COMMENTARY
NO. 347

Winners and Losers: The Inequities within Government-Sector, Defined-Benefit Pension Plans

Defined-benefit pension plans in the public sector reward winners who have high salary-growth rates—such as deputy ministers – at the expense of workers with lower earnings growth rates—such as clerks, bus drivers and postal workers. Why the losers and the public should care.

Geoffrey Young

The Institute's Commitment to Quality

About The Author

Geoffrey Young
is a principal at *Discovery Economic Consulting*. He is a city council member in Victoria, B.C. and is chair of the regional (county) board. He has worked within the federal, Alberta and British Columbia governments.

C.D. Howe Institute publications undergo rigorous external review by academics and independent experts drawn from the public and private sectors.

The Institute's peer review process ensures the quality, integrity and objectivity of its policy research. The Institute will not publish any study that, in its view, fails to meet the standards of the review process. The Institute requires that its authors publicly disclose any actual or potential conflicts of interest of which they are aware.

In its mission to educate and foster debate on essential public policy issues, the C.D. Howe Institute provides nonpartisan policy advice to interested parties on a non-exclusive basis. The Institute will not endorse any political party, elected official, candidate for elected office, or interest group.

As a registered Canadian charity, the C.D. Howe Institute as a matter of course accepts donations from individuals, private and public organizations, charitable foundations and others, by way of general and project support. The Institute will not accept any donation that stipulates a predetermined result or policy stance or otherwise inhibits its independence, or that of its staff and authors, in pursuing scholarly activities or disseminating research results.

Finn Poschmann
Vice-President, Research

The Study In Brief

There are little-acknowledged yet striking inequities built into the payout formulas of defined-benefit (DB) pension plans, which are typically provided to government employees across Canada. This *Commentary* illustrates various ways that plan formulas can produce redistribution of retirement income among members and recommends potential reforms.

An analysis of representative DB plans shows they systematically transfer income away from groups of employees in occupations with slow wage growth to employees in occupations or careers with higher wage growth rates; this often means from low-income clerks to high-income deputy ministers. The winners are "high-flying" employees who are likely to enjoy pensions that exceed the value of the accumulated employee and employer contributions in their "accounts" at retirement, while the losers are those who would be better off if they simply received the value of their contributions plus interest rather than rely on future payments from a discounted pension.

There are other problems with these DB plans: they potentially discourage movement of workers between the private and public sectors, waste human potential by encouraging the early retirement of those who might wish to continue to work if faced with the true costs and benefits of their decision, and bias plans toward underfunding and, hence, further demands for inputs of public funds. The public should be concerned.

However, public-sector DB plans could be redesigned to retain much of their appealing certainty and efficiency without redistributing retirement income among members to the extent that they now do. Change could begin with three components of the formulas:

(1) Magic number formulas and minimum service requirements that provide long-service employees with early retirement benefits not given to late arrivers could be modified.

(2) The earnings base for DB formulas, usually the best five years of non-indexed earnings, could be extended to 10, 15 or more years, or indeed to the full career average.

(3) Plans that provide a "free" benefit for the surviving spouses of plan members could gradually reduce the free component of the survivor benefit (as Nova Scotia has recently done), leaving the married to purchase their survivor benefits with an actuarial reduction in their initial pension, as is required in western Canadian public service plans.

If formula changes allow employees to work longer by enabling them to choose their retirement age without fear of sacrificing benefits they have paid for, all employees can benefit.

Most Canadians are familiar with Registered Retirement Savings Plans (RRSPs) as a means of saving for retirement. An individual can use savings within an RRSP to purchase an annuity on retirement that has a discounted present value (over the pensioner's life expectancy) equal to the accumulated value of his or her contributions to the RRSP. Management costs and market interest rates will, of course, affect both the RRSP's accumulated value and the annuity payout.

Defined-contribution (DC) pension plans work essentially the same way as RRSPs. The employer may make contributions on behalf of the individual plan member in addition to, or in place of, the member's contributions, but pension payouts still depend on the accumulation of contributions and investment returns over many years and on the estimated cost of providing for the plan member's pension over his or her life expectancy at retirement. Essentially, each DC plan member's annual pension entitlement will be set such that its discounted present value at retirement is equal to the value of the employee account, which consists of the accumulated value of the contributions made by, or on behalf of, the employee. As with an RRSP, market interest rates as well as the cost of administering invested funds and pensions will affect pension amounts.

A defined-benefit (DB) plan is very different. DB pensions – in Canada, most frequently found in the public sector[1] – are typically determined by a formula that is based on the employee's length of service and annual earnings. Neither the individual employee's accumulated contributions nor the employee's life expectancy at retirement affects the pension payments directly. A typical pension formula pays 2 percent of earnings per year of service, falling to a lower amount after age 65 to offset expected income from the Canada Pension Plan (CPP).

In a DB plan, employee contributions and service to be counted are usually limited to a maximum of 35 years, corresponding to a pension income of about 70 percent of the employee's earnings while employed. Earnings, in turn, are usually defined as the average over the five highest-salaried years of service. The pension is often guaranteed for a minimum of five or 10 years, even if the pensioner dies before then.

Employees with many years of service might be eligible for a DB pension under this formula as early as 55, while employees with only a few years

1 DB pension plans are losing ground in the private sector, but they are still almost universal for federal, provincial and local government employees and teachers in Canada (Gougeon 2009).

of service (or who have left government service before reaching retirement age) might be eligible at age 60 or 65. Those drawing pensions earlier than the prescribed age suffer a pension reduction of 3 to 5 percent for each year they are short of the retirement age requirement. Often, however, a retiree satisfying a "magic number" (age plus years of service) of perhaps 85 or 90 can draw a pension without penalty. DB pensions are usually fully or partially indexed to inflation.

In Canada, government DB plans are funded by employee contributions deducted as a percentage of salary and by employer contributions that are usually also at a set percentage. Many of the provincial plans have multiple employer members – public agencies, school boards, or municipalities, for example – and the employer contribution rate allocates pension costs to these individual employers. Although DB plans, unlike RRSPs, do not maintain separate accounts for individual participants, the amount within the plan's investment fund that is attributable to each employee can easily be calculated, provided the employer contribution is in the form of a percentage of employee earnings and the return on plan investments is known. In this way, one could estimate "accounts" within a DB plan that are the same as the amounts the employees would have in personal RRSPs, had both employee and employer contributions instead been paid into each employee's RRSP (assuming the RRSP earned the same return as the plan fund, net of administrative costs).

In a stable, fully funded DB plan, the sum of the discounted value of all future member pensions must be equal to the sum of all of the employee "accounts" just as in a DC plan the discounted value at retirement of each individual employee's expected pension is necessarily equal to the value of his or her account in the fund. In a DB plan, however, the value of an individual employee account is generally not equal to the value of the individual's pension. DB members, instead, receive a pension based on the plan formula, so that some members will draw pensions that are greater in discounted value than the value of their "accounts," while others will

necessarily draw pensions that fall short of the value of their accounts.

This *Commentary* illustrates various ways that plan formulas may produce redistribution of retirement income among DB plan members. For example, plan formulas tend to favour those who retire early with fast-growing earnings toward the end of their career and disadvantage those who spend only a portion of their career within a plan. The impact of plan formulas is not always apparent and participants may not be fully aware of the extent to which pension wealth is transferred among plan members.

Transfers of pension income among DB plan members also should be of public concern if pension formulas discourage workers from moving between the private and public sectors, if they waste human capital by encouraging early retirement of those who would have continued working if faced with the true costs and benefits of their decision, or if the formulas make more probable funding deficiencies that sponsors – taxpayers in the case of public sector plans – will have to fill.

The discussion that follows is restricted to stable pension plans that are fully funded by employee contributions and by employer contributions that are tied to employee earnings (we return later to the question of how close most DB plans are to this description). We have disregarded issues that arise with plans that are underfunded, that are partially supported by general contributions paid by the employer to cover shortages, or that change contribution rates over time.

Who are Winners and Losers under Defined-Benefit Plans?

Within stable contribution-funded DB plans, it is useful to observe which employees are likely to enjoy pensions that exceed the value of the accumulated contributions in their "accounts" at retirement – call them "winners" – and which are the pension losers who would be better off if they simply received the value of their accounts.

Figure 1: Pension Value, Account Value and Net Pension Value by Age for Employee entering Plan at Age 25
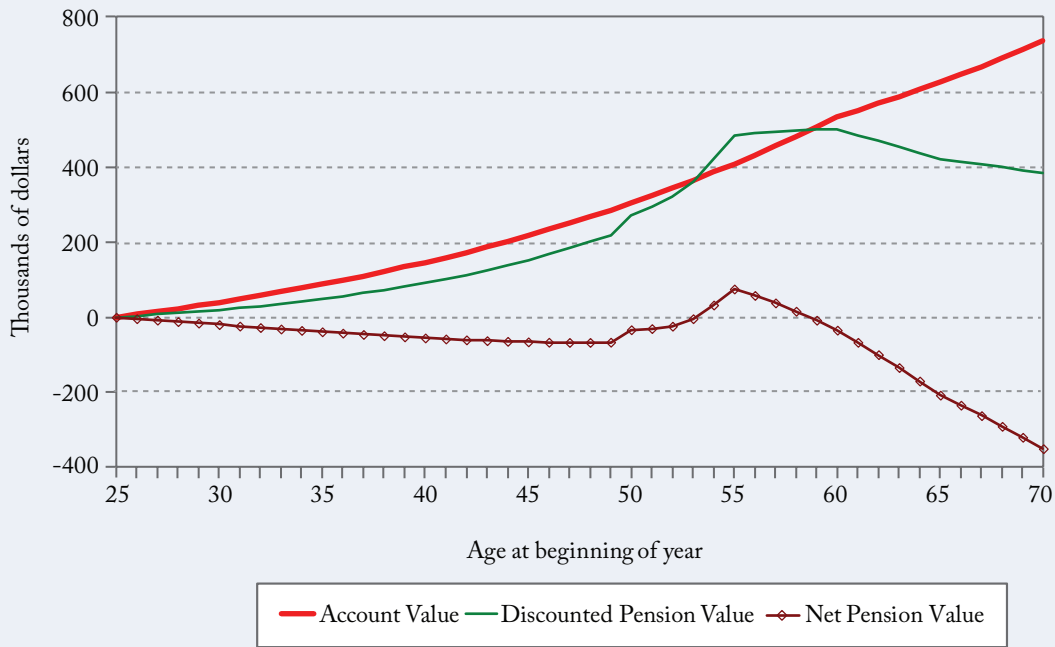
Note: Male working under B.C. Public Service Pension Plan, 2011.
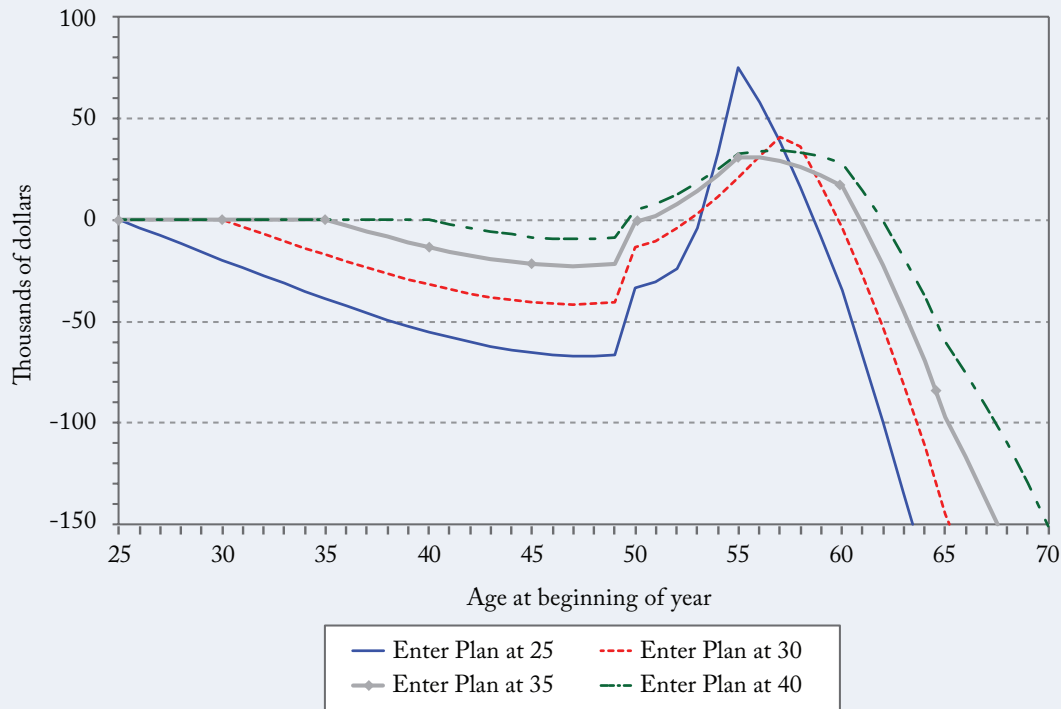Source: See Box 1.

Winners Pick the Best Time to Retire

For most plan members, particularly for those with long service, the surest way to be a winner is to retire at the right age, which is usually early.[2] Figure 1 shows the accumulated account of employee and employer contributions each year for a man who starts work at age 25 under the B.C. Public Service plan, a typical DB plan similar to those described above, with a magic number of 85. The graph assumes current employee and employer contribution rates will continue over the career of the employee, who is assumed to earn $50,000 per year at age 40, with real earnings increasing at $500 per year (we assume no inflation).

The graph also shows the *discounted pension value* earned to each year, defined as the sum of discounted expected future pension payments, were the individual to quit work at that age (drawing the pension at 55 if he quits before then). Finally, the graph shows the *net pension value* (the value of the pension less the employee's account) at each age. As can be seen, in this instance an employee who retires between the ages of 53 and 58 is a winner – the value of his future pension payments exceeds the value of his accumulated account. He becomes a loser if he works too long, or quits too soon.

2   Pesando (1988) discusses the retirement incentives and disincentives created at different ages under typical "final earnings" DB plans. Schirle (2008) provides examples of the best time to retire for a number of DB plans.

Figure 2: Net Pension Value by Age for Employee Entering Plan at 25, 30, 35 and 40

Note: Males working under B.C. Public Service Pension Plan, 2011.
Source: See Box 1.

Figure 2 shows the net pension value for the same employee, and also shows the net pension value for a man who has started work under the plan at ages 30, 35 or 40. As can be seen, the net pension value tends to be less dependent on retirement age for those who start work later. However, even an employee who enters the plan only at 40 becomes a loser if he works past 62.

My calculations of accumulated account values and discounted pension values are based on assumptions about mortality, inflation, wage inflation, investment returns and interest rates, CPP levels, etc., that are described in Box 1. All values depend on these assumptions, but the general comparisons shown here and in subsequent tables are likely to apply to a wide range of DB plans.

Employees with Fast-Growing Earnings are Winners

The value of a typical DB pension plan to an employee, relative to the value of her contribution account, is greater the faster her wages have grown over the course of her career. Pensions are more valuable for employees with higher wage-growth rates because most DB plans determine pensions by salary only during the highest-paid, usually the last five years of employment.

An example is shown in Figure 3, again for the B.C. Public Service plan. The graph shows the total pension value at age 60 for male plan members whose salaries have been growing at different rates. For this graph, we assume all employees have total

Box 1: Notes on the Calculations

For all graphs and the examples in the Box 2, I have used the current pension formulas (including magic numbers, early-retirement penalty rates and conditions) and employer and employee contribution rates for the noted plans, assuming the pension is taken in the normal form converted to a single life pension using estimated conversion factors. Information on the plans can be found on the web site pensionsbc.ca. I assume no inflation and constant CPP yearly maximum pensionable earnings. I discount future payments at 3.25 percent and accumulate accounts at the same interest return rather than at actual historic returns. I use Canada life tables provided by Statistics Canada in "Life Tables, Canada, Provinces and Territories, 2000-2002 (Catalogue 84-537-XIE)" for the noted gender. All calculations neglect management and administrative costs, survivor benefits and insurance paid to those dying before pension payments begin, and the value of non-wage benefits attached to pensions.

Figures 1 and 2 value the pensions and accumulated funds at the date of ceasing work under the plan. Figure 4 values pensions at age 55 and assumes the pensioner working from age 25 survives to 55 and draws her pension then.

lifetime earnings of $1.7 million over a 34-year career from 26 to 60 as their salaries grow by an equal dollar amount each year – we again assume no inflation. All have earnings of $50,000 per year at the midpoint of their careers, but those with a 1 percent wage growth rate (measured as a percentage of mid-career salary) have earnings that rise from about $42,000 at age 26 to $58,000 in the last year of work, while those with a 3 percent mid-career growth rate have earnings that rise from about $25,000 at age 26 to $75,000 as they near 60. As the graph shows, the value of a pension is much higher for a given level of total career earnings when the growth rate is higher and earnings are concentrated near the end of a career. [3]

The graph also shows the accumulated value of the sample employees' accounts (employer and employee contributions at current rates, with interest) upon retirement at age 60. Given

identical lifetime earnings the accumulated value of the contribution accounts for employees with slower wage growth is greater than for those with faster growing earnings, since those with slow-growing earnings make a greater proportion of their contributions in early years and their contribution accounts accumulate more interest before retirement. [4]

Thus, for given lifetime earnings employees with slow-growing earnings are more likely to be pension losers, both because at retirement their pensions are worth less, and because their contribution accounts are worth more than those of employees with faster growing earnings.

Career wages grow faster in some Careers

Predictably, an individual who follows a successful professional career stream in the public service,

---

3   See Box 1 for other assumptions.
4   This is true even though lifetime contributions in this example are slightly higher for higher salary growth rates (although lifetime earnings are the same in all cases), because contribution rates for this plan (as for many plans) are higher for earnings above the CPP maximum pensionable earnings.

Figure 3: Value of Pension and Contributions at Retirement by Rate of Growth of Salary
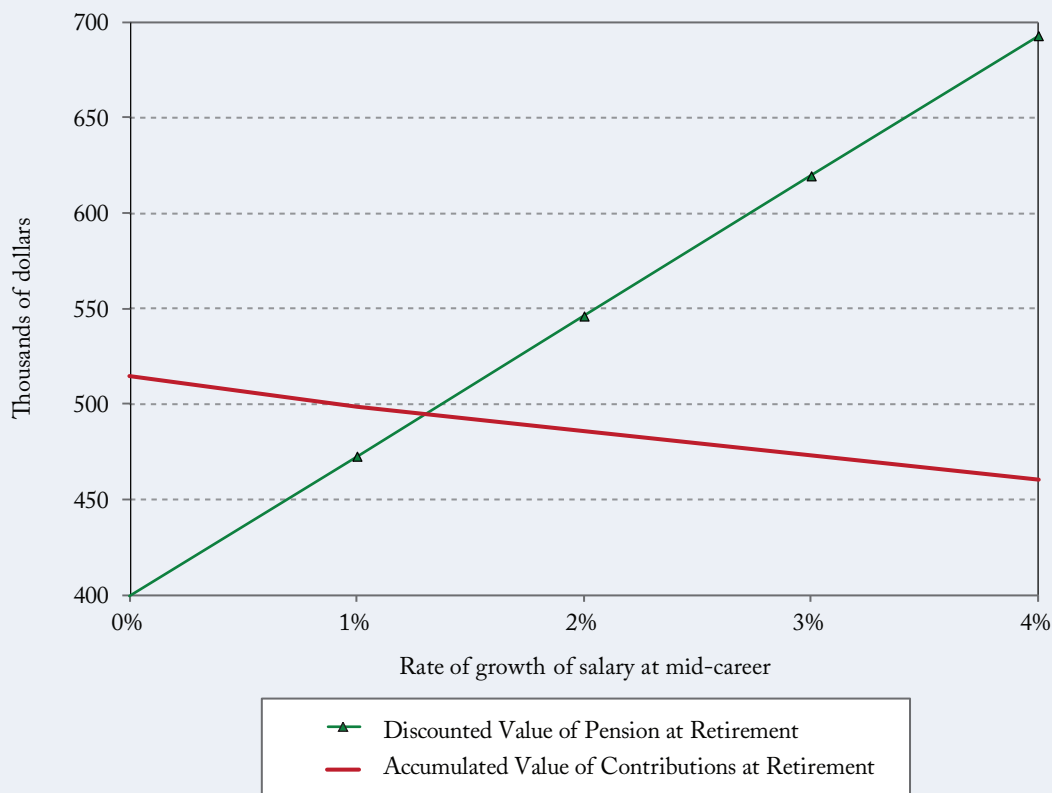
Note: Males working 26 to 60 under B.C. Public Service Plan, lifetime earnings $1.7 million.
Source: See Box 1.

entering as a low-earning professional and reaching high administrative rank, is likely to be a winner under a DB plan, while a person who enters as clerical staff and progresses only to higher clerical levels is likely to be a loser. Thus, a person advancing in the B.C. public service from the lowest levels of clerk stenographer to the highest might have earnings growing at about 0.75 percent per year

over the course of a 35-year career. Similarly, a career homecare aide (personal support worker) who receives only seniority increases may have lifetime earnings growth of only 0.25 percent annually. In contrast, a person advancing from lowest level of economist to assistant deputy minister might experience earnings growing of 3 percent per year.[5]

---

5   These growth rates are based on earnings levels published in the BCGEU/BC Public Service salary grid and in the HEABC agreement found on the BCGEU website, www.bcgeu.ca. Information on ADM salaries comes from the B.C. Public Service Agency. Growth rates are expressed (for consistency with other growth rates shown in the *Commentary*) as the dollar increase each year (assumed to be constant in this case) as a percentage of the midpoint value of earnings over a 35-year career. All growth rates are based on earnings for a single year and thus omit inflationary wage growth over time.

In rewarding individuals with high salary-growth rates, the plans also systematically transfer income away from groups of employees in occupations with low wage-growth patterns to employees in occupations with higher growth rates. Some occupation groups have few opportunities for advancement and receive few seniority-based wage increases, so that an individual's career wage growth – leaving aside wage inflation – is likely to be very low. Meanwhile, other groups can expect to receive promotion and higher salaries as they gain experience and training.

Table 1 shows estimated average real wage-growth rates per year of age for some occupation groups in the B.C. and federal public sectors.[6] These career wage-growth rates are based on cross-section Census data for a single occupation (or linked single-career occupations such as teacher and principal) and thus, as above, omit the impact of wage inflation.

While the careers of most firefighters, teachers or postal workers, for example, can be tracked within the relevant occupation grouping, we recognize that these growth rates do not capture those clerks, labourers or nurses who move to higher paid supervisory classifications that are identified as different occupations. Nevertheless, differences in average career wage-growth rates are striking.

Average wages have grown faster in some occupations

The average growth rate of earnings over a person's career depends on the career advances that accompany additional years of experience, and on the overall real wage growth of the individual's chosen occupation relative to other occupations. Both technological change and differences in relative bargaining success affect relative wage growth. Over the 20-year period from 1985 to 2005, for example, the average earnings of mid-career police officers grew a full percentage point faster per year than the earnings of letter carriers in the same age group.

As Figure 3 suggests, an occupation group with slowly growing wages that is pooled in the same stable, funded DB plan with employees experiencing a more rapid rate of wage growth can expect to transfer much of its retirement income to the high wage-growth group.

Mobile Workers are Losers

Almost all government DB plans impose a penalty on those who move in or out of employment.[7] This mobility penalty results from several elements of plan formulas. Those employed within the plan for their full career often qualify under magic number or years-of-service formulas to begin receiving pensions as early as 55, while a penalty reduction is imposed on a late-entering employee retiring at the same age. Those who leave the plan for other employment before retirement may suffer from higher early-retirement penalty rates. Although the past wages of those who leave early are likely to be indexed for inflation in calculating the highest average earnings, if they are in careers with growing incomes they are still likely to fall behind the final-year average wages of their colleagues who remain in service. Since pension treaties among

---

6   The growth rates are based on OLS regressions on cross-section data of employment income by occupation by five-year age group for full-time full-year workers. Source is a special tabulation of National Occupation Classification system data for 2005 prepared by Statistics Canada for Discovery Economic Consulting. To remove any effect of shifting gender compositions, most results are for the majority gender in a particular group. Career groupings combine occupations in identifiable career paths; e.g., firefighter and fire chief, elementary/secondary teacher and principal/adminstrator, bus or transit operator and transit supervisor. Averages for age groups for the combined groupings are weighted by number of individuals. Growth rates are average growth per year as a percentage of average career earnings.

7   See, for example, Plender (1998).

Table 1: Average Growth in Real Earnings per Year of Age Based on Average Census Data, 2005	
Age Groups 25-29 to 55-59	
Firefighting career (male, B.C.)	1.6%
Nursing career (female, B.C.)	0.7%
Teaching career (B.C.)	1.5%
Post office career (male, Canada)	0.7%
Bus driver/inspector career (male, Canada)	0.3%
Public works labourer (male, Canada)	0.5%
General office clerk (female, Canada)	0.7%

Source: See footnote 6.

government plans often allow for transfer of service, the penalized tend to be those who transfer between public and private sector employment.

This mobility penalty varies between plans and for each career path. Figure 4 illustrates the mobility penalty in the B.C. Public Service plan for the earnings path up to age 55 that we assumed for Figure 1, based on earnings growing at 1 percent per year at mid-career. The rising line shows the capital value at age 55 of the pension earned at each age by a woman who works only up to that age and receives the pension deferred to begin at age 55.

The falling line shows the reverse scenario—the value of the pension beginning at age 55 earned by a woman who begins to work at the job at the age shown (and at the salary associated with that age) and works to retirement at 55. Thus, the line showing the sum of the two amounts represents the pension accumulations of two women who fill the position in succession, earning the same amount, and making exactly the same pension contributions each month as a single individual who fills the position over her full career. The single individual's

pension would be equal to the amount shown as the horizontal dotted line at $528,000, the pension value amount earned by an individual who begins work at age 25 and ends at 55. The amount by which the sum of the pension values of the two women filling the job falls short of the horizontal line – in this particular example, by up to 30 percent of the single-career amount – represents the penalty the pension plan imposes on these two mobile workers.

Box 2 gives an example that shows how various elements of plan formulas can produce dramatically different pensions, relative to contributions, for two individuals within the same plan.[8]

Other Redistribution

DB plans may produce other redistributions of retirement income. Under government DB plans in western Canada and under most private sector DB plans, for example, a married pensioner electing a joint life pension (that continues for the life of the spouse, should the spouse survive the pensioner) must accept a reduction in monthly payments to

---

8   For further examples, see Young (2004).

Box 2: Elena and Helen

"Elena" comes to Canada under the Live-in Caregiver program and after qualifying to become a permanent resident becomes a home-care worker (Community Health Worker 2) at age 35. She begins at Step 1 on the pay scale and moves over four years to Step 4, where– typically for this job – she remains, earning about $42,000 a year. Her financial circumstances oblige her to work until 65.

Elena's contributions and those of her employer under the BritishColumbia Municipal Superannuation Plan accumulate to about **$350,000** when she retires. Her pension of about **$16,400** per year (she receives OAS and CPP as well, of course) is worth about **$235,000** measured as a discounted lump sum.

"Helen" earns an MA in Urban and Regional Planning and begins her career at age 25 as an auxiliary planning assistant for a B.C. local government, earning $50,000 per year. She accepts better paying planner and senior planner positions at other local governments, becoming an assistant director and, for the last five years of her career, a city planner earning $160,000 annually. She retires at 55. By that date, her contributions and her employers' under the Municipal Pension Plan have accumulated to **$747,000**. Her pension begins at about $82,000 per year and reduces to $73,000 per year at 65. It is worth about **$1.4 million** in lump sum terms.

Helen is a winner because her salary has grown rapidly and she retired early, with a pension that is worth far more than she and her employers have contributed.

Elena is a loser because she had to work to 65, and her salary stayed constant. Leaving aside the administrative and investment management costs that the plan has incurred on her behalf, belonging to the pension plan has cost her almost a third of her contributions, compared to the amount that she would have had available if, instead of joining the plan, she and her employer had simply paid their contributions into her RRSP.

Note: The calculations in the box are based on the B.C. Municipal Superannuation Plan as of the end of 2011. "Elena's" earnings are based on 2010 wage schedules (Community Health Worker 2) published in the Health Employers Association of British Columbia agreement found on the B.C. Government and Service Employees' Union website, www.bcgeu.ca. "Helen's" earnings are based on earnings for individuals with the noted job titles published in employment advertisements and in the public financial statements for a small B.C. city, adjusted to approximate 2010 pensionable earnings. Note that employer contribution rates under this plan vary with the age and gender of the plan member, although employee contribution rates do not.

reflect the probability that the pension will continue longer than a pension lasting for the pensioner's life only. Thus, a 65-year-old member with a 55-year-old spouse retiring under the B.C. Public Service plan must accept a reduction of more than 25 percent (from the single life pension) to ensure the full pension will continue for the life of the surviving spouse. For cases of spouses aged two years apart (the approximate average age differential in Canada), penalties are in the range of 10 percent to 15 percent.[9]

In contrast, the pension plans of the federal government and many of the provinces from Ontario eastward provide "free" pensions for

---

9   Calculated using rates for single-life, five-year and 100 percent joint life pensions from the B.C. Pensions website calculator (found at www.bcpensions.ca) for a 30-year employee with $60,000 average annual earnings. For retirement ages under 65, we used the ratio of present-value mortality adjusted averages for pre- and post-65 pensions. Reductions shown are to continue the full pension to the survivor; reductions are smaller if only a fraction of the pension is to continue to a surviving spouse.

Figure 4: The Mobility Penalty – Value of Pension at 55 by Age of Beginning or Ending Work

Note: Female(s) working under B.C. Public Service Pension Plan, 2011. The Mobility Penalty is the amount by which the Value of Pension to an Employee Continuing from 25 to 55 exceeds the Sum of Pensions of Employees leaving and joining at any given age to fill the same career path.
Source: See Box 1.

surviving spouses of one-half to two-thirds of the basic pension amount. For a stable, funded DB plan, this represents a significant transfer to the married from the unmarried.

Most government DB plans do not adjust pensions or contributions based on gender[10] or health history, so they represent a transfer to those with predictably longer life expectancies, such as women, non-smokers, etc. This type of redistribution can occur in DC plans as well – the

Saskatchewan public employees DC plan, for example, uses unisex life tables and does not take account of health factors.[11]

DO TRANSFERS UNDER DB PLANS INCREASE EFFICIENCY?

Some writers have suggested in their defence that DB plans are economically efficient in the sense that their redistribution of retirement

---

10   The B.C. Municipal Pension Plan requires higher employer contributions for female employees.
11   Private communication from Saskatchewan's Public Employment Benefit Agency, July 22, 2011.

incomes corrects for politically imposed defects in wage scales; that is, DB pensions bring total compensation for government jobs closer to the compensation that reflects the true market value of the labour provided. Thus, in defence of pensions biased to favour long-service employees and final-year averaging, proponents argue that wages for senior employees do not reflect adequately the value of employer-supplied training (Fuerst 2004).

Similarly, it has been argued that wages for higher ranking government officials, the "high flyers" who benefit from final-year averaging at the expense of the "plodders" (in the terminology of the *Economist* 2002) are politically constrained and not high enough to reflect their productivity. It is, therefore, seen as desirable to reward these employees with high pensions that draw on the contributions of their lower-ranking colleagues. In this way, DB plan formulas are seen as a substitute for raising pay levels.

Measuring individual employee productivity and relating it to age, experience and pay level is obviously complex (and beyond the scope of this paper), yet these arguments would seem hard to demonstrate. Certainly, the major argument in favour of final-year averaging and the mobility penalty, i.e., that those with seniority are underpaid, almost directly contradicts the efficiency arguments in favour of magic numbers and early retirement subsidies, which are presumably based on the objective of encouraging high-cost senior employees to retire in favour of lower-cost younger employees who provide more labour per dollar.[12] Both arguments cannot be correct. Should we reward

long-service employees under DB formulas because productivity grows faster than wages over many years? Or should we set formulas to encourage early retirement because productivity grows more slowly than wages beginning as early as age 55 or so?

The efficiency argument for final-year averaging seems particularly doubtful. The provision certainly benefits the high flyers who achieve high rank in their final years, but it benefits most those high flyers who have worked for many years within the government at a modest earning level and who take advantage of early retirement, perhaps losing their most productive years. In contrast, the high flyers attracted late to government after a successful career in the private sector cannot benefit from magic number early-retirement formulas.

are Plan Formulas Partly Responsible for Pension Funding Woes?

The challenges DB plans have faced recently in maintaining adequate funding levels have been discussed by many writers. Clearly plans have been faced with unexpectedly low market rates of return and inflation.[13] Beyond these factors, however, it may be useful to ask whether particular elements of plan formulas are contributing to plan funding problems.

Is it possible, for example, that members are responding to the incentives provided by plan formulas in ways that are difficult for actuaries to forecast, leading to a constant underestimate of average pensions? For example, might we see groups of employees shaping their careers to take greatest

---

12 Kotlikoff (1992) and Kesselman (2004) discuss these issues.

13 It has long been recognized (Deutsch 1975) that the final-year averaging element of plan formulas favours those retiring in times of low inflation, and vice versa. Over the last 40 years, the "averaging lag" (the extent to which the average of the final five years' wages has fallen short of the final year's wage) for an employee with constant real wages has varied from about 18 percent in the high-inflation years 1981-1982 to about 2 percent in the recent low-inflation period. The low "inflation penalty" being paid by those retiring in the current period of stable prices has undoubtedly added to the problem of DB pension plan funding over the last few years.

advantage of plan formulas, gaming the system by negotiating wage increases allocated to further seniority increases (e.g., by increasing the number of seniority steps) in order to maximize pension benefits for their average career path? Certainly, this does not seem far-fetched in light of the experience of US public sector plans that saw costs explode when they moved from three-year to single final-year averaging. Employees in their final year responded by working overtime to inflate the base earnings level used in plan formulas (Curry 2011).

Employers also may game the system in those plans where the employer is not a single decision-making entity when individual municipalities, healthcare districts and educational institutions are pooled in the same plan. Both employer and employee can benefit, at the cost of the system as a whole, when long-serving employees take advantage of magic number targets to take early retirement while continuing to work under contract after formally retiring and beginning to draw their pensions. If policies against this double dipping become less strictly enforced over time, we can expect to see pension plan financial performances fall short of forecasts made by actuaries who find it difficult to quantify this type of institutional change.[14]

How Realistic are Our Assumptions?

This discussion has been based on plans that are assumed to be entirely supported by stable contributions tied to plan members' wages and the investment return on those contributions. In such a plan, to the extent any individual pension exceeds the value of the associated employee's account, another's must necessarily fall short. Although most provincial DB plans tell new employees that their plan is entirely funded by their contributions, employer contributions at a matching or similar rate and by investment earnings, changes in fund circumstances mean this is not always the case.

In the days of high interest rates, high investment returns and high inflation, when funds often appeared to be in surplus, many public sector plan administrators introduced lower early-retirement penalties, lower magic numbers, richer normal forms of pension and shorter periods of best-years averaging, dissipating perceived fund surpluses and also generating or exacerbating the inter-member transfers of retirement income discussed above.

In recent years, as it has become apparent that long-term investment forecasts were too optimistic and plan funding may not be adequate, public sector plans have not typically reversed the formula changes that produced the problems. Instead, retired or senior plan members have been left in possession of their promised pensions, but contribution rates have increased, thus shifting costs to younger and future employees and taxpayers. Sometimes formula benefits have been cut for future employees alone. The resulting intergenerational transfers make it hard to determine to what extent employees are competing against other groups of employees within the plan, rather than against their younger or older colleagues, or their employer.

Even aside from the issue of the timing of contributions, it is difficult to determine to what extent employers are likely to make additional contributions to plans. For some plans, most notably the federal scheme, no employer contribution rate is specified and employees are simply told that the employer will pay whatever is necessary beyond employee contributions.

---

14 Another example of a change that was outside the usual realm of actuarial expertise was the expanded definition of marriage by the courts to include same-sex spouses. When this happened, the pension funds of the federal government and the provinces that provide "free" (actuarially unreduced) joint life pensions to married members were charged with a new obligation. Plan members previously unable to marry were now able to benefit along with other couples from the income transfer built into their plans.

Even where employers are formally responsible for a plan's residual funding, there seems to be an emerging unwillingness among employers to be seen as the sole funder of shortfalls. University of Toronto economist James Pesando (2008) provides some evidence that the formal governance structure of most plans gives little guidance as to who – employer or employees – is responsible for plan deficits and reaps the benefit of surpluses.

Why Have Losers Been Prepared to Subsidize Winners?

In this *Commentary*, I have suggested that to the extent that DB plans are fully funded by employee and associated employer contributions, they are systematically disadvantaging several groups of people: those who have arrived later to their government jobs (or leave for other jobs), those who have lost working years while caring for their families, those who simply need to work or want to work later in life, and some entire occupation groups characterized by low annual wage increases and few advancement prospects. While administrators of these DB plans (understandably) do not draw attention to how their plans transfer retirement income from losers to winners, it is nevertheless surprising that those interested in the welfare of employees in occupations with low average rates of either career or historic wage increases have not objected to plan formulas on these grounds.

The fact that losing groups have been content to accept the inequities of plans that appear to systematically transfer retirement income away from them and toward winning groups suggests that – despite what they are often told when entering the plan – they do not believe their plan is truly funded only by stable employee and associated employer contributions, but rather that any shortfall in plan funding that threatens their promised benefits will be made good by the government employer.

Thus, they may not consider themselves to be in a competition with winning groups.

If pension benefits are, indeed, determined by a mechanism that is independent of funding, and any funding shortfalls will be wholly or largely made up only by employer contributions, then it is possible for every member of the plan to be a winner. While some employees win more than others (relative to their salaries), this imbalance is swamped by the net benefit being conferred, currently or in the future, by the employer on the majority of plan members or, potentially, on every member of the plan.

Forecasting the extent to which the burden of plan funding shortfalls will be shared among present and future members, government employers and taxpayers is more a political than an economic exercise and is beyond the scope of this paper. Nevertheless, unless all shortfalls are made up by employers or newly entering plan members alone, it would seem that losing employee groups should be paying attention to pension redistribution under DB plans.

A more fruitful explanation of income redistribution under DB plan formulas is perhaps that the formulas represent the outcome of a political process. While every public plan is controlled by a different combination of current government employees, past employees and technical experts, in general it does not seem surprising that plan formulas favour senior managers who have reached high salary levels at the end of their careers rather than their subordinates in constant-wage jobs. Nor should it be surprising that formulas favour long-time employees rather than short-term employees who are less likely to reach influential positions in unions or as decisionmakers. Those departing at mid-career, who would seem to be even less likely to be represented among pension plan decisionmakers, are consistent losers under DB plans.[15]

---

15   The author falls in this group.

CAN PLAN FORMULAS BE AMENDED TO SERVE PUBLIC INTERESTS BETTER?

It may be of little concern to the broader public if public service plan members choose to transfer income from the unmarried to the married or from low-income clerks to high-income deputy ministers. However, if DB plan formulas are, indeed, discouraging movement of workers between the private and public sectors, or wasting human potential by encouraging the early retirement of those who might wish to continue to work if faced with the true costs and benefits of their decision, or are biasing plans toward underfunding and hence further demands for inputs of public funds, then the public should be concerned.

Government pension plan members also support their plans for reasons that are unconnected with the retirement income redistribution they bring about. The plans pool investment funds to allow diversification and professional management with low administrative costs, they pool annuity insurance risks among members in a way that a private annuity provider cannot and they offset the bias toward the healthy that characterizes any pension system by providing offsetting insurance elements such as survivor pension top-ups for families of plan members who die in service. Plans also pool risk over time, reducing the vulnerability of annuities to market rates at the moment of retirement.

However, public sector DB plans could be redesigned to retain much of their appealing certainty and efficiency without redistributing retirement income among members to the extent that they now do. Change could begin with three components of the formulas:

(1) Magic number formulas and minimum service requirements that provide long-service employees with early retirement benefits not given to late arrivers could be modified. However, changing these rules would face strong opposition from most existing plan members, and would probably have to be phased in. In 2010, the Nova Scotia plan raised the magic number, but only for new employees. Actuarially sound early-retirement penalties could also be restored for all employees going forward, so that the component of the pension already earned continues to benefit from old rules and magic number provisions, while the component of each individual pension to be earned in the future does not.[16] Reducing penalties for mid-career employees who are laid off or voluntarily leave for other employment would also reduce the effect the plans have in reducing labour mobility.

(2) The earnings base for DB formulas, usually the best five years of non-indexed earnings, could be indexed and extended to 10, 15 or more years, or indeed to the full career average.[17] This would give fairer treatment to those in careers marked by slow-growing incomes and would allow employees who wish to work less, or to reduce the scope of their work and responsibility in their final years of employment, to maintain their pension values.

(3) Plans that provide a free benefit for the married could gradually reduce the free component of the survivor benefit (as Nova Scotia has recently done), leaving the married to purchase their survivor benefits with an actuarial reduction in their initial pension, as is required in western Canadian public service plans.

---

16   For example, the Westminster Saving Credit Union DB plan imposes a higher early-retirement penalty on the proportion of a pension that is earned after 2009.

17   For a discussion of full-career averaging in the United Kingdom, see Sutcliffe (2007).

Conclusion

DB pension plan administrators who might want to amend plans to address some of the issues outlined in this *Commentary* face considerable challenges. The plans are obviously popular with employees who are likely to be winners, and losers may be less aware of the impact of formulas or less influential in plan decisionmaking. Some people have chosen to enter public service while young because they were already thinking about their retirement, and they will resist any changes that reduce the certainty of a formula-driven plan. Nevertheless, most of those outside the public sector must make do with DC plans and, realistically, the alternative to change in current plans may be a gradual conversion of new entrants to DC plans, or even having DC pensions for future service, even for current members, with only past service giving entitlement to DB pensions.

In fact, change would benefit many employees. If governments begin to resist devoting budget funds to propping up DB plans that have underestimated their needs (instead requiring higher employee contributions), formula changes will benefit new employees who would otherwise pay heavily to support past employee pensions. If formula changes allow employees to work longer by enabling them to choose their retirement age without fear of sacrificing benefits they have paid for, all employees can benefit.

References

Curry, Tom. 2011. "A guide to public employees' rights and benefits." MSNBC.com. Available at www. msnbc.msn.com/id/41672854/ns/politics-more_ politics/t/guide-public-employees-rights-benefits.

Deutsch, Antal. 1975. "Inflation and Guaranteed Formula Pension Plans." *Canadian Journal of Economics*. VIII (3): 447. August.

The Economist. 2002. "A Matter of Definitions." February 14. Available at Economist.com/ node/97559.

Fuerst, Donald. 2004. "Defined Benefit Plans: Still a Good Solution?" *Mercer Human Resources Consulting*. April 3.

Gougeon, Philippe. 2009. "Shifting Pensions." *Perspectives on Labour and Income*. Statistics Canada cat 75-001-XPE, 21 (2): 43-50. Summer.

Kesselman, Jonathan R. 2004. "Mandatory Retirement and Older Workers: Encouraging Longer Working Lives." *Commentary* 200. Toronto: C.D. Howe Institute. June.

Kotlikoff, Laurence J., and Jagadeesh Gokhale. 1992. "Estimating a Firm's Age-Productivity Profile Using the Present Value of Workers' Earnings." *The Quarterly Journal of Economics*. 107(4): 1215-1242. November.

Mulligan, Casey B., and Xavier Sala-i-Martin. 1999. "Gerontocracy, Retirement, and Social Security." mNBER Working Paper 7117. Cambridge, Mass.: National Bureau of Economic Research: 34-35.

Pesando, James, and Morley Gunderson. 1988. "Retirement Incentives Contained in Occupational Pension Plans and Their Implications for the Mandatory Retirement Debate." *Canadian Journal of Economics*. 21(2) 244-64. May.

Pesando, James. 2008. "Risky Assumptions: A Closer Look at the Bearing of Investment Risk in Defined-Benefit Pension Plans." *Commentary* 266. Toronto: C.D. Howe Institute. June.

Plender, John. 1998. "Ownership and Pensions." *The Political Quarterly*. 69(4): 394. Oct.-Dec.

Schirle, Tammy. 2008. "Greener Pastures: Understanding the Impact of Retirement Incentives in Defined-benefit Pension Plans." *Commentary* 262. Toronto: C.D. Howe Institute. May.

Sutcliffe, Charles. 2007. "Should Defined Benefit Pension Schemes be Career Average or Final Salary?" ICMA Centre. University of Reading. Available at http://www.geog.ox.ac.uk/news/events/governance/sutcliffe.pdf.

Young, Geoffrey. 2004. "Can the Economy Afford Government Pensions?" *Fraser Forum*. 27 May. Available at www.fraserinstitute.org/WorkArea/DownloadAsset.aspx?id=3234.

NOTES:

NOTES:

NOTES:

Recent C.D. Howe Institute Publications

April 2012	MacGee, James. *The Rise in Consumer Credit and Bankruptcy: Cause for Concern?* C.D. Howe Institute Commentary 346.
March 2012	Hicks, Peter. *Later Retirement: The Win-Win Solution.* C.D. Howe Institute Commentary 345.
March 2012	Busby, Colin, and Finn Poschmann. "The Hole in Ontario's Budget: WSIB's Unfunded Liability." C.D. Howe Institute E-Brief.
March 2012	Laurin, Alexandre, and William B.P. Robson. *Achieving Balance, Spurring Growth:A Shadow Federal Budget for 2012.* C.D. Howe Institute Commentary 344.
March 2012	Robson, William B.P. "What to do About Seniors' Benefits in Canada: The Case for Letting Recipients Take Richer Payments Later." C.D. Howe Institute E-Brief.
March 2012	Aptowitzer, Adam, and Benjamin Dachis. *At the Crossroads: New Ideas for Charity Finance in Canada.* C.D. Howe Institute Commentary 343.
mars 2012	Pierlot, James. « La retraite à deux vitesses : comment s'en sortir? » Institut C.D. Howe Cyberbulletin.
February 2012	Doucet, Joseph. *Unclogging the Pipes: Pipeline Reviews and Energy Policy.* C.D. Howe Institute Commentary 342.
February 2012	Percy, David R. *Resolving Water-Use Conflicts: Insights from the Prairie Experience for the Mackenzie River Basin.* C.D. Howe Institute Commentary 341.
February 2012	Dawson, Laura. *Can Canada Join the Trans-Pacific Partnership? Why just wanting it is not enough.* C.D. Howe Institute Commentary 340.
January 2012	Blomqvist, Åke, and Colin Busby. *Better Value for Money in Healthcare: European Lessons for Canada.* C.D. Howe Institute Commentary 339.
January 2012	Ragan, Christopher. *Financial Stability: The Next Frontier for Canadian Monetary Policy.* C.D. Howe Institute Commentary 338.
January 2012	Robson, William B.P. "Fixing MP Pensions: Parliamentarians Must Lead Canada's Move to Fairer, and Better-Funded Retirements." C.D. Howe Institute Backgrounder 146.

Support the Institute

For more information on supporting the C.D. Howe Institute's vital policy work, through charitable giving or membership, please go to www.cdhowe.org or call 416-865-1904. Learn more about the Institute's activities and how to make a donation at the same time. You will receive a tax receipt for your gift.

A Reputation for Independent, Nonpartisan Research

The C.D. Howe Institute's reputation for independent, reasoned and relevant public policy research of the highest quality is its chief asset, and underpins the credibility and effectiveness of its work. Independence and nonpartisanship are core Institute values that inform its approach to research, guide the actions of its professional staff and limit the types of financial contributions that the Institute will accept.

For our full Independence and Nonpartisanship Policy go to www.cdhowe.org.