



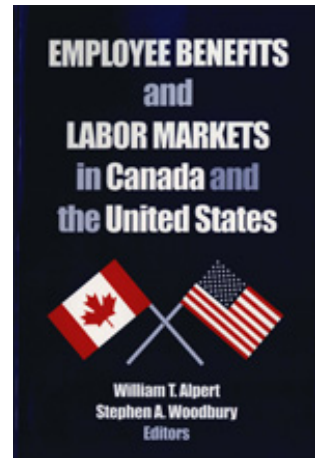
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10 Public Pension Plans in the United States and Canada

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Increased attention is being paid to the similarities and differences between Canada and the United States in a variety of areas of social policy. The similarities provide elements of a natural experiment to facilitate controlling for the myriad of observable and unobservable factors that can affect behavior. They also make it more likely that the experiences in one country have relevance for the other country. The differences provide variation in a number of factors that are of interest for their possible impact on behavior. The differences are especially of interest when they involve variables that are subject to a degree of policy control.

These similarities and differences have been exploited in a number of areas of social policy. Card and Freeman (1993) analyzed the impact of differences in labor-market and social policies on various outcomes, including wage and income inequality, poverty, union density, unemployment, and immigration. Chiswick (1992) looked at the impact of differences in immigration and language policies on such factors as immigrant assimilation, fertility, domestic earnings, language fluency, and the economic returns to that fluency.

The purpose of this chapter is to outline important similarities and differences between Canada and the United States in public pension plans. While the focus is on public pension plans, brief mention is made of private pensions, so as to put the public plans in perspective. Particular attention is paid to the potential redistributive and incentive

effects of the public plans, especially as they may shed light on the trend towards earlier retirement.

The chapter begins with a description of the different components of the Canadian public pension system, emphasizing features that have potential redistributive and incentive effects. Private employer-sponsored occupational pension plans are briefly discussed, and the importance of both public and private pension plans are documented as sources of retirement income. The extent to which public pension plans serve to replace preretirement earnings is documented, as are their potential redistributive effects. Intergenerational transfers implied by the “pay-as-you-go” financing are then analyzed as is the shift in policy emphasis from public to private pensions. A similar but briefer description of the U.S. public pension system is provided, and the similarities and differences are used to shed light on the trend in both countries to reward earlier retirement. The paper concludes with a brief summary of the salient points.

PUBLIC PENSION PROGRAMS IN CANADA

The public pension programs provided by the Government of Canada consist of three components: 1) Old Age Security (OAS) payable to all Canadians aged 65 and over regardless of means; 2) an income-tested supplement (the Guaranteed Income Supplement or GIS) payable, upon application, to recipients of the basic OAS pension who have little or no other income; and 3) an earnings-related component (the Canada Pension Plan or CPP) linked to an individual's average lifetime earnings.¹ The basic features of these public pension programs are summarized in Table 1. Unlike the situation in the United States, health insurance is provided under the universal public programs in each of the provinces, and coverage is unaffected by retirement status.

Old Age Security (OAS)

Old Age Security is a demogrant, financed out of general tax revenues and payable to those aged 65 and older and with 40 years of residence. It is a flat-rate, universal benefit unrelated to work history. It

Table 1 Public Pension Programs: Government of Canada

Program	Nature	Benefit	Financing
Old Age Security (OAS)	Demogrant payable to those over 65 subject to residency requirement; benefits reduced for Canadians with incomes over \$39,911	Maximum annual pension is \$3,472; fully indexed to CPI	General tax revenues
Guaranteed Income Supplement (GIS)	Income-tested benefit; recipient must be over age 65 and in receipt of OAS pension	Maximum annual pension is \$4,127; reduced by 50% of recipient's income in excess of OAS benefits; not taxable and fully indexed to CPI	General tax revenues
Canada Pension Plan (CPP)	Earnings-related; designed to replace 25% of average lifetime earnings, up to the average industrial wage	Maximum annual pension is \$6,250; fully indexed to CPI	Equal employer/employee contributions, set at 2.6% of earnings between \$3,300 and \$33,400

NOTE All amounts are expressed in U.S. dollars, at an exchange rate of 75 cents (U.S.) for each Canadian dollar, and pertain to January 1, 1994. The provinces of Alberta, British Columbia, Nova Scotia, Manitoba, Ontario, and Saskatchewan provide income-tested supplements, thereby raising the guaranteed annual income of those aged 65 in excess of OAS/GIS benefits.

begin as a means-tested pension, introduced in 1927, payable to qualifying individuals at the age of 70. By 1951, it had become a universal flat-rate pension payable at age 70, and the age of eligibility was subsequently reduced to 65 in concert with the introduction of the Canada Pension Plan. The full OAS benefit is equal to \$3,472 per year as of 1994.² (All dollar amounts hereafter are expressed in U.S. dollars, at an exchange rate of 75 cents [U.S.] for each Canadian dollar.) Beginning in 1989, the OAS pensions of higher income Canadians have been “clawed-back” at the rate of 15 percent after net income of \$39,911 in 1993.

Guaranteed Income Supplement (GIS)

The Guaranteed Income Supplement is an income-tested transfer payment given to residents of Canada who are in receipt of the basic OAS pension and who have little or no other income. The GIS was introduced in 1966. Like OAS, GIS is financed from general tax revenues. At the beginning of 1994, the maximum GIS pension was \$4,127 for singles and \$5,376 for married couples. The GIS places a floor on the minimum income of those aged 65 and over. Unlike OAS and CPP pensions, GIS benefits are not subject to income tax. The implicit tax-back rate for GIS benefits is 50 percent; that is, for each dollar of income (including CPP benefits) in excess of the basic OAS pension, GIS benefits are reduced by 50 percent.³

Canada Pension Plan (CPP)

The Canada Pension Plan (like Social Security in the United States) is a mandatory, contributory, earnings-based pension that provides coverage for the majority of workers. It was established in (largely) its present form in 1965. The CPP is designed to replace 25 percent of a worker’s average lifetime earnings for persons whose earnings are equal to or less than the average industrial wage. For persons whose earnings are higher than the average industrial wage, the CPP is designed to replace a smaller portion of their average lifetime earnings. At the beginning of 1994, the maximum CPP benefit was \$6,248 per year, or approximately 25 percent of the average industrial wage of \$25,800. The maximum CPP benefit is paid to workers whose

earnings equal or exceed the ceiling on contributions (the Year's Maximum Pensionable Earnings, or YMPE) for each year during their work lives.

The CPP is financed out of a payroll tax, with equal contributions from employers and employees. In 1994, the contribution rate for employers and employees was set for both at 2.6 percent of earnings between the Year's Basic Exemption (\$2,550) and the YMPE (\$25,800).⁴ The average contribution was \$680 in 1991. The contribution rate is scheduled to rise steadily over the next 25 years, from 5.2 percent (combined rate) in 1994 to 10.10 percent in 2016 and to 12.73 percent in 2030.

Prior to 1987, CPP benefits were payable at age 65 (or later, at the worker's option). Since 1987, CPP benefits have been payable at age 60, on an actuarially reduced basis and subject to the requirement that the recipient is not working.⁵ The actuarially fair reduction is designed to exactly compensate for the fact that the pension is received earlier and for a longer expected period of time. In January 1992, the majority of males who commenced receipt of CPP retirement benefits were aged 60 to 64. Indeed, the number of males commencing receipt of benefits at age 60 was only modestly less than the number commencing receipt at age 65. For females, the early receipt of benefits is more pronounced, with the number commencing receipt of CPP benefits at age 60 exceeding the number commencing receipt at age 65 (Health and Welfare Canada 1992, Table 8).

CPP benefits can be delayed until age 70, in which case annual benefits are actuarially increased to compensate for the fact that they will be received later and for a shorter expected period of time. After the age of 70, there is no actuarial adjustment so that there is in effect a penalty for delaying receipt after that age.

CPP benefits are fully taxable as a normal source of income. However, there is no clawback if the person does not retire (after attaining age 65) but continues to work and earn income. The only clawbacks are indirect: CPP income is subject to income tax and if the person continues to work, the person would presumably be in a higher marginal tax bracket. As well, if the person continues to work, the person is more likely to exceed the threshold level of income of \$39,111 that would subject their OAS income to the 15 percent clawback. More importantly, if the person is eligible for the GIS supplement, the per-

son's GIS benefits would be reduced by the 50 percent "tax-back" that applies to income (including CPP income) beyond the OAS demogrant.

Private Pension Plans (RPPs and RRSPs)

Canada's public and private pension system is generally described as involving three tiers: 1) the universal Old Age Security component consisting of the OAS demogrant and the possible GIS income-tested supplement; 2) the Social Insurance component involving the mandatory, earnings-based CPP which covers most workers; and 3) and employer-sponsored, occupational Registered Pension Plans (RPPs). The first two tiers are the public pension system, and the third is the private pension system.

Private, employer-sponsored RPPs are financed by employers, usually with employee contributions.⁶ In 1992, 38.4 percent of the labor force were covered by such occupational pension plans, the coverage being slightly higher for males than for females (Statistics Canada 1994, p.16). In 1992, 90 percent of plan members were in defined-benefit plans, with 18 percent being in flat-benefit plans (predominantly in the unionized sector) and 72 percent being in earnings-based plans (usually dependent upon the individual's final years of earnings). Only 9 percent of plan members were in defined-contribution plans. Although membership in both defined-benefit and defined-contribution plans has been growing, membership in defined-contribution plans has been growing at a faster rate.

Private, earnings-based pensions also exist in the form of personal savings through Registered Retirement Savings Plans (RRSPs) that basically involve a deferral of taxes until the pension is withdrawn upon retirement. These are earnings-based in the sense that (as of 1991) individuals are allowed to contribute up to 18 percent of their earned income in the previous year. The maximum contribution for 1991 was \$8,625 for individuals who did not have an RPP, or \$8625 less what is known as the "Pension Adjustment" for those who belong to an RPP. (The pension adjustment seeks to underscore the value of the pension benefit carried during the year by a member of a defined-benefit pension plan. Technically, it equals nine times the benefit enti-

tlement less \$1,000). In 1991, 24 percent of all tax filers made RRSP contributions, averaging \$2,172 .

Contributions and Benefits from Pension Plans

As indicated in Table 2, among the different contributory pension plans, the CPP has the greatest number of contributors, given the mandatory nature of such contributions. Private RPPs and tax-advantaged RRSPs have considerably fewer contributors. The number of contributors has grown most rapidly, however, for RRSPs. Although the CPP involves the greatest number of contributors, it also involves the lowest average contribution (\$680) compared to average contributions of over \$2,000 for both RPPs and RRSPs. This smaller average contribution for CPPs leads to lower total contributions for CPPs than for RRSPs, which—in turn—are less than contributions for RPPs. From 1981 to 1991, the growth of total contributions has been greatest for RRSPs, followed by the CPP and then RPPs.⁷

With respect to benefits paid under the different pension plans, Table 3 indicates that the CPP and the OAS/GIS have the greatest number of beneficiaries. Beneficiaries of the CPP have grown the most, reflecting the aging of the workforce and the tendency to retire early and receive the actuarially adjusted benefits after age 60. Average benefits are greatest for RPPs, followed by OAS/GIS, with CPP benefits being the smallest. Total benefits, however, have grown the most under CPP, reflecting the highest growth in both the number of recipients and the average benefit per recipient.

Pension Income as Component of Retirement Income: Canada

The importance of the three public pension plans in contributing to retirement income is shown in Table 4. In 1988, they accounted for 38 percent of retirement income for men and 50 percent for women. The earnings-based CPP, however, constitutes a smaller component for women than for men, reflecting the fact that women tend to have lower earnings (and less continuous work histories) than do men. The OAS and GIS benefits are not linked to labor-market earnings; hence, their fixed nature means that, in combination, they constitute a larger portion of the retirement income for women (40.0 percent) than for men (22.5

Table 2 Contributors and Contributions of the CPP Relative to Employer Private Registered Pension Plans (RPP) and Earnings-Based Registered Retirement Savings Plans (RRSPs) in Canada, in 1991

Contributors/contributions	Public (CPP)	Employer-based private pension (RPP)	Tax advantaged savings (RRSP)
Contributors			
Number (millions)	12.0	5.3	4.6
Growth 1981-91	9%	14%	136%
Average contribution			
Average (\$US)	680	2,411	2,172
Growth 1981-91	151%	47%	46%
Total contributions			
Total (million \$US)	8,135	12,822	10,028
Growth 1981-91	173%	68%	245%
<hr/> Working age population growth 1981-91, 14.5% Labor force growth 1981-91, 16.8% Nominal GDP growth 1981-91, 86.7% Consumer price growth 1981-91, 67.2%			

SOURCE: Calculations based on data from Statistics Canada (1994, p. 9) Growth rates calculated using the following data series from the Statistics Canada CANSIM Main base: working age population, D767867; labor force, D767870; nominal GDP, I28026; and, consumer price index, P490000.

NOTE: All dollar amounts are converted to U.S. dollars, at an exchange rate of 75 cents (U.S.) for each Canadian dollar.

Table 3 Benefits Paid Under Public Pension Plans (OAS, GIS, CPP) and Employer-Registered Pension Plans (RPP) in Canada, in 1991

Beneficiaries and benefits	OAS/GIS	CPP	RPP
Beneficiaries			
Number (millions)	3.3	3.7	1.8
Growth 1981-91	34%	108%	98%
Average benefit			
Average (\$US)	4,136	3,020	7,328
Growth 1981-91	63%	128%	99%
Total benefits			
Total (millions \$US)	13,571	11,171	13,083
Growth 1981-91	118%	375%	294%

SOURCE: Calculations based on data from Statistics Canada (1994, p. 14).

NOTE: All dollar amounts are converted to U.S. dollars, at an exchange rate of 75 cents (U.S.) for each Canadian dollar.

Table 4 Public Pension Income as a Percentage of Total Retirement Income Males and Females Age 65 and Over in Canada, in 1978 and 1988

% Income derived from	1978		1988	
	Men	Women	Men	Women
OAS demogrant	20.8	36.2	17.2	29.1
GIS supplement	5.6	11.0	5.3	10.9
CPP public pension ^a	8.5	4.3	15.9	10.5
(Total public pensions)	(34.9)	(51.5)	(38.4)	(50.5)
Private pensions (RRP, RRSP) ^b	16.7	8.4	23.1	11.6
Investment income	25.4	32.6	21.9	31.4
Employment income	19.5	5.3	14.0	4.2
Other income	3.5	2.1	2.7	2.4
Total retirement income	100.0	100.0	100.0	100.0

SOURCE: Based on data presented in Galarneau (1991, p. 29).

^a The CPP benefits include payments to surviving spouses, which amount to 32 percent of total CPP payments in 1988.

^b Private pension income includes income from employer-sponsored Registered Pension Plans (RPP) and tax-advantaged private Registered Retirement Savings Plans (RRSP).

percent). This larger portion more than offsets the lower portion from CPP income for women, so that overall pension income from the three pension programs comprises 50.5 percent of the retirement income for women, compared to 38.4 percent for men in 1988.

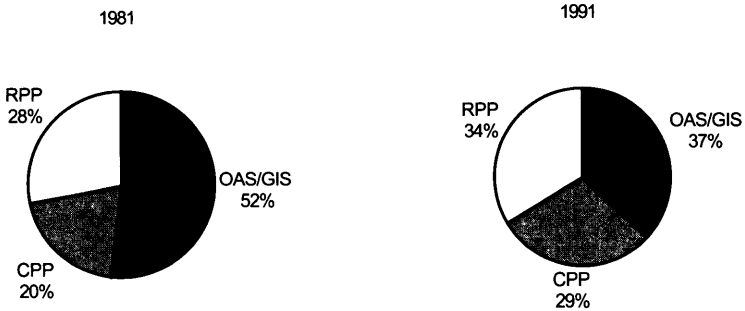
Because of their higher earnings and greater labor force attachment, the earnings-based occupational pension plans (RPPs) and earnings-based RRSPs also constitute a larger portion of retirement income for men than for women. The same applies to employment income. Table 5, based on more current and comprehensive data from the 1991 census, presents a similar picture.

Figure 1 illustrates that, between 1981 and 1991, there was a relative decrease in the importance of the OAS demogrant and GIS supplement as a source of pension income, in contrast to the increased importance of employer-sponsored RPPs and especially the public CPP.

Table 5 Public Pension Income as a Percentage of Total Retirement Income Persons Age 65 and Over in Canada in 1991

% Income derived from	Males	Females	Both sexes
OAS demogrant/GIS supplement	20.0	36.0	27.3
CPP public pension	15.3	12.6	14.0
(Total public pension)	(35.3)	(48.6)	(41.3)
Private pension (RRP, RRSP)	22.3	11.6	17.4
Investment income	19.1	25.9	22.2
Employment income	17.1	7.6	12.8
Other income	6.2	6.3	6.3
Total retirement income	100.0	100.0	100.0
Average income (\$US)	17,699	11,255	14,018

SOURCE: Calculated from the individual files of the Public Use Sample Tapes of the 1991 Census of Canada, weighted by the Statistics Canada sample weights.

Figure 1 Components of Pension Income in Canada, 1981 and 1991

The Income Replacement of Public Pension Programs in Canada

The income replacement rate (i.e., the ratio of postretirement to preretirement annual income) is a standard measure of the adequacy of pension benefits. As indicated previously, the benefits delivered by the CPP, the earnings-related component of Canada's public retirement system, are modest. The CPP is designed to replace 25 percent of the worker's average annual lifetime earnings, with a lower replacement rate for persons beyond the average industrial wage. As well, there is a maximum on the CPP benefit, equal to \$6,248 per year in 1994. The target replacement rate of 25 percent for the CPP indicates that the CPP is to serve as only one component of the overall replacement rate of 70 percent that is widely used in Canada as the goal for retirement planning.

This fact, together with the flat pension provided through OAS and the income-tested benefit provided by the GIS, implies that income replacement rates from public pension programs will be high for low-income Canadians, and low for high-income Canadians. This result is readily confirmed by examining the income replaced through Canada's public pension programs for individuals whose lifetime earnings equal different fractions (or multiples) of the average industrial wage (Table 6).⁸

Table 6 Income Replaced by Public Pension Programs in Canada

Individual's earnings, preretirement ^a	OAS benefits (\$) ^b	GIS benefits (\$) ^c	CPP benefits (\$)	Total benefits (\$)	Replacement rate (%)
Nil	3,472	4,127	Nil	7,599	NA
\$6,450 (25%)	3,472	3,346	1,562	8,380	129.9
\$12,900 (50%)	3,472	2,565	3,124	9,161	71.0
\$19,350 (75%)	3,472	1,784	4,686	9,942	51.4
\$25,800 (100%)	3,472	1,003	6,248	10,723	41.6
\$51,600 (200%)	3,472	1,003	6,248	10,723	20.8
\$129,000 (500%)	3,472	1,003	6,248	10,723	8.3

^a The different levels of preretirement earnings represent the indicated fraction (enclosed in parentheses) of the average industrial wage in Canada.

^b All amounts are expressed in U.S. dollars, at an exchange rate of 75 cents (U.S.) for each Canadian dollar, and pertain to January 1, 1994.

^c GIS benefits are income-tested and reduced by 50 percent of income in excess of OAS benefits. In these illustrations, the recipient is assumed to receive income *only* from the public pension programs. For the purpose of these illustrations, additional income-tested pensions provided by some provinces are ignored

For an individual who earns the average industrial wage (i.e., with preretirement earnings of \$25,800 per year), 42 percent of their preretirement earnings would be replaced by Canada's public pension programs. This ratio rises to 71 percent for those who earn half the industrial wage and falls sharply to 21 percent for those who earn twice the average industrial wage. The modest role of the earnings-based CPP is further illustrated by the fact that an individual who qualifies for the maximum CPP pension will also qualify for (partial) income-tested GIS benefits, if the individual has no other source of retirement income.

The OAS benefits shown in Table 6 are constant at the maximum amount of \$3,472 because the individuals are assumed to have no post-retirement income other than public pension income and hence are not subject to the 15 percent clawback. However, GIS benefits fall as preretirement earnings increase, because higher preretirement earnings lead to higher CPP benefits and CPP benefits are included in the income that is subject to the 50 percent GIS "tax-back." Therefore, GIS benefits fall by 50 percent of the increase in CPP benefits. When CPP benefits reach their maximum of \$6,248, there is no further reduction of the GIS supplement and it bottoms out at \$1,003 as long as the person has no source of income other than public pension income.

As a result of these opposing forces, total public pension benefits are relatively flat and do not increase much for persons with higher preretirement earnings. Only earnings-based CPP benefits increase as preretirement earnings increase, but these are capped at a fairly modest level. The increase up to the cap is subject to the 50 percent "tax-back" of the GIS supplement. The fact that OAS benefits are flat and that CPP benefits are modest, capped, and effectively subject to the GIS "tax-back," means that total public pension benefits do not change substantially as the individual's preretirement earnings change. This means that the income replacement rate is very high for persons with low preretirement earnings and very low for persons with high preretirement earnings.

Clearly, the public pension system is very "progressive," yielding relatively constant total benefits and hence high income replacement rates for low-income individuals. Furthermore, the earnings-based CPP component is relatively modest as evidenced by the fact that even when the full maximum CPP benefits are received, individuals are still

eligible for the income-tested GIS supplement if they have no other source of income.

Intergenerational Transfers: Canada

The tax rates, explicit or implicit, to finance Canada's public pension programs will rise sharply in the years ahead, to offset the aging of the population and the increasing ratio of pensioners to active workers. In 1966, when the CPP was introduced, the total contribution rate was set at 3.6 percent, to be shared equally by employers and their employees. This rate remained in effect until 1986. Since then, the CPP contribution rate has gradually increased, to 5.2 percent in 1994. This rate is somewhat higher than the contribution rate that would have been forecast for 1993 in 1966, the year that the CPP was introduced. This result is due to subsequent benefit enrichments and "unfavorable" demographic developments.

The CPP contribution rate is scheduled to rise to 10.10 percent in 2016, 12.73 percent in 2030, and 13.18 percent in 2040.⁹ These increases presume there will be no change to the CPP benefit formula. However, two points merit attention. First, future generations of workers will be required to pay higher CPP contribution rates than does the current generation of workers, with no increase in the benefit formula. Second, there are no published forecasts of the implicit tax or contribution rates for OAS, GIS, and the various provincial "top-ups." Since these programs are also financed on a "pay-as-you-go" basis, however, it is clear that the implicit tax or contribution rates necessary to finance these programmes will rise as well.

With "pay-as-you-go" financing, each generation of workers pays for the pensions of the previous generation. The security of CPP (and other public pension) benefits is linked, ultimately, to the willingness of the next generation of workers to pay the tax or contribution rates necessary to finance the level of benefits promised to the current generation.

Canadians born in 1920—who reached age 65 in 1985—will receive far more in benefits from the CPP than they paid in contributions. Canadians who were born in 1960—who will attain age 65 in 2025—will also receive more in benefits than they paid in contributions but on a more modest scale. For Canadians born after 1980, how-

ever, lifetime CPP contributions are likely to equal or exceed CPP benefits. The “pension crisis” thus reflects the concern that the next generation of workers may choose not to honor the rules of the game established by the current generation because the next generation will be treated less favorably.

This likelihood of younger generations “breaking” an implicit social contract established by older generations who will benefit by such a contract is enhanced by a number of other factors. The younger generations will also be experiencing greater pressure for health and elder-care expenditures, associated with the aging population that is also in receipt of the pension income. Pressure may be enhanced by the possibility both of inheriting a large government deficit and assuming responsibility for substantial deferred wage obligations being paid to public sector workers in the form of generous occupational pensions and seniority-based wage increases and job security. Concern that labor markets may not be able to absorb traditional immigrant flows may lead to reductions in that source of labor-force growth that could otherwise sustain pension obligations. The likelihood that the implicit pension contract is not adhered to is also enhanced by the fact that the “pension crisis” is not an exogenous unforeseen event that leaves the older generation no time to adjust.

Because of these and related considerations, there has been a profound shift in the past 15 years in the nature of the policy debate regarding public pensions in Canada. In the late 1970s, the major issue was whether or not to double the size of the CPP, as advocated by the Canadian Labour Congress and other groups. This potential initiative was debated at length in a National Pension Conference convened by the federal government in 1980. In 1991, in sharp contrast, the Organization for Economic Cooperation and Development (OECD) held a major conference on “Private Pensions and Public Policy.” The first sentence in the “Foreword” to the conference volume (OECD 1992) sets the tone for the current policy debate in Canada:

Government interest in relying more on private arrangements and less on public pensions for income in retirement appears to be increasing across OECD countries. Old-age pensions currently are the largest social policy expenditure in public budgets, and their share of public costs is expected to grow in the years ahead.

Clearly, the potential financial problems and the intergenerational transfers associated with public pension plans has redirected attention from public to private pensions.

PUBLIC PENSION BENEFITS IN THE UNITED STATES

A brief treatment of the U.S. public pension system is given here, highlighting the main similarities and differences with the Canadian system.

Social Security (OASDI)

The United States does not have an equivalent of the first tier of the pension system in Canada—a universal demogrant like the OAS and income-tested supplement like the GIS. The U.S. Social Security through Old Age, Survivors and Disability Insurance (OASDI), covering over 90 percent of the U.S. workforce, is broadly comparable to the second tier of Canada's system, the CPP. OASDI, which dates back to 1935, consists of three components: Old Age or retirement (OA), Survivor (S), and Disability (DI) benefits. OASDI is financed by a payroll tax with equal contributions by the employer and employee. In 1994, the total contribution rate was set at 12.4 percent of earnings up to a ceiling of \$60,600.¹⁰

The full Old Age Security retirement benefit is available to employees who are *fully insured* by the year of their retirement.¹¹ For individuals born in 1937 or earlier, the normal retirement age (that is, the age at which unreduced social security benefits are payable) is 65. For those born after 1937, the normal retirement age is gradually being increased. For those born in 1960 or later, the normal retirement age will be age 67. Retirement benefits are available to individuals as early as age 62 on an actuarially reduced basis. Benefits are increased for those working beyond the normal retirement age, up to age 70.

The pension benefit is based on the worker's Averaged Indexed Monthly Earnings (AIME) to which a formula is applied to determine the Primary Insurance Amount (PIA). The PIA is subject to an annual cost-of-living adjustment. Up to 85 percent of Social Security benefits

are subject to income taxes for persons whose income exceeds a certain threshold amount. The exact proportion subject to taxes depends upon such factors as marital/tax filing status, and combined income from earnings, tax-exempt interest, and social security.

Those who continue employment after commencing receipt of benefits will have their benefit subject to a clawback. For those between the ages of 65 and 69, the benefit is reduced by one-third of earnings above \$11,160 (in 1994). Those under age 65 experience a reduction in social security benefits of 50 cents for every dollar of earnings above \$8,040.

Fully insured individuals and their spouses qualify for health benefits under Medicare, which covers in-patient hospital care, home nursing and health care services, and some types of hospice care. Deductibles and coinsurance payments apply for certain services. Those qualifying for Medicare may also opt (at a fee of \$41.10 per month in 1994) for supplementary health benefits which cover a number of services not covered by the basic Medicare plan. There is an annual deductible and coinsurance for most charges.

Family members of persons receiving Social Security are also eligible for partial payments. Eligible family members include: spouses (including divorced spouses) who are at least 62 years old; spouses of any age who are caring for a child under the age of 16 or caring for a child who became disabled before the age of 22; unmarried dependent children (and sometimes grandchildren) under the age of 18 (under age 19 if the child is still in high school); and children of any age if they became disabled before age 22. The sum of these benefits are subject to a Family Maximum Benefit level. If the Social Security recipient is deceased, more generous survivor benefits are available to a slightly broader group of family members.

Pension Income as Component of Retirement Income: United States

Table 7 shows the relative contribution of OASDI benefits to the incomes of older Americans in 1979, 1989, and 1992. The median income level of those 65 years of age and older was \$8,795 in 1979, \$10,765 in 1989, and \$10,200 in 1992. OASDI benefits accounted for about 42 percent of retirement income in both 1979 and 1992. The rel-

Table 7 Contribution of Public Pension Benefits to Incomes of Americans Aged 65 and Over, 1979, 1989, and 1992

% Income derived from	1979	1989	1992
Public OASDI	42.7	38.6	41.7
Private pension income	14.8	17.5	20.1
Investment income	21.5	25.2	20.5
Employment income	17.3	15.8	14.8
Other income	3.6	2.9	3.0

SOURCE: Yablonski and Silverman (1994, p. 29).

ative share of income from investment was about four percentage points higher in 1989 than in the other two years, presumably reflecting the relatively high returns on investment vehicles experienced at the time.

While definitional differences preclude strict comparisons with the Canadian figures given in Tables 4 and 5, some comparisons can be suggested. The share of retirement income derived from sources other than public pensions are remarkably similar in the two countries. This is best seen by comparing Table 5 for Canada with the latest year figures in Table 7 for the United States. The components are usually within 1–3 percentage points of each other. The overall public pension components, at about 41 percent of retirement income, are almost identical between OASDI in the United States and the combined OAS/GIS and CPP in Canada. Because the OAS/GIS in Canada is almost twice as large as the CPP component, this means that Canada delivers its public pensions in a more “progressive” fashion—that is, universal (OAS) and income-tested (GIS). As highlighted previously, the earnings-based CPP component in Canada is extremely modest.

The Income Replacement of Public Pension Programs in the United States

The effect of this greater progressivity in Canada as compared with the United States is highlighted when comparisons are made of the extent to which public pensions replace preretirement earnings for those who retire and have no further earnings. Like the Canadian sys-

Table 8 Income Replaced by Public Pension Programs in the United States

Individual's earnings, preretirement	OA benefit (\$) ^a	Replacement rate (%)
Nil		
\$6,450 (25%)	5,087	78.9
\$12,900 (50%)	7,346	56.9
\$19,350 (75%)	9,606	49.6
\$25,800 (100%)	11,868	46.0
\$51,600 (200%)	13,764	26.7
\$129,000 (500%)	13,764	10.7

^a The OA benefit calculation assumes that the worker retired at age 65 in 1994 with average indexed annual earnings shown in the first column.

tem, the U.S. Old Age benefit program is designed to replace a greater proportion of preretirement earnings for lower income workers. The effect of this policy is demonstrated in Table 8, which shows the income replacement rates for individuals with preretirement earnings levels corresponding to the Canadian levels given earlier in Table 6. Individuals earning the average Canadian industrial wage of \$25,800 would have almost 50 percent of their preretirement earnings replaced by the OAS benefit. The replacement rate is higher at 79 percent for those earning one-quarter of the average industrial wage, and is lower at 27 percent for those who earn twice the industrial wage.

While the U.S. public pension system has elements of progressivity, it is much less so than the Canadian system. For persons at one-quarter of the industrial wage, the Canadian system replaces 130 percent of preretirement income, as compared with 79 percent in the United States. For persons at twice the industrial wage, the Canadian system replaces only 21 percent of preretirement income, as compared with 27 percent in the United States.

Intergenerational Transfers: United States

As of 1994, it has been estimated that the OASDI will require funding from other government revenues by the year 2013 and will

become insolvent by 2029 (U.S. Department of Health and Human Services 1994). An increase in the contribution rate from the present 12.4 percent to 19.0 percent of earnings by 2070 would be required to fund the benefits at current levels. No contribution rate increases have been scheduled.

As a result of the 1983 reforms to the Social Security Act, the normal retirement age of individuals born after 1937 has been gradually increased. For those born in 1938, the normal age of retirement is 65 years and 2 months. For those born in 1960 and after, the normal retirement age is 67. Assuming that the normal retirement benefit remains at its January 1, 1995 level of \$884, the impact of increasing the normal retirement age from 65 to 67 has been estimated to result in a reduction in the monthly benefit for an individual who chooses to retire at age 65, with average indexed monthly earnings of \$2,000, from \$884 to \$766. This 13.3 percent reduction is due to the fact that those retiring at age 65 will be doing so early, given the increase in the normal retirement age to 67, and thus their benefit will be subject to the reduction formula applied to the benefits of those who retire prior to the normal retirement age. Similarly, those retiring at age 67 will receive a 6 percent smaller monthly payment in comparison to the pre-reform benefit because the increase in benefits due to late retirement would not be applied given the older normal retirement age (Salisbury and Silverman 1994).

POTENTIAL INCENTIVE EFFECTS

While a full mapping of the incentive effects of the public pension schemes in Canada and the United States is beyond the scope of this analysis, some broad characterizations can be suggested. More complete discussions of theory and empirical research into the work incentive effects of social security benefits can be found in popular labor economics texts such as Ehrenberg and Smith (1994) and Gunderson and Riddell (1993), and they are also contained in broader reviews of the pension literature including Mitchell and Fields (1982) and Lazear (1986).

Work Incentives

An analysis of the financial incentives contained in public (and private) pension benefits on the decision to retire from the labor market typically begins by calculating the discounted present value of the future stream of such benefits, commonly termed “pension wealth,” at different points in the lifetime of the worker. In essence, pension wealth at time t is a measure of the future stream of pension payments due to the worker if the worker were to retire or otherwise terminate participation in the pension plan at time t . Other factors constant, it is assumed that workers seek to maximize their pension wealth.

The period-by-period changes in pension wealth, termed “pension accruals,” embody the magnitudes of the financial incentives for the worker to remain in the labor force earlier in the life-cycle and then retire later in the life-cycle. For pension plans based on, for example, average earnings over some number of years of pensionable employment, an additional year of service generally brings about an increase in the monthly benefit payable to the worker. This increases pension wealth. Working against this, however, is the inevitable fact that every year the pension plan member gets a year older and the remaining years over which benefits can be received falls. In other words, over any period of time, while the monthly benefit payable to the worker may increase, the amount of time the worker has left to collect the benefit falls. As workers age, depending on the specific benefit formula of the pension plan, the positive impact on pension wealth of labor-market work becomes increasingly offset by the reduced amount of time remaining to receive the benefit. At some point, which again is influenced by the specific benefit formulae contained in the pension plan, pension payments foregone by not retiring are not offset by increased monthly benefits, and pension wealth accruals become negative—that is, pension wealth falls with increased work. At some point in time, the two effects are completely offsetting, at which point pension wealth is maximized. Delaying receipt of benefits beyond this point is associated with negative pension wealth accruals and, clearly, reductions in pension wealth (see Kotlikoff and Wise 1987; Lazear and Moore 1988; Pesando and Gunderson 1988; and Pesando, Hyatt and Gunderson 1992). Thus, as long as pension wealth accruals are positive, there is an incentive to continue work, or stated differently, there is no pension

penalty to continued labor market employment. Holding pension wealth accruals constant, increases in pension wealth are expected to be associated with younger retirement ages.

If Social Security benefits are unexpectedly increased, but the post-retirement income clawback, the preretirement labor-market wage and other factors are all held constant, economic theory predicts that the retirement age will fall—that is, the increase in Social Security benefits will have a pure wealth effect, encouraging workers to consume leisure. Anderson, Burkhauser, and Quinn (1986) estimated that unanticipated increase in Social Security wealth significantly increases the probability of retiring earlier and significantly decreases the probability of retiring later, for a sample of men aged 58 to 63 in 1969.¹²

Some public pension plans, like U.S. Social Security, have postretirement earnings tests such that pension payments are clawed-back by some proportion for each dollar of labor-market income (usually over some threshold amount). These earnings tests effectively reduce the wage net of pension benefit reductions, thereby reducing the opportunity cost of retirement. Policies that reduce the clawback would increase time in labor-market work, thereby increasing the expected retirement age, but they would also result in greater wealth, thereby reducing the expected retirement age. Which of the two effects dominates is an empirical question that Gustman and Steinmeier (1991) addressed through a simulation analysis. Their results suggest that eliminating the Social Security clawback would have a small positive effect on the labor supply of those in the 65–69 age group.

In summary, Social Security can be expected to discourage continued labor-market work (i.e., encourage retirement) both because the income transfer enables the individual to afford to retire and because the clawback reduces the net returns to continued work. The income or wealth effect may be small because it is largely anticipated and hence can affect labor-supply decisions throughout the life-cycle, not just when the income is received after the normal retirement age. Nevertheless, income that is guaranteed in the later part of the life-cycle can be particularly important in facilitating retirement since it does not require the uncertainty of liquidating assets to pay for retirement—assets that can be bequeathed if not used and can be used up too quickly if one lives longer than expected.

While Social Security can discourage labor-force participation after the age of normal retirement, it can encourage labor-force participation in earlier stages of the life-cycle to build eligibility for the benefits. Furthermore, the wealth effects emanating from the intergenerational transfers can affect retirement decisions. Specifically, the older generations who are recipients of the transfers can more easily afford to retire. Future generations who are net payers may be less likely to afford to retire.

As indicated previously, the Canadian public pension system has a different set of incentives. The intergenerational wealth redistribution effects are likely to be similar because both involve transfers from younger generations to older generations. However, the more progressive nature of the Canadian system implies that lower income people in Canada may more easily be able to afford to retire.

More importantly, the absence of direct clawbacks on CPP in Canada means that there are less disincentives to keep working past the normal retirement age.¹³ For lower income people who would otherwise receive the GIS supplement, however, the 50 percent clawback for that component could discourage continued work. In essence, there may be some tendency for the Canadian system to encourage retirement amongst lower income persons, both because the progressive nature of the system means that they can afford to retire and because the 50 percent clawback of the GIS supplement is likely to discourage work most amongst low-income persons. Overall, however, the absence of a direct clawback on CPP in Canada should mean that there is more incentive to continue working and not to retire.

Interestingly, the United States appears to facilitate continued working past the normal retirement age because of the legislated ban on mandatory retirement. However, it discourages continued working through the clawback of Social Security. In contrast, mandatory retirement in Canada is generally not banned¹⁴; however, continued labor-force participation is not discouraged through tax-back features of the public pension system (except possibly for low-income persons as indicated).

Payroll Taxes and the Demand for Labor

While most attention on incentive effects focuses on the labor-supply side, the payroll taxes used to finance the CPP in Canada and Social Security in the United States can also have important incentive effects reducing the demand for labor. The issue is complicated, however, by the fact that payroll taxes may be shifted back to labor in the form of lower wages in return for the pension benefits that are financed by the payroll tax.

Dahlby (1992), based on previous econometric studies, concluded that in the short-run, workers bear less than 50 percent of the payroll tax burden, increasing to at least two-thirds in the longer term.

Payroll taxes can affect the demand not only for the overall labor input but also for the different components of the labor input. Specifically, the ceilings on the payroll tax mean that the tax does not apply to earnings beyond the ceiling. This can create an incentive for firms who have employees at the ceiling to work them long hours (since no further payroll taxes are incurred) rather than to hire new recruits and to incur the payroll taxes. In essence, the ceilings create an element of quasi-fixed costs of employment that can discourage new employment and encourage firms to demand longer hours from existing employees. This can be a contributing factor, for example, to the tendency to work incumbent workers overtime hours on a regular basis rather than hiring new employees. Since the ceiling on CPP contributions in Canada is reached sooner (i.e., at \$25,800) than the ceiling on Social Security contributions in the United States (i.e., \$60,000), this constraint should be more binding in Canada than in the United States.

CONCLUDING OBSERVATIONS

There is a clear trend to early retirement that exists in both Canada and the United States. In both countries, in the immediate post-war period, the labor-force participation rates of males aged 65 and over were in the neighborhood of 47 percent. By the early 1990s, these had fallen to well under 20 percent and closer to 10 percent in Canada. Participation rates of older workers have consistently been higher in

the United States than in Canada. Of note, however, is the fact that after 1985, U.S. participation rates began moving upwards, while Canadian rates continued their downward trend. Whether this reflects the impact of the legislated ban on mandatory retirement in the United States (a ban that did not occur in Canada) is an interesting and important question.

Overall, the following general conclusions emerge from this analysis.

- In addition to the earnings-based CPP (broadly comparable to OASDI in the United States), the Canadian public pension system also has a universal demogrant, the OAS, payable to all Canadians 65 and over, and an income-tested supplement, the GIS.
- As a source of retirement income, the OAS demogrant and the GIS supplement are more important than is the labor-market-based, earnings-related CPP. In fact, the target income replacement rate of the CPP is designed to be modest, at 25 percent of the average industrial wage. As a result, an individual who qualifies for the maximum CPP benefit, but who has no additional income other than the OAS pension, would qualify for some income-tested GIS benefits.
- The U.S. public pension system of OASDI, which is broadly comparable to the Canadian CPP, does not have a universal demogrant like the OAS, nor an income-tested supplement like the GIS. In spite of these differences, the public pension systems in both countries are remarkably similar as a source of retirement income, accounting for slightly over 40 percent of retirement income in both countries. Canada simply delivers more of its public pension under universal and income-tested components, while the United States delivers its public pension largely through the labor-market-related, earnings-based component.
- In both countries, the public pension systems are progressive or redistributive in that they involve higher income replacement rates for low-income persons and lower income replacement rates for higher income persons. In Canada, however, this is much more prominent. This reflects the fact that total public pension benefits are almost constant with respect to income: the OAS

demogrant is completely flat and the CPP component, which is earnings-related, is modest, capped, and effectively subject to the 50 percent GIS clawback because CPP benefits are included in total income for purposes of that clawback.

- In the United States, the continuation of working past a normal retirement age is facilitated by the legislated ban on mandatory retirement, but it is discouraged by the clawbacks on Social Security that range from 0.33 to 0.50, depending upon age and income. In Canada, in contrast, mandatory retirement is not generally banned, but continued work is also not discouraged in the sense that there is no direct clawback from the CPP. There is only an indirect clawback for low-income people in the sense that any additional income (including CPP income) is subject to the 50 percent clawback of the GIS supplement.
- Payroll taxes that are used to finance public pensions can reduce the overall demand for labor. The ceilings on such payroll taxes can also create a quasi-fixed hiring cost that discourages new hiring (that would be subject to the payroll tax) and that encourages working the existing workforce long hours (since no further payroll taxes are incurred once the ceiling is reached). The impact of such taxes on the demand for labor, and on the demand for hours versus new hires, is complicated by the fact that the cost of a large portion of the payroll tax is ultimately shifted back to labor.
- In both Canada and the United States, public pension programs contain significant intergenerational transfers, to current from future generations, creating some uncertainty as to the willingness and ability of future generations to sustain future pension “obligations.”

These conclusions highlight the substantial degree of variation in the key parameters of the public pension systems in the United States and Canada. This variation can potentially be exploited to understand and examine the behavioral effects of public pensions in a way which is seldom possible in a single jurisdiction, unless that jurisdiction experienced a major change in policy regimes. This echoes the sentiment expressed by Card and Freeman (1993, p. 2) that, “(i)f one wants to study the impact of differing unemployment insurance, income mainte-

nance, or labor laws on economic behavior and outcomes, comparisons of Canadian and U.S. experiences hold out the promise of relatively straightforward inferences.”

There are at least two areas of research on public pensions that have the potential to realize some of the promise suggested by Card and Freeman. The first is an examination of the comparative labor demand effects induced by financing public pensions exclusively through a payroll tax, as is the case in the United States, or a combination of a payroll tax and general revenues, as is the case in Canada. It would also be possible to examine the extent of disemployment in Canada that results from the quasi-fixed cost of hiring created by the relatively low payroll tax ceiling in Canada. These features have competing implications for employment and hours. This first suggests that Canadian firms will hire more workers than U.S. firms, while the second suggests that rather than hire new workers, firms will try to amortize the quasi-fixed cost of the payroll tax by working its existing workforce longer hours. However, as we cautioned earlier, the impact on labor demand of a payroll tax depends on the ultimate incidence of the tax, which some evidence suggests may fall largely on workers in the form of lower wages.

Second, on the supply side, useful research would consider the impact of pension generosity on labor-force participation. It would be expected that labor-force withdrawal rates would be higher for low lifetime income earners in Canada than for their counterparts in the United States. Confounding considerations, such as the fact that mandatory retirement is still permitted in some provinces, would have to be addressed in the research design.

Both Canada and the United States have exhibited a dramatic trend towards retirement as exhibited by the falling labor-force participation rates of males age 65 and older. The role of public pensions (as well as private pensions and mandatory retirement policies) in stimulating, or facilitating, this trend remains an important topic of future research.

Notes

1. The Government of Canada also provides an additional tax credit (equal in 1993 to 54 percent of the basic personal tax credit) for those age 65 or over and additional tax credit for the first \$750 of private pension income. In Quebec, the Canada Pension Plan is replaced by its equivalent, the Quebec Pension Plan.
2. There is also a Spouse's Allowance, which is income-tested and payable from age 60 to 65 to eligible widows, widowers, and spouses of OAS pensioners. In 1993, the maximum annual allowance was \$6,160 to spouses and \$6,801 to widows and widowers.
3. Additional income-tested benefits for those aged 65 and over provided by several provinces are also exempt from the GIS tax-back provisions. Indeed, receipt of GIS benefits is generally used as the eligibility criterion for these provincial supplements. As an example of a provincial supplement, Ontario paid a maximum supplement of \$83.00 per month in 1994 to single retirees through its Guaranteed Annual Income System (GAINS) program. The supplement is scaled down based on a formula which takes into account other sources of income, such as interest and dividend payments, foreign pensions, CPP benefits, employment income, unemployment benefits, workers' compensation payments, and net rents from property.
4. The self-employed pay both employer and employee contributions. The CPP also contains death (including surviving spouse's) and disability benefits.
5. For those between the ages 60 and 65 who opt for early retirement, the normal retirement benefit is reduced by 0.5 percent for each month that early retirement precedes normal retirement to a maximum reduction of 30 percent. The worker must have substantially ceased working, meaning that the worker's employment earnings must be less than the maximum CPP benefit payable at age 65.
6. Of course, these costs can be shifted back to employees in the form of lower compensating cash wages in return for more generous pension benefits. Evidence on such cost shifting in union-based flat benefit plans in Canada is given in Gunderson, Hyatt, and Pesando (1992).
7. The contribution growth rate is expressed in nominal terms. This facilitates comparison with the CPP growth rate, which reflects both increases in the earnings base and increases in the contribution rate.
8. The retirement benefit payable under the CPP is linked to the worker's average lifetime earnings, updated to the three years prior to the worker's retirement. The mechanics are as follows: The ratio of the worker's earnings to the YMPE (set equal to one if earnings exceed the YMPE) is averaged for each year after the worker turned age 18 (or 1996). The resulting fraction (or the value one) is multiplied by the YMPE average for the year of retirement and the two previous years. This is called the worker's Average Pensionable Earnings (AYMPE). The procedure, in effect, updates the worker's lifetime earnings to their current equivalent. The worker's CPP benefit is equal to 25 percent of the worker's AYMPE. (If a worker earned more than the YMPE in every year, for, example, the worker's pen-

sion would equal 25 percent of the YMPE in the years in which the worker was 63, 64, and 65. If the worker has contributed for more than 10 years, 15 percent of the months in the contribution period can be dropped before the worker's AYMPE is calculated. In effect, this allows the worker to eliminate the periods of lowest earnings.

9. The contribution rates through the year 2016 were set in the 1990–1991 review of contribution rates, per agreement among the federal and provincial ministers of finance.
10. The self-employed pay both employer and employee contributions.
11. A fully insured individual is one who has (or whose spouse has) earned 40 credits in the year in which they reach age 62. In 1994, a credit is earned for every \$620 of employment earnings, up to a maximum of four credits per year. The amount of employment earnings required to earn a credit increases annually, to reflect changes in the average industrial wage.
12. For an excellent discussion of these issues, see Ippolito (1990). Krueger and Pischke (1992) find only small effects of increases in Social Security wealth on labor-force participation of older workers.
13. As described earlier, to draw CPP benefits before age 65 an individual in Canada must have substantially stop working.
14. Except in the federal jurisdiction, which covers about 10 percent of workers, and in the provinces of Manitoba and Quebec.

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