



Article from

Retirement 20/20 Papers

June 2018

Finding the Optimal Pension Plan for Public Sector Workers: A Mix of DB and DC Pension Elements

Robert L. Brown, Ph.D., FSA, ACAS, FCIA, HONFIA

Stephen A. Eadie, FSA, FCIA

Executive Summary

Defined benefit (DB) pension plans are under pressure in the public sector, as they have been in the private sector. In some instances, benefits are being reduced. In other cases, DB plans are being replaced by defined contribution (DC) or individual account (e.g., IRA) plans. Apparently, government sponsors of DB plans have concluded that they are no longer affordable.

In many private-sector workplaces, DB plans are being eliminated, leaving individual employees to solve the financial security in retirement problem alone or through expensive individual services.

At the same time, two stock market meltdowns in less than a decade have exposed to everyone the frailties of the current go-to alternatives: DC plans and individual account plans.

This paper explores a new pension paradigm that uses the best elements of current DB and DC plans to the benefit of the participating parties, while minimizing their worst elements. The goal is to provide a retirement solution that recognizes the likely needs and skill sets of all stakeholders in a reasonable future marketplace.

The proposed model is best described as a pooled target benefit pension plan (PTBPP). The paper shows that such plans would retain many of the best features of existing multiemployer pension plans. PTBPPs also have much in common with the best of the TIAA-CREF plans that are used in the education sector in the United States as well as other successful pension plans from around the world.

For the employer, a PTBPP is a DC plan. The employer is not directly responsible for plan governance, administration, or investments. The employer's responsibilities essentially end

when the agreed-upon contribution is made. The contribution may be changed from time to time but only with the employer's agreement. The assets and liabilities of the PTBPP do not form part of the employer's accounts. The employer simply expenses actual employer contributions made to the PTBPP on an ongoing basis.

For the employee, a PTBPP would establish target benefits that are defined by selected actuarial formulae. The employee would share risks (e.g., investment and longevity) with other plan members. Plan participants would receive regular updates for their expected retirement benefits. The participants would be able to better place their pension benefits in the context of their overall retirement plan and determine what, if any, need exists for supplementary personal savings. These updates would also remind participants that benefits are not guaranteed and would help them adjust their plans before it is too late.

A third party would manage the PTBPP assets and liabilities with representation on the board of this third-party manager reserved for the employers, employees and pensioners who have a direct interest in the plan. The board would encourage all stakeholders to select representatives with pension expertise (as opposed to constituency representation).

The relationship between the PTBPP total contribution rate (employer and employee combined) and target benefit(s) would be managed on an ongoing basis using slightly conservative actuarial projections of the current assets and future expected contributions, asset returns, benefits and expenses. In particular, in setting the initial contribution rate, the actuary would have to run a series of simulations and show that there is an agreed-upon chance (e.g., 90% or better) that the intended contribution rate would, in fact, support the benefits being targeted. Further, besides the normal funding requirements, the plan could establish a provision for adverse deviations that would imply a safety margin for the funding of the plan. The level of the required PfAD would depend on the risk profile of the plan (e.g., intended investment portfolio). This PfAD could be returned to the plan sponsor in case the plan were to close in a surplus position.

The paper also advocates creating large asset pools for all pension participants. Clearly, size matters. Larger plans can run at lower per-unit expense ratios and can also achieve entry into a wider variety of investment opportunities not available to a smaller plan.

Larger funds can also be used to manage some of the underlying liability risks through the benefit of the law of large numbers. Large funds can be especially important when managing a plan member's longevity risk during the payout phase.

Investment mandates and payout methods would be established to reflect the needs of the particular PTBPP and its members and pensioners. Member communication prior to retirement would focus on the relationship between target benefits and the contributions needed to support those targets. After retirement, dedicated pensioner assets would be pooled to share investment and longevity risks fairly among the pensioners.

Any good experience would be used to improve the benefits of the affected member using protocols set in advance. Any bad experience would be used to reduce benefits. There will be risks, but sharing risks among a large number of members should provide an acceptable result for everyone. No one will outlive their savings!

The end result is that the employee in a DC plan today would move from an “I don’t really know what to expect,” to a solid “I expect to be financially secure in retirement,” expectation. For those in existing DB plans, the worker would accept some measurable risk in terms of variance in investment results and cohort longevity. But this would be preferable to moving to an individual account DC world.

Inherent in the concept are that all smaller plans (DB, DC and even individual accounts) should commingle their assets to achieve size. This will provide better opportunities for efficient investment mandates to be established and will allow appropriate, and statistically sound, pooling of assets for pensioners during the payout stage.

The concept will also require a shifting of expectations away from the personalization of pension plans for each employer to each employer agreeing to work within well-established PTBPP plan parameters. An employer joins the PTBPP and accepts the PTBPP plan rules.

A PTBPP could be established to support a short array of potential target benefits that the employer, and then the employees, could prioritize. Ultimately, the employee controls the benefits being targeted and the total contributions being made to support the employee’s personal benefit targets.

1. Introduction

It is becoming increasingly difficult for employees to achieve financial security in their retirement. There are several reasons for this.

First, many employers have backed away from sponsoring workplace defined benefit (DB) pension plans. They find that with increased longevity, low rates of investment return and accounting for liabilities on a mark-to-market basis, these plans have become extremely costly. They are also worried about managing the volatility of these costs as the returns on investments and the cost of settling liabilities have become ever more volatile over the past two decades. This has led to volatile funding costs.

In response, they have followed one of three paths. They have substituted formal defined contribution (DC) plans for their now defunct DB plans; they have set up administrative systems that allow their employees to participate in individual retirement savings schemes through payroll deductions, sometimes with incentive employer contributions, and with

lower costs than available to an individual in the open market (e.g., IRAs and 401(k)s); or they have just left the provision of retirement income to the individual employee with no pension plan sponsorship or participation of any kind. Many employers have changed their approach from “We will look after your retirement income,” to “You are on your own.” Not because they wanted to change, but because they believed they had no choice.

At the other end of the current retirement security spectrum, existing DC plans and individual retirement savings schemes are facing two challenging trends. First, individual life expectancy is rising. Thus more money is expected to be needed to provide the same monthly benefit over a longer life. Second, rates of investment return are down and more volatile, meaning that less money is accumulated in one’s capital accumulation account unless contributions are increased and there is more uncertainty surrounding the level of contributions that will be needed to provide the same benefit.

In addition, members of DC plans or individual savings schemes are only now coming to realize one of the biggest hurdles associated with these plans. Once they reach retirement age they have two choices: purchase an expensive annuity to guarantee their monthly income for their lifetime, or continue to actively manage their assets and pay themselves an income until they die. These are not optimal choices.

Do we really expect a 90-year-old to be able to manage their retirement income well? Or an 80-year-old? Or for that matter, most 65-year-olds? Will the popular press pension story 10 years from now be our failure to provide the baby boom pensioners with the necessary tools to manage their retirement income?

In the workplace, it is now clear that the days when employers viewed a DB pension as a necessary human resource investment are gone. At the same time, the financial crisis of 2008–2009 has demonstrated again the potential frailty of saving for retirement in a DC world. Employers do want good pension products, just not the current single-employer designed and administered DB plan. They feel forced to provide a DC plan or nothing at all.

Employers and taxpayers want better pension plans that remove the burden of pension risks from them. They are happy to pay for pensions as part of the total compensation package, just not over and over again. Both employers and employees want a pension plan that provides reasonable benefit targets that are managed well for them.

What this paper does is propose a new pension model that reduces the known risk and then shares the remaining risk more appropriately between sponsors/taxpayers and employees and provides both sides of the pension contract with most of the advantages of both a DB and a DC pension world. In this paper, we define risk as the failed delivery of a member’s targeted retirement benefits.

2. Traditional Pension Designs

For workplace pensions, two plan designs have traditionally been used to provide retirement income security. Those systems are defined benefit and defined contribution. Each has its own advantages and disadvantages that will now be reviewed.

2.1 A Traditional DB Plan

A traditional defined benefit (DB) plan is a pension plan under which an employee receives a set monthly pension upon retirement, guaranteed for life or the joint lives of the member and the member's spouse. This pension may or may not include a cost-of-living increase each year during retirement. The monthly pension is determined based on a formula that normally reflects the participant's years of service, age at retirement and, often, the highest (or final) average earnings over a specified number of years at retirement. Some DB plans use a formula that does not reflect the participant's salary, but the formula does generally reflect earnings, at least indirectly.

In a traditional DB plan, almost all of the recognized pension risks are carried by the plan sponsor. For public sector plans, this is ultimately the taxpayer. Risks associated with sponsoring a pension plan have historically been:

1. Investment risk
2. Expense risk
3. Inflation risk (if the benefit is inflation protected)
4. Interest rate risk (if the payout is annuitized or settled in a lump sum)
5. Longevity risk (if the payout is not annuitized)

In more recent years, accounting and valuation risks have been added to the plan sponsor. Employees will argue that all of the resultant costs are ultimately borne by the employees through their total compensation package. This paper will not take a position on this issue.

It will be the position of the paper that, regardless of who ultimately pays the bill, it is the plan sponsor (often after negotiations with the unions) who decides whether the plan will be DB or DC or whether there will be a plan at all. What is not debatable is that if the employer decides to sponsor a DB plan, then the plan sponsor must accept the consequences of and manage the traditional risks.

In the early days of pension plans, workplace DB pension sponsors were able to offer significant benefits, but faced a relatively low actual cost. This was true because vesting periods were long, indexation of benefits was rare and pension funding requirements allowed for the use of discount rates that reflected the full equity "risk" premium plus a number of averaging mechanisms, in determining the funding status. A mark-to-market requirement was not even contemplated.

With the introduction of many pension benefits acts in the 1970s (e.g., ERISA), vesting periods were shortened. With the high inflation rates of the late 1970s and early 1980s, more public sector employees bargained for inflation protection (cost of living adjustments), both before and after retirement.

During the 1990s, plan sponsors were able to continue to promise generous retirement benefits while incurring relatively small costs because of the very high real investment returns experienced during that decade. But since 1999, we have experienced two equity market meltdowns, leading to much higher actual pension contribution levels. We have also experienced an inexorable decline in market interest rates, leading to an increase in market liability valuations. This has resulted in both higher DB plan costs and a higher volatility of DB plan costs. Today, this is being exacerbated by evidence of increasing life expectancy. Add to that the fact that over the last few decades, accounting rules have pushed for mark-to-market valuations with no smoothing and a liability discount rate that reflects a costly immunized investment portfolio.

These factors and the continuing maturation of pension systems (the increasing ratio of retirees to contributors) have all had their part in raising the cost of pensions today. Perhaps more important, the volatility of contribution rates has been raised significantly (regulatory changes have also generally accelerated the timing of minimum contributions required to be made today rather than down-the-road). Low interest rates and recent market experience have also exacerbated this volatility. Thus many plan sponsors have decided or have been forced to conclude that they can no longer afford the vagaries of the full DB promise.

Further, traditional DB plans provide less than full portability of accrued benefits because of the method used to calculate termination benefits. For example, the financial cost to an employee leaving a typical final average DB plan midway through his or her career could represent a loss of benefit accruals of as much as 45% relative to a continuing plan member with similar career earnings.

Finally, if a DB plan sponsor goes bankrupt when the plan is not fully prefunded, the plan participants could face severe reductions in their pension benefits. Legally, they stand last in line, except for minimum contributions that are already due at the date of termination, behind other creditors in terms of being compensated out of any remaining corporate assets.

2.2 A Traditional DC Plan

This section includes both employer-sponsored DC pension plans and individual account systems (e.g., 401(k) plans and IRAs).

Under a traditional DC plan, the plan sponsor sets a contribution level, selects investment options for the plan members and monitors the results. Often the link between contribution levels and expected benefits is not managed.

Under a traditional DC plan, the employee carries all of the traditional pension risks listed in the previous section, except the accounting risk. If experience is bad, the member must accept a lower retirement benefit. The employer is not required to make additional contributions to make up for bad experience.

Clearly, an individual employee is not capable of managing these risks. While many of the risks can be mitigated by the employer or pension plan provider to a certain extent, we would argue that most cannot be avoided in totality or can only be avoided at an unreasonable cost under a traditional DC plan.

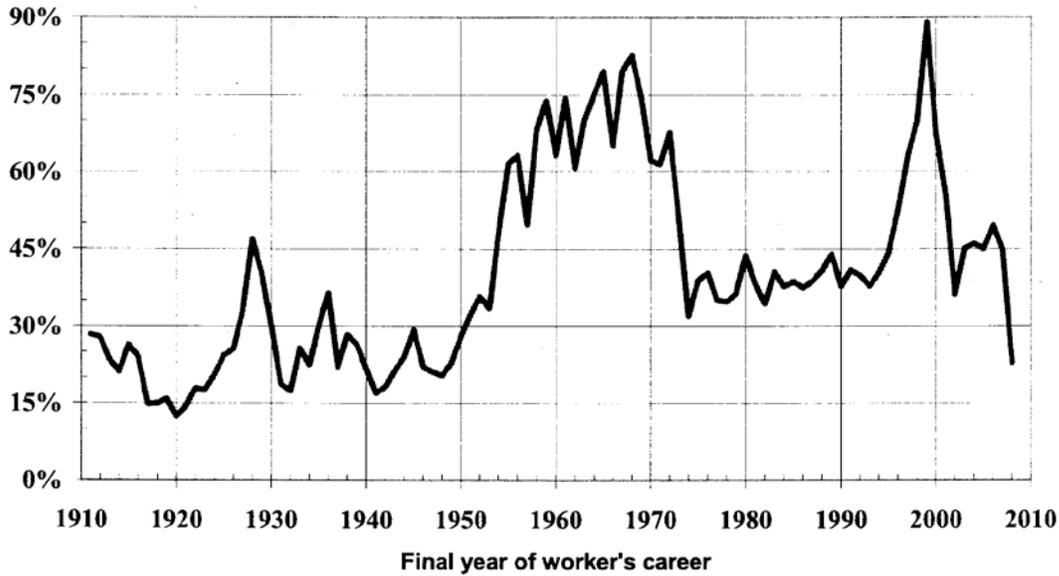
An individual pensioner has less hope of managing these risks well but is often left to his own devices under a traditional DC plan. That is, the pensioner is sent on his way at retirement and no longer has the benefit of the DC plan sponsor's support, as limited as that may be.

The combined preretirement investment and interest rate risk, which is the responsibility of the individual employee under a DC plan, is illustrated nicely in Figure 1.

Figure 1.

Replacement rate obtained from personal account savings of workers who invest solely in stocks and contribute 4% of annual salary over a 40-year career

Replacement rate
(Annuity / Final wage)



Source: Burtless, G. July 2009. *Lessons of the Financial Crisis for the Design of National Pension Systems*. CESIFO Working Paper No. 2735, p. 12. Reprinted by permission of Gary Burtless.

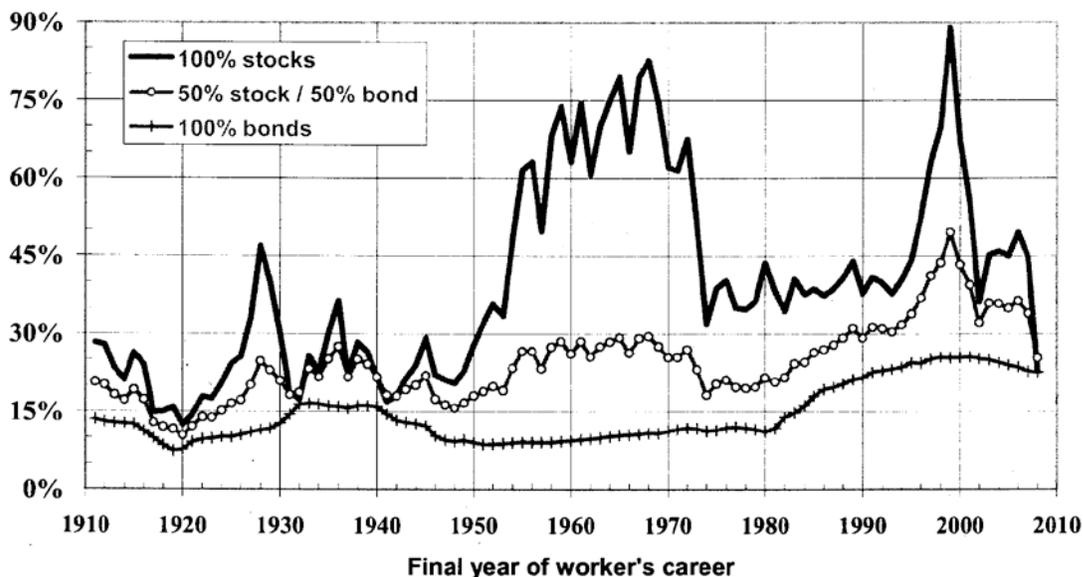
Clearly, the employee can decrease the investment risk by choosing less volatile investments such as government bonds. While it is true that the volatility decreases markedly, so too do the replacement rates as seen in Figure 2.

Figure 2.

Replacement rate obtained from personal account savings of workers who invest in alternative portfolios and contribute 4% of annual salary over a 40-year career

Replacement rate

(Annuity / Final wage)



Source: Burtless, G. July 2009. *Lessons of the Financial Crisis for the Design of National Pension Systems*. CESIFO Working Paper No. 2735, p. 16. Reprinted by permission of Gary Burtless.

Another lesson can be learned from Figure 2. A career employee is best served by investing 100% in stocks at all but the end dates. It is never better to invest 100% in bonds or even to invest 50%/50% in stocks and bonds. While Figure 2 ends in 2009, similar outperformance through a 100% stock strategy has continued.

In all fairness, programs do exist to mitigate the investment risk. For example, we have investigated a strategy where a member invests 100% in stocks and then transitions these investments into long bonds during the last ten years of working life (transition 1/10 entering the 10th year, 1/9 entering the 9th year, etc.). This member would have a higher expected and less volatile replacement ratio than the member using the 100% stock investment strategy.

In the real world, employees tend not to shift their investment portfolio mix as they approach retirement—even though the literature tells us that one should move out of a strong equity portfolio to more of a bond portfolio as one nears retirement (life-cycle investing). This is seldom actually seen when individual employees manage their investment affairs (see Munnell et al., 2013). Thus many (most) individual account holders

lost 20% to 30% of their equity investment values between the summer of 2008 and the spring of 2009. Work by the OECD (Antolin, 2009) indicated that the market crash of 2008 could have led to a drop in replacement ratios of almost 10 percentage points. For example, an individual in the United States lucky enough to have reached retirement age 65 in 2007 would have enjoyed a replacement ratio equal to 24%, while the unlucky individual reaching age 65 at the end of 2008 would have achieved a replacement ratio of only 15% (assuming defined contributions of 5% over 40 years and a fixed portfolio of 40% domestic government bonds and 60% in domestic equities).

Towers Watson maintains a Defined Contribution Retirement Age Index, which uses market performance to calculate the age at which an average middle-income employee paying into a DC plan can retire with sufficient asset value to pay for a life annuity guaranteeing an average rate of income replacement. It shows that the level of benefits an employee who retired at age 60 in 2007 could expect to receive would, by 2012, take an employee until age 68 to achieve because of lower investment returns (Towers Watson, 2012).

There are some new investment products being made available to the individual investor that use life-cycle investment strategies. While a step in the right direction, many individual investors do not select the life-cycle investments, many of the investment procedures underlying the funds are overly conservative and in many instances, the life-cycle funds are just too expensive.

The employer/sponsor may suggest a number of investment options, but research has shown that members do not select well. They tend to be overly risk averse. (Interestingly, the more options that are provided, the higher the probability that the employee will choose the default option [Antolin, Payet & Yermo, 2010]). Such an approach can also add significantly to the real costs of the DC plan.

Or the employee may hire an investment advisor if one is not provided through the DC plan. In a way, however, this only shifts the investment risk over to the expense risk (actually it may “lock in” higher expenses) and may not reduce the investment risk at all. Individuals can easily lose up to 3% of their gross rate of return to the investment advisor or fund manager (referred to as the management expense ratio, or MER). If funds earn in the neighborhood of 5% per annum and inflation runs close to 2% (not unusual assumptions for today), then such an employee is actually receiving effectively no real rate of return at all.

If that isn't frightening, we have completed calculations that indicate a 1% annual reduction in investment return or equivalently, an increase in investment expenses, will result in a reduction in a career member's account balance at retirement of about 20% to 25%. That will result in 20% to 25% reduction in lifetime benefits, all else being equal.

On a macroeconomic basis, one result of this investment risk or volatility is that DC plans produce countercyclic retirement patterns. That is, when the economy and as such the capital markets are weak and we would like employees to retire (to ease unemployment, control expenses or allow for succession), employees will have deflated DC asset values that will force them to work longer. Similarly, when times are good and DC balances high, employees will choose to retire just when we need them for an expanding labor force.

A second major risk for a DC individual account participant is longevity. If the employee does not buy an annuity at retirement, effectively, they must self-annuitize. That is, they must determine a program of income withdrawal that is optimal for them. Depending on their desire to leave a bequest (which we ignore here), they will want to take out the maximum income possible without creating the threat of outliving their assets. That is a lot to ask. Who knows their life expectancy? And covering your estimated life expectancy is not enough. One would be wise to cover one's life expectancy plus at least one standard deviation. So if employees want to be sure that they will not outlive their assets, they must make very conservative withdrawals. That means they live at a lower standard of living than is probably necessary.

If they take more aggressive withdrawals, then they increase the probability of outliving their assets and thus becoming dependent on friends and family, or on government programs for their continued consumption. This should be a concern to taxpayers who will pay for those welfare benefits. This also creates intergenerational inequities as most government welfare schemes are pay-as-you-go.

The employee can mitigate the longevity risk by buying a life annuity upon retirement. However, this again raises the expense risk as insurance companies must operate in a for-profit context. Further, many employees cannot get a true market-value annuity in today's marketplace. That is because insurers assume that if a worker voluntarily applies to purchase an annuity, then that person must be in five-star health and the annuity is priced accordingly. Very few employees have five-star life expectancy, but they get painted with the one-size-fits-all brush. Annuities can be a cost-effective method for protecting benefits, but not necessarily for all employees. Purchasing an annuity also leaves the employee open to the interest-rate risk on the day of purchase.

Finally, it is very difficult to get an annuity that provides true inflation protection. One can buy variable annuities whose payouts move with market values, but market values do not correlate well with inflation. Or one can buy an annuity where the annual payout increases according to a set (constant) inflation factor, but this is far from true inflation protection (and of course, this feature greatly decreases the initial monthly payout). Inflation protection is a worthy social goal, one that individual account DC plans cannot cost-effectively achieve.

In total, the traditional DC plan creates more problems than solutions. You do not provide retirement income security just by saving for retirement.

3. Pooling of Assets Matters

One of the problems with individual account DC plans, in achieving retirement income security, is the fact that one individual is attempting to mitigate many of the retirement income risks alone. Many advantages can come from having a larger asset pool, either by being part of a very large employment group or by allowing smaller pension funds (including capital accumulation accounts held by individuals) to commingle their assets. Not only can you achieve savings in the expense of administration and management, but there are also investment opportunities that exist for large funds that do not accrue to smaller funds (e.g., private placements).

Work by K. Ambachtsheer (2007), displayed in Table 1, shows how important plan size is with respect to the investment expense.

Table 1. Investment Fees by Size of Pension Fund

<u>Size of Pension Fund</u>	<u>Investment Fees for Large-Cap Equities</u>
Individual account	250–300 basis points
\$10 million	60 basis points
\$1 billion	42 basis points
\$10 billion	28–35 basis points

Source: Ambachtsheer, Keith. 2007. *Pension Revolution: A Solution to the Pensions Crisis*. Hoboken, New Jersey: Wiley and Sons Inc. Copyright © 2007 Keith Ambachtsheer. Reprinted by permission.

Table 2 tracks the impact of investment expense ratios and shows how profoundly they can affect the aggregate pension benefits and working income replacement ratios of retired plan members. The data assume an annual contribution to a plan of \$10,000 over 40 years for an employee making \$50,000 per year.

Table 2. Impact of Investment Expense Ratios on Pension Adequacy

Expense Ratio	0%	0.4%	1.5%	3%	5%
Accumulated value (after 40 years)	\$777,000	\$707,000	\$551,000	\$400,000	\$272,000
Annual pension payout	\$45,000	\$41,000	\$32,000	\$23,000	\$16,000
Replacement ratio	90%	82%	64%	46%	32%

Source: Ambachtsheer, Keith. 2007. *Pension Revolution: A Solution to the Pensions Crisis*. Hoboken, New Jersey: Wiley and Sons Inc. Copyright © 2007 Keith Ambachtsheer. Reprinted by permission.

In a separate study, Munnell et al. (2013) found that: “fees have a significant effect on how much an individual will have at retirement. An additional 100 basis points over a 40-year period reduces final assets by about one fifth.”

A study for New York City employees found that it would be 57% to 61% more expensive to deliver the same benefits under a DC plan using individual accounts than it would with the existing DB plans (Fornia, 2011, as quoted in Brown & McInnes, 2014).

In a 2015, Munnell et al. analyzed data comparing returns by plan type from 1990–2012 (U.S. Department of Labor). During this period, DB plans outperformed 401(k)s by an average of 0.7% per year, even after controlling for plan size and asset allocation. In addition, much of the money accumulated in 401(k) plans was eventually rolled over into IRAs, which earn even lower returns. One reason for the lower returns in 401(k) plans and IRAs is higher fees, which should be a major concern, as they can sharply reduce a saver’s nest egg over time.

In particular, larger plans, when professionally managed, achieve greater efficiency and effectiveness as compared to DC plans that are made up of individual accounts and can thus deliver any given level of benefit at a lower cost. That is, larger plans squeeze the most benefits from a given level of contributions. Clearly, the harder the money works, the easier it is for everyone involved.

Collectively managing investments will provide an expense advantage. Of that there is no doubt. Collectively managing investments will also result in better investment management and therefore better investment returns.

A 2011 Texas study that looked at the ramifications of converting public sector DB plans to

DC plans found that in any DC plan with a self-directed component (e.g., members select their investments from a menu), just 8% of members would do better in retirement than under the existing DB plan and 92% would do worse. Two-thirds would do significantly worse, receiving 60% or less of the current DB benefit.

Robertson Eadie & Associates conducted an independent study in Canada that compared the investment returns obtained by individual investors in a DC plan that provided the members with investment choice against those obtained by a pension committee that collectively managed the investment process on behalf of all of its DC plan members using the same investment techniques and mandate as were used for an existing DB plan that was also being managed by the committee. The collective plan obtained a 96th percentile rating. That is, only 4% of the individual DC plan investors beat the collective result. Further, this result was before investment expenses were considered. The collective result was better than all individual results studied, after investment expenses were deducted. Individuals just don't manage their investments well and certainly not as well as professionally managed collective funds.

In Canada, approximately 75% of every public sector DB pension dollar of benefits comes from investment returns—a testament to the sound funding and best in-class investing of the pension funds (i.e., only 25% of benefits come from contributions) (Brown and McInnes, 2014). Net, after expense, investment return matters. It matters a lot.

Further, if a commingled fund is established to pay out retirement income, then a large collective plan has the advantage of pooling the longevity risk resulting in more control of this very manageable risk.

To illustrate this concept, consider a 65-year-old male who is just about to retire with a retirement account of \$500,000. This member has two main choices in the current market place. He can buy an annuity from an insurance company, or he can continue to invest on his own and pay himself an income. If we analyze the continue-to-invest alternative, we must ask, "How much should he pay himself?"

Using a mortality assumption that is currently mandated in Canada for pension actuaries, we determined that this 65-year-old individual can expect to live for about 21.6 years (i.e., to age 86.6). The cost of an annuity certain with an annual income of \$10,000 is \$164,400 using an annual discount rate of 3% per annum. That is, an investment of \$164,400 would allow a 65-year-old male to pay himself \$10,000 a year from now until age 86.6. The \$10,000 each year would be adjusted to reflect actual investment income (i.e., if the member earned 4% in one year his future payments could be increased by 1%).

Therefore, this member could start to pay himself about \$30,400 per year in retirement income (using the \$500,000 fund), and he could expect reasonable increases over time to

help with inflation because he expects to earn investment returns that are better than 3% per annum.

This seems like a good strategy until you consider that only about 8% of all 65-year-old males are expected to actually die within one year of age 86.6, using the same mortality table. For most members, this is a lose-lose proposition. They either die too young (and have given up income during their shorter actual life span) or they run out of money. Most individuals, and certainly most professional advisors, concentrate on the “run out of money” side of this dilemma. Instead of planning to pay yourself for your expected lifetime, advisors recommend that you plan to pay yourself to some higher age. It is quite common to consider age 90 as a cutoff point.

- If our 65-year-old male member sets his target to pay himself until age 90, two things result. First, he must lower his income from \$30,400 to about \$28,900, a 6% drop. He also reduces the probability of outliving his savings from 50% to about 40%, which may not be enough for his comfort.
- If instead, he wants to give himself only a 10% probability of outliving his savings, then he must plan to pay himself to age 96. This will cause a reduction in his starting income from \$30,400 to about \$25,000, a 22% drop in income. Of course, this member will expect to have a larger estate 90% of the time!

None of these options seem all that appropriate.

- If instead, the 65-year old male takes his \$500,000 to an insurance company to purchase a lifetime annuity, then he can expect to receive a lifetime income (adjusted for inflation) of no more than \$25,000, if he can obtain this annuity at all.

Again, not appropriate.

- If, however, the 65-year-old male and 10,000 similar individuals agree to deposit their \$500,000 into a collective fund that earns a 3% real rate of return, and agree to start their income at \$30,400, then the probability of the fund going bankrupt (i.e., not making a scheduled payment to any of the 10,000 individuals), is virtually zero.

To an individual in the collective group, there is no risk of outliving the funds and the individual does not have to accept a lower income. The trade-off is that the individual does not use any of the funds to provide an estate. There are no payments to anyone’s estate.

Further, if we consider a collective where a similar number of individuals join each year (e.g., 400 new pensioners each year), then once the collective reaches its steady state, only about 10% of the members would be more than 90 years old and 2% to 3% would be 95 years or older. If the original longevity estimate is off a little, there is a very large group to

support the additional payments being made to a very small group. Improved future longevity can be reflected slowly over time without putting the entire collective at risk. If experienced life expectancy is lower than expected, everyone can benefit through increased payments.

As is evident, many savings can be provided under a pooled pension arrangement. One study found that:

- Longevity risk pooling (knowing the average longevity) in a DB plan saves 15%
- Maintenance of a balanced highly diversified portfolio in a DB plan saves 5%
- A DB plan's superior investment returns, after expenses, save 26% as compared with a typical individual account DC Plan (Almeida & Fortia, 2008)

Brown and McInnes (2014) looked at the impact of these 46% savings on a model DB plan. Starting with an assumption that the plan earns 6.5% gross, they modeled an individual account DC plan as earning 3.5% (46% less). The DB plan used in the analysis was a fairly typical Canadian public sector plan with employer (taxpayer) contributions of 12.5% matched by 12.5% contributions from the employee/participants. If investment returns dropped by 46% from 6.5% to 3.5%, these matched contribution rates would have to rise to 22.5% (a 77% increase) to provide equal benefits. Instead of investment returns paying 75% of the benefits, they would pay only 55% of the benefits. A large "best-practices" pooled DC plan (an example being the U.S. Thrift Savings Plans for federal civil servants and uniformed services) would lie somewhere in between. If the motivation for a conversion to DC is to reduce costs, then it should be noted that shifting to DC actually increases the cost of delivering a comparable pension benefit without the pooling of assets.

4. Finding Middle Ground

If we accept that neither a pure DB nor a pure DC plan is optimal for the future, can we find an innovative pension plan design that might maximize the advantages of these two traditional systems for public sector plans?

Our search is for a plan design suited to the 21st century that is neither pure DB nor pure DC. Our goal is to find a combination of the two designs that uses some elements of each to maximum advantage.

5. Examples of Target Benefit Plans: Are Multiemployer Pension Plans DB or DC?

A multiemployer pension plan (MEPP) is an employee benefit plan maintained under one or more collective bargaining agreements to which more than one employer contributes. These collective bargaining agreements typically involve one or more local unions that are

part of the same national or international labor union and more than one employer. Normally, the plan sponsor is a joint board of trustees consisting of equal representation from labor and management; these trustees are responsible for the overall operation and administration of the plan. The board of trustees is generally the “named fiduciary” and allocates or delegates the administrative functions to persons or entities with expertise regarding the particular function.

MEPPs provide benefit security for participants and beneficiaries through pooling of risk and economies of scale for employees in a unionized workforce covered by the plan. They also provide portability of certain benefits and eligibility for those employees who move from employer to employer within the industry covered by the plan. As a result, multiemployer plans often enable coverage accruals to be transferred from employer to employer or job to job, thus avoiding interruptions in coverage that would apply without this portability.

MEPPs also help employers with a union workforce in the affected area and industry by making available coverages on a more economical basis due to a pooling of risk and economies of scale.

MEPPs are often found in industries and geographic areas where several employers are covered by collective bargaining agreements with one or more participating local unions and covered members could work for several of those employers during their career. Examples of these industries include construction, arts and entertainment, retail stores, transportation, service (including lodging and health care workers), mining, and communication.

Many jurisdictions regulate MEPPs as DB plans. However, they are funded by fixed, collectively bargained contributions (Shilton, 2007, p. 2). Typically, the benefit formula for an MEPP is the total number of hours worked in the industry for participating employers multiplied by a flat rate. Contribution levels are negotiated at the collective bargaining table and are fixed for the life of the particular collective agreement.

With defined benefits funded by fixed contributions, funding shortfalls are always a possibility, and accordingly such plans normally permit the trustees to amend the plan to reduce benefits when necessary: not just future benefits but also *accrued* benefits. *All* MEPPs established under collective or trust agreements are exempt from the prohibition against reducing accrued benefits. Thus the benefits are target benefits to which one can attach an expectation but not a guarantee. Because benefits are not guaranteed but can be reduced, MEPPs pay lower contributions to the Pension Benefits Guarantee Corporation.

With respect to the actuarial valuation of such plans, the plan actuary is required to:

- Perform such tests as will demonstrate the sufficiency of the contributions required by the collective agreement to provide for the benefits set out in the plan without consideration of any provision for reduction of benefits set out in the plan.
- Where the contributions are not sufficient to provide the benefits under the plan, propose options available to the administrator of the plan that will have the result that the required contributions will be sufficient to provide the benefits under the plan.

If the actuary finds an insufficiency and proposes options, the actuary is required to inform the plan's administrator. The onus then falls on the plan administrator to advise the regulator of what action will be taken to meet the funding requirements within the Pension Benefits Act (PBA).

Finally, under the PBA, the minimum content requirements for the annual statement to members must include a statement that the pension benefits are not guaranteed and a statement that if, on windup of the plan, the assets of the plan are not sufficient to meet the liabilities of the plan, pension benefits may be reduced.

Thus all MEPPs participants are in pension plans that have an expectation of defined benefits for the employee, but are clearly DC plans for the employer(s).

6. Are Jointly Sponsored Pension Plans the Solution?

In Canada, some of the largest public sector pension plans are now jointly sponsored pension plans (JSPP), the largest being OMERS (Ontario Municipal Employees Retirement System) with 230,000 active members. Other large MEPPs are the Ontario Teachers Pension Plan (OTPP), and the Hospitals of Ontario Pension Plan (HOOPP) (Shilton, 2007, p. 9).

A JSPP has many of the elements of a traditional MEPP but with a few important differences.

- The most important difference is that a JSPP may be sponsored by a single employer.
- JSPPs also have separate regulations from MEPPs in most jurisdictions, which can affect the plan's funding rules and insolvency rules.
- Many JSPPs also are able to retain separate plan rules for benefits accrued prior to the plan becoming a JSPP. For example, many JSPPs do not allow the so-called prior benefits (benefits accrued prior to the plan becoming jointly sponsored) to be reduced except upon a plan windup.
- Similar to an MEPP, a JSPP must be jointly sponsored and the typical JSPP board has representation for both employers and employees.

- Unlike MEPPs, JSPPs are not just provided to unionized workforces. Many provide benefits based on years of service and highest average earnings close to retirement.
- JSPPs tend to be very large and provide opportunity to benefit from efficiencies associated with size and are able to provide efficient pooling of benefits for their members.
- JSPPs work especially well when the members have common interests and have similar working lifetimes. A homogenous member group is often the key to their success.

In many ways, a JSPP meets all of the requirements we would impose on an ideal pension plan for both today and for tomorrow. Some of the most efficient plans are JSPPs.

There are two major reasons why the current JSPP model needs to be adjusted if it is to be more commonly adopted in the marketplace:

1. It would be very difficult to find many employee groups that are sufficiently homogenous. This matters, because the benefits formula used for a typical JSPP inherently assume that one size fits all and that a single benefit formula will meet all of the members needs in much the same fashion. For example, the Ontario Teachers Plan works very well, in part, because all of its members were teachers and have similar needs and expectations.
2. JSPPs are not completely efficient. We say this because they do not separate the needs of their pensioners from their working members. As a result, we believe that they are needlessly inefficient. For example, if a JSPP separated the assets supporting its pensioners from the assets supporting its working members, there would have to be a rethink of their underlying investment policies and procedures.

This separation of pensioners from working members would result in more efficient investment strategies and more efficient administration, and would remove the potential subsidization of one generation by another.

7. Searching for the Pension Holy Grail

In describing a new pension paradigm, this paper proposes a system of mitigating pension risks for the public sector that is present in almost none of the traditional DB or DC systems. In this regard, some pension systems available today provide the employee with little more than a faint hope of retirement income security. We would include in this category many existing individual account DC and 401(k) or IRA plans with contribution rates that are just too low to result in retirement income security.

At the other extreme, many pension plans present the plan participant with a benefit promise that appears to be guaranteed. Such plans in existence today are virtually all in the public sector and thus ultimately supported by taxpayers. They are often DB plans with full

inflation protection in retirement. To say that these plans will fail is equivalent to suggesting that the government will fail.

In this paper, we intend to move beyond hope, but not as far as guaranteed pensions—toward something one might refer to as a justifiable expectation. Obviously, regardless of what plan an employee/sponsor has today, our hybrid plan will mean some gains and losses for both sides. It is the hope of the authors of this paper that these gains and losses will balance out or be so small in total as to be acceptable to all participants.

Our end-point will be a plan that can be described as a pooled target benefit pension plan (PTBPP). The pooled characteristic of this family of plans results from plan assets and liabilities being heavily commingled with assets from other plans with the intent of reaping the benefits of size and the opportunities of pooling. The intent is to target an asset portfolio of \$10B or more, although many of the pooling ideas will provide benefits to much smaller pension plans that are designed as described in this section. Large existing plans with assets in excess of \$10B would not have to seek any commingling.

The plan would be governed and administered by an independent third party. The board for this third party would have appropriate representation from all stakeholders, and in particular, from sponsoring employers, covered employees and pensioners. The board would encourage all stakeholders to select individuals with pension expertise. As a result, we would expect that most of the elected representatives would be experts in pension governance, administration or investments. We believe that this is critical to ensure that the administration is streamlined and that both the member benefits and investments are coordinated well. The board will be the management board.

This independent management board of pension and governance experts will make major decisions as to the governance of the fund and will liaise with the investment manager(s). They will also decide on any adjustment of benefits. The board must be independent of plan sponsors, employees, pensioners, internal and external service providers, government and investment managers.

We suggest that representation for the pensioners on the management board is an important part of the good governance of the plan. Pensioner interests and employee interests are not always aligned, just as employee interests in a pension plan are not always aligned with employer interests. This is so important, in fact, that we could see the need for approval of the board to rest with the supervisory authority.

Plan assets for employees and pensioners should be managed separately and would have different investment policies and goals. There should be automatic transition procedures to move employee assets from the fund established on behalf of the employees to the fund(s) established on behalf of the pensioners during payout.

We believe it is important to separate the investment of employee funds from pensioner funds because the investment horizon and other investment goals are so different during a member's working age and during an employee's subsequent retirement. For example, the investment horizon for the employee's fund would be very long term, resulting in an investment mandate that would be very heavily weighted toward equity investments (if not exclusively invested in equity investments). Such an approach would not be suitable for any fund(s) held for the pensioners.

The third party would be responsible for all governance, administration and investment activities. Employers and members would join because they want the services offered in this plan. The plan is a defined management plan.

The plan would allow any employer to join as a participating employer. In essence, we would open the plan to any employer who reports taxable income for an employee or partner. The employer would determine the employer contribution rates for its employees. Additional member contributions would be allowed.

The plan would convert any member funds at payout commencement to a benefit stream using well-publicized (i.e., transparent) methods and assumptions. The same rules would apply to every member starting any particular benefit payout.

The third-party administrator would establish benefit targets for all members and payout strategies for the member to select from. Given that the members of this plan could have very different retirement goals, we believe it would be prudent to offer some payout options.

Member payments from some of the payout funds could be managed using a variable annuity technique that is used for some U.S. qualified plans. Under this technique, the plan establishes a hurdle rate and any investment returns that differ from the hurdle rate are used to adjust member payments each year. For example, if the hurdle rate is 4% per annum and actual returns for a year are 6%, then all members participating in this payout scheme would receive a 2% increase in benefits.

This approach could be altered by introducing the concept of a hurdle annuity. The hurdle annuity would be used to determine the pension adjustment each year rather than the hurdle rate. In this way, each member participates in the actual longevity experience of the group, as well as the investment experience. We would be managing both investment and longevity risk. Of course, this approach requires that the funds set aside for this payout benefit be separate and distinct from any other plan assets (e.g., the plan assets held for members currently active at work).

Other payout funds could be made available that would provide some guarantees or could provide an access to investments that are more volatile for members who were high

earners, at their discretion. Some benefits could be temporary, and some could be provided without inflation protection.

One risk that has not been mentioned to date is the inflation risk. It is the proposition of this paper that the contribution required to fund the target benefit or expected benefit would be determined using slightly conservative actuarial assumptions. If rates of return exceed those assumed in the actuarial projections, this would create room for benefit improvements. One benefit improvement would be to upgrade the earnings profile of the participant preretirement so as to move the plan from one replicating an updated career average plan to one more closely paralleling a final average plan.

As set out earlier, a second improvement that would take place postretirement would be to use any excess earnings to index benefits to inflation. Clearly, there is no guarantee that true CPI-indexed benefits will necessarily result. However, this plan would move indexation from a hope to an expectation. (This is very similar to how the national pension system in the Netherlands works.) This targeted nature of the COLA is now becoming the norm in many provincial and municipal public sector pension plans in Canada.

The plan assets can be managed in the private sector or by an *arms-length* government-sponsored investment board similar to the Canada Pension Plan Investment Board (CPPIB). Note that the investment board might be government sponsored, but it would not be government controlled or even government influenced (again similar to the existing CPPIB). Nor would it be controlled by any single plan sponsor.

What is important is that *total* management expense fees should be capped at, for example, 40 basis points (i.e., < 0.40%). A plan of this nature should be able to achieve this goal easily. This is a very important requirement.

Having a commingled asset portfolio does not mean that all participant plans need to be identical. The participant plans can have differing contribution rates and differing benefit targets (e.g., 2% final average versus \$1,000 per year of service). Only the assets are commingled and the actual pensions managed together once in payment mode.

For the plan sponsor, this new PTBPP is a DC plan. For existing DB sponsors, this will release them from a huge amount of responsibility inherent in a classic DB plan.

The initial target benefit could be based on some agreed-upon earnings replacement objective. The required contribution rate would be set accordingly, assuming, for example, 35 years of contributions and using slightly conservative actuarial assumptions. The actual benefit earned would, of course, depend on the age of the participant at entry. In particular, in setting the initial contribution rate, the actuary would have to run a series of simulations and show that there is an agreed-upon chance (e.g., 90% or better) that the intended contribution rate would, in fact, support the benefits being targeted. Further, besides the

normal funding requirements, the plan would have to establish a provision for adverse deviations that would imply a safety margin for the funding of the plan. The level of the required PfAD would depend on the risk profile of the plan (e.g., intended investment portfolio). This PfAD could be returned to the plan sponsor in case the plan were to close in a surplus position.

The plan administrator would provide the member information about his benefit targets, how well it is funded and what level of future contributions are required to reach the targets. This information would be provided regularly throughout the member's career.

Antolin (2009) indicates that a contribution rate of 5% would provide a replacement ratio of 25.3%, while a contribution rate of 10% would double that to 50.7%. Equivalently, a 1% increase in the contribution rate would raise the replacement rate 5 percentage points, *ceteris paribus*. (This assumes 40 years of contributions and a fixed portfolio of 40% domestic government bonds and 60% domestic equities.) Better management and the resulting efficiencies should allow this plan to achieve these targets or more.

Since plan participants will receive regular updates on their expected retirement benefits, the members will be able to better place their pension benefits in the context of their overall retirement plan, and determine what, if any, need exists for supplementary personal savings. These updates will also remind participants that benefits are not guaranteed and will help them adjust their plans before it is too late.

One should not expect *any* of these plans to exist with low employer/employee contributions (e.g., < 5% of pay). In fact, it would be more likely to anticipate employer/employee contributions of at least 10%. Employees are expected to contribute.

For some sponsors who, today, have pure, traditional DC plans, this may mean a significant uptick in the contribution rate to achieve meaningful target benefits.

For some plan sponsors, this plan design might be viewed as a small loss in that they no longer have the right to unilaterally control the investment of the funds. For the plan participant, this should be viewed as an improvement over a traditional employer-sponsored pension plan where participants often have little to no say in the management of the fund.

This new plan will result in huge improvements for the plan participants who are now in a traditional DC plan. No longer will the plan participant have the responsibility for the investment of funds. This will be done by the arms-length independent investment manager(s), either internal or external, reporting to the management board.

These PTBPPs should also enhance the retirement income security of employees who change jobs often (i.e., portability). Because we are accruing a DC account toward a target

benefit, moving from one employer to another should not have as serious an impact on a member's ultimate pension as it can today in a DB plan. Further, because employees change jobs more often than they change careers, it is quite conceivable that even with a job change, the employee may still be in the same commingled pension fund.

And as discussed earlier, if the plan sponsor should go bankrupt, there will be no loss to the plan participants. This is a DC plan. Plan contributions are made as earnings are paid. By definition, the plan is always fully funded. Workers do not have to worry about ending up at the back of the line in bankruptcy court.

Clearly, the investment risk is now that of a huge commingled asset portfolio. The expense ratio for its management should be forced to be less than 40 basis points (although we would target lower) either through pension regulation or legislation, thus alleviating the expense risk.

Asset values will go up and down, but should not have a full or immediate impact on the benefit schedule. However, benefit reductions are possible. A variable annuity approach with sound investment strategies will help manage this process.

The plan can manage the payout of benefits, and the plan can carry the investment risk in a more collective manner. The authors view this as being parallel to the systems used by the TIAA-CREF institution. If insurance for a particular payout scheme is required for any reason, the plan will be able to obtain that insurance at better rates than those available to individuals.

No longer will the individual employee/participant be expected to have the ability or resources to manage investment risks, to manage longevity risk or to create personal retirement security programs. For that matter, neither will their employer.

Conclusion

Some societal benefit provisions require a collective delivery system to mitigate the given risks. One example is the achievement of retirement income security. For this to be achieved, the optimal model is based on a collective approach.

This paper has explained in detail a new pension paradigm that lies between the traditional DB and traditional DC models and is called a pooled target benefit pension plan (PTBPP). The PTBPP attempts to achieve a more equitable mitigation and sharing of risk than now exists in traditional DB or traditional DC plans and attempts to retain the advantages of both traditional delivery mechanisms.

Workers should be able to be convinced that if facing a move from a traditional DB plan to an individual account DC plan, a PTBPP is a far preferable alternative. What is needed now

is the political will to see that small, but absolutely necessary, changes are made to legislation, regulations and tax rules to allow for this optimal model.

References

- Almeida, B., and W. B. Forna. 2008. A better bang for the buck: The economic efficiencies of defined benefit pension plans. Washington, DC: National Institute on Retirement Security, <https://www.nirsonline.org/wp-content/uploads/2008/08/Bang-for-the-Buck-Report.pdf> (accessed April 29, 2018).
- Ambachtsheer, Keith. 2008. The Canada supplementary pension plan (CSPP): Towards an adequate, affordable pension for *all* Canadians. *C. D. Howe Institute Commentary*, No. 265, https://www.cdhowe.org/sites/default/files/attachments/research_papers/mixed/commentary_265.pdf (accessed April 29, 2018).
- Ambachtsheer, Keith. 2007. *Pension Revolution: A Solution to the Pensions Crisis*. Hoboken, New Jersey: Wiley and Sons Inc.
- Ambachtsheer, Keith, and Rob Bauer. 2007. Losing ground: Do Canadian mutual funds produce fair value for their customers? *Canadian Investment Review*. March 1. <http://www.benefitscanada.com/investments/asset-classes/losing-ground-9477> (accessed April 29, 2018).
- Antolin, P. 2009. Private pensions and the financial crisis: How to ensure adequate retirement income from DC pension plans. *Financial Market Trends*, no. 2.
- Antolin, P., S. Payet, and J. Yermo. 2010. Assessing default investment strategies in defined contribution pension plans, *OECD Working Papers on Finance, Insurance and Private Pensions*, no. 2, OECD Publishing. doi: 10.1787/5kmdbx1nhfnp-en.
- Brown, R. and C. McInnes. Shifting public sector DB plans to DC: The experience so far and implications for Canada. *OPTrust*, October 2014, <https://www.optrust.com/documents/DB-vs-DC-plans-research-paper.pdf> (accessed April 25, 2018).
- Burtless, G. (2009). *Lessons of the financial crisis for the design of national pension systems*. CESIFO Working Paper No. 2735, July.
- Forna, William B. 2011. *A Better Bang for NYC's Buck: A Efficiency Comparison of Defined Benefit and Defined Contribution Retirement Savings Plans*. New York: New York City Comptroller's Office, Budget and Policy Bureau.
- Munnell, A.H., A. Webb, & F. M. Vitagliano. 2013. *Will regulations to reduce IRA fees work?* Boston College: Center for Retirement Research, IB#13-2.

Munnell, A. H., J. P. Aubry, and C. V. Crawford. 2015. *Investment returns: Defined benefit vs. defined contribution plans*. Boston College: Center for Retirement Research, IB#15-21.

Shilton, E. Current issues concerning multi-employer pension plans in Ontario. A research report prepared for the Ontario Expert Commission on Pensions, 2007.

Texas Teacher Retirement System of Texas. 2011. *Pension benefit design study*. Report to legislature, Teacher Retirement System of Texas.

Towers Watson. 2012. "DC Pension Index" shows prospect of "Freedom 68," increases focus on personal finances. Press release, December 6, Toronto: Towers Watson, <https://www.towerswatson.com/en/Press/2012/12/towers-watson-dc-pension-index-shows-prospect-of-freedom-sixty-eight-increases-focus-on> (accessed April 29, 2018).

Robert L. Brown, Ph.D., FSA, ACAS, FCIA, HONFIA, is past president of the Canadian Institute of Actuaries (CAS), the Society of Actuaries (SOA) and the International Actuarial Association (IAA). He can be reached at rlbrown1949@gmail.com.

Stephen A. Eadie, FSA, FCIA, is CEO and UDP for ICPP Funds Ltd. and is involved in promoting the Ideal Canadian Pension Plan. He can be reached at seadie@re-a.com.