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Income Security and Stability During Retirement in Canada

**Sébastien LaRoche-Côté
John Myles
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SEDAP Research Paper No. 236

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Income Security and Stability During Retirement in Canada

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Abstract

Post-war policies and subsequent debates had two policy targets: reducing old-age poverty and enhancing income security for the “average worker” after retirement. While we know a lot about the first issue, the second has received less attention as a result of data limitations. We take advantage of unique longitudinal data based on Canadian tax files (the LAD) to examine income replacement rates of older Canadians relative to their economic status when they were in their mid-fifties. In 2005, the replacement income of retired individuals in their mid-seventies who were in the *middle* of the income distribution at age 55 (in the early 1980s) was between 70 and 80 percent of their previous incomes some 20 years earlier. This figure is at the high end of the range (65 to 75 percent) that experts generally consider “adequate” for middle-income retirees to maintain their pre-retirement living standards. However, we also show that there is considerable variation in replacement rates. By age 75, about a quarter of *middle-income* persons had retirement incomes of less than 60 percent of the income they were receiving in their mid-fifties, a result of differential access to private pension income. We also ask whether income replacement rates have been rising or falling among more recent cohorts of retirees but find little change. Finally, we report results about the stability of incomes in the retirement years. We conclude that year to year instability in family income declines for both high and low income earners as they age, largely because of the stabilizing effect of public pension income sources.

JEL Classification: J14, J26, D60, D63, H19, H55, I30

Keywords: retirement, income security

Résumé

Les politiques d'après-guerre et les débats qui s'en sont suivis avaient deux objectifs: réduire la pauvreté des personnes âgées et renforcer la sécurité économique du «travailleur moyen» après son départ à la retraite. Bien que nous soyons bien renseignés sur la première question, la deuxième a reçu moins d'attention en raison de l'insuffisance des données. Nous profitons d'une base de données longitudinales unique construite à partir des déclarations d'impôt des canadiens (le DAL) pour examiner les taux de remplacement du revenu des retraités Canadiens par rapport à leur situation économique à la mi-cinquantaine. En 2005, le revenu de remplacement des retraités âgés de soixante-quinze ans qui se situaient au milieu de la distribution des revenus à l'âge de 55 ans (au début des années 1980) collectaient entre 70 et 80 pour cent de leur revenu 20 ans plus tôt. Ce chiffre se situe dans le haut de la fourchette (65 à 75 pour cent) que les experts considèrent généralement "adéquat" pour que les retraités aux revenus moyens puissent maintenir le niveau de vie dont ils jouissaient avant leur départ à la retraite. Cependant, nous observons aussi qu'il existe des variations considérables entre les taux de remplacement. Environ un quart des individus *aux revenus moyens* âgés de 75 ans percevaient des revenus de retraite inférieures à 60 pour cent des revenus qu'ils percevaient à la mi-cinquantaine. Ce résultat s'explique par les différences d'accès aux revenus provenant de fonds de pensions privées. Nous avons également examiné si le taux de remplacement des revenus des cohortes de retraités les plus récentes ont augmenté ou à baissé mais nous n'avons détecté que peu de changements. Enfin, nous rapportons des résultats concernant la stabilité des revenus pendant les années de retraite. Nous observons une baisse de l'instabilité des revenus familiaux d'une année à l'autre aussi bien dans les familles aux revenus faibles qu'élevés à mesure qu'elles vieillissent, en raison principalement de l'effet stabilisateur des sources de revenus provenant des régimes de pension publics.

Introduction

As in all western democracies, old-age income support was a top priority on Canada's social policy agenda from the 1950s to the 1970s and had two major drivers. The first of these was the fact that during the post-war decades "old age" was a virtual synonym for poverty. The second was the rapid spread of retirement – the labour force practice of superannuating elderly workers at a fixed age without regard to their physical or mental capacity to continue in employment. High rates of old age poverty were in large measure due to the fact that the elderly of the day had experienced "poor" lives -- their peak working years occurred during the Great Depression -- and they were beyond the stage when they were able to benefit from the enormous economic expansion that followed the Second World War. But their poverty was accentuated by the drive to create jobs for the young men returning from war and the resulting acceleration of mandatory retirement practices in the absence of well developed pension schemes.

These two features of the post-war world established the two major parameters for social policy debates. How best to deal with the anti-poverty objective? And, how best to provide income security for workers in a world in which mandatory retirement was becoming the norm? The anti-poverty objective dated from the pre-war era but the income security objective was new for governments (Perrin 1969). Many workers were happy to embrace retirement but only if retirement was accompanied by a "retirement wage" that allowed them to maintain their pre-retirement living standards. For high-wage, "middle class," workers, simply avoiding "poverty" was hardly a satisfactory trade-off for giving up their jobs at age 65. Their aim was *income security*, a "retirement wage" sufficient to maintain pre-retirement living standards in old age. To achieve this objective the Canadian Congress of Labour called for the addition of a universal and publically administered earnings-related pension in 1953 to supplement the universal flat benefit Old Age Security program adopted in 1951. Their call was met in 1965 with the addition of the Canada and Quebec Pension plans (C/QPP).

How well has the Canadian old-age support system coped with these two objectives – reducing poverty *and* maintaining pre-retirement living standards (*income security*) in retirement. The answer to the first question is well known. Although Canadian public expenditures on old age security is near the bottom of the international league lists, Canada stands near the top among western democracies with respect to reducing rates of old age poverty rates (Smeeding and Sullivan 1998). But what about income security? How well, for example, do middle-income workers fare when they enter their retirement years?

The question of *income security*, especially for families of "average" workers (the "middle class") was the key issue taken up by the Canadian Government's *Task Force on Retirement Income Policy* (1979), probably the most thorough and sophisticated report on Canada's retirement income system ever undertaken.¹

1. For low- income families, the anti-poverty and income security objectives are virtually synonymous. By 1979, the combination of Old Age Security benefits and the Guaranteed Income Supplement ensured income replacement rates of 100 percent or more for such families, a finding replicated here. Nor was there particular concern about high-income families who were well-placed to save for their own retirement, especially in light of widespread coverage by private pensions among high earners and their equally widespread use of Registered Retirement Savings Plans. These assumptions reflect the standard result from studies of savings behaviour, namely is that the savings to permanent income ratio rises with permanent income but does so in a sharply non-linear fashion (Diamond and Hausman, 1984).

The authors of that report were not optimistic. They concluded (1979: 175) that the current system would not maintain the “the living standards of those who were middle-income earners during their working years.” The income replacement rate for the average worker from Canada’s public system (Old Age Security and the Canada Pension Plan) were modest – ensuring only 40 percent of pre-retirement income – and flaws in private occupational pensions (including inadequate coverage, vesting and portability rules) made it unlikely that they would provide a satisfactory solution for the future. The first best solution according to the *Task Force* (and many pension experts) would be a dramatic expansion of the Canada and Quebec Pension Plans to European-like levels that would make private occupational plans redundant. A second best solution, according to the task force, would be to make occupational plans mandatory for all Canadian workers, a strategy later adopted by countries such as Australia, Denmark, the Netherlands and Switzerland. With onset of recession in the early eighties, all such plans were abandoned and Canada’s retirement income system remains much as it was in 1979.

Since then, of course, Canada’s old age pension system has matured (Myles 2000). In 1979 few retirees were receiving benefits from the Canada and Quebec Pension Plans and the expansion of private occupational plans and Registered Retirement Savings Plans in the post-war decades would only benefit workers retiring in the 1980s or even later. So what has been the outcome?

As the *Task Force* (1979: 101) observed at the time, there were no (longitudinal) data available to measure the relationship between the living standards of the current elderly and the living standards they experienced during their working years. Ours is one of the first studies to overcome that difficulty. To do so, we use a rich source of longitudinal data (Statistics Canada’s longitudinal administrative databank based on taxation records, the LAD) and we follow a cohort of individuals over two decades to examine various aspects of income security in retirement. The analysis is restricted to individuals who, at age 55, had a significant attachment to the labour force². The analysis does not focus on poverty in retirement, about which a lot is known, but rather income replacement among individuals with significant labour market attachment during the working years.

The results (on average) are at odds with the expectations of the *Task Force* and other experts of the period, at least for the particular population on which this analysis focuses. We find that by the turn of the century replacement rates for middle-income families are higher than the *Task Force* expected. In 2005, the replacement income of retired individuals in their mid-seventies who were in the *middle* of the income distribution at age 55 (in the early 1980s) was between 70 and 80 percent of their previous incomes some 20 years earlier. This figure is at the high end of the range (65 to 75 percent) that experts (Schulz 1992: 99) generally consider “adequate” for middle-income retirees to maintain their pre-retirement living standards. Moreover, it is at the high end of the replacement rates that even the most generous (e.g. Sweden) welfare states offer retired workers through their public pension schemes that the *Task Force* sought to emulate.³ Strikingly, these estimates produced with longitudinal data are not far from cross-sectional estimates of “quasi-replacement rates” based on comparisons of the incomes of the elderly with those of the non-elderly (OECD 2001:24).

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2. For technical reasons related to tax filing behavior, and outlined in the “data” section of the paper, the analysis was restricted to individuals who had individual earnings of \$10,000 or more at age 55.
 3. The OECD (2001:24) estimates of quasi-replacement rates also confirm that, on *average*, Canada is it at the high end of the international distribution.

We also show, however, that there is considerable variation among the replacement rates. By age 75, about a quarter of *middle-income* persons had retirement incomes of less than 60 percent of the income they were receiving in their mid-fifties. This heterogeneity in replacement rates is consistent with the expectations of the *Task Force*. The main concern of the *Task Force* was the uneven coverage of private pension plans and RRSP contributions among Canadian workers with average earnings. And our results show that for middle-income earners, it is largely whether one has income from these two sources that differentiates people with low and high replacement rates after age 70. Had Canada embarked on the more ambitious public pension program proposed by the *Task Force*, we would expect much less variation in the replacement rates of middle-income families. Just how much less, however, we are unable to say. Variation in replacement rates also reflects actual differences in employment and earnings histories of individuals who were in the middle of the income distribution by their mid-fifties. Retirement incomes in old age reflect the *entire* employment and earnings history of each individual in our sample and no such data is available. Although income at age 55 provides a reasonable (and previously unavailable) benchmark to estimate income security in old age, it is far from being the ideal benchmark.

We also report income replacement rates for low and high-income individuals. Among individuals in the *bottom* quintile, median replacement rates remained at about 1.0 (100 percent of their incomes at age 55) throughout their retirement years. Individuals in the *top* quintile experienced a larger drop in replacement rates, to around 70 percent since they were starting from a much higher income base at age 55.

We also ask whether income replacement rates have been rising or falling among more recent cohorts of retirees but we find little change. People aged 55 in 1983 experienced roughly the same median replacement rates in retirement as those aged 55 in 1995. However, family income levels among more recent retirees have been rising, mainly because of higher income from family employment earnings in the early retirement years, and private pensions. We do not currently have the data to determine if this trend will continue in the longer run, given the decreased private pension coverage among younger worker, and the shift from defined benefit to defined contribution plans.

Finally, we report results about the stability of incomes in the retirement years. Income replacement rates (say at age 75 compared to age 55) are not very useful for evaluating *income security* if the incomes of the elderly fluctuate wildly from year to year, as a result, say, of changes in real interest rates. In fact, we conclude that year to year instability in family income declines for both high and low income earners as they age, largely because of the stabilizing effect of public pension income sources.

Data

Statistics Canada's Longitudinal Administrative Data base (LAD) consists of a random 20% sample of the T1 family file, a yearly cross-sectional file of all taxfilers. Individuals selected for the LAD are linked across years to create a longitudinal profile of each individual. The LAD contains demographic, income and other taxation information for the period from 1982 to 2005, which makes it possible to track individuals for a maximum of 23 years. As a result, it is possible to follow the evolution of the financial situation of individuals after retirement over a long period. Our focus is on six cohorts of Canadians who were aged from 54 to 56 years in 1983,

1986, 1989, 1992, 1995 and 1998 and who earned at least \$10,000 at this age (in 2005 constant dollars). We exclude individuals earning less than \$10,000 at age 55 since many of them did not file a return at the time.⁴ This implies that our focus is on individuals who had a significant degree of attachment to the labour market when they were in their mid-50s.

Our six samples (one for each cohort) were constructed as follows. First, individuals who were still alive in 2005 were included if they filed an income return for every year of the period of analysis.⁵ For instance, individuals from the 1983 cohort were included in the sample if a return was filed every year from 1983 to 2005. Second, individuals who died before 2006 were also included if a return had been filed for all years until the year before they died. For instance, consider an individual who was aged 55 in 1983 and who died in 1995 at the age of 67. To be included in our first sample, a return must have been filed for each of the years 1983 to 1994, which was the last complete year of his/her life. As a result of this process, we obtain six samples with a number of observations ranging from approximately 70,000 in 1983 to 100,000 in 1998 (see Table 1 for more information). Women comprised one third of the sample in 1983, but this share rose to more than 40% in 1998, which is consistent with the higher rates of labour market participation seen among younger cohorts of women. In this paper, we use our first cohort of 1983 most often because it covers the longest time period (20 years). The other samples are used only to examine differences across cohorts.

Table 1
Sample characteristics

Cohort	Aged 54 to 56	Total number of observations	Men		Women	
			Number of observations	Share of total (%)	Number of observations	Share of total (%)
1	1983	68,735	46,345	67.4	22,390	32.6
2	1986	73,970	48,735	65.9	25,235	34.1
3	1989	75,930	47,800	63.0	28,130	37.0
4	1992	76,970	46,705	60.7	30,265	39.3
5	1995	85,440	50,700	59.3	34,740	40.7
6	1998	100,565	58,530	58.2	42,040	41.8

Note: The numbers might not add up due to rounding.

Source: Statistics Canada, Longitudinal Administrative Data base.

4. With the introduction of the Goods and Services Tax in 1986 and the Child Tax Credit in 1992, low-income individuals became more likely to file an income tax return in order to apply for various tax credits. Prior to 1992, low-income individuals had fewer incentives to file. We get similarly defined cohorts by excluding all individuals with less than \$10,000 in earnings, which is close to the basic exemption amount that was used for most years in federal tax returns and above which most individuals should be expected to file (which corresponds to approximately 50% of all individuals aged 54 to 56 years old in every cohort). One alternative could have been to include individuals with positive earnings. If this had been the case: (1) coverage would have increased by a little, albeit unequally across cohorts (from 53.1% among those aged from 54 to 56 years old in 1983, to 58.6% in 1998); and (2) our results would have been essentially the same, although replacement rates among low-income individuals would have been slightly higher.
5. It was necessary to exclude these individuals for reasons of consistency. Naturally, fewer individuals were lost in more recent cohorts because individuals were followed over a shorter period of time. In 1983, about 68,800 individuals were included in the final sample (out of 78,900 individuals aged 54 to 56 with at least \$10,000 in earnings), which means that about 10,100 were excluded because of reporting problems (12%). In 1998, only 7,800 were excluded, out of 108,400 individuals (about 7% of individuals with at least \$10,000 in earnings).

Our measure of income is based on adult-equivalent-adjusted (AEA) *family* income (on a constant basis), which includes the income of the spouse and all other family members in the Census family unit. For the most part, we use family income after tax because this measure of income is the best approximation of the level of financial well-being experienced by individuals. Our family income values are then adjusted by dividing total family income by the square root of family size to take account of economies of scale that accrue to people who live together in families.⁶ Finally, income levels by age are calculated on a ‘permanent’ basis, in order to account for temporary fluctuations that might not be representative of the true financial situation of the family. For example, the permanent income of someone aged 54 was calculated by dividing the sum of income levels reported at age 53, 54 and 55 by three.⁷ We also tested several alternative definitions of income to assess the robustness of our conclusions. All income figures are expressed in 2005 dollars adjusted with the consumer price index.

The income replacement rate is the standard indicator of welfare loss associated with retirement. We compute replacement rates by age, using permanent income at the beginning of the period (age from 54 to 56) as a benchmark when earnings are typically at their peak.⁸ In addition to median replacement rates by cohort, we also compute replacement rates across key points in the income distribution, again using permanent income at the beginning of the period as a benchmark to classify individuals across income groups.

We have not attempted to pursue one of the more important dimensions of income security in old age, namely the effects of widowhood on the income trajectories of the elderly, especially among elderly women. Early on we determined that estimating the effects of widowhood required a more complex research design than that employed here and would be taken up in a separate paper. And, ideally, we would want to track individuals into their eighties, a task that will become feasible as more data points are added to the LAD file in future years.

Results

Replacement Rates

Family-income replacement rates represent the percentage of permanent family income at age 55 ‘replaced’ by the sources of income that are available during retirement and can be used as an indicator of welfare ‘loss’ associated with retirement. Based on the assumption that family expenses will be lower in retirement than before retirement, it is generally agreed that 100% income replacement in retirement is not necessary. In the absence of children, expenses for goods and services are lower; work-related expenses disappear; there is no longer a need to save for retirement; and, where home-ownership rates are high (as in Canada), housing costs tend to be lower in the retirement years.

Policy-makers in the rich democracies have typically set a target replacement rate of from 65% to 75% for the average worker (Schulz 1992: 99). In Canada, Old Age Security and the Canada and Quebec Pension Plans were designed to replace about 40% of pre-retirement earnings for the average worker and it was assumed the balance would come from private pensions and personal

6. Changes in the family composition over time are taken into account in our calculations.

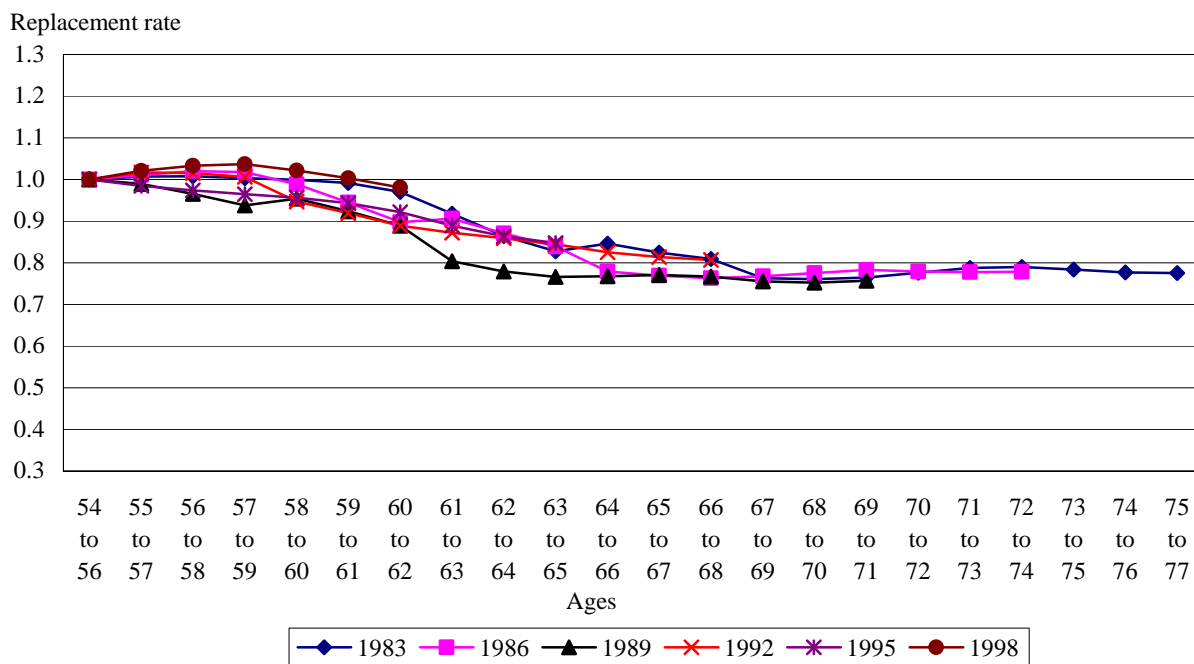
7. Individuals with less than \$1,000 in permanent adult-equivalent adjusted income were excluded from our sample, but these amounted to a very tiny portion of the final sample (less than 0.1%).

8. Earnings peak at age 55, but total family income peaks around 60 years of age (see figure 5).

savings. Low-income families who are already living on the margin are assumed to require higher replacement rates (close to 1.0) while high-income families are assumed to require less.

Figure 1 shows that median replacement rates for the entire sample remain close to 1.0 until around age 60, then decline to about 0.8 around age 65. Furthermore, longer time series from older cohorts indicate that replacement rates remain relatively stable until late in life. The main implication of this is that the Canadian pension system appears to be doing relatively well in ensuring basic standards of well-being among seniors who had a substantial attachment to the labour force, at least for individuals near the median.⁹

Figure 1
Median replacement rates of adult-equivalent-adjusted family income after taxes



Source: Statistics Canada, Longitudinal Administrative Data base.

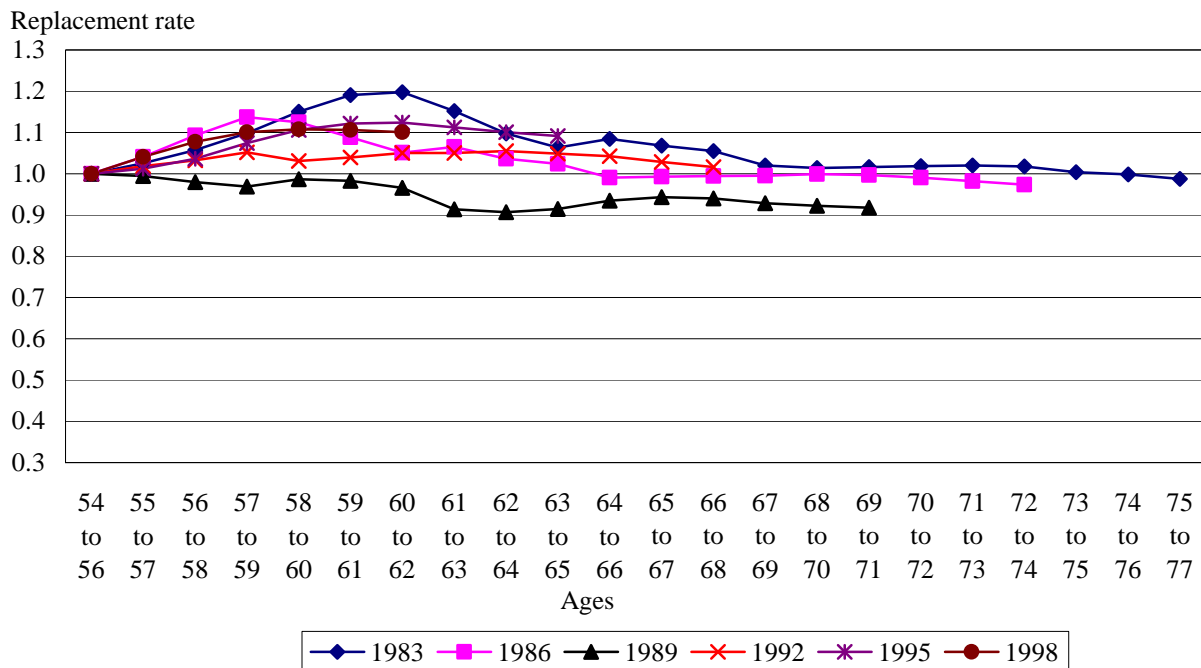
However, there is considerable variation in replacement rates both within and between pre-retirement income levels as shown in Table 2 for the 1983 cohort.¹⁰ Almost 50% of individuals had a replacement rate above 1.0 at age 59 to 61. This proportion fell to 35% at age 64 to 66 and to 23% at age 69 to 71. Conversely, the share of individuals with a replacement rate of 0.6 or less increased from 10% at age 60 to 21% by age 75.

9. Recall that these results are based on family income, which is more indicative of the level of financial well-being enjoyed by individuals over the course of the retirement period. The median replacement rate after age 65 is about 10 percentage points lower when individual income is used instead of family income, at approximately 0.7 (see Appendix A of the original research paper, no. 306 in the Analytical Studies Research Paper Series, Statistics Canada, for more detail).

10. Results for the other cohorts are not shown, but showed similar results when comparisons could be made. Readers interested in other cohorts will find a complete description of these results in Appendix B of the original research paper (see note 9).

Are these results a cause for concern? In other words, do individuals have low replacement because of limited access to retirement income, or simply because their permanent income was initially high? If low-income individuals aged from 54 to 56 consistently had replacement rates above 1.0 in the following years, this would suggest that the pensions system is relatively effective in preserving the living standards of low-income seniors. Conversely, if low-income individuals had lower and lower replacement rates as they age, this would raise serious questions about the ability of the pensions system to maintain their living standards in retirement. One way to deal with this is to control for initial income levels. We do so by dividing the population into five quintiles (for each cohort) based on their permanent adult-equivalent-adjusted income at age 55 and by examining the distribution of replacement rates in the first, third and fifth quintiles of permanent income. Results for individuals in the bottom quintile are shown in Figure 2.

Figure 2
Median replacement rates of adult-equivalent-adjusted family income after taxes, bottom quintile



Source: Statistics Canada, Longitudinal Administrative Data base.

For the majority of low-income families (the bottom quintile), median replacement rates were generally high, and remained close to, or above 1.0.¹¹ The 1989 cohort, which was undoubtedly affected by the 1990-to-1992 recession, is the exception.¹² These are encouraging results but if many low-income seniors had replacement rates much below the median, there would be cause for concern. Hence, it is also important to examine the distribution of individuals across categories of replacement rates within the bottom quintile as well.¹³

11. Recall that we have excluded persons earning less than \$10,000 around age 55.
 12. These results are consistent with Gower (1998), who also finds higher replacement rates among low-income individuals.
 13. The distribution of replacement rates within quintiles are also based on our first cohort of individuals aged from 54 to 56 in 1983. Other cohorts have shown similar distributions (see Appendix B for details).

The results are shown in the second panel of Table 2 and indicate that about half of all individuals in the bottom quintile enjoyed full replacement rates until late in retirement. Four out of five had replacement rates above 0.8 at age 75. Nevertheless, nearly 20% of the bottom-quintile seniors aged 70 had replacement rates below 0.8, which suggests that a sizeable number may face financial stress.

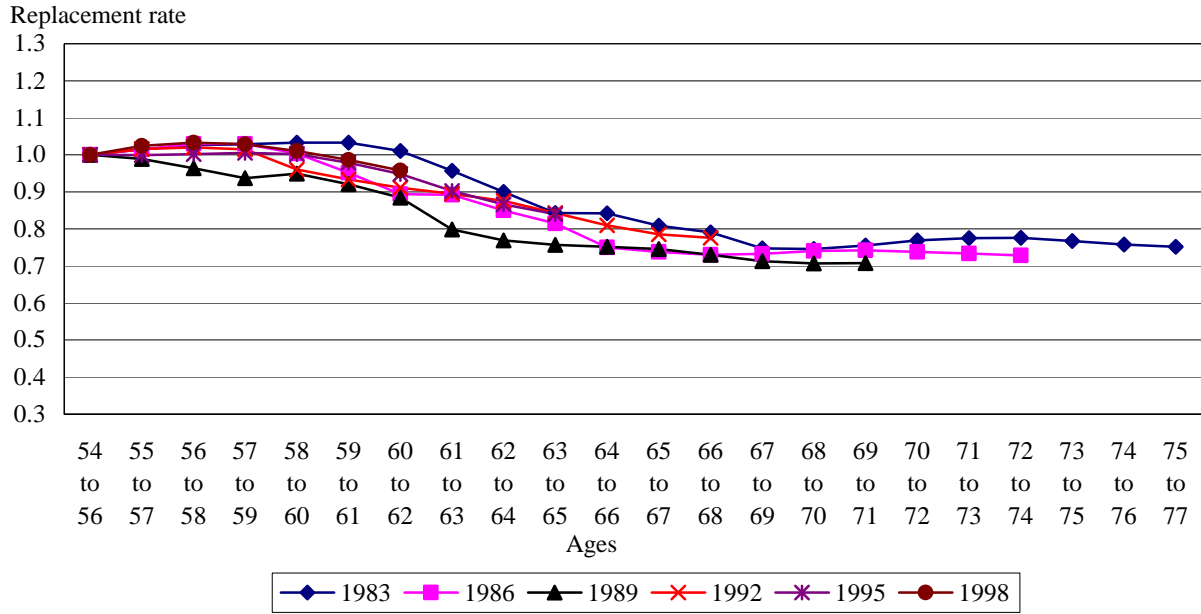
Table 2
Distribution of individuals across replacement rate categories, all individuals

	Distribution of replacement rates by age (percent)				
	54 to 56 years old	59 to 61 years old	64 to 66 years old	69 to 71 years old	74 to 76 years old
All individuals					
<= 0.4	0.0	2.3	2.9	2.4	2.7
> 0.4 and <=0.6	0.0	7.2	14.8	19.0	18.4
> 0.6 and <=0.8	0.0	16.2	26.7	34.1	32.4
> 0.8 and <=1.0	100.0	25.5	21.0	21.5	22.4
> 1.0 and <=1.5	0.0	38.9	24.0	17.2	18.0
> 1.5	0.0	10.0	10.6	5.7	6.0
Bottom quintile					
<= 0.4	0.0	3.4	1.6	0.1	0.1
> 0.4 and <=0.6	0.0	5.3	5.2	1.4	1.8
> 0.6 and <=0.8	0.0	10.6	16.1	19.4	18.3
> 0.8 and <=1.0	100.0	18.5	21.8	28.1	28.9
> 1.0 and <=1.5	0.0	42.9	33.4	35.0	35.1
> 1.5	0.0	19.4	21.8	16.0	15.8
Middle quintile					
<= 0.4	0.0	1.7	2.2	1.0	1.1
> 0.4 and <=0.6	0.0	7.0	15.9	23.3	23.6
> 0.6 and <=0.8	0.0	16.8	31.5	38.8	36.7
> 0.8 and <=1.0	100.0	28.3	21.9	21.4	21.6
> 1.0 and <=1.5	0.0	39.9	21.6	12.9	14.2
> 1.5	0.0	6.4	7.0	2.6	3.0
Top quintile					
<= 0.4	0.0	2.9	6.2	7.5	7.7
> 0.4 and <=0.6	0.0	10.2	21.2	28.7	26.2
> 0.6 and <=0.8	0.0	19.8	26.7	34.6	31.7
> 0.8 and <=1.0	100.0	25.9	17.7	14.8	17.5
> 1.0 and <=1.5	0.0	31.8	19.5	10.2	12.1
> 1.5	0.0	9.3	8.7	4.2	4.9

Note: Based on a cohort of individuals aged from 54 to 56 in 1983.
Source: Statistics Canada, Longitudinal Administrative Databank.

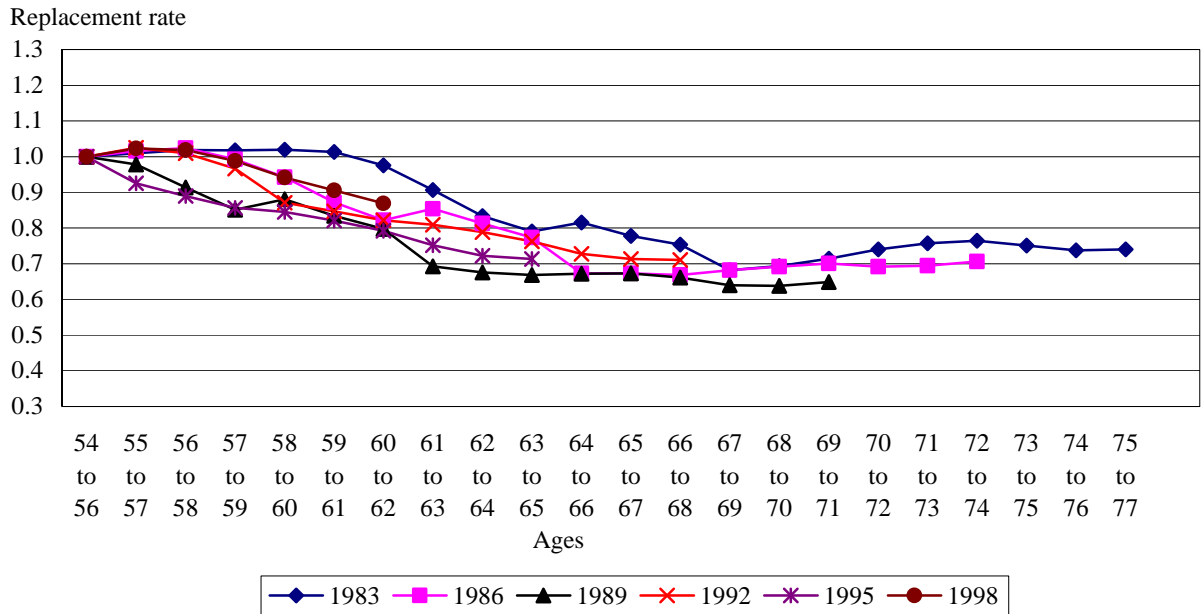
Figures 3 and 4 show median replacement rates among individuals in the middle and top quintiles, respectively. Median replacement rates among individuals in the middle quintile closely resembled those of the cohort as a whole with replacement rates above between 0.7 and 0.8 for most cohorts after age 65. After age 70, however, about a quarter of middle-income seniors have replacement rates below 0.6 (Table 2 (6)). Replacement rates among individuals in the top quintile declined to approximately 0.7 after age 65.

Figure 3
Median replacement rates of adult-equivalent-adjusted family income after taxes, middle quintile



Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 4
Median replacement rates of adult-equivalent-adjusted family income after taxes, top quintile



Source: Statistics Canada, Longitudinal Administrative Data base.

The replacement rate patterns are similar for men and women, largely because the analysis is based on family income, and not individual earnings. Hence, a man and a woman in the same family will have exactly the same family income replacement rate trajectory in retirement. Both had higher replacement rates if they were in the bottom quintile of the income distribution and lower replacement rates if they were in the top quintile. Similar results were also found in terms of the distribution of replacement rates (results not shown, but available in the original research paper).

While replacement rates vary across the income distribution, with generally higher replacement rates among individuals with lower family incomes at age 55, they also vary among individuals with generally the same income at age 55. Why do two individuals who have the same income levels at age 55 end up with very different replacement rates in retirement? Is it simply the case that one has a private pension, and the other does not? Or do other sources of income significantly affect the outcome?

To address this issue we focus on individuals from the 1985 cohort (age 55 in 1985) who were in the middle family-income quintile at age 55. We divide this group into those with high replacement rates (> 1.0), and low replacement rates (< 0.6) at various ages in retirement. We then determine the contribution of each income source to the difference in family income between the low and high replacement rate groups. The results are in Tables 3 and 4.

The average family income at age 55 of the groups with low and high replacement rates were virtually identical at around \$38,000 (adult equivalent adjusted, Table 3). Hence, differences in replacement rates in the retirement years were not due to differences in income at age 55.

Table 3 shows that at age 64 to 66, differences in employment earnings is the major factor differentiating those with high replacement rates from those with lower ones, accounting for 57% of the \$44,000 difference in income between these two groups. And as the cohort aged from 69 to 71, some maintenance of employment earnings remained the largest single factor, accounting for 40% of the still very large \$42,000 difference in family income between the low and high replacement rate groups. Differences in private pension income (occupational pensions and RRSPs) start to become important at this age—accounting for 34% of the difference—as does investment and capital gains, together accounting for about 27% of the difference. By age 74 to 76, employment earnings remain significant, accounting for 29% of the difference, but the money received from private pensions (including RRSP and RIF income) becomes the major contributor (45% of the difference).

These results are based on family income so that the earnings reported under ‘employment earnings’ for an individual aged, say from 64 to 66, may not have been earned by that particular individual, but by someone else in the family, possibly younger. Hence, it is difficult to determine to what extent remaining in the labour market during the older years accounts for the differences in outcomes between the low- and high-replacement rate groups.

Table 3
Average family income before tax by source, middle income quintile, in thousands of 2005 constant dollars

	Replacement rates				Difference (High-low)	
	Low (<60%)	Medium low (60% to 80%)	Medium high (80% to 100%)	High (>100%)	Difference (\$000)	Share of difference (percent)
Age from 64 to 66						
Average Income at age 55 (\$'000) ¹	38.9	38.7	38.7	38.6	...	...
Distribution (%)	18.1	31.5	21.9	28.6	...	...
Earnings (\$'000)	1.8	5.2	12.1	26.9	25.1	57.2
Private pensions (\$'000)	6.4	11.6	13.2	12.4	6.0	13.7
Investment gains (\$'000)	1.6	2.4	3.1	6.0	4.4	10.0
Capital gains (\$'000)	0.1	0.4	1.2	10.3	10.2	23.2
OAS/GIS ² (\$'000)	3.5	3.4	3.3	2.5	-1.0	-2.3
C/QPP ³ (\$'000)	6.7	7.0	6.6	5.5	-1.2	-2.7
Other (\$'000)	0.9	1.0	1.1	1.1	0.2	0.5
Total before tax (\$'000)	20.9	30.8	40.6	64.8	43.9	100.0
Age from 69 to 71						
Average Income at age 55 (\$'000)	38.9	38.7	38.6	38.6	...	...
Distribution (%)	24.3	38.8	21.4	15.5	...	...
Earnings (\$'000)	0.3	1.4	4.5	17.3	17.0	40.3
Private pensions (\$'000)	5.2	11.7	17.0	19.6	14.4	34.1
Investment gains (\$'000)	1.0	2.2	3.5	7.6	6.6	15.6
Capital gains (\$'000)	0.1	0.2	0.6	5.0	4.9	11.6
OAS/GIS (\$'000)	7.0	6.8	6.7	5.8	-1.2	-2.8
C/QPP (\$'000)	7.5	8.2	8.2	8.0	0.5	1.2
Other (\$'000)	0.3	0.2	0.2	0.3	0.0	0.0
Total before tax (\$'000)	21.4	30.6	40.9	63.6	42.2	100.0
Age from 74 to 76						
Average Income at age 55 (\$'000)	38.9	38.7	38.7	38.6	...	...
Distribution (%)	24.7	36.7	21.6	17.2	...	...
Earnings (\$'000)	0.1	0.9	2.7	12.0	11.9	28.6
Private pensions (\$'000)	4.4	11.1	17.6	23.3	18.9	45.4
Investment gains (\$'000)	0.8	1.8	3.0	8.3	7.5	18.0
Capital gains (\$'000)	0.1	0.2	0.5	4.0	3.9	9.4
OAS/GIS (\$'000)	7.3	7.1	7.1	6.4	-0.9	-2.2
C/QPP (\$'000)	7.6	8.3	8.4	8.2	0.6	1.4
Other (\$'000)	0.3	0.2	0.1	0.2	-0.1	-0.2
Total before tax (\$'000)	20.7	29.5	39.5	62.3	41.6	100.0

... not applicable

1. Total income after taxes.

2. Old Age Security/Guaranteed Income Supplement.

3. Canada and Quebec Pension Plans.

Note: Numbers may not add up due to rounding.

Source: Statistics Canada, Longitudinal Administrative Data base.

Table 4**Average individual income before tax by source, middle income quintile, in thousands of 2005 constant dollars**

	Replacement rates				Difference (High-low)	
	Low (<60%)	Medium low (60% to 80%)	Medium high (80% to 100%)	High (>100%)	(\$000s)	% share of difference
Age from 64 to 66						
Average Income at age 55 (\$'000) ¹	38.1	38.2	37.9	37.8	...	...
Distribution (%)	26.3	34.3	19.5	20.0	...	...
Earnings (\$'000)	0.9	3.7	12.7	24.0	23.1	54.0
Private pensions (\$'000)	5.8	12.3	11.9	10.7	4.9	11.4
Investment gains (\$'000)	1.8	2.2	3.0	6.7	4.9	11.4
Capital gains (\$'000)	0.1	0.4	1.4	12.3	12.2	28.5
OAS/GIS ² (\$'000)	3.2	3.2	2.9	2.2	-1.0	-2.3
C/QPP ³ (\$'000)	7.2	7.6	6.4	5.5	-1.7	-4.0
Other (\$'000)	0.7	1.1	1.3	0.9	0.2	0.5
Total before tax (\$'000)	19.7	30.4	39.7	62.5	42.8	100.0
Age from 69 to 71						
Average Income at age 55 (\$'000)	38.2	38.1	37.7	37.7	...	...
Distribution (%)	36.5	43.2	13.5	6.8	...	...
Earnings (\$'000)	0.0	0.5	2.6	13.1	13.1	27.6
Private pensions (\$'000)	5.1	12.8	18.0	20.5	15.4	32.5
Investment gains (\$'000)	1.0	2.0	4.2	13.0	12.0	25.3
Capital gains (\$'000)	0.1	0.2	1.0	8.3	8.2	17.3
OAS/GIS (\$'000)	6.4	6.0	5.8	4.8	-1.6	-3.4
C/QPP (\$'000)	7.9	8.4	8.5	8.5	0.6	1.3
Other (\$'000)	0.2	0.2	0.2	0.2	0.0	0.0
Total before tax (\$'000)	20.9	30.1	40.2	68.3	47.4	100.0
Age from 74 to 76						
Average Income at age 55 (\$'000)	38.2	38.1	37.8	37.7	...	...
Distribution (%)	37.9	39.7	14.1	8.3	...	...
Earnings (\$'000)	0.0	0.3	1.1	6.5	6.5	13.4
Private pensions (\$'000)	4.7	12.9	19.5	28.8	24.1	49.7
Investment gains (\$'000)	0.8	1.7	3.8	12.6	11.8	24.3
Capital gains (\$'000)	0.1	0.2	0.7	7.0	6.9	14.2
OAS/GIS (\$'000)	6.3	5.8	5.7	4.9	-1.4	-2.9
C/QPP (\$'000)	7.8	8.3	8.4	8.5	0.7	1.4
Other (\$'000)	0.2	0.1	0.0	0.1	-0.1	-0.2
Total before tax (\$'000)	19.9	29.3	39.2	68.4	48.5	100.0

... not applicable

1. Total income after taxes.

2. Old Age Security/Guaranteed Income Supplement.

3. Canada and Quebec Pension Plans.

Note: Numbers may not add up due to rounding.

Source: Statistics Canada, Longitudinal Administrative Data base.

To overcome this shortcoming, we replicate the analysis based on individual, not family, income. In this case, all reported incomes are received by the individuals themselves, not by others in the family. The results (Table 4) indicate that employment earnings is not as dominant as a source of difference, but investment and capital gains play a very large role. At age 64 to 66, remaining active in the labour market with significant earnings accounted for 54% of the difference in income between the low- and high-replacement rate groups, and investment and capital gains about 40%. But by age 69 to 71, investment and capital gains together accounted for the largest part of the income difference (43%), followed by private pensions (33%) and earnings (28%). By age 74 to 76, it is private pensions and RRSP income that primarily explains the difference in income (about 50%) between the low- and high-replacement rate groups, followed by investment and capital gains (39%) and employment earnings (13%).

To summarize, when replacement rates are computed at the family level, employment earnings is the single most important factor differentiating persons with low- from those with high-income replacement rates until the cohort enters their 70s. After that age, the difference in income from private pensions, including RRSP income, is the most discriminating factor. When computed at the individual level, the importance of employment earnings declines significantly, and investment and capital gains play a large role, accounting for around 40% of the difference between the high- and low-replacement rate groups at all reported ages. Remaining at work is the most important factor for those aged from 64 to 66, but by their middle 70s, private pensions and RRSPs become the most important source.

Income Levels Among More Recent Cohorts of Retirees

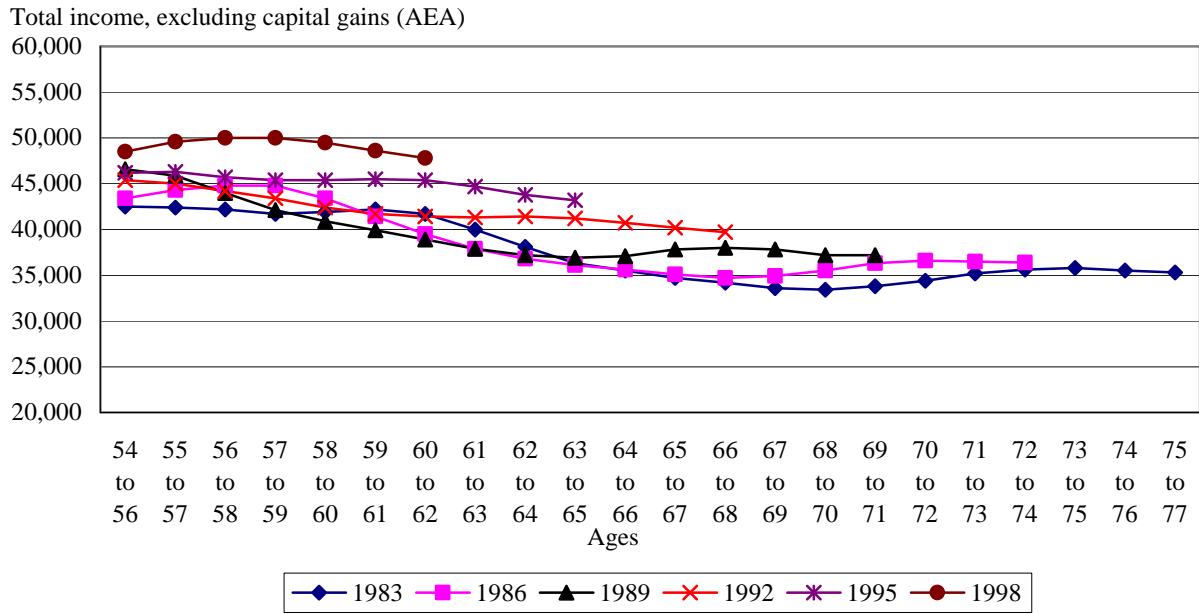
Are more recent cohorts doing better or worse financially than their predecessors as they enter the retirement years? Figure 1 shows remarkable stability in replacement rates across cohorts. People age 55 in 1983 experienced roughly the same replacement rates as those age 55 in 1995, or 1998. However, the story is somewhat different if one turns to actual income levels.

Figure 5 shows that more recent cohorts, such as those age 55 in 1995, are enjoying higher after tax family income in their early retirement years than their earlier counterparts. For example, at age 64 family income was \$35,000¹⁴ in the 1983 cohort (ie those age 55 in 1983), but had risen to around \$43,000 in the 1995 cohort. This increase was related both to increases in family earnings (see figure 6) and income from private pensions (see figure 7).

Although replacement rates have not increased among recent cohorts of retirees, family income has risen simply because income at age 55 is higher among more recent than earlier cohorts.

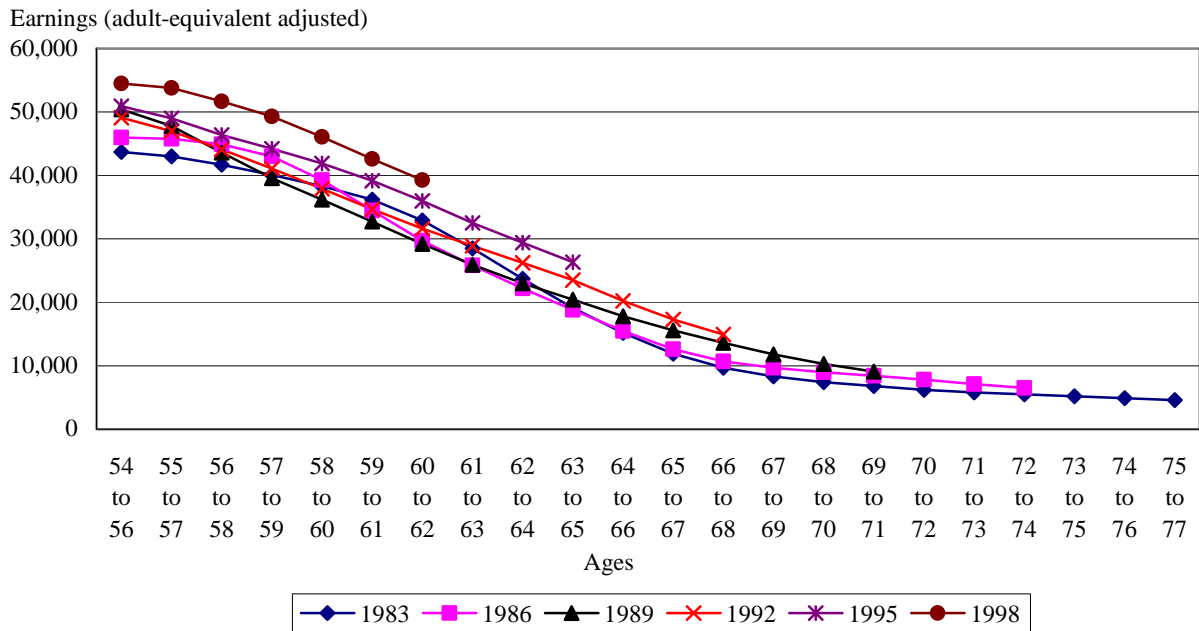
14. This is after tax family income in constant dollars, adult equivalent adjusted. To convert adult equivalent adjusted income to actual family income for a family of two, one multiplies by approximately 1.4. Hence, actual family incomes for a family of two in this case would be about \$50,000 for the 1983 cohort, rising to \$60,000 in the 1995 cohort. Note that capital gains are excluded here, simply because of a discontinuity in the way capital gains are reported associated with a legislative change in 1994. This discontinuity renders the figure less clear, but does not affect comparisons among cohorts.

Figure 5
Family income after taxes, excluding capital gains, in 2005 constant dollars per year, adult-equivalent adjusted (AEA), various cohorts



Source: Statistics Canada, Longitudinal Administrative Data base.

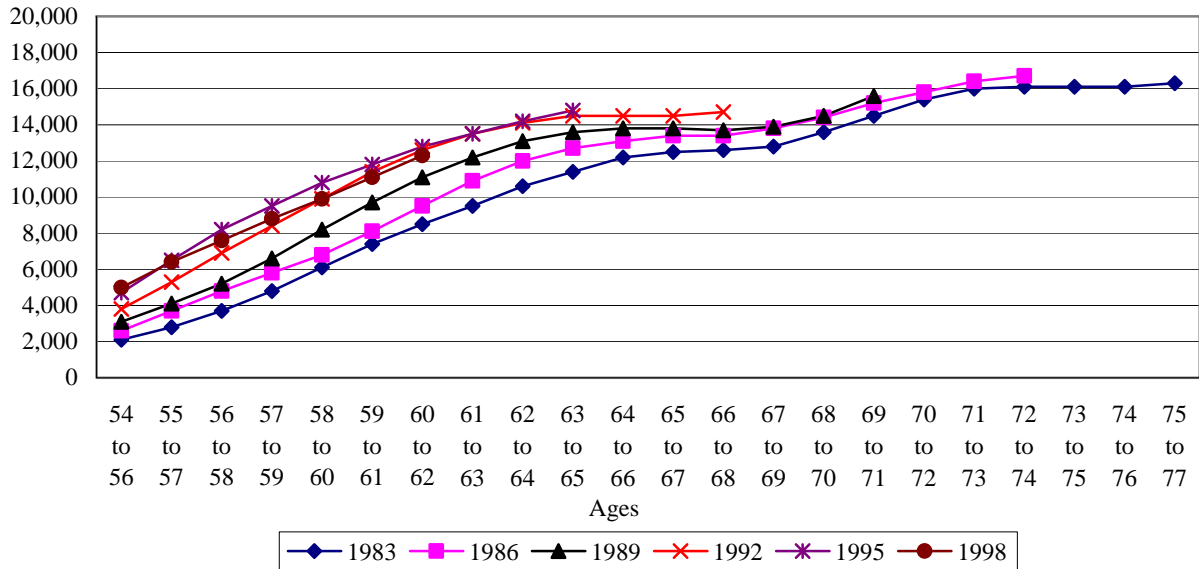
Figure 6
Earnings by cohort, in 2005 constant dollars per year, adult-equivalent adjusted



Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 7
Income from private pensions (and RRSPs) by cohort,
in 2005 constant dollars per year, adult-equivalent adjusted

Private pensions (adult-equivalent adjusted)



Source: Statistics Canada, Longitudinal Administrative Data base.

Income Stability

The core idea underlying the concept of “income stability” is the notion of predictability (the reduction of uncertainty) in year-to-year income flows at the individual family level. Instability in year to year family income may affect the well-being of individuals in that family in many ways, most notably by affecting consumption levels and by creating uncertainty. High levels of income instability in the retirement years are likely to create a good deal of stress and anxiety among seniors.

One very intuitive means of assessing income instability at the individual level is to compute the mean absolute deviation (MAD)¹⁵.

The MAD measures the average deviation, in percentage terms, of actual income from mean income levels during the observation period. For instance, if an individual has a MAD of 0.2 (or 20%), it means that his/her annual family income level during a given period of time, say five years, deviated from its mean income level during the five years by 20% each year, on average.

Table 5 shows the levels of income instability experienced by individuals who were in the bottom, middle and top tertiles of the income distribution, using results from the MAD.

Table 5
Family income instability (mean absolute deviation) by income tertiles¹

Age	All	Bottom tertile	Middle tertile	Top tertile
	Mean absolute deviation			
55 to 59 ²	0.199	0.250	0.162	0.182
60 to 64 ²	0.216	0.257	0.188	0.201
65 to 69 ²	0.126	0.138	0.115	0.124
70 to 74 ²	0.095	0.096	0.086	0.103
75 to 79 ³	0.080	0.081	0.074	0.085
80 to 84 ³	0.085	0.080	0.077	0.097

1. Includes all individuals with positive income after taxes in all 5 years of the interval studied.

2. Results based on a cohort of individuals aged 55 in 1985.

3. Results based on a cohort of individuals aged 65 in 1985.

Source: Statistics Canada, Longitudinal Administrative Data base.

There are two major observations: (1) income instability declines as the cohorts age, and (2) instability was higher among low-income individuals (bottom tertile) than among middle and higher income people at the beginning of the period, but became very similar to the instability levels of the other two groups after age 65. From age 55 to 59, in any given year individuals in the bottom tertile diverged from their mean income by an average 25%, while individuals in the middle and the top tertiles typically diverted by 16% and 18%, respectively. Annual income

15. The mean absolute deviation is computed using the following formulae,

$$MAD = \left(\frac{1}{N} \right) \sum_{i=1}^N \left[\left(\frac{1}{T} \right) \sum_{t=1}^T |y_{it}^* - \bar{y}_i^*| \right]. \quad (1)^{15}$$

Where N = number of individuals

T = number of years over which the mean deviation is computed

$y^*(i,t)$ = the residuals ($e(i) + u(it)$) from a regression of $y(it)$ on a vector of observable characteristics, including age, where $y(it)$ is the log of family income. Using the residuals from this regression in essence “detrends” the income variable to account for trends in the age income profile over the five year period. The regression assumes a common slope for the age-income profile of all individuals, but allows for a distinct intercept for each individual (hence the $u(it)$ residual term). For more detail on this approach, see the original research paper from which this paper is an excerpt, “Income Security and Stability During Retirement in Canada, Research paper # 306, Analytical Studies Research Paper Series, Statistics Canada.

There is an alternative methodology used to study income instability, developed by Gottschalk and Moffit (1994). It essentially separates the income variance into two components: a) *permanent* differences in income *between* individuals, and (b) *transitory* differences in annual income for individuals. The (b) component is a measure of income instability. This approach was also used in the original research paper, and can be found there. The results were very similar to those observed using the less complex “mean absolute deviation” approach.

deviation became much lower after age 70 (below 10%) and did not vary significantly across income groups. These results indicate that the higher levels of instability experienced by low-income individuals (due to unstable employment earnings) are eventually dampened by the stable influx of cash provided by public pensions. The main implication of this is that the pensions system not only provides income security to low-income individuals, but also significantly reduces their degree of income instability.

To assess the extent to which different sources of income dampen income instability among older individuals, we re-estimated the mean absolute deviation (MAD) using a number of different income concepts, starting with: (a) *market income*, including income from earnings, private pensions, investments and capital gains; then moving to (b) *market income plus public pensions*, including benefits from the Old Age Security, the Guaranteed Income Supplement and the Canada and Quebec Pension Plans; followed by (c) *total income* (market income plus all transfers) before taxes; and finally (d) *total income after taxes*.¹⁶ The results are shown in Table 6. Moving from one income concept to the next allows one to determine the effect of the various income components on income stability. For example, for the 65 to 69 age group in table 6, public pensions reduced income instability (i.e. the mean absolute deviation) by 15 percentage points as income instability fell from 29% based on market income alone, to 14% based on market income plus public pensions.

In general, the results show that it is the public pension system that is the main source of the reduction in income instability, and that the pension system plays a much larger role in reducing instability for lower rather than higher income individuals. This is simply because public pensions, for which annual income instability is extremely low, is a greater share of income among lower than among higher income individuals.

For example, among 70 to 74 year olds, instability falls by 13.2 percentage points as one moves from market income alone (MAD of 22.8%) to total family income after taxes (9.6%). Of this 13.2 percentage point decline, 12.1 percentage points is associated with the public pension system and the remainder with other transfers and taxes. This result is for all individuals. The effect of the pension system on instability in the bottom tertile is even greater, reducing income instability (the mean absolute deviation) by 20.7 percentage points (32.1-11.4). In the top tertile, in contrast, the pension system improved income instability by only 6.5 percentage points (17.6-11.1).

The end result is that, after age 65, income instability is very similar for people at the top and bottom of the distribution (mean absolute deviation of around 10%). The larger effect of the public pension system among the lower income offset the higher instability in market earnings among this group.

But *average* income instability can also be misleading. Around this average of, say, 20% mean absolute deviation, is a distribution. Some people may have very low levels of instability, and some very high.

16. For convenience, Table 5 only includes individuals who had positive market income in all years, but individuals were similarly classified across tertiles (similar boundaries).

Table 6
Family income instability (mean absolute deviation) based on various income definitions¹

	Mean absolute deviation			
	All	Bottom tertile	Middle tertile	Top tertile
55 to 59 years²				
Market income	0.236	0.300	0.206	0.206
Market income + public pensions	0.215	0.262	0.186	0.196
Total income before taxes	0.200	0.238	0.172	0.190
Total income after taxes	0.187	0.218	0.159	0.181
60 to 64²				
Market income	0.304	0.379	0.287	0.255
Market income + public pensions	0.228	0.261	0.212	0.213
Total income before taxes	0.210	0.232	0.194	0.204
Total income after taxes	0.200	0.216	0.183	0.200
65 to 69²				
Market income	0.290	0.396	0.275	0.217
Market income + public pensions	0.140	0.154	0.132	0.138
Total income before taxes	0.138	0.149	0.129	0.137
Total income after taxes	0.123	0.132	0.113	0.124
70 to 74²				
Market income	0.228	0.321	0.205	0.176
Market income + public pensions	0.107	0.114	0.097	0.111
Total income before taxes	0.106	0.112	0.095	0.111
Total income after taxes	0.096	0.100	0.085	0.103
75 to 79³				
Market income	0.218	0.315	0.201	0.155
Market income + public pensions	0.091	0.092	0.085	0.094
Total income before taxes	0.090	0.091	0.084	0.094
Total income after taxes	0.080	0.082	0.074	0.085
80 to 84³				
Market income	0.217	0.297	0.198	0.173
Market income + public pensions	0.095	0.091	0.085	0.105
Total income before taxes	0.094	0.089	0.084	0.104
Total income after taxes	0.085	0.081	0.076	0.096

1. Includes all individuals with positive market income in all 5 years of the interval studied.

2. Results based on a cohort of individuals aged 55 in 1985.

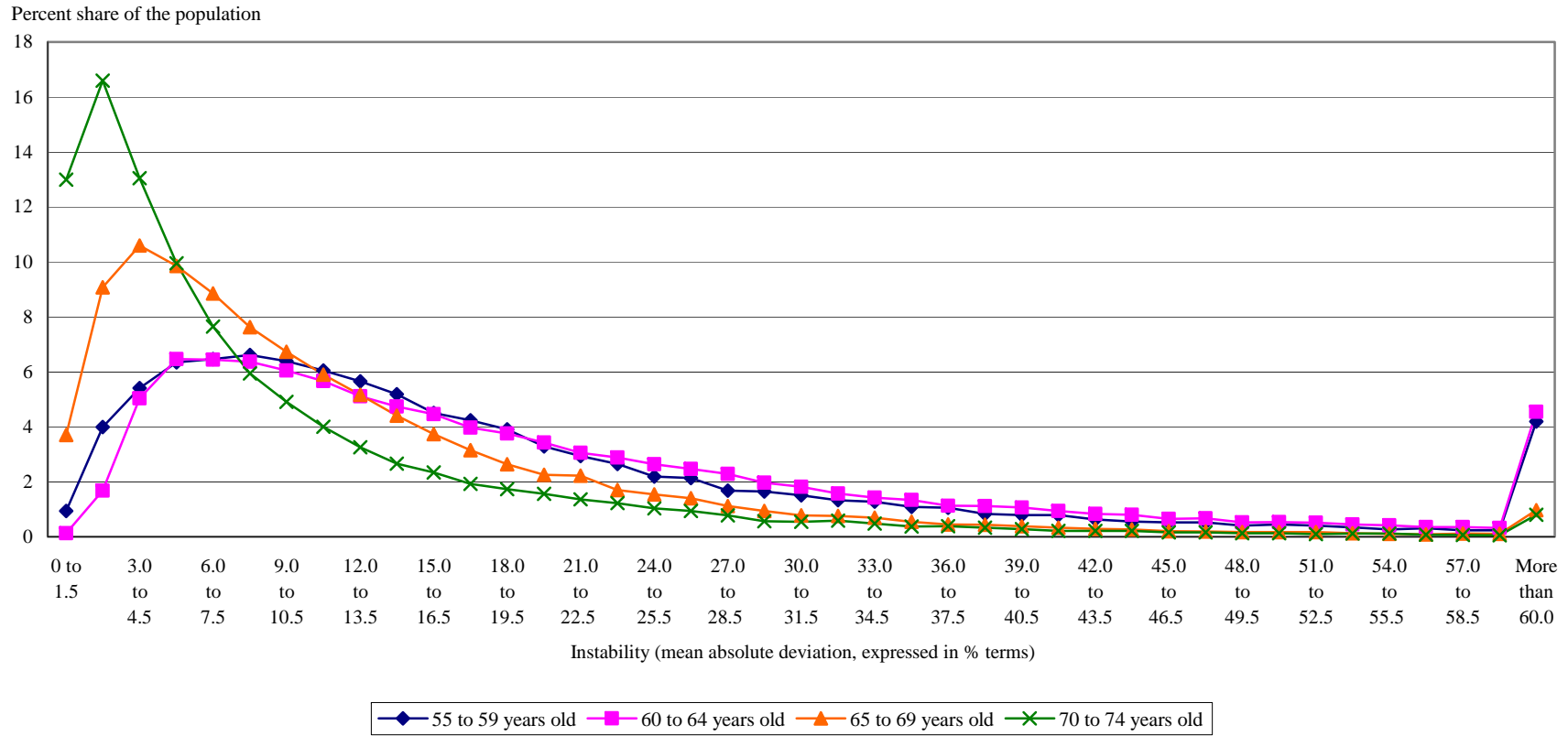
3. Results based on a cohort of individuals aged 65 in 1985.

Note: Market income includes earnings, private pensions (including registered retirement saving plans), investment and interest gains and capital gains.

Source: Statistics Canada, Longitudinal Administrative Data base.

In Figure 8, we follow the cohort of individuals aged 55 in 1985 to study the changes in the distribution of instability over four age periods: from 55 to 59, from 60 to 64, from 65 to 69 and from 70 to 74. The results clearly show that the distributions move to the left after age 64, indicating that income levels became increasingly stable (instability as measured by the MAD declined) for most seniors as they advanced into their retirement years. At age 60 to 64, there is considerable dispersion of instability, with a significant proportion registering a MAD between 3% and 12%, but also a large proportion beyond 25% and even over 60% mean absolute deviation. By age 70 to 74, the population was heavily concentrated around very low instability levels of less than 10%. These findings suggest that the pension system not only reduces income instability for individuals as they age, but also the *variation* in income instability among retired people. That is, income instability is both lower, and more similar among seniors as a result of the public pension system. This is in addition to providing minimum levels of income security, especially among low-income seniors.

Figure 8
Percentage distribution of the population by mean absolute deviation levels, and by age group



Source: Statistics Canada, Longitudinal Administrative Data base.

Conclusion

Creating a retirement income system that would generate replacement rates between 65 and 80 percent of pre-retirement incomes was a widespread goal during the post-war decades in the affluent democracies. Some nations (Germany, Sweden) moved quickly in the late fifties to establish universal earnings-related pension schemes that would reach that target. In Canada, policy-makers chose a more modest route. In 1965, the Canada and Quebec Pension Plans were added to the flat-benefit Old Age Security program created in 1951. Together, the two programs would replace about 40 percent of the income of the average worker. The expectation then was that the difference for most workers would be made up by private occupational pensions (then rapidly expanding) and personal savings (e.g. in RRSPs).

By the end of the seventies, however, scepticism that the desired replacement targets would be reached under existing arrangements was widespread in Canada and in countries with similar designs, largely due to inadequate coverage by private pensions. In the 1980s, Australia, Denmark, the Netherlands and Switzerland all adopted the second option proposed by the *Task Force* and made occupational pensions mandatory for all employees.

Recent research, however, has begun to cast doubt on these earlier expectations. An influential report prepared by the Organization for Economic Cooperation and Development (OECD 2001) concluded that levels of income replacement in most of the affluent democracies were quite high and similar despite widely divergent pension designs and levels of public benefits. Those results, however, are based on estimating “quasi-replacement” rates, i.e. by comparing the incomes of the elderly to those of the non-elderly with cross-sectional data.

Recent longitudinal data produced by Statistics Canada allow us to estimate true replacement rates during their 60s and 70s for individuals with significant labour force attachment. Our main conclusion is that, on average, Canada’s income retirement system provides relatively high levels of income replacement for elderly Canadians who had significant attachment to the labour force in their 50s: 100 percent or more for low income individuals, close to 80 percent for those in the middle, and about 70 percent for those with high incomes.

Averages, of course do not tell the whole story. Roughly a quarter of middle income individuals (in their mid-fifties) had income replacement rates of less than 60 percent by their mid-seventies. By the time they reached their 70s, access to a private pension and RRSP income was the main factor differentiating people with low from those with high income replacement rates. This is important, since both the coverage and type of private pensions are undergoing change.

Our analysis of income stability also confirms that the retirement income system yields very stable year-to-year flows of income over the retirement years, due largely to the stabilizing effects of public pensions. Generally speaking, we find that poorer individuals have higher levels of income instability than richer individuals during their late 50s and early 60s, largely because of greater instability in employment income. As the cohorts age, however, the more stable benefits from the public pension system lead to more income stability among low-income individuals and the gap in income stability between the rich and the poor disappears.

But the retirement income system is continuously changing. The results reported for the cohorts included in this analysis, people entering the retirement years during the late 1980s and 1990s, may or may not hold for future cohorts.

In the short term, there are a number of reasons to believe that economic outcomes for most retirees with significant labour market attachment will not be any worse than those reported here. The educational attainment of retirees is increasing dramatically. In 1990, around one-quarter of Canadian aged 55 to 64 had completed some form of post-secondary education; by 2006 this had risen to around one-half. This likely means that the lifetime earnings of future retirees will be higher, and the desires and opportunities for some employment earnings during the retirement years may be greater than among their predecessors.

The opportunities for employment are also likely to be greater for retirees in the future. Many analysts are predicting labour shortages as the workforce ages and labour supply declines. This increased demand will likely result in increased employment opportunities for seniors, if they wish to pursue them and are healthy enough to do so. Furthermore, with the rise in the two earner family during the 1970s and 1980s, more women entering retirement will have worked a significant portion of their lives, meaning an increased contribution to the retirement income in many families.

But there remain a number of areas for concern regarding income maintenance. Replacement rates may remain an issue for families without a private pension or significant RRSP savings, the widowed, divorced or separated women, and possibly immigrants who enter Canada in their later years, and do not have time to accumulate savings prior to retirement.

As one moves farther into the future, possible outcomes regarding replacement rates are, of course, even less certain. Private pension coverage has been falling among younger people, and in some industries a shift from defined benefit to defined contribution plans is underway. These and other changes may significantly affect replacement rates in the more distant future.

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