions are met
- Accounting expense follows defined benefit rules, although individual participating employers will likely use the contribution when a plan covers a group of employers, whether under common control or not (with additional disclosure requirements)
- Transfer value is the economic value of the guaranteed pension with potential adjustment for the value of conditional indexing.

4.4.1 Jointly Sponsored Plan

Jointly sponsored pension plans are common in the Canadian public sector.[35] Employers and employees contribute a fixed proportion of the total required contribution. Benefit for future service can be reduced if an increase in contributions is unacceptable, but no reductions are

[35] There is a brief description of jointly sponsored pension plans on the Ontario Financial Services Regulatory Agency website at www.fsco.gov.on.ca/en/pensions/pension-plan-guide/pages/HRPPW-Types-of-Registered-Pension-Plans-and-Benefits.html. Details of individual plans are generally publicly available on plan websites.

permitted in pensions for former employees or in future benefits attributable to past service for current employees except in a plan wind-up. Pensions are linked to salary in the years prior to termination of employment and are indexed to inflation after termination of employment, both before and after commencement of monthly payments. Most plans have been amended so that the level of guaranteed inflation protection is less than 100% of increases in the CPI, with full inflation protection dependent on investment returns or the availability of surplus. Aside from this conditional indexation feature, former members do not share in the risks of plan funding.

The plans cover multiple employers within the broad public sector and, as a rule, the contribution rates paid by each employer are the same, irrespective of their demographic profile or the accumulated surplus or deficit attributable to their past participation. Exceptions to this rule arise when special benefits are paid to groups of employees (e.g. firefighters) or as transitional measures when employers enter a jointly sponsored pension plan.

Clearly, there is cost sharing amongst employers and employees. Even aside from responsibility for accumulated deficits and surpluses, individuals and groups will pay more or less than the expected value of benefits because of differences in their demographic profile.

4.4.2 American Multi-employer Plan

Multi-employer pension plans are common in unionized trades. Workers move from job to job as their skills are needed. Construction contractors and other companies participate in the pension plan as projects arise and workers are hired. The terms of the pension plan may be determined solely by the union or may be negotiated between the union and an industry association of employers. Contributions are intended to be sufficient to fund benefits over the long term.

Under the rules that existed in Quebec prior to 2019 and continue to exist in the United States, accrued benefits cannot be reduced and continuing employers cannot escape the cost of deficits.[36] If contributions are insufficient, contribution rates can be increased or benefit accrual rates for current employees can be reduced. Participating employers are obliged to pay their share of any accumulated deficit before exiting the plan.

4.4.3 New Brunswick Shared Risk Plan

In 2012, New Brunswick introduced legislation to support a new type of pension plan.[37] The shared risk pension plan (SRPP) is intended to provide a high degree of security for plan members with stable contributions for employees and employers. An SRPP must perform annual stress tests to illustrate there is a 97.5% likelihood that base benefits will not be reduced and a 75% likelihood that ancillary benefits (such as cost-of-living adjustments) will be maintained over a 20-year time horizon. The plan's benefit, funding and investment policies include triggers for

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[36] This is a simplification. The Multiemployer Pension Reform Act of 2014 permitted U.S. multi-employer plans to reduce benefits in extreme circumstances; basically, if they can prove that doing so will prevent them from running out of assets and participant votes support the reduction. Exit charges often go unpaid.
[37] There is a presentation on this reform available on the government website at www2.gnb.ca/content/gnb/en/corporate/promo/pension.html

adjustments to benefits, investments and (in most instances) contributions to achieve this balance of risks and projected benefits.[38] In most instances, funding levels outside the target range trigger changes to employer and employee contributions, up to a specified limit. Changes, first to ancillary benefits and then to base benefits, are only triggered once these limits are reached.

Employers, employees and pensioners all participate in risk sharing, although the extent of risk sharing for pensioners is less than for other stakeholders. Risks are also shared between generations of participants through margins of conservatism in the funding target and reserve levels required before benefit increases and contribution reductions can be triggered.

4.4.4 Quebec Member-Funded Pension Plan

A Quebec member-funded pension plan (MFPP) is unique, in that there is provision for adjustments to member contributions to reflect deficits, but no provision for adjustments to employer contributions.[39] Pensioners participate in risks through conditional indexation. The plan design must be career average or flat benefit. That is, guaranteed inflation protection in the form of a final average salary plan formula is not permitted. Active members participate in plan risks through conditional indexation during their working careers, in addition to contribution risks and uncertain post-retirement indexation. Funding must include provision for indexation both before and after retirement. This, together with the mandated provision for adverse deviations (the Quebec stabilization reserve) represents a significant element of conservatism relative to the guaranteed non-indexed benefit. There is no longer any requirement to fund on a solvency basis.

Although employer contributions are fixed under the terms of the plan, an MFPP is normally maintained pursuant to a collective bargaining agreement. Unfavorable experience and member contribution increases could lead to pressure for increased wages or employer contributions.

4.4.5 Illustration of Contribution Partnership

In a contribution partnership, variations in benefits for pensioners are restricted to conditional indexing. Most of the economic risks are absorbed in contributions. In the illustration below, employer and employee contributions are allowed to vary between 70% and 130% of the initial level, with gains outside this range being absorbed in benefit improvements for active members and losses outside this range being absorbed firstly in the elimination of conditional indexing and

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[38] See, for example, Steele, J., New Brunswick's Pension Change: The Shared Risk Pension Plan Model, Pension Investment Association of Canada, 2013. www.osler.com/osler/media/Osler/reports/pensions-benefits/Pensions-New-Brunswick-Pension-Change.pdf; Munnell, A.H., and Sass, S.A., New Brunswick's New Shared Risk Pension Plan, Center for Retirement Research, Boston College, 2013. http://crr.bc.edu/wp-content/uploads/2013/07/slp_33_508.pdf; Vestcor, New Brunswick Public Service Pension Plan: Funding Policy, 2015. https://vestcor.org/wp-content/uploads/2015/09/Final-EN-NBPSPP-Funding-Policy.pdf

[39] There is a summary of member-funded pension plans in Newsletter Number 23 on the Quebec government website at www.rrq.gouv.qc.ca/en/programmes/rcr/Pages/rrfs_nouveau_regime_retraite.aspx

secondly in reductions in prospective benefits for active members (which do not arise in the illustration). Conditional indexing is included in the target benefit.

4.5 Defined Benefit with Adjustment Mechanisms

Features:

- Individual account balances comprise employee contributions only
- No individual allocation of assets
- Matching employer contributions may be allocated to members' accounts
- Retirement options include lifetime pension and (possibly) transfer out
- Accrued pension cannot be reduced
- Employer can amend the terms of the plan.

Implications:

- PA is nine times normalized pension
- Accounting expense follows defined benefit rules, with potential application of onerous contribution provisions
- Transfer value is the economic value of the minimum benefit with potential adjustment for contributions and other special features.

4.5.1 Defined Benefit Variable Pensions

A few pension plans with minimum defined benefit accruals provide post-retirement adjustments based on a hurdle rate. Each year as investment returns are greater (less) than the hurdle rate, pensions are increased (or in some cases decreased). If the hurdle rate is conservative, then increases will be common. Since these plans are registered as defined benefit pension plans under provincial regulations, variable payment annuities may be required to have a provision preventing reductions in monthly pensions or preventing reductions below the initial level. Mortality experience gains and losses sometimes lead to pension adjustments but more often they are absorbed into the general defined benefit funding surplus or deficit.

4.5.2 Contributory Pension Plans

Many defined benefit pension plans include employee contributions. Almost all contributory pension plans are required to provide a minimum value based on the employee contribution account balance. Some pension plan designs provide more than this, in one way or another. In particular, employee contributions may be regarded as evidence that employees are entitled to share in pension plan surplus, or used as a basis for apportioning surplus.

4.5.2.1 The 50% Rule

Canadian pension regulations require that at least half of the value of a defined benefit pension be funded from employer contributions.[40] If, at termination of employment, the employee contribution account balance exceeds half of the pension value, the excess is refunded to the employee as an additional pension benefit. Effectively, the employee receives the defined contribution account balance plus half of the value of the defined benefit.

This situation usually arises when employment terminates before early retirement eligibility. However, if the contribution rate and the discount rate used to calculate the commuted value of the defined benefit pension are high enough (relative to the accrual rate and the interest credited on employee contributions), a 50% refund can occur at retirement age.

In most jurisdictions, the interest rate credited on employee contributions is the rate credited on five-year term deposits. In some jurisdictions, the plan administrator may (or must) credit the actual rate of return on pension fund investments. Either way, the 50% rule introduces an element of market-related uncertainty for the plan member, since market interest rates are used to determine the size of the refund. Thus, the 50% rule is a form of sharing of interest rate and investment risks with the plan member. Part of the loss due to a decline in market interest rates will be absorbed by the plan member when the 50% rule is operative.

4.5.2.2 Hybrid Pension Plans

In the context of risk sharing, a hybrid pension plan is one that provides the greater of a defined benefit and a defined contribution. Typically, the member's contribution account balance is equal to two times the member's own contributions (i.e. including matching employer contributions), plus interest at the rate of return earned by the pension fund.[41] In addition to matching employee contributions, the employer will need to fund the defined benefit floor in those instances where the contribution account balance is insufficient.

A hybrid pension plan narrows the range of potential outcomes for employer cost as compared to a non-contributory defined benefit pension plan, since there is a minimum employer cost. This is a form of risk sharing, although it is often not understood in this way. Only favourable outcomes are shared with employees. A hybrid pension plan can operate for decades with no more than matching contributions if investment returns are favourable and the factors used to convert contribution account balances into pensions are inexpensive. When interest rates fall or investments underperform, the defined benefit floor can become the dominant feature for an extended period.

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[40] Federally regulated plans that provide post-retirement inflation protection are exempt from this requirement.
[41] For example, see the York University Pension Plan Booklet at https://retire.info.yorku.ca/files/2018/11/2018-Employee-Booklet.pdf

Note that the term "hybrid" is also sometimes used to refer to a "combination" or "stacked" pension plan that provides benefits equal to the sum of a pension based upon defined contributions and a pension based upon a defined benefit formula. For this analysis, an arrangement that provides the sum of defined benefits and defined contributions is considered to be two separate plans, each classified according to its own risk-sharing features.

4.5.2.3 Indexing Fund

Some public sector pension plans maintain a separate indexation account with fixed contributions. From 1970 to 1991, a separate Supplementary Retirement Benefits Act provided indexing for federal civil servants.[42] Similar arrangements are still in place for British Columbia public employees.[43]

4.5.3 Formal Gain Sharing

There are instances in which an explicit formula has been adopted to resolve the question of how much surplus can be used to reduce employer contributions and how much must be reserved for the benefit of various groups of plan members.[44] A portion of investment and mortality experience gains and losses is earmarked to provide improvements to pensions, including cost-of-living adjustments for pensioners and adjustments to the benefit formula or contributions for active plan members. Although each group of plan members may have a separate experience account, risk is transferred between generations when employees retire and move into the pensioner group without a transfer of their accumulated reserves.

4.5.4 Cash Balance Plans

Although subject to defined benefit rules for funding and accounting, a cash balance plan might be better described as a defined contribution pension plan that substitutes a predefined rate of return for the actual rate of return on investments.[45] The employer who sponsors this kind of plan absorbs the investment risk. The member retains the inflation risk and interest rate risk. This type of arrangement has gained wide acceptance in the United States.[46]

This type of plan is not common in Canada. To comply with Canadian tax rules, an explicit annual pension must be specified, and variable ancillary benefits must be incorporated to bring the commuted value of that pension in line with the notional cash balance.

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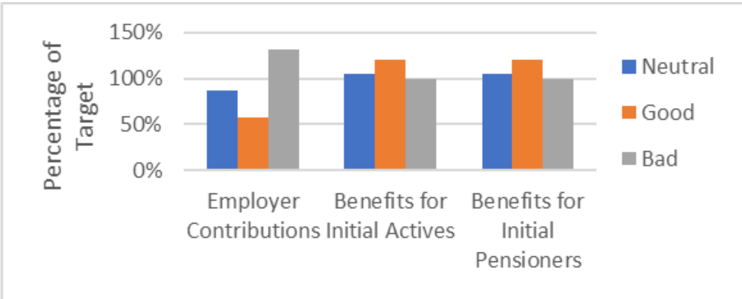
[42] See the Public Service Pension Plan History at www.canada.ca/en/treasury-board-secretariat/services/pension-plan/plan-information/public-service-pension-plan-history.html
[43] See Public Service Pension Plan, Adjusting for Inflation, n.d. https://pspp.pensionsbc.ca/adjusting-for-inflation
[44] The most notable example is for CN Rail employees. A presentation to the Canadian Institute of Actuaries on this plan can be found at www.actuaries.ca/meetings/pension/2007/en/pdf_ppt/Caroline%20Drouin%20(E).pdf
[45] U.S. Department of Labor, Fact Sheet: Cash Balance Pension Plans, November 2011. www.dol.gov/agencies/ebsa/about-ebsa/our-activities/resource-center/fact-sheets/cash-balance-pension-plans
[46] According to U.S. Department of Labor statistical summaries, 16,971 out of 46,300 defined benefit plans were classified as cash balance plans in 2016. See Table A.1 of the Private Pension Plans Bulletin, Abstract of 2016 Form 5500 Annual Reports Data Extracted on 7/10/2018. www.dol.gov/agencies/ebsa/researchers/data/private-pension-plan-data

4.5.5 Illustration of Defined Benefit Plan with Gain Sharing

In the illustration below, 50% of gains are shared with plan participants in the form of benefit improvements. Losses are not shared, although a provision for adverse deviation is included to reduce the likelihood of this outcome. Defined benefit plans with other types of adjustment mechanisms would lead to different deviations from targets.



4.6 Defined Benefit

A single-employer defined benefit pension plan has come to be regarded as a contractual promise by the employer to pay a pension determined by the plan's benefit formula. Employers have discretion in determining contributions, subject to minimums and maximums imposed by pension and tax regulations. The investments required to provide for each plan member's projected benefits are a consideration in the determination of aggregate contributions, but individual liability balances are not maintained or reported.

Features:

- Clear employer entitlement to surplus
- A guarantee fund, group deposit administration contract or other mechanism to secure benefits in the event of plan sponsor insolvency
- No individual allocation of assets or investment returns
- Retirement options include lifetime pension and (possibly) transfer out
- Accrued pension cannot be reduced
- Employer can amend the terms of the plan.

Implications:

- PA is nine times normalized pension
- Accounting expense follows defined benefit rules, with potential application of onerous contribution provisions due to solvency funding requirements
- Transfer value is the economic value of the benefit.

At termination of employment prior to retirement age, employees have the option to transfer the commuted value of their accrued benefits out of the pension plan. Commuted values are highly dependent on market interest rates and, in a sense, fluctuations in the commuted value represent a market-related risk to plan members. However, these fluctuations are designed to preserve the economic value of the defined benefit and so they do not represent a risk from the perspective of retirement income security. Commuted values do not reflect the actual return on pension fund investments, and they are not routinely reported to employees.

With defined benefit accounting, shareholders and other stakeholders have access to information on the fair value of assets and liabilities, and so there is no sharing of risks between generations of owners. On the surface, there is no risk sharing between the employer and the employee or amongst the employees. The pension is a deferred wage and the costs and risks of providing the pension rest entirely on the employer.

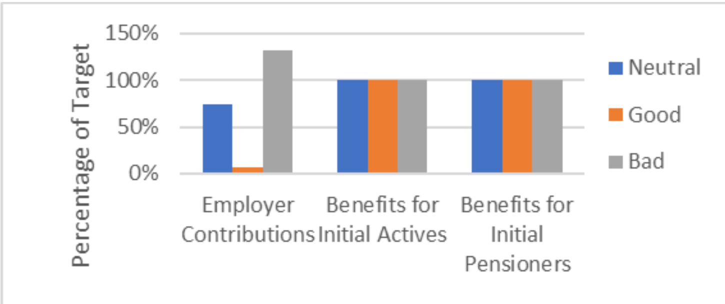
A pure defined benefit pension plan of the kind contemplated in this category may be more common in the United States and the United Kingdom than in Canada. Most Canadian defined benefit pension plans include elements of uncertainty as to whether the actual benefits will exceed or fall short of the benefit formula as a result of surplus distributions, defaults, ad hoc inflation protection and contribution refunds. For members of private sector defined benefit plans, benefit reductions due to bankruptcy of the sponsor's business could be as likely as benefit reductions in a New Brunswick SRPP.

This is not to say that members of pure defined benefit pension plans bear no risks.

- Typically, private sector pension plans are not indexed to inflation, and so the risk of declining purchasing power is borne entirely by individual plan members. Benefits may be linked to salary in the years prior to termination of employment or flat benefit rates may be renegotiated from time to time along with wages rates as a form of non-guaranteed pre-retirement inflation protection.
- Pension plans may include valuable early retirement subsidies but there is no guarantee that employment will continue until early retirement age. Loss of employment prior to retirement can pose a serious risk to retirement income security for members of private sector defined benefit pension plans.
- In some instances, early retirement benefits are only provided as an alternative to severance that would otherwise be payable by the employer (plant closure benefits, involuntary termination benefits, consent benefits, temporary early retirement windows) – shifting some of the risk and cost of unexpected loss of employment from the employer and individual employee to the pension fund.
- Amendments to the benefit formula can and do occur over time. If the plan becomes unaffordable, it can be terminated or benefit accruals can be reduced. While benefits cannot be reduced after they are earned, unvested early retirement benefits and the effect of future salary increases on benefits for past service can usually be curtailed (subject to the applicable laws and plan provisions).

4.6.1 Illustration of Defined Benefit

In a pure, non-contributory defined benefit pension plan, gains and losses are absorbed in fluctuations in employer contributions. Since there is an element of conservatism in the funding target, a neutral outcome produces reductions in contributions when the provisions for adverse deviations are unused.



4.7 Summary of Distinctions Between Plan Designs

The table below summarizes the ways in which pension plans differ.

Table 2
Characteristics of Pension Plans

	Defined Contribution	Asset Share	Specified Contribution, Target Benefit	Contribution Partnership	DB with Adjustments	Defined Benefit
Predefined benefit accrual rate	No	Possible	Yes	Yes	Yes	Yes
Reductions in benefit accruals permitted	Yes	Yes	Yes	No	No	No
Conditional improvements	Yes	Yes	Yes	Yes	Yes	No
Tax limits	DC	DC	DB	DB	DB	DB
PA basis	DC	DC	DC*	DC*	DB	DB
U.S. accounting	DC	DC	ME	ME or DB	DB	DB
Canadian & international accounting	DC	DC	DC	ME or DB	DB	DB
Transfer values	Account Balance	Account Balance	Going Concern	Economic Value†	Economic Value†	Economic Value
Wind-up benefit	Account Balance	Account Balance	Asset Share	Asset Share	Asset Share	Insured Benefit
Contribution target	Fixed	Fixed	Going Concern	Going Concern	Solvency	Solvency

Intergenerational risk sharing	No	No	Yes	Yes	Yes	No
Ability to amend (single employer)	Employer	Employer	Trustees	Legislator	Employer	Employer
Individual equity	Yes	Yes	No	No	No	No

* if SMEPP conditions are met.

† with potential adjustments for conditional indexation or contribution account balance.

Section 5: Possible Future Directions

5.1 Options for Publicly Traded Companies

The volatility and uncertainty of defined benefit pension accounting costs increases borrowing costs and reduces share prices for publicly traded companies.[47] Investors will penalize target benefit alternatives to money purchase pension plans and other capital accumulation plans unless they are governed by defined contribution accounting.

Most publicly traded companies are winding down their defined benefit pension plans and migrating to defined contribution pension plans or other types of capital accumulation plans.[48] Any risk-sharing plan design would be considered as an alternative to defined contribution, rather than an evolution of defined benefit.

Alternatives that might be considered unattractive include:

- Designs that require defined benefit accounting
- Multi-employer arrangements that involve portability or sharing of costs with competitors
- Arrangements that require variations by province because of unique funding and benefit rules.

If defined benefit risks are entertained at all, companies can be expected to take a financial economics approach to allocation and investment of shareholder risk capital. The human resource value would need to outweigh the resulting increase in the cost of capital. Transparent and fair valuation of any off-balance-sheet employee benefit liabilities and risks will be key.

A CDC pension plan could be attractive if it provides some of the following:

- Expected lifetime pensions comparable or superior to defined contribution

[47] Huang, L., and Lalani, M., Corporate Pension Risk Management and Corporate Finance: Bridging the Gap between Theory and Practice in Pension Risk Management, Society of Actuaries, August 2015. www.soa.org/globalassets/assets/Files/Research/Projects/research-2015-corporate-pension-risk-management.pdf

[48] Vettese, F., The Extinction of Defined Benefit Pension Plans Is Almost upon Us, *Globe and Mail*, October 2018. www.theglobeandmail.com/investing/personal-finance/retirement/article-the-extinction-of-defined-benefit-pension-plans-is-almost-upon-us/. With data from Statistics Canada Table 11010-0106-1 Registered Pension Plans (RPPs) active members and market value of assets by contributory status.

- Greater predictability of lifetime income for plan members
- Reduced correlation between retirement rates and stock market returns
- No greater risk of regulatory creep or class action claims than defined contribution
- Decrease or modest increase in administration cost and complexity
- Ability to adjust plan terms to maintain comparability with labour market competitors
- A unique value proposition that helps define corporate culture
- Mechanisms for facilitating involuntary termination, phased retirement and postponed retirement
- Incentives for retention of long-service employees who are receiving merit increases and incentives for retirement of long-service employees who are not receiving merit increases
- Practical disposition of pension obligations in corporate acquisitions and divestitures.

5.2 Options for Rate-Regulated Entities, Private Companies and Not-for-Profit Entities

Other private sector entities will be less averse to defined benefit accounting than publicly traded companies. They may be more averse to fluctuations in contribution requirements. Specified contribution, target benefit arrangements may be appealing.

5.3 Options for Public Sector Employers

Accounting issues may not be paramount in the selection of a pension risk-sharing deal. Many public sector employees are already covered by pension plans with risk-sharing features. For those who are not, or for public sector pension plans that are challenged by aging or declining membership, the full spectrum of options could be considered.

5.4 Conversion of Existing Benefits

A major challenge for adoption of new risk-sharing plan designs has been and will continue to be the conversion of existing benefits to the new plan. Without conversion, plan sponsors would need to operate two separate pension plans with different fundamental promises and risks for decades. The new plan would likely not have enough assets or plan members to effectively pool risks and investments.

For conversion of traditional defined benefits, the challenge is to remove guarantees from existing benefits, when the optimal shared risk investment policy would be no less risky than a traditional defined benefit approach and riskier than a liability-driven investing approach.

For conversion of traditional defined contribution accounts, the challenge is to remove individual investment choice and, in some cases, introduce mandatory risk-pooling features or target-based variations in contribution rates. Conversion to plans with account balances or asset shares will be easier to communicate.

Moving retirement benefits from one plan to another or changing pension plan deals in a way that has the potential for adverse outcomes is not a new problem. Examples of situations where this already occurs include:

- Moving administration of a defined contribution pension plan to a new custodian with a new suite of investment options
- Pension asset transfers and plan mergers involving pension plans with different funding levels and ancillary benefits
- Transfer of membership and defined benefit accruals to a new employer under a reciprocal transfer agreement
- Conversion of defined benefit pension plan accruals to defined contribution
- Adoption of reduced employer contributions under solvency relief measures
- Amendments to early retirement provisions or other aspects of defined benefit formulas that do not reduce the commuted value of termination benefits at the date of amendment but have the potential to provide smaller future benefits under some circumstances (adverse amendments).

Changes of this kind require communication, regulatory scrutiny and, in many instances, plan member consent. A spectrum of regulatory options has emerged:

- Communication of change to regulators and affected plan members prior to effective date
- Opportunity for members to comment on changes prior to regulatory approval
- Regulatory approval prior to effective date
- Consent of collective bargaining agent
- Rejection of change if a sufficient proportion of affected members object
- Rejection of change unless a significant proportion of members in each affected class proactively accepts the change
- Consent of members individually.

Aside from regulatory requirements (which are not consistent across jurisdictions), pension plan sponsors undertaking a change to the fundamental nature of the risk-sharing deal will adopt communication strategies intended to ensure affected plan members truly understand the implications of the change. These could include written communications, presentations, modeling software and personal consultations. Effective communication reduces fiduciary risks and increases the value of employment-based retirement plans.

The table below considers conversion of past service benefits from one category of risk sharing to another (or changes to risk-sharing arrangements within a category). It suggests some types of changes are relatively minor in terms of the new risks for plan members, and might proceed with a simple consent process, while others are so major as to warrant a more onerous consent process.

Of course, even a change of risk-sharing provisions within a category is an important change to the plan members' rights, requiring careful consideration by stakeholders and regulators. To say it is minor merely suggests that it might proceed without extensive member engagement in the decision-making process and without providing members with the opportunity to opt out on an individual basis.

Table 3
Complexity of Conversion between Risk-Sharing Plans

		Risk-Sharing Provision Prior to Conversion					
		DC	Asset Share	Specified Contribution, Target Benefit	Contribution Partnership	DB with Adjustments	DB
Risk-Sharing Provision After Conversion	DC	n/a	Minor	Major	Major	Major*	Major*
	Asset Share	Minor	Moderate	Moderate	Major	Major	Major
	Specified Contribution, Target Benefit	Major	Major	Moderate	Moderate	Moderate	Major
	Contribution Partnership	Major	Major	Minor	Minor	Moderate	Moderate†
	DB with Adjustments	Major	Major	Minor	Minor	Moderate	Moderate
	DB	Major	Major	Minor	Minor	Moderate	n/a

* There have been many conversions from defined benefit to defined contribution. With rare exception, regulators will not permit conversion of past service without individual member consent.
† New Brunswick public sector defined benefit plans were converted to shared risk plans without individual member consent.

5.5 Curtailment and Wind-up

As noted in the Introduction, it is unreasonable to expect pension plans to survive for centuries, or even for the entire working and retired lifetime of a typical individual. A robust risk-sharing arrangement should be sustainable through long-term changes in financial market conditions but will still require modification or replacement for other reasons. Industries and employers come and go, and employment patterns change. In the private sector, ownership of an enterprise can pass from one corporation to another several times over the course of a single employee's career. Anticipating plan curtailments, amendments and wind-ups is important.

What are the consequences for funding and benefits? Does over-maturity pose unmanageable risks? At what stage should a wind-up be triggered? Not surprisingly, a pattern emerges with similar challenges and outcomes for all types of pension plans within each risk-sharing category. These outcomes are summarized in the table below.

Table 4
Wind-up and Curtailment of Pension Plans with Risk Sharing

	Employer Funding Obligation on Wind-up	Defining Benefit on Wind-up	Plan Continuation without Active Members	Reducing Amendments
DC	None	Account balance	Possible	Never
Asset Share	None	Account balance	Tontine	Never
Specified Contribution Target Benefit	None	Funded portion of target benefit	Tontine	Per plan terms
Contribution Partnership	Possibly	Funded portion of target benefit	Impossible	Only on wind-up
DB with Supplements	Usually	Annuity or commuted value	Possible	Federally regulated distressed plans only
DB	Yes	Annuity or commuted value	Possible	Never

In plans at the defined contribution end of the spectrum, a reducing amendment would be one that reduces a member's account balance, whereas at the defined benefit end of the spectrum, a reducing amendment would be one that reduces the member's accrued pension.

5.6 Areas for Further Research

- What are the effects of alternate pension deals on surviving spouses, beneficiaries, transferred members and suspended members?
- What challenges do risk-sharing arrangements create for division of pension benefits on marriage breakdown?
- Will well-designed risk-sharing arrangements still lead to contributions that exceed the risk-free value of accruing benefits or perpetual contribution holidays?
- How have risk-shared pension plans been dealt with in mergers and acquisitions?
- What challenges do risk-sharing arrangements create for reciprocal agreements?

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