



Catalogue no. 11F0019M — No. 306

ISSN: 1205-9153

ISBN: 978-0-662-48209-3

Research Paper

Analytical Studies Branch Research Paper Series

Income Security and Stability During Retirement in Canada

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March 2008

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Published by authority of the Minister responsible for Statistics Canada

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La version française de cette publication est disponible (n° 11F0019M au catalogue, n° 306).

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Abstract

Past research has shown that the Canadian pension system is relatively effective in helping seniors to stay out of poverty. However, the extent to which the pension system enables individuals and families to maintain living standards achieved during their working years after retirement (income security) is less well understood. To help fill this knowledge gap, we employ 20-year longitudinal data to track individuals as they move from age 55 through their retirement years. We use various measures of an individual's family income to study four main issues: change in income levels through retirement; the role that various income sources play in this change; variation in replacement rates through time and between poorer and richer individuals; and, finally, the degree of long-term stability in individual incomes. For workers with average incomes, family income falls after age 60, declines until age 68, and then stabilizes at approximately 80% of the income level they had at age 55. In contrast, low income individuals (those in the bottom income quintile) experience little change in income as they move from age 55 through the retirement years, largely because of the income maintenance effects of the public pension system. They experience high levels of individual income instability in their late 50s and early 60s, but income instability falls dramatically after retirement. Individuals in the top quintile experience substantially larger income declines in retirement so that income inequality within a cohort declines as the cohort ages. More recent groups of retirees are experiencing higher income levels than earlier cohorts, largely because of higher private pensions. Replacement rates have changed little among cohorts, however. Whether recent gains in income levels will persist in future cohorts is unknown since pension coverage has been falling among younger workers.

Keywords: income security, income stability, retirement, replacement rates, seniors

Executive summary

This study is concerned with the economic welfare of individuals following retirement, and hence we use a family-income concept, usually family income after taxes (i.e., disposable family income). Using a rich source of longitudinal data, we track the income levels of individuals over a period of more than 20 years as they enter retirement and we calculate a number of statistics that can be related to the degree of financial preparedness for retirement.

Our results indicate that, on average, family income peaks at around age 60, then declines until around age 68, and remains stable thereafter. However, this pattern varies tremendously depending upon where one is located within the income distribution. There is little change, on average, in the income levels of lower income people as they move through retirement, while individuals near the top of the income distribution experience significant declines in income through retirement.

By their late 60s, public pensions (including the Canada and Quebec Pension Plans, Old Age Security and the Guaranteed Income Supplement) account for about half of the income of bottom quintile individuals, and private pensions and registered retirement saving plans for only 18%. Among top quintile individuals, private pensions, investments and capital gains provide the major source (57%) of income.

More recent cohorts of retirees (say those age 55 in 1998) have higher family-income levels than their earlier counterparts (say those age 55 in 1983) when they enter retirement, largely because of higher private pensions. Whether these increased benefit levels will continue for future cohorts is unknown, since private pension coverage has been falling among younger workers.

A replacement rate is an individual's income at any age, say 70, compared with his income at age 55. Among individuals aged 55 in 1983, median replacement rates started falling below 1.0 at around age 60, fall to about 0.8 by their late 60s and then remain stable.

Replacement rates vary considerably across income levels, however. The median replacement rate for the middle quintile stabilized from 70% to 80% of pre-retirement income, well within the target range usually considered necessary to maintain pre-retirement living standards. Nevertheless, by age 70, almost a quarter had fallen below the 60% level. Among individuals in the bottom quintile, median replacement rates remained at about 1.0 throughout their retirement years. Individuals in the top quintile experienced a larger drop in replacement rates, to around 0.7 by their middle 60s, since they were starting from a much higher income base at age 55.

In addition to variation in replacement rates *across* the income distribution, there is variation in rates *within* an income quintile. Individuals with virtually identical family incomes at age 55 can obviously have very different replacement rates in retirement. Focusing on the middle income quintile, analysis indicates that high replacement rate individuals are distinguished from low replacement rate individuals (from the same income quintile at age 55) by employment earnings early in retirement, investment and capital gains, and in later retirement, access to private pension income.

The evidence suggests that there has been little change in the pattern of replacement rates across cohorts. More recent cohorts (e.g., those age 55 in 1995) appear to have similar patterns of replacement rates as they age as retirees in the 1983 cohort.

In addition to income level and replacement rates, income instability can be an issue for retirees. By income instability, we mean the amount of year-to-year variation in income levels for any individual. High levels of income instability can lead to consumption issues in some years, and possibly emotional stress.

We reach two main conclusions. First, poorer individuals have higher levels of income instability than richer individuals during their late 50s and early 60s, but as the pension income kicks in and stabilizes incomes, the gap in income instability between the rich and poor disappears. Secondly, income instability declines for all groups as they age, largely because of the stabilizing effect of public pension income sources.

1 Introduction

In Canada, as well as in all other major industrial economies, the aging of the population poses a number of challenges to the pension system. According to the most recent population projections, the number of seniors aged 65 and over will surpass the number of children aged less than 15 years within 10 years (Martel and Caron-Malenfant 2006). Furthermore, the proportion of retirees will increase considerably, relative to active wage earners, in the near future. In this context, the degree of financial well-being experienced by seniors will likely become an issue of paramount importance, not only for the beneficiaries of pensions, but also for active workers contributing to the pension system, for policymakers and for the business community.

Information about the financial well-being of seniors following retirement remains relatively scarce. While other studies have shown that the pension system has been effective in keeping seniors out of low income, much less is known about the extent to which pre-retirement lifestyles can be maintained for a long time after retirement. In this paper, we fill this gap by developing a series of statistical indicators that can be related to the degree of income security during retirement.

To do so, we use a rich source of longitudinal data (Statistics Canada's Longitudinal Administrative Data base based on taxation records) and we follow a cohort of individuals over two decades after retirement to examine various aspects of income security. Our paper includes the following information: (1) income levels accessed by individuals after retirement for various cohorts of workers; (2) the role of various income components in providing income security during retirement, i.e., earnings, public pensions, private pensions, investment income and other sources; (3) retirement income replacement rates, i.e., an individual's income level at any age (say 70) compared with his/her income at age 55; and, (4) the degree of income instability experienced by seniors (or the degree of year-over-year variation in income levels).

Our findings indicate that more recent cohorts of retirees are better off than earlier ones when they enter retirement, largely because of higher private pension benefits. We also find that for a typical worker, income begins to fall at around age 60, dropping to about 80% of what he or she earned at age 55, and then remains stable for a long period of time. However, this pattern varies considerably, depending upon where the individual stands within the income distribution. We also find that poorer individuals have higher levels of income instability than richer individuals during their late 50s and 60s, but this gap largely disappears as they begin to access the more stable income flows they receive from the public pension system lead.

We proceed as follows. In Section 2 we review some of the literature associated with financial security during retirement. Section 3 describes the data and the methodology we use in this paper. In Section 4 we examine income levels and the evolution of income sources after retirement. Section 5 discusses the results associated with replacement rates. Finally, Section 6 provides some information about income instability at various stages of the retirement period, or the degree of year-over-year variation in income levels.

2 Background

The Canadian pension system has two major objectives: to alleviate poverty among the elderly, and to prevent a significant decline in living standards after retirement. (Task Force on Retirement Income Policy 1979). In order to achieve these objectives, the government intervened by creating public pension plans and by helping to finance private pensions with an array of tax incentives. The public pension schemes include Old Age Security programs, which pays a flat rate amount to all eligible Canadians aged 65 or more; the Canada and Quebec Pension Plans, which pay earnings-related benefits to workers based on contributions made during their working years. The Guaranteed Income Supplement provides an income-tested supplement to retirees with few or no private sources of income. Tax-assisted private pensions include employer-sponsored registered pension plans (RPPs) and individually based registered retirement saving plans (RRSPs). These tools have remained largely unchanged over the past 25 years and they are likely to become important sources of revenue for an increasing number of Canadians in the near future (Myles 2006).

Is our pension system effective in achieving the two objectives mentioned above? With respect to the first objective, it appears that Canada is doing well. For example, other studies have shown that the pension system has been relatively effective in keeping seniors out of low income (Myles 2000) and in improving the purchasing power among the elderly (Baldwin 2006).

Much less is known about the second objective, the extent to which pre-retirement lifestyles can be maintained after retirement. In the United States, studies based on longitudinal data have investigated the degree of income security among seniors, by using the concept of income-replacement rates. Replacement rates are based on income earned during retirement, expressed as a percentage of the level of income earned by individuals during their working years. Smith (2003), for example, calculates retirement income replacement rates over a period of 25 years and shows that (1) replacement rates change over the course of the retirement years; (2) that replacement rates are very sensitive to one's position in the income distribution; and, (3) that the pension system offered high replacement rates for low-income households.

What about Canada? Originally, the pension system was intended to provide an income replacement rate for the average worker corresponding to 60% or 70% of the level of earnings enjoyed prior to retirement. Public pensions were intended to pick up approximately 40% of the tab (Li 2006, Department of Finance 1995). Until very recently, however, it was not possible to assess the degree of income replacement following retirement. The lack of information about the degree of financial well-being after retirement partly stemmed from the absence of a dataset that could provide the opportunity to observe the income levels of a specific cohort of seniors over a sufficiently long period of time. This obstacle is now removed with the development of a rich longitudinal income dataset—Statistics Canada's Longitudinal Administrative Data base (LAD)—that makes it possible to track individuals for more than two decades.

In a short article, Gower (1998) made a courageous attempt to evaluate the degree of income security during retirement in Canada, using data from a LAD that was only 14 years old at the time. Gower selected a cohort of individuals who were aged at least 55 in 1992, who obtained at least 50% of their income from employment sources in that year, and who had no employment income by 1995. He computed income-replacement rates corresponding to the income level of

1995 expressed as a share of the income level they had earned in 1992. He found an average income-replacement ratio of 58% among all individuals, and also found that those that were in the bottom part of the income distribution in 1992 had much higher replacement rates in 1995 than those who were in the middle and in the top of the income distribution. However, Gower could not examine income-replacement rates in the long run, and did not examine the sources of income that contribute the most to the income security of seniors. To our knowledge, this paper is the first Canadian study that investigates income security over a long period of time following retirement.

We develop a number of statistics related to the degree of income security during retirement, very much in the spirit of Smith (2003). These include not only average replacement rates at various points of the income distribution but also an examination of the distribution of replacement rates, which vary considerably across individuals. We also provide new information about changes in the sources of income over the retirement years.

Another important aspect of income security is the degree of income instability, or year-over-year variation in income levels experienced by seniors. Morissette and Ostrovsky (2005) have shown that income instability varies considerably over the working life of individuals, with younger workers experiencing more instability and older workers experiencing more stability. Morissette and Ostrovsky also demonstrated that working individuals in the bottom of the earnings distribution experience more instability than other workers. This is important, as it suggests that seniors—and especially low-income seniors—may also experience considerable income instability which may create a good deal of anxiety and stress. We adopt the variance decomposition techniques used in Morissette and Ostrovsky to investigate the degree of income instability experienced by seniors at various stages of the retirement period. We also investigate if instability is higher among individuals that, prior to retirement, were in the bottom of the income distribution.

3 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.¹ 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.² 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.

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.³ 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.⁴ We also tested several alternative

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1. 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.
 2. 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).
 3. Changes in the family composition over time are taken into account in our calculations.
 4. 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%).

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.⁵ 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.

4 Trends in income levels after retirement

We begin by examining the evolution of income levels among a single cohort of workers over two decades. For this purpose, we use our first cohort of workers aged from 54 to 56 in 1983, and we examine the evolution of their average family adult-equivalent-adjusted (AEA) income after taxes over 20 years. We also calculate separate results for individuals that were in the bottom, middle and top quintiles of the ‘permanent’ income distribution in 1983. The objective is to provide a sense of whether the level of living standards enjoyed prior to retirement are maintained later in life.

The results for this cohort are shown in Figure 1. Average family income reached a peak of \$45,600⁶ at age 60 and then fell sharply to \$38,600 by age 64. Average income rises slightly at age from 65 to 67, declines over the next three years, and then stabilizes after age from 67 to 69.

In contrast, income did not decline among individuals in the bottom quintile after age 65 (Figure 2), but income levels in the bottom quintile were relatively low to begin with. Individuals in the bottom quintile had incomes of approximately \$22,000 per year in almost every year of the panel.

Incomes in the middle quintile income remained stable until age from 59 to 61 (\$39,100), fell to \$33,800 at age from 63 to 65, rose again the following year, and then fell to approximately \$30,000 in subsequent years. As a result, differences in average income levels between individuals in the bottom and the middle quintiles shrank from \$18,200 at age from 54 to 56, to \$8,300 at age from 74 to 76.

Family income declined even faster among individuals in the top quintile (Figure 4). Average adjusted (AEA) income in the top quintile peaked at \$83,400 (equivalent to an after-tax family income of \$166,800 for a family of four) around age 60, declined to \$66,700, rose significantly the next year (around age 65), then fell to \$59,100, but began rising at age 70 to reach a maximum of \$67,800 at age from 74 to 76. At age 54 to 56, individuals in the top quintile had 3.8 times the income of individuals in the bottom quintile (an income differential of \$56,900), but by age from 74 to 76 the top quintile individuals had only 2.9 times the income of their

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

6. It is important to note that this is adult-equivalent adjusted (AEA). To convert this to a number more easily recognizable, an AEA family income of \$45,600 is equivalent to a family income of \$91,200 for a family of four.

counterparts in the bottom quintile (an income differential of \$42,300). These results point to a significant reduction in income inequality over the retirement years.

Understanding variations in income levels requires a close examination of income sources after retirement. For this purpose, we shift our attention from AEA income after tax to AEA income before tax⁷, and we examine the share of income that came from earnings, private pensions—including registered retirement saving plans (RRSPs)—Old Age Security (OAS) and Guaranteed Income Supplement (GIS), Canada and Quebec Pension Plan (C/QPP) benefits, investment and interest income, capital gains, and other income sources⁸ in every year. Results are shown in Table 2 for everyone (aged from 54 to 56 in 1983) and in Tables 3, 4 and 5 for individuals in the bottom, middle and top quintiles, respectively.

Unsurprisingly, income largely came from earnings at age from 54 to 56 (Table 2). But as the same people grew 10 years older, earnings were gradually replaced by other sources of income—including private pensions (including RRSPs), public pensions (including OAS/GIS) and C/QPP benefits—that eventually became the main sources of income during retirement. To take the full measure of changes in income sources and the short period of time over which these changes are taking place, the reader should note that earnings typically accounted for 82.1% of all income before taxes in 1983, when individuals were from 54 to 56 years old. Some 13 years later, in 1996 (when the same individuals were aged from 67 to 69), earnings accounted for only 19.2% of total income before taxes, while private pensions accounted for 29.6%, C/QPP benefits for 17.6%, OAS and GIS for 14.6%, investment gains for 13.9% and capital gains for 3.9%.

Of note, capital gains were unusually high at 64-to-66, 65-to-67 and 66-to-68 years (corresponding to 1993, 1994 and 1995, respectively). This is because there was a change in the legislation whereby individuals could no longer claim a deduction for gains realized after February 1994. As a result, individuals could report all or part of their capital gains accrued before February 23, 1994 so that they could benefit from any unused part of their \$100,000 capital-gains exemption. Since capital gains can be used to offset the losses in other years, the levels of capital gains reported in 1993 were also affected, which is the year corresponding to the sudden increase in income levels observed in Figure 1.

Among individuals in the bottom quintile in 1983 (Table 3),⁹ earnings also accounted for a very high percentage of income levels at age from 54 to 56 (84.3%). However, the OAS, GIS and C/QPP benefits accounted for a much larger portion of income during retirement. Taking 1996 (when individuals were aged from 67 to 69) as an example, C/QPP benefits and the OAS and GIS accounted for 53% of income before taxes, whereas income from private pensions and RRSPs accounted for only 17% of income among bottom-quintile individuals.

While the composition of income sources for individuals in the middle quintile closely resembled that of the cohort as a whole (Table 4), the decomposition of income sources among those that

7. In this case, it is necessary to use income before taxes because not all components of income are taxable.

8. Other income sources include employment insurance benefits and refundable tax credits.

9. Recall that individuals earning less than \$10,000 at age from 54 to 56 were excluded from the sample (see Section 3). Hence, individuals with very low earnings have been excluded.

were in the top quintile in 1983 was different in many ways (Table 5). First, top-quintile individuals derived a much larger portion of their income from investment, interest and capital gains in every year of the panel. Second, income from private pensions accounted for a much larger portion of income during retirement, while income from public sources only accounted for a small portion of their post-retirement income. Again, taking 1996 as an example, income from OAS, GIS and C/QPP benefits jointly accounted for 18.1% of total income before taxes, while income from private pensions, investments and capital gains jointly accounted for 57.8% of their total income. Finally, earnings accounted for a larger portion of income after age 65, possibly reflecting higher rates of labour market participation among highly educated individuals.

While it is useful to look at the financial evolution of those aged 55 years in 1983, it is also important to examine the evolution of income trends by cohort. According to Myles (2000), the share of income received from private pensions rose considerably among recent cohorts of retirees, with the continued maturation of registered pensions plans (RPPs) and personal retirement accounts (RRSPs). Other studies also indicate that the labour market participation of seniors is on the rise (Horner 2007, Turcotte and Schellenberg 2007), which suggests that younger cohorts might be more likely to receive income from employment sources. These changes are fundamental and clearly underscore the need to look at various cohorts of retirees to understand the dynamics of income security after retirement.

We begin with the evolution of earnings (shown in Figure 5). Earnings include all income from paid jobs, and also income from self-employment jobs and all other possible sources of employment income (at the family level, adult-equivalent adjusted). As Figure 5 indicates, earnings fell rapidly after age from 54 to 56 but some interesting changes could be noted across cohorts. For instance, average earnings levels at the beginning of the period were slightly higher among individuals from younger cohorts and remained higher after age from 54 to 56 among the 1995 and 1998 cohorts, possibly reflecting higher rates of labour market participation among recent cohorts. Also, it should be noted that earnings fell faster in the early years of retirement among individuals in the 1989 cohort, who were undoubtedly affected by the 1990-to-1992 recession.

Figure 6 reports the levels of income received from private pensions, including income received from RPPs and private RRSPs. The key finding is that the three most recent cohorts (1992, 1995 and 1998) received larger amounts of money from private pensions than earlier cohorts.

Private pension income rises from age 70, which coincides with the age limit for continued RRSP contributions (69 years old). After the age of 69, individuals must transfer the property of an RRSP to a registered retirement income fund (RRIF), or must buy an eligible annuity. The benefits from these plans are fully taxable. However, the increase from age 70 is mainly observed among high-income individuals who receive a much larger share of their income through these channels (see Table 5).

There is no difference among cohorts with respect to OAS and the GIS (Figure 7). The OAS/GIS provides a basic flat-rate benefit (the OAS portion) to all persons with net income below a specified amount. A supplementary benefit (the GIS portion) is allocated to those with little or no other income and an allowance provided to the spouse of OAS pensioners and widows aged from 60 to 64 with limited income. The objective of the OAS/GIS is to guarantee a minimum income

to all persons 65 or older.¹⁰ No contributions are required to benefit from these programs. The OAS and GIS programs were not affected by major policy changes in recent years, and benefits are adjusted every year by using the consumer price index. As a result, OAS and GIS benefits remained stable across cohorts and provided more than \$6,000 in benefits to beneficiaries.

The C/QPP (Figure 8) were designed to replace a portion of earnings that cease after retirement or disability, and the objective is to provide employees with a basic retirement benefit.¹¹ As with OAS/GIS, the C/QPP has changed little over the years. As a result, the amount received from these pension plans did not change substantially across cohorts, typically yielding more than \$7,000 to its beneficiaries after age 68.

Investments gains are important sources of income to many retired individuals and are shown in Figure 9.¹² Average investment gains were unusually high around age 62 for individuals in the 1983 cohort, around age 59 for individuals in the 1986 cohort and around age 56 for individuals in the 1989 cohort, with all three situations corresponding to the year 1990. Investment gains generally follow the evolution of interest rates which were high during this period, reaching their peak in 1990.

Net capital gains are shown in Figure 10. For all cohorts, average income received from capital gains was generally low. The only exception was during the years from 1993 to 1995 when there was a change in the legislation that restricted deductions for gains realized after February 1994. As a result, all cohorts showed a boost in capital gains during the period corresponding to these three years.

Figure 11 shows the evolution of family income after taxes across cohorts (adult equivalent adjusted). Unfortunately, the temporary increase in capital gains induced by the change in the legislation makes it difficult to identify clear differences across cohorts in income trends. One way to deal with this is to examine total income after taxes without capital gains. This is appropriate because Figure 10 has shown that income received from capital gains is relatively low and does not vary considerably across cohorts. Results are shown in Figure 12.

More recent cohorts are entering retirement with higher income levels. These results reflect the rise in private pensions and employment income noted earlier. Around age 60, AEA family income (without capital gains) was \$42,200 among the 1983 cohort, rising to \$48,600 among the 1998 cohort.

10. The Old Age Security in its current form was implemented in 1952 and replaced the *Old Age Security Act*, which provided a flat-rate benefit to all persons aged 70 or over meeting the residency requirements. In 1967, the Guaranteed Income Supplement Program was implemented to improve the quality of life of low-income seniors (Maser 2003).

11. These plans are directed at the employed, cover all workers in Canada and are compulsory for those aged 18 or more. Contributions are made to a specified maximum level by both employees and employers with a maximum possible benefit of 25% of the average wage (up to a maximum benefit of about \$800 per month).

12. Investments include any income received from bank deposits, corporate bonds, trusts, mortgage, notes and Canada Saving Bonds. Investments also include income from dividends and net rental income.

We also examined the evolution of family income after taxes separately for men and women. The results are shown in Figure 13 for all individuals in the first cohort, and results for the bottom, middle and top quintiles are shown in Figures 14, 15 and 16, respectively. With the possible exception of individuals in the top quintile—where men enjoyed slightly higher income levels than women—trends in income levels did not differ much by gender. Differences in the sources of income between men and women were also quite small (results not shown). Since our focus is on family-income levels and not on individual-income levels, this is not a surprise. However, this does not necessarily mean that all aspects of income security are gender neutral. For instance, women are more likely than men to suffer the adverse consequences of a separation or widowhood—events that cannot be properly assessed with the methodology we use in this paper and will be taken up separately in future work.

5 Trends in replacement rates

As indicated in Section 3, family-income replacement rates represent the fraction 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 somewhat 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 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 17 shows that the evolution of median replacement rates after age from 54 to 56 is remarkably similar across cohorts. Generally speaking, median replacement rates 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, at least for individuals near the median.¹³

However, there is considerable variation in replacement rates both within and between pre-retirement income levels as shown in Table 6 for the 1983 cohort.¹⁴

13. 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 for more details).

14. 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.

Almost 50% of individuals had a replacement rate above 1.0 at age from 59 to 61. This proportion fell to 35% at age from 64 to 66 and to 23% at age from 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.

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 in 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 18.

For the majority of low-income families (the bottom quintile) median replacement rates were generally high,¹⁵ and remained close to, or above 1.0 most of the time. The 1989 cohort, which was undoubtedly affected by the 1990-to-1992 recession, is the exception.¹⁶ 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.¹⁷

The results are shown in the second panel of Table 6 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 be under financial duress.

Figures 19 and 20 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 0.7 for most cohorts after age 65), while replacement rates among individuals in the top quintile declined to approximately 0.7 after age 65. After age 70, however, about a quarter of middle-income seniors have replacement rates below 0.6 (Table 6).

Figures 21 to 24 show replacement rates separately for men and women, using data from the 1983 cohort. By and large, the trends are similar for men and women. Both had higher replacement rates if they were in the bottom quintile of the income distribution and lower

15. Recall that we have excluded persons earning less than \$10,000 around age 55.

16. These results are consistent with Gower (1998), who also finds higher replacement rates among low-income individuals.

17. 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).

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).

While replacement rates vary across the income distribution, with generally higher replacement rates among individuals with lower family incomes at age 55—variation across income quintiles—they also vary among individuals with generally the same income at age 55—variation within income quintiles. 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. That is, everyone in this particular sample had roughly the same family income 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 7 and 8.

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 7). Hence, differences in replacement rates in the retirement years were not due to differences in income at age 55.

Table 7 shows that at age from 64 to 66, maintaining 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 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 the age from 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).

But these results are based on family income. Hence, 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.

To overcome this shortcoming, we replicate the analysis based on individual, not family, income. In this case, all reported incomes are earned by the individuals themselves, not by others in the family. The results (Table 8) indicate that employment earnings is not as dominant as a source of difference, but investment and capital gains play a surprisingly large role. At age from 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 from 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%). When the cohort ages, reaching from 74 to 76, it is private pensions 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, which is most appropriate from a welfare perspective, the level of employment earnings in the family is the single most important factor differentiating persons with low- from those with high-income replacement rates, at least until the cohort enters their 70s. After that age, the difference in income from private pensions is the most discriminating factor.

But to what extent is it the tendency of the individuals themselves (rather than other family members) to work into their late 60s that differentiates the low- from high-replacement rates groups? When computed at the individual level, the importance of employment earnings declines significantly, and investment and capital gains play a surprising 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 become the most important source.

6 Income stability during retirement

Another aspect of income security relates to the relative stability, or instability, of income sources during retirement. Instability in family income may affect the well-being of individuals in many ways, most notably by affecting consumption levels and by creating uncertainty. As a result, high income instability may create a good deal of stress and anxiety among seniors. In this section, we attempt to provide some insights about income instability, or the degree of year-over-year variation in income levels, at various stages of the retirement years.

To study income instability, we adopt the methodology developed by Gottschalk and Moffit (1994) and more recently applied by Morissette and Ostrovsky (2005) to examine earnings instability at various points of the life-cycle, and by Heisz and LaRochelle-Côté (2006) to examine the degree of instability in work hours.

This method separates the income variance in a cohort over some interval of time (say five years) into two components: (a) *permanent* differences in income *between* people; and (b) *transitory* differences in yearly income for individuals. While the first part is useful, in the sense that it provides a general idea of ‘permanent’ income differences across individuals (i.e., inequality in permanent income), it is the second part that is of interest here, as it directly relates to the degree of income instability experienced by individuals, the year-over-year variation in individual incomes.

We examine income instability over six age intervals: 55-to-59, 60-to-64, 65-to-69, 70-to-74, 75-to-79 and 80-to-84 years. Our focus is on two cohorts of individuals from the Longitudinal Administrative Data base. The first cohort was aged 55 years in 1985, and it can be used to examine the degree of income instability during the first four periods mentioned above. The second cohort of individuals was aged 65 years in 1985, and it can be used to examine income

instability from the age of 75 to 84 years.¹⁸ We still use adult-equivalent-adjusted family income after taxes, but since the objective is to quantify the degree of year-over-year variation in income levels, we make use of annual income values instead of permanent income. Finally, we also compute income instability into top, middle and bottom thirds (income tertiles) of the population. Individuals were classified across tertiles by using their average income in 1982, 1983 and 1984 in order to minimize the influence of unusually good or bad years, a problem that would plague the classification of individuals if a single year of observation was used.¹⁹

Our method can be described as follows. First, suppose that log earnings of individual i in period t , y_{it} , are generated by the following random-effects model:

$$y_{it} = \beta_0 + \beta X_{it} + e_i + \mu_{it} \quad (1)$$

where X_{it} is a vector of observable characteristics, e_i is an error term specific to the individual, μ_{it} is a general error term and where $\text{cov}[e_i, \mu_{it}] = \text{cov}[e_i, X_{it}] = \text{cov}[\mu_{it}, X_{it}] = 0$. While Equation (1) assumes a common slope for the age-income profile of individuals, it allows for a distinct intercept for each family (e_i). This is useful because it allows low-income individuals to have a lower ‘permanent’ income level than high-income individuals. We capture the age-income profile of a group of individuals by including in X_{it} a quadratic term for age. We abstract from mobility associated with the life cycle by replacing the actual log of individual incomes y_{it} by the life-cycle adjusted (log) individual incomes derived from Equation (1):

$$y_{it}^* = y_{it} - (\hat{\beta}_0 + \hat{\beta} X_{it}) = \hat{e}_i + \hat{\mu}_{it}. \quad (2)$$

If we observe N individuals across T years, the total variability of individual incomes (h) across individuals and years is given by:

$$\sigma_{total}^2 = \left(\frac{1}{NT-1} \right) \sum_{i=1}^N \sum_{t=1}^T \left(y_{it}^* - \bar{y}^* \right)^2. \quad (3)$$

This total variation in income levels can be decomposed into a permanent and a transitory component. The permanent component reflects the degree of income variation among individuals, while the ‘within’ component reflects the degree of instability over time in an

18. The use of two separate cohorts to compare the evolution of income instability might cause a problem, as it ignores the possibility of cohort effects. The use of two cohorts is necessary to examine income instability over the long run. This is because the Longitudinal Administrative Data base starts in 1982, which implies that income instability can be analysed just over two decades (we use the three first years of data to classify individuals across tertiles). However, cohort effects are likely to be small for two reasons: (1) individuals from the first cohort are only 10 years older than individuals in the second cohort, and (2) when comparisons could be made across the two cohorts, the trends from the first cohort did not differ significantly from the second.

19. We keep individuals who reported positive income levels in all years until their death (or until 2004). In the previous section, we kept individuals who reported at least \$10,000 in the first year of their respective panels to obtain equivalent samples. This precaution was not necessary for the analysis of income instability, because our sample was entirely selected in 1985. Individuals who died during the period are also kept in the sample for all completed age intervals. For instance, if an individual dies at age 67, he will be included in instability measures produced for the analysis of the age period from 55 to 59, the age period from 60 to 64, but not the age period from 65 to 69.

individual's income. The 'within' component can be thought of as the 'income instability' measure, and the 'between' component can be thought of as being related to 'income inequality.'

The 'within' component is given by:

$$\sigma_{within}^2 = \left(\frac{1}{N} \right) \sum_{i=1}^N \left[\left(\frac{1}{T-1} \right) \sum_{t=1}^T (y_{it}^* - \bar{y}_i^*)^2 \right]. \quad (4)$$

Intuitively, σ_{within}^2 is the average (across individuals) of individual specific variances (over time) of annual income levels.

The 'between' component is given by:

$$\sigma_{between}^2 = \left(\frac{1}{N-1} \right) \sum_{i=1}^N \left(\bar{y}_i^* - \bar{\bar{y}}^* \right)^2 - \frac{\sigma_{within}^2}{T} \quad (5)$$

where \bar{y}_i represents the average income for person i during a given period of time (say, from 55 to 59 years old), and $\bar{\bar{y}}$ is the average of \bar{y}_i across individuals. Hence, $\sigma_{between}^2$ represents the variance of annual income levels among individuals, after averaging out the part of income variation due to individual income instability.

It should be noted that for each group (or tertile) of individuals and for each age period, we estimate specific age-income profiles; in other words, we re-estimate Equation (1) separately for each group and for each period. This is necessary, because the age-income profile of individuals changes over time. As a result, the 'within' variance can simply be interpreted as an average deviation from the specific age-income profile of a given period.

Table 9 shows the total variance in income levels across persons and years (for each age period), as well as the variation associated with instability in individual income (the 'within' component) and the variation associated with the 'between' component, which is related to income inequality between individuals. It shows that (1) total variance in income levels fell by more than half over the course of retirement; (2) total variance declined both as a result of reductions in instability and in the permanent differences across individuals. That is, both income inequality (the variation in income between individuals at a point in time) and income instability (the variation over time of an individual's income) decline as cohorts age.

While the method used by Morissette and Ostrovsky (2005) provides a useful way to decompose the total variance of income, it might not be the most intuitive one to evaluate individual-income instability. Another, more intuitive measure that can be used to evaluate instability at the individual level is the mean absolute deviation (MAD) and can be expressed as follows:

$$MAD = \left(\frac{1}{N} \right) \sum_{i=1}^N \left[\left(\frac{1}{T} \right) \sum_{t=1}^T |y_{it}^* - \bar{y}_i^*| \right]. \quad (6)$$

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

Table 10 shows the levels of income instability experienced by individuals that were in the bottom, middle and top tertiles of the income distribution, using results from the MAD. (We also provide the results obtained by the method of variance decomposition, as results from the MAD can be compared with the square root of σ_{within}^2 .)

There are two major observations: (1) income instability declines as the cohorts age, and (2) instability was higher among low-income individuals 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, individuals in the bottom tertile deviated from their mean income by an average 25.0%, while individuals in the middle and the top tertiles typically deviated by 16.2% and 18.2%, respectively. Annual income 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 the public pensions and taxes dampen income instability among older individuals, we re-estimated Equation (1) by using the following income concepts: (a) market income, which includes income from earnings, private pensions, investments and capital gains; (b) market income plus public pensions, which includes benefits from the Old Age Security, the Guaranteed Income Supplement and the Canada and Quebec Pension Plans; (c) total income before taxes; and (d) total income after taxes.²⁰ The results are shown in Table 11.

From ages 55 to 59, instability in market income was relatively high among low-income individuals (mean absolute deviation was 30.0%, compared with 23.6% for all individuals). After adding pension incomes, transfers and taxes to obtain after-tax family income, instability is reduced significantly, particularly in the bottom quintile. Hence, those income sources (and taxes) do tend to reduce income instability. But even after considering the effect of these sources, instability remained marginally higher in the bottom tertile. This is not a surprise, as income comes mainly from earnings at this age.

From age 60 to 64, instability in market income rose, especially for market income. Higher instability in market income was likely the result of declining earnings, as many individuals choose to retire during this period. Furthermore, not everyone has access to a well-defined set of benefits from private pensions, which may also cause instability to rise. At this point, public pensions reduced instability substantially among individuals in the bottom tertile, but even after considering the effect of public pensions, low-income individuals still faced higher instability in their income than individuals in the other tertiles. With the effect of transfers and taxes, however,

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

instability among individuals in the bottom tertile became similar to that of individuals in the other tertiles, at approximately 21.6%.

Instability in market income among the 65-to-69-year olds was similar to that at age from 60 to 64, but public pensions contributed more to reduce instability, especially among individuals in the bottom tertile. Indeed, as a result of public pension income, income instability in the bottom tertile became similar to that of the other two tertiles at approximately 15%. At this point, taxes contributed little to reduce instability. Similar trends were found for the other two periods above age 70.

It is also informative to examine the distribution of income instability. To do so, we rank individuals by their mean absolute deviation, from those who have the smallest deviation to those who have the highest deviation from expected income. In so doing, we obtain a distribution of instability among seniors at various stages of their retirement years. If the distribution is skewed to the left, it means that there is a higher concentration of individuals with less instability. Conversely, a distribution that is skewed to the right means that there is a larger portion of seniors with more instability.

In Figure 25, we follow a cohort of individuals aged 55 in 1985 and we 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 for most seniors as they advanced into their retirement years. By age from 70 to 74, individuals were largely concentrated around very low instability levels. By and large, these findings suggest that the pension system contributes to reduce income instability among seniors, in addition to providing minimum levels of income security, especially among low-income seniors.

7 Conclusion

This study is concerned with the economic welfare of individuals following retirement, and hence we use a family-income concept, usually family income after taxes (i.e., disposable family income). To account for the effect of family size on purchasing power, we adult-equivalent adjust (AEA) all income measures.²¹ AEA family income provides us with an estimate of the economic resources available to each individual in the family, assuming all individuals have equal access to the family's income.

Using longitudinal data to track cohorts as they age, we find that average family income peaks at about age 60, declines until age 68 and is stable thereafter. However, this pattern varies considerably across the income distribution. People at the bottom of the distribution experience relatively little change in their incomes as they age, while those at the top witness a significant

21. As a result of the adult-equivalent adjusted (AEA) adjustment, the income values reported in this paper are an estimate of the economic resources available to each individual in the family, and are not the raw family income values. To interpret AEA (adult equivalent adjusted) family income in a more intuitive manner, simply multiply the AEA-adjusted value by two. The result is the disposable income for a family of four. For example, average AEA-adjusted family income for the 1983 cohort peaked at around \$45,600 at age 60. This is the equivalent of a disposable family income of \$91,200 for a family of four.

decline, on average. Hence, the income gap between the high- and low-income individuals falls as the cohorts age; income inequality falls as cohorts enter and move through the retirement years.

By their late 60s, Canada and Quebec Pension Plans (C/QPP), Old Age Security (OAS) and Guaranteed Income Supplement (GIS) accounted for about one half of the income in the bottom quintile, and private pensions and registered retirement saving plans for only 18%. Among top quintile individuals, C/QPP, OAS and GIS accounted for only 18% of income, while private pensions, investments and capital gains accounted for 60%.

Are more recent cohorts better off than their earlier counterparts as they enter retirement? Generally speaking, the answer is 'yes.' The increase is largely related to the higher levels of private pension benefits received by the more recent cohorts, which in turn reflect higher earnings levels during their working years. Whether these increased benefit levels will continue for future cohorts is unknown. However, private pension coverage has been falling among younger workers, and it could affect their benefits levels at retirement.

While private pension benefits rose among more recent cohorts of retirees, investment income fell; the decline is likely related to the fall in interest rates in recent years.

A replacement rate is an individual's AEA family income at any age, say 70,²² compared with their income at age 55.²³ Hence, a replacement rate of 0.8 means that the individual has an adult-equivalent-adjusted family income at age 70 that is 80% of that at age 55.

For the 1983 cohort, median replacement rates started falling below 1.0 at around age 60, fell to about 0.8 by their late 60s and then remained stable. However, this pattern varies depending upon where the individual is in the income distribution. Generally speaking, among poorer individuals (in the bottom quintile) median replacement rates remained at about 1.0 throughout their retirement. Public pensions and other income sources maintained their income levels. However, about 20% of this group had replacement rates below 0.8 by the time they were 70. Given the low base from which they were starting at age 55, this could be an issue.

For individuals in the middle quintile, median replacement rates remained stable at from 70% to 80% of their pre-retirement income over the retirement years, well in line with standard assumptions about desirable replacement levels. Nevertheless, by age 70, almost a quarter had replacement levels below 60% of their pre-retirement income.

Individuals in the top quintile experienced a larger drop in replacement rates, since they were starting from a much higher income base at age 55. For this group, median replacement rates fell to around 0.7 by their middle 60s, and remained at that level as they aged.

In addition to variation in replacement rates *across* the income distribution, there is variation in rates *within* an income quintile. Individuals with virtually identical family incomes at age 55 can obviously have very different replacement rates in retirement. Focusing on the middle income

22. Actually, the average income over ages 64, 65 and 66—i.e., their permanent income at around age 65.

23. Actually, their average income over the ages of 54, 55 and 56.

quintile, analysis indicates that high replacement rate individuals are distinguished from low replacement rate individuals (from the same income quintile at age 55) by employment earnings early in retirement, investment and capital gains, and in later retirement, access to private pension income.

The evidence suggests that there has been little change in the pattern of replacement rates across cohorts. More recent cohorts (e.g., those age 55 in 1995) appear to have similar patterns of replacement rates as they age as retirees in the 1983 cohort.

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 the low-income individuals and the gap in income stability between the rich and the poor disappears.

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.

Table 2
Share of total adult-equivalent-adjusted income before tax across various categories of income, all individuals, 1983 to 2004

Year	Age	Before tax income (\$)	Share of income by category (percent)						
			Earnings	Private pensions	Investment gains	Capital gains	OAS/GIS ¹	C/QPP ²	Other
1983	54 to 56	53,200	82.1	3.9	10.0	1.1	0.0	0.4	2.1
1984	55 to 57	53,500	80.4	5.2	9.5	1.7	0.2	0.6	2.4
1985	56 to 58	53,900	77.4	6.9	10.0	2.2	0.2	0.9	2.4
1986	57 to 59	54,600	73.4	8.8	10.4	3.7	0.2	1.3	2.2
1987	58 to 60	55,600	68.9	11.0	10.8	4.9	0.4	2.2	2.0
1988	59 to 61	56,900	63.6	13.0	11.8	6.0	0.5	3.3	1.9
1989	60 to 62	56,400	58.3	15.1	13.7	5.7	0.5	4.8	1.8
1990	61 to 63	53,800	53.0	17.7	15.2	4.8	0.7	6.3	2.0
1991	62 to 64	50,200	47.2	21.1	15.5	3.8	1.6	8.6	2.4
1992	63 to 65	47,700	40.0	23.9	14.3	4.8	3.6	10.9	2.5
1993	64 to 66	48,900	31.1	24.9	12.1	10.6	6.3	12.7	2.0
1994	65 to 67	47,400	25.1	26.4	12.2	10.5	9.9	14.6	1.5
1995	66 to 68	46,400	20.9	27.2	12.7	9.7	12.3	15.9	1.1
1996	67 to 69	43,200	19.2	29.6	13.9	3.9	14.6	17.6	0.9
1997	68 to 70	43,700	16.9	31.1	13.5	5.0	14.9	17.6	0.7
1998	69 to 71	44,300	15.3	32.7	13.5	5.2	15.1	17.6	0.7
1999	70 to 72	45,600	13.6	33.8	14.0	6.1	14.7	17.3	0.4
2000	71 to 73	46,100	12.6	34.7	14.5	5.9	14.8	17.1	0.4
2001	72 to 74	45,900	12.0	35.1	14.4	5.7	15.0	17.2	0.4
2002	73 to 75	44,800	11.6	35.9	14.3	4.2	15.6	17.6	0.4
2003	74 to 76	44,100	11.1	36.5	13.4	4.3	15.9	18.1	0.5
2004	75 to 77	44,600	10.3	36.5	13.2	5.6	15.9	17.9	0.4

1. Old Age Security/Guaranteed Income Supplement.

2. Canada and Quebec Pension Plans.

Notes: Based on a cohort of individuals aged from 54 to 56 in 1983. The percentages might not add up due to rounding. Money figures are expressed in 2005 constant dollars.

Source: Statistics Canada, Longitudinal Administrative Data base.

Table 3
Share of total adult-equivalent-adjusted income before tax across various categories of income, bottom quintile, 1983 to 2004

Year	Age	Before tax income (\$)	Share of income by category (percent)						
			Earnings	Private pensions	Investment gains	Capital gains	OAS/GIS ¹	C/QPP ²	Other
1983	54 to 56	22,900	84.3	2.6	5.2	0.4	0.0	1.3	6.1
1984	55 to 57	23,500	83.0	3.0	5.1	0.9	0.0	1.7	6.0
1985	56 to 58	24,400	80.7	3.7	5.7	1.6	0.4	2.0	6.1
1986	57 to 59	25,600	78.1	4.7	5.9	2.7	0.4	2.7	5.5
1987	58 to 60	26,700	74.9	5.6	6.4	3.4	0.4	4.1	5.2
1988	59 to 61	27,700	70.4	7.2	6.9	4.3	0.7	5.4	5.1
1989	60 to 62	27,900	65.6	8.6	8.2	3.9	0.7	7.5	5.4
1990	61 to 63	27,000	60.7	10.0	8.9	3.3	1.1	9.6	5.9
1991	62 to 64	26,000	53.8	12.3	8.8	3.1	3.1	12.7	6.5
1992	63 to 65	25,300	45.1	14.6	7.5	3.2	7.5	15.8	6.7
1993	64 to 66	26,500	34.0	15.5	6.0	7.2	13.6	18.1	5.3
1994	65 to 67	26,300	26.6	15.6	6.1	6.8	20.2	20.5	4.2
1995	66 to 68	26,000	21.2	15.8	6.2	6.5	25.0	22.3	3.1
1996	67 to 69	24,500	19.2	16.7	6.5	2.0	29.0	24.1	2.4
1997	68 to 70	24,400	17.2	17.2	6.1	2.5	30.3	24.6	2.0
1998	69 to 71	24,400	16.0	17.2	6.1	2.5	31.1	25.0	2.0
1999	70 to 72	24,400	15.2	17.6	6.6	2.9	31.6	25.0	1.6
2000	71 to 73	24,400	13.9	17.6	7.0	2.5	32.0	25.0	1.6
2001	72 to 74	24,300	13.6	17.7	6.6	2.5	32.5	25.1	1.6
2002	73 to 75	24,200	12.8	17.4	6.6	2.5	33.5	25.6	1.7
2003	74 to 76	24,000	12.1	17.5	6.3	2.9	33.8	26.3	1.7
2004	75 to 77	23,800	10.9	17.6	6.3	2.9	34.5	26.5	1.7

1. Old Age Security/Guaranteed Income Supplement.

2. Canada and Quebec Pension Plans.

Notes: Based on a cohort of individuals aged from 54 to 56 in 1983. The percentages might not add up due to rounding. Money figures are expressed in 2005 constant dollars.

Source: Statistics Canada, Longitudinal Administrative Data base.

Table 4
Share of total adult-equivalent-adjusted income before tax across various categories of income, middle quintile, 1983 to 2004

Year	Age	Before tax income (\$)	Share of income by category (percent)						
			Earnings	Private pensions	Investment gains	Capital gains	OAS/ GIS ¹	C/QPP ²	Other
1983	54 to 56	46,600	86.1	3.4	6.7	0.4	0.2	0.6	2.6
1984	55 to 57	46,800	84.4	4.7	6.6	0.6	0.2	0.9	2.8
1985	56 to 58	47,200	81.4	6.1	7.0	1.3	0.2	1.1	2.8
1986	57 to 59	47,500	77.7	8.4	7.4	1.9	0.2	1.7	2.5
1987	58 to 60	47,500	73.3	10.9	7.8	2.7	0.4	2.7	2.3
1988	59 to 61	47,500	67.6	13.7	8.6	3.2	0.6	4.2	2.3
1989	60 to 62	46,700	61.5	16.3	10.1	3.0	0.9	6.0	2.1
1990	61 to 63	44,700	55.0	19.2	11.2	2.9	1.1	8.1	2.5
1991	62 to 64	42,400	48.1	22.9	11.1	2.6	1.9	10.6	2.8
1992	63 to 65	40,400	39.9	26.2	9.9	3.2	4.2	13.4	3.0
1993	64 to 66	40,900	30.1	27.4	8.3	8.3	7.6	15.6	2.4
1994	65 to 67	39,500	23.0	28.9	8.4	8.1	11.6	18.0	2.0
1995	66 to 68	38,500	17.9	29.9	8.6	7.8	14.8	19.7	1.3
1996	67 to 69	35,800	15.6	32.4	9.5	2.5	17.6	21.8	1.1
1997	68 to 70	35,600	13.5	33.7	9.0	2.8	18.3	22.2	0.8
1998	69 to 71	35,700	12.0	35.0	8.4	2.8	18.8	22.4	0.8
1999	70 to 72	36,300	10.7	35.8	8.8	3.3	18.7	22.0	0.6
2000	71 to 73	36,500	9.9	36.2	9.3	3.3	18.6	21.9	0.5
2001	72 to 74	36,300	9.1	36.4	9.4	3.3	19.0	22.3	0.6
2002	73 to 75	35,600	8.7	36.8	9.0	2.5	19.7	22.8	0.6
2003	74 to 76	35,100	8.5	36.8	8.3	2.6	19.9	23.4	0.6
2004	75 to 77	35,100	8.0	36.8	8.0	3.1	20.2	23.4	0.6

1. Old Age Security/Guaranteed Income Supplement.

2. Canada and Quebec Pension Plans.

Notes: Based on a cohort of individuals aged from 54 to 56 in 1983. The percentages might not add up due to rounding. Money figures are expressed in 2005 constant dollars.

Source: Statistics Canada, Longitudinal Administrative Data base.

Table 5
Share of total adult-equivalent-adjusted income before tax across various categories of income, top quintile, 1983 to 2004

Year	Age	Before tax income (\$)	Share of income by category (percent)						
			Earnings	Private pensions	Investment gains	Capital gains	OAS/GIS ¹	C/QPP ²	Other
1983	54 to 56	101,000	76.6	5.1	15.0	2.2	0.1	0.2	0.7
1984	55 to 57	100,800	74.8	6.5	14.3	3.1	0.1	0.3	1.0
1985	56 to 58	101,000	71.3	8.3	15.0	4.1	0.1	0.4	1.0
1986	57 to 59	102,100	66.8	10.1	15.3	6.2	0.2	0.7	0.9
1987	58 to 60	105,700	62.3	12.0	15.6	7.9	0.2	1.1	0.7
1988	59 to 61	110,500	57.6	13.2	16.7	9.8	0.3	1.8	0.6
1989	60 to 62	109,500	53.4	15.0	19.2	8.9	0.4	2.6	0.5
1990	61 to 63	103,300	49.0	17.2	21.6	7.5	0.5	3.7	0.6
1991	62 to 64	94,000	44.6	20.5	22.6	5.7	1.0	5.0	0.6
1992	63 to 65	88,500	39.3	23.2	21.2	7.3	1.8	6.6	0.7
1993	64 to 66	91,200	31.9	23.8	18.3	14.8	3.1	7.7	0.5
1994	65 to 67	88,200	27.8	25.4	18.4	14.4	4.6	9.0	0.5
1995	66 to 68	86,100	24.6	26.8	19.4	13.2	5.8	10.0	0.2
1996	67 to 69	79,600	23.9	29.6	21.4	6.8	7.0	11.1	0.3
1997	68 to 70	81,900	21.2	31.3	20.9	8.3	7.1	11.0	0.1
1998	69 to 71	84,300	19.1	33.6	21.2	8.3	6.9	10.8	0.1
1999	70 to 72	88,300	16.4	35.1	21.6	9.7	6.6	10.3	0.1
2000	71 to 73	89,700	14.9	36.5	22.4	9.5	6.5	10.1	0.1
2001	72 to 74	88,900	14.4	37.5	22.0	9.1	6.6	10.3	0.1
2002	73 to 75	85,400	14.2	39.0	22.4	6.6	7.0	10.8	0.1
2003	74 to 76	83,500	14.1	39.9	21.1	6.6	7.2	11.0	0.1
2004	75 to 77	85,200	12.9	40.1	20.3	8.7	7.0	10.9	0.1

1. Old Age Security/Guaranteed Income Supplement.

2. Canada and Quebec Pension Plans.

Notes: Based on a cohort of individuals aged from 54 to 56 in 1983. The percentages might not add up due to rounding. Money figures are expressed in 2005 constant dollars.

Source: Statistics Canada, Longitudinal Administrative Data base.

Table 6
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.

Table 7**Average family income before tax by source, in thousands of constant dollars**

	Replacement rates				Difference (High-low)	
	Low (<60%)	Medium low (60% to 80%)	Medium high (80% to 100%)	High (>100%)	(\$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 8**Average individual income before tax by source, in thousands of 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.

Table 9
‘Within’ and ‘between’ variance components¹

Age	Total variance	‘Within’ component variance	‘Between’ component variance
55 to 59 ²	0.605	0.144	0.461
60 to 64 ²	0.645	0.154	0.491
65 to 69 ²	0.275	0.055	0.22
70 to 74 ²	0.277	0.040	0.237
75 to 79 ³	0.227	0.028	0.199
80 to 84 ³	0.257	0.034	0.223

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.

Table 10
Evolution of income instability across 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
	Square root of ‘within’ variance			
55 to 59 ²	0.379	0.484	0.293	0.327
60 to 64 ²	0.392	0.481	0.330	0.344
65 to 69 ²	0.235	0.259	0.207	0.230
70 to 74 ²	0.200	0.202	0.179	0.212
75 to 79 ³	0.167	0.173	0.148	0.182
80 to 84 ³	0.184	0.176	0.161	0.205

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.

Table 11
Evolution of income instability using various income definitions¹

	Mean absolute deviation				Square root of 'within' variance			
	All	Bottom tertile	Middle tertile	Top tertile	All	Bottom tertile	Middle tertile	Top tertile
55 to 59 years²								
Market income	0.236	0.300	0.206	0.206	0.431	0.538	0.368	0.364
Market income + public pensions	0.215	0.262	0.186	0.196	0.388	0.469	0.329	0.348
Total income before taxes	0.200	0.238	0.172	0.190	0.359	0.427	0.300	0.336
Total income after taxes	0.187	0.218	0.159	0.181	0.338	0.397	0.279	0.323
60 to 64²								
Market income	0.304	0.379	0.287	0.255	0.543	0.683	0.495	0.435
Market income + public pensions	0.228	0.261	0.212	0.213	0.404	0.482	0.362	0.363
Total income before taxes	0.210	0.232	0.194	0.204	0.362	0.408	0.331	0.344
Total income after taxes	0.200	0.216	0.183	0.200	0.349	0.386	0.317	0.341
65 to 69²								
Market income	0.290	0.396	0.275	0.217	0.537	0.695	0.503	0.399
Market income + public pensions	0.140	0.154	0.132	0.138	0.254	0.278	0.233	0.252
Total income before taxes	0.138	0.149	0.129	0.137	0.250	0.272	0.231	0.249
Total income after taxes	0.123	0.132	0.113	0.124	0.226	0.244	0.205	0.230
70 to 74²								
Market income	0.228	0.321	0.205	0.176	0.465	0.621	0.412	0.350
Market income + public pensions	0.107	0.114	0.097	0.111	0.215	0.231	0.194	0.221
Total income before taxes	0.106	0.112	0.095	0.111	0.213	0.228	0.191	0.220
Total income after taxes	0.096	0.100	0.085	0.103	0.199	0.208	0.175	0.211
75 to 79³								
Market income	0.218	0.315	0.201	0.155	0.446	0.601	0.404	0.313
Market income + public pensions	0.091	0.092	0.085	0.094	0.184	0.189	0.173	0.189
Total income before taxes	0.090	0.091	0.084	0.094	0.185	0.192	0.168	0.193
Total income after taxes	0.080	0.082	0.074	0.085	0.168	0.174	0.149	0.180
80 to 84³								
Market income	0.217	0.297	0.198	0.173	0.450	0.587	0.407	0.358
Market income + public pensions	0.095	0.091	0.085	0.105	0.198	0.200	0.173	0.215
Total income before taxes	0.094	0.089	0.084	0.104	0.196	0.196	0.171	0.213
Total income after taxes	0.085	0.081	0.076	0.096	0.183	0.179	0.160	0.202

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

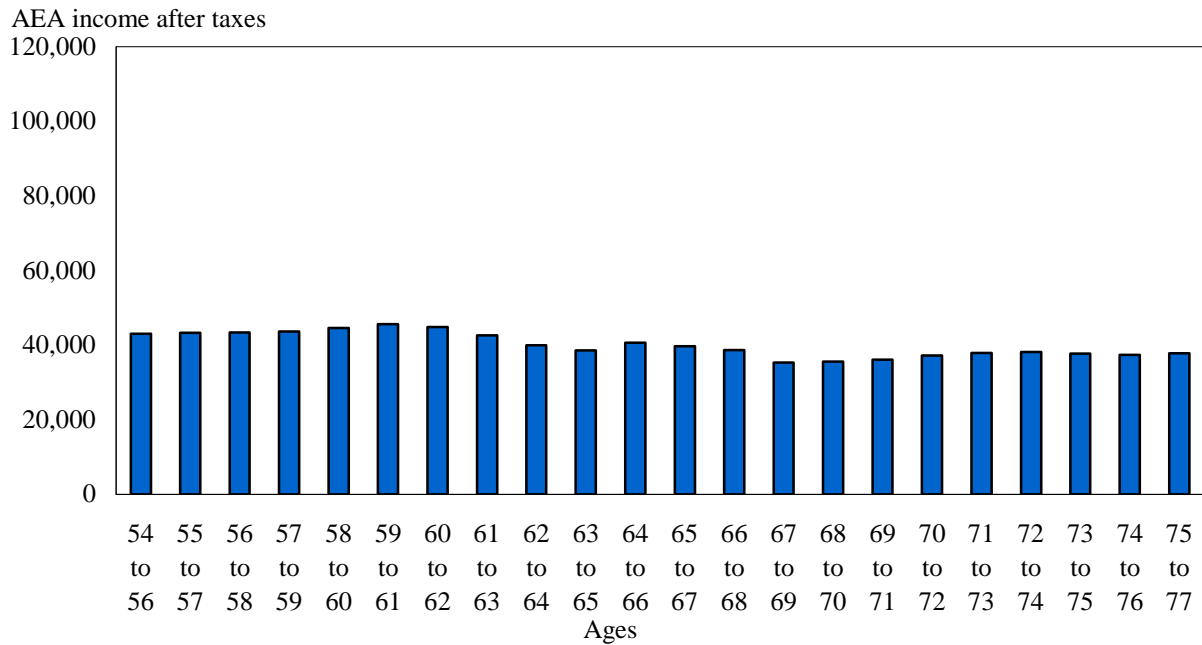
2. Results based on a cohort of individuals aged 55 in 1985.

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.

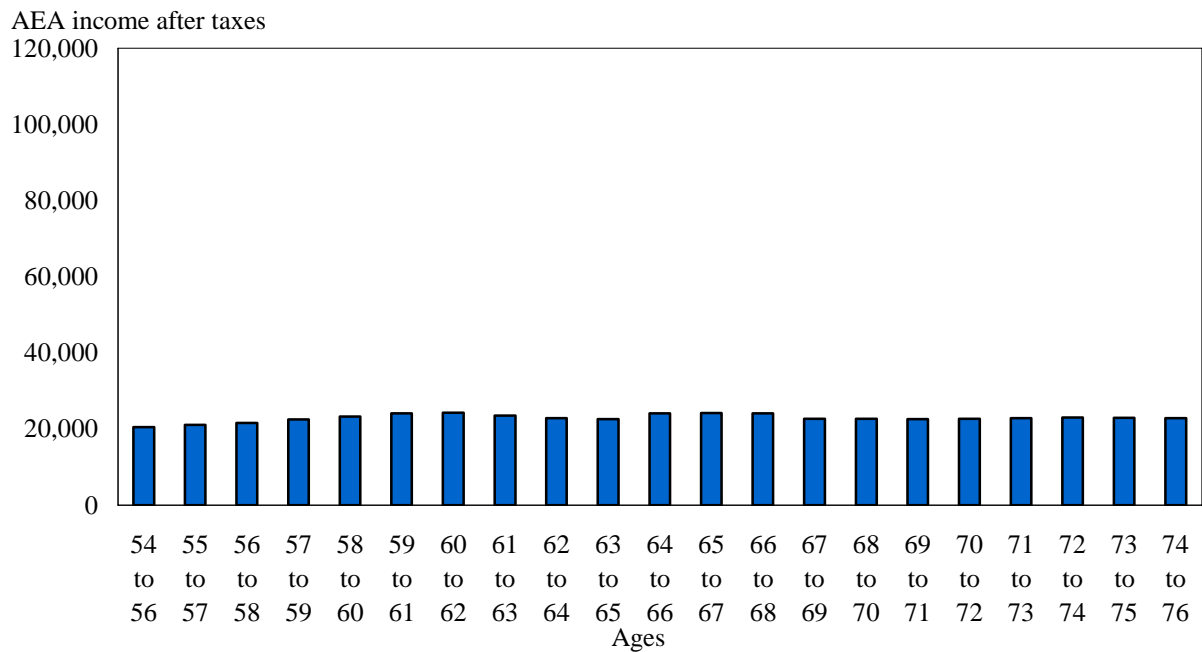
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 1
Average adult-equivalent-adjusted (AEA) income after taxes, in 2005 constant dollars, all individuals aged from 54 to 56 in 1983



Source: Statistics Canada, Longitudinal Administrative Data base.

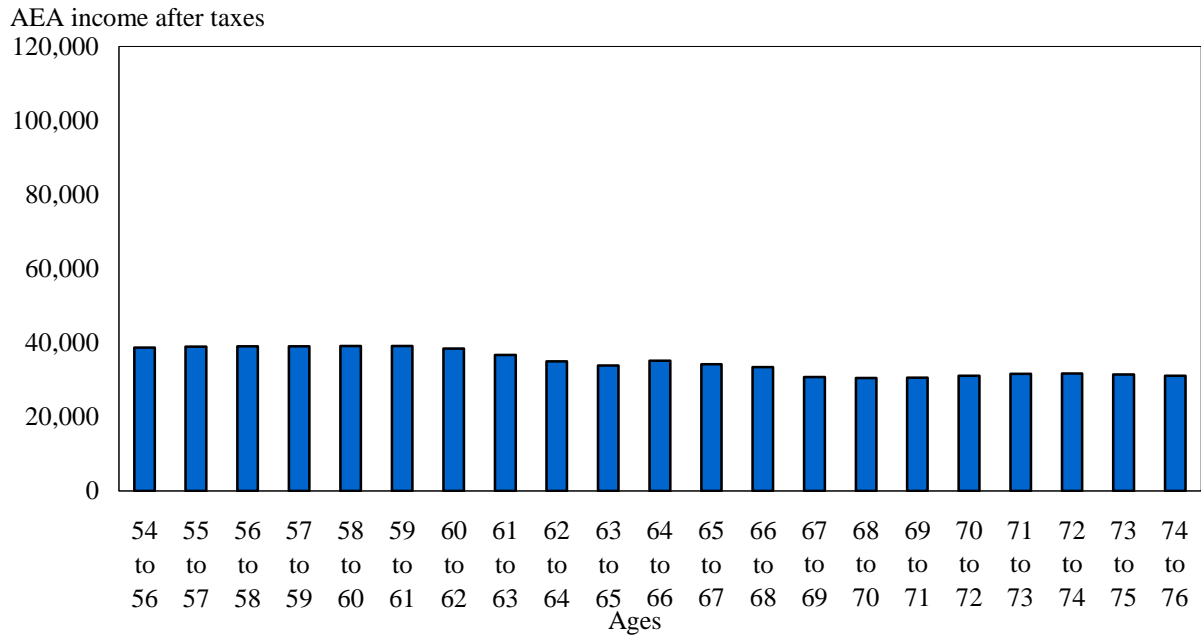
Figure 2
Average adult-equivalent-adjusted (AEA) income after taxes, in 2005 constant dollars, individuals aged from 54 to 56 in 1983, bottom quintile



Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 3

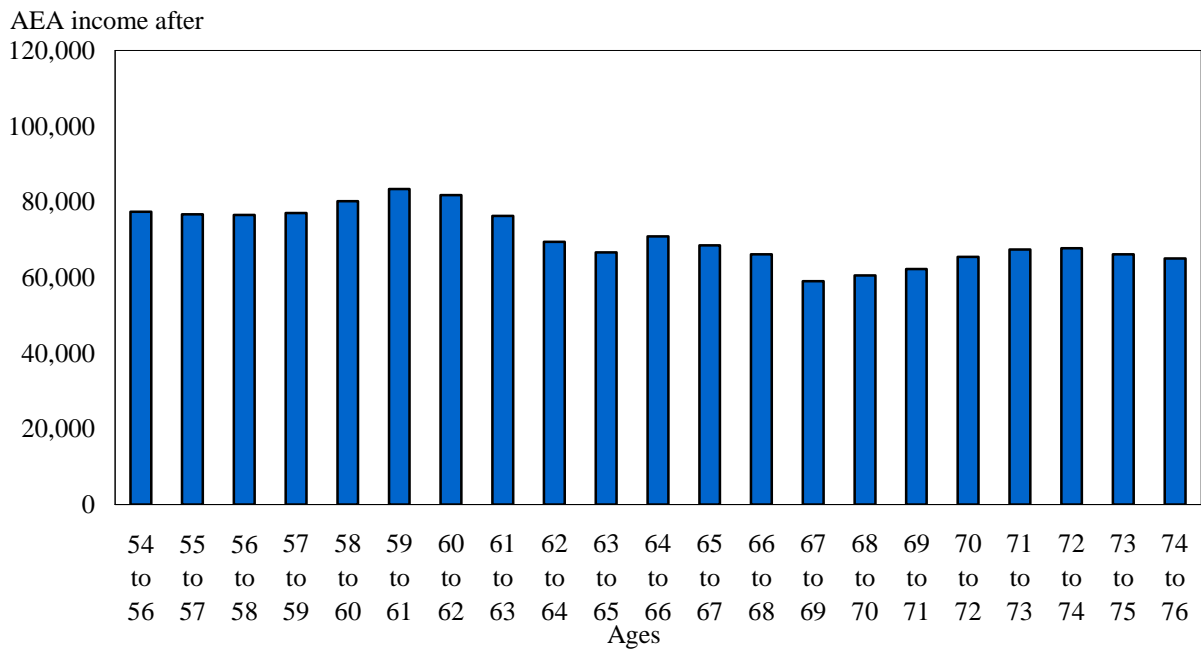
Average adult-equivalent-adjusted (AEA) income after taxes, in 2005 constant dollars, individuals aged from 54 to 56 in 1983, middle quintile



Source: Statistics Canada, Longitudinal Administrative Data base.

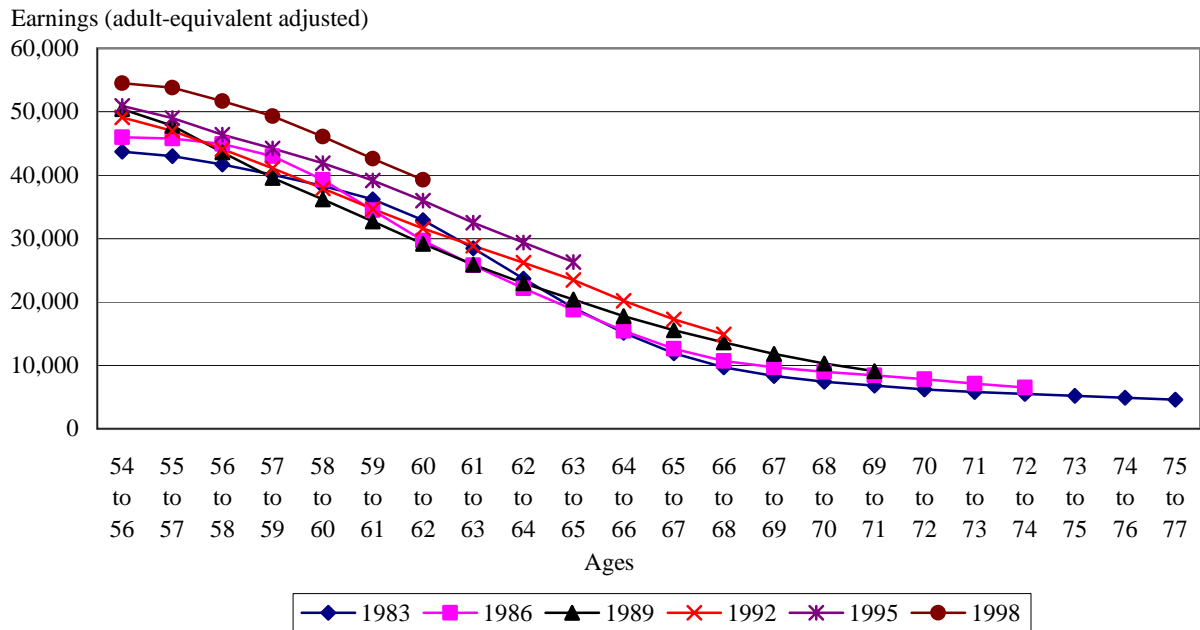
Figure 4

Average adult-equivalent-adjusted (AEA) income after taxes, in 2005 constant dollars, individuals aged from 54 to 56 in 1983, top quintile



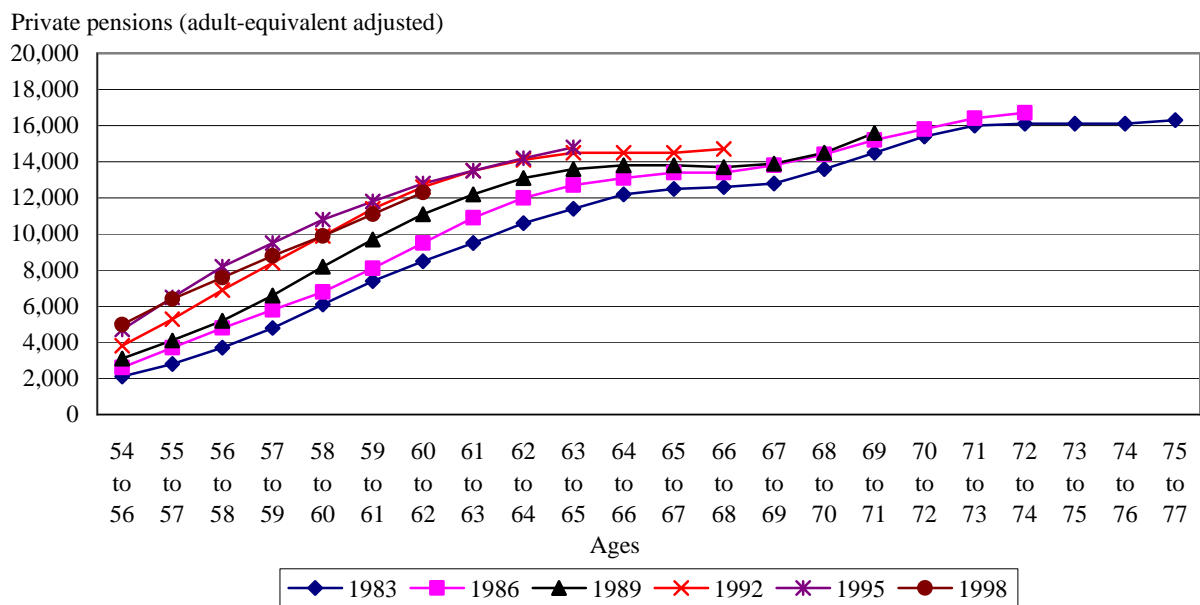
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 5
Earnings by cohort, in 2005 constant dollars per year, adult-equivalent adjusted



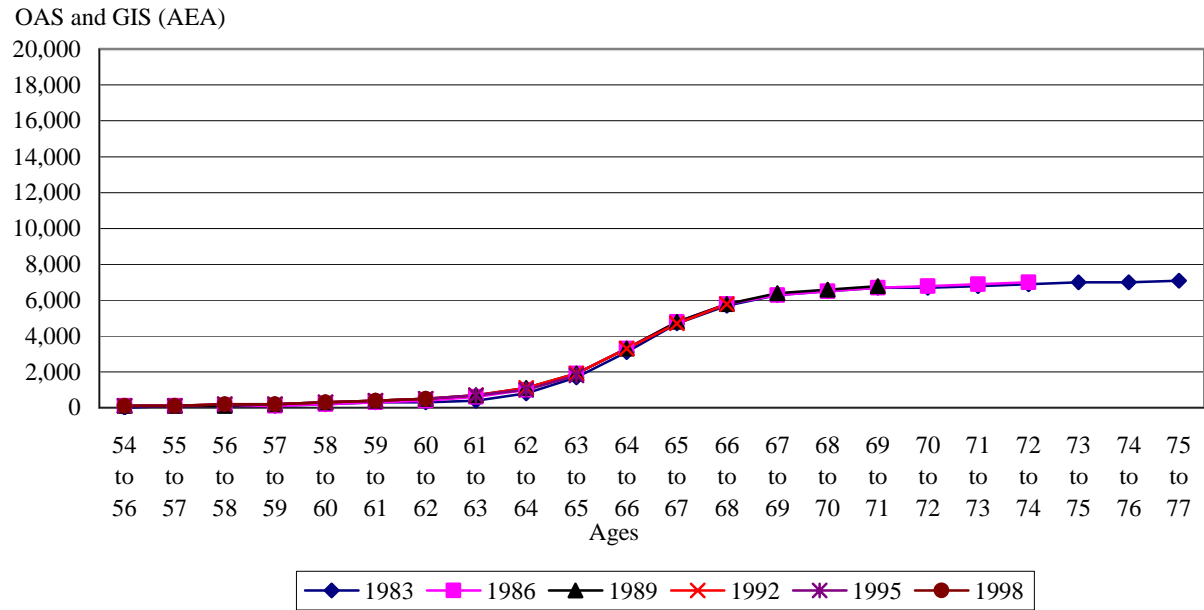
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 6
Income from private pensions by cohort, including registered retirement saving plans, in 2005 constant dollars per year, adult-equivalent adjusted



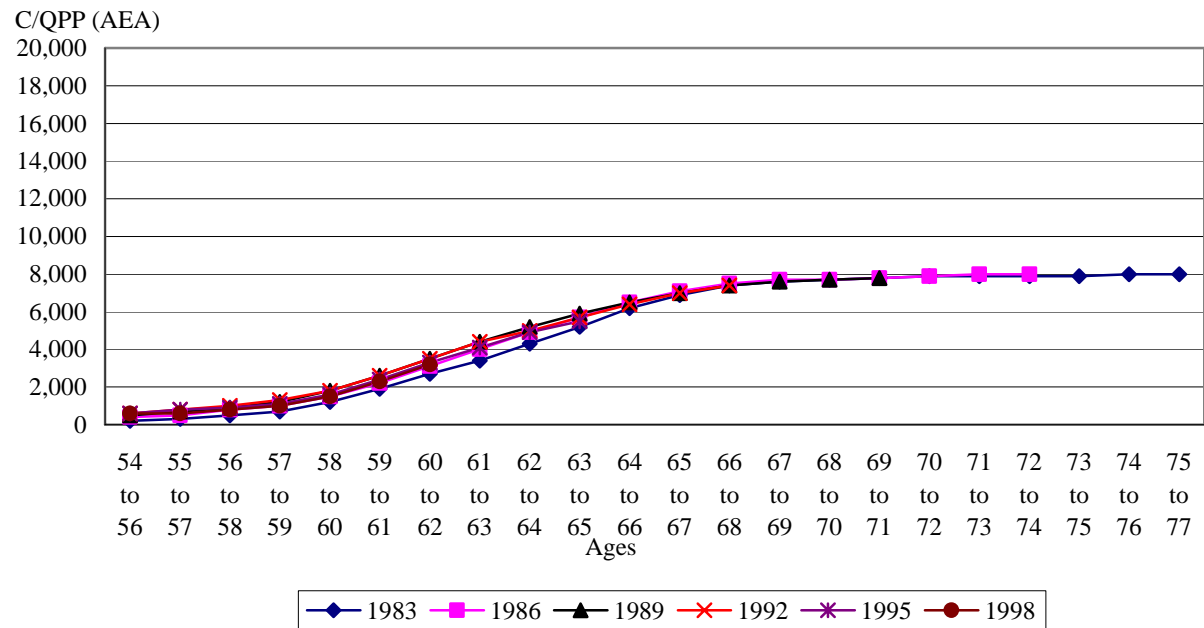
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 7
Old Age Security (OAS) and Guaranteed Income Supplement (GIS) income, in 2005 constant dollars per year, adult-equivalent adjusted (AEA)



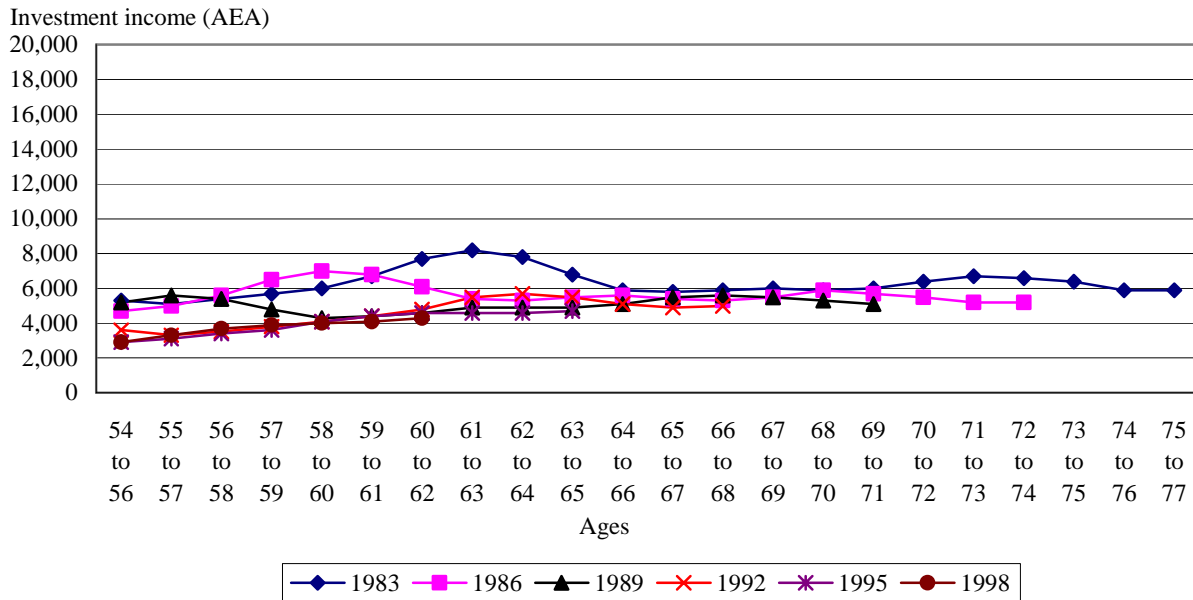
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 8
Canada and Quebec Pension Plans (C/QPP) income, in 2005 constant dollars per year, adult-equivalent adjusted (AEA)



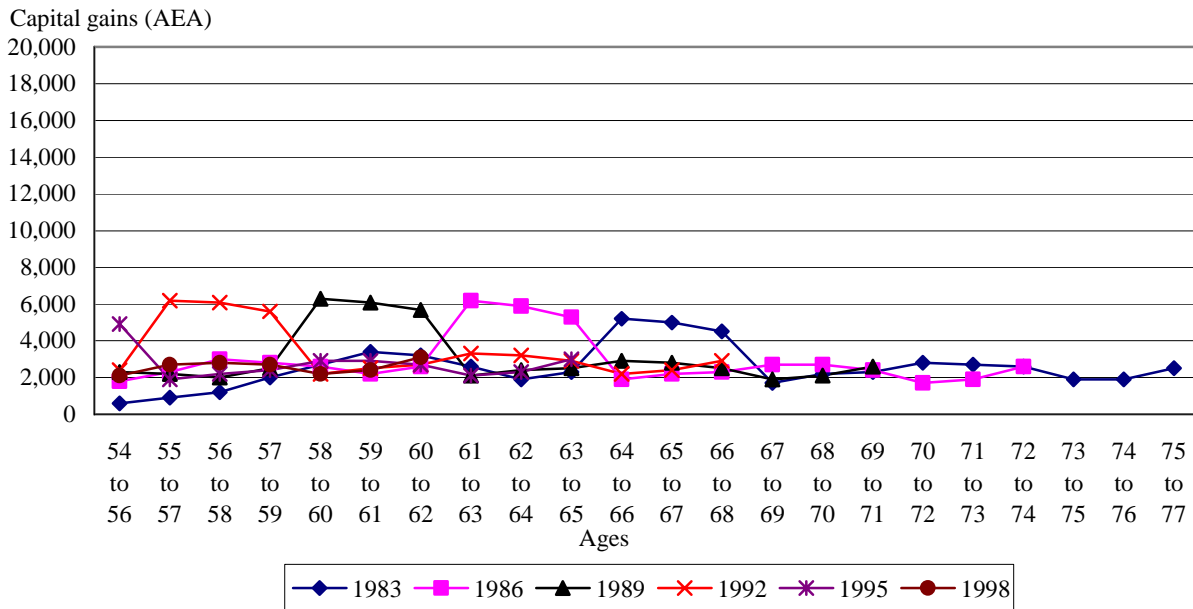
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 9
Interest and investment income, including dividends and rental income, in 2005
constant dollars per year, adult-equivalent adjusted (AEA)



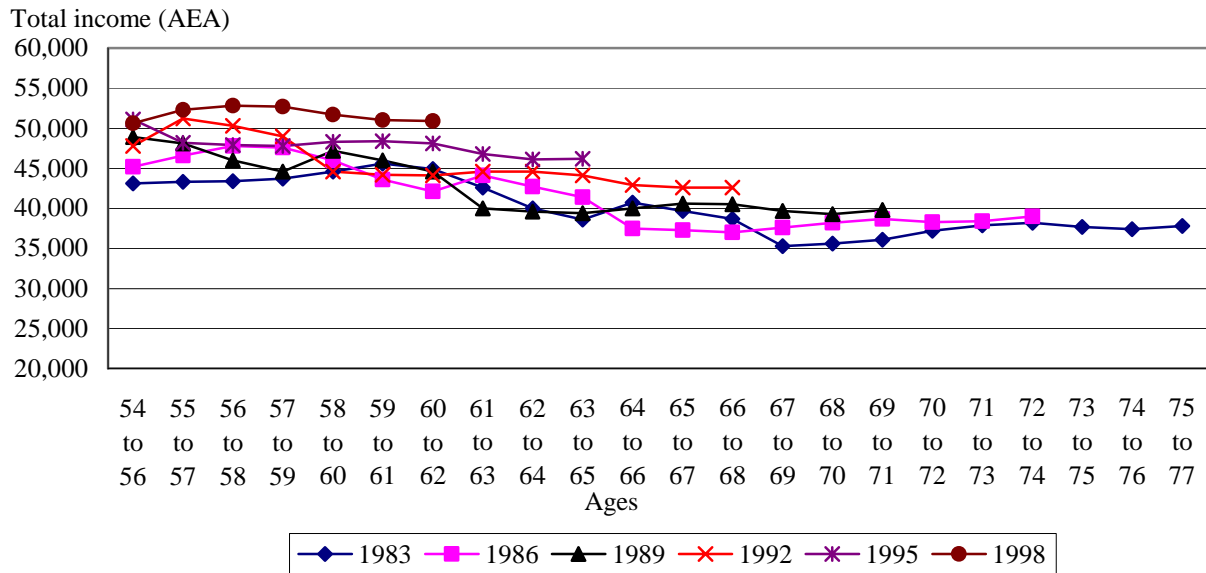
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 10
Capital gains, in 2005 constant dollars per year, adult-equivalent adjusted (AEA)



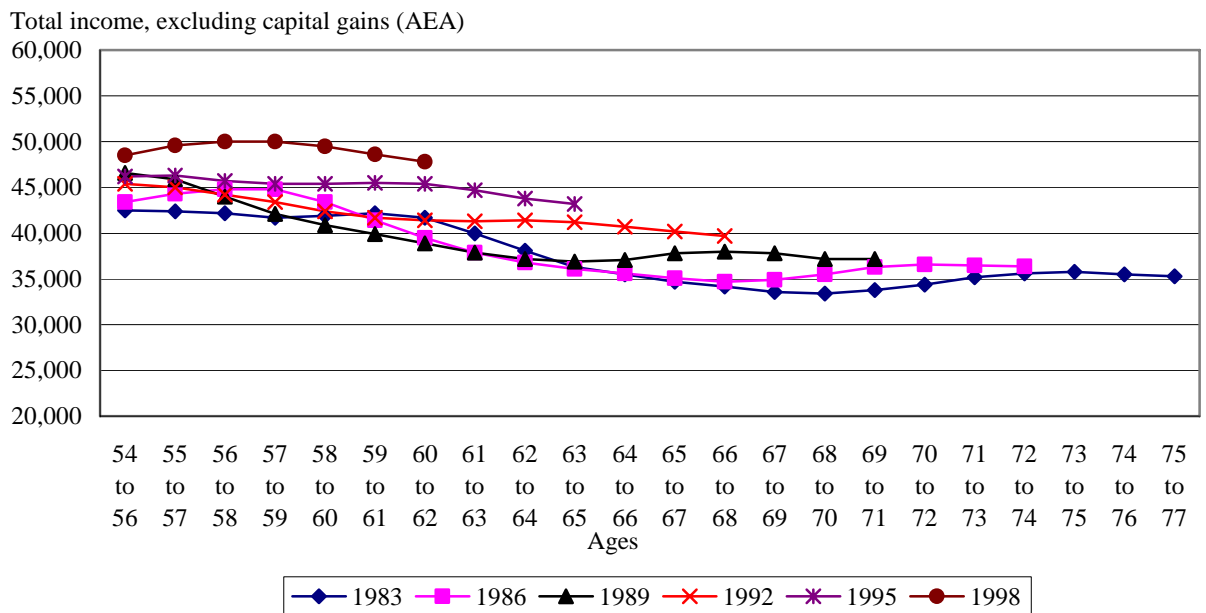
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 11
Family income after taxes, in 2005 constant dollars per year, adult-equivalent adjusted (AEA)



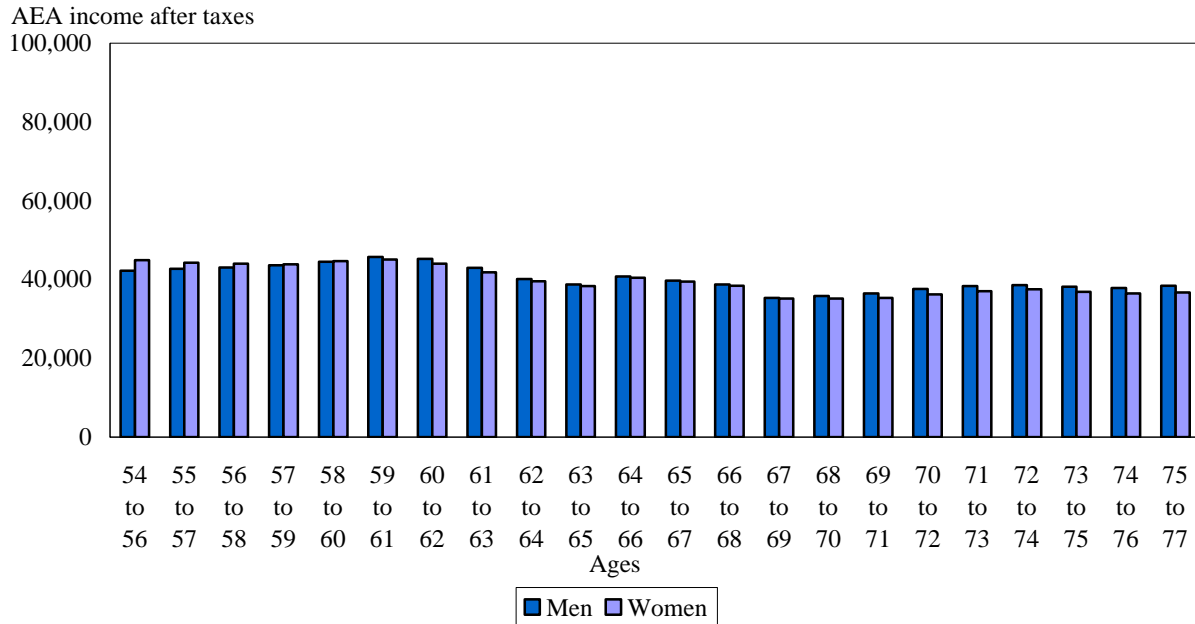
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 12
Family income after taxes, excluding capital gains, in 2005 constant dollars per year, adult-equivalent adjusted (AEA)



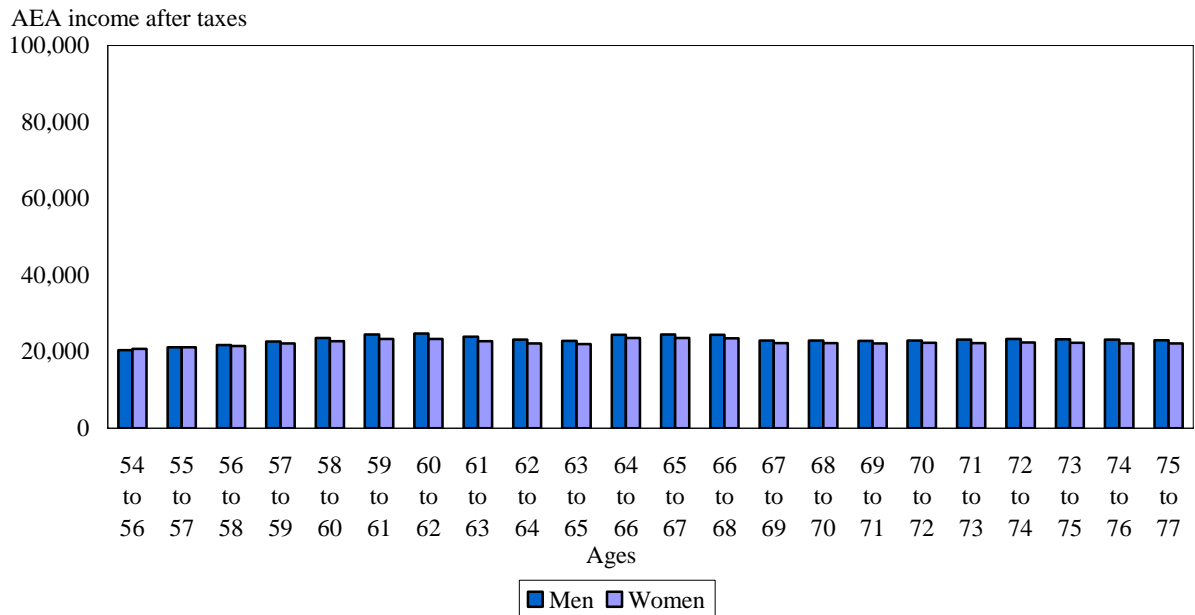
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 13
Average adult-equivalent-adjusted (AEA) income after taxes, in 2005 constant dollars, men and women from 54 to 56 years old in 1983



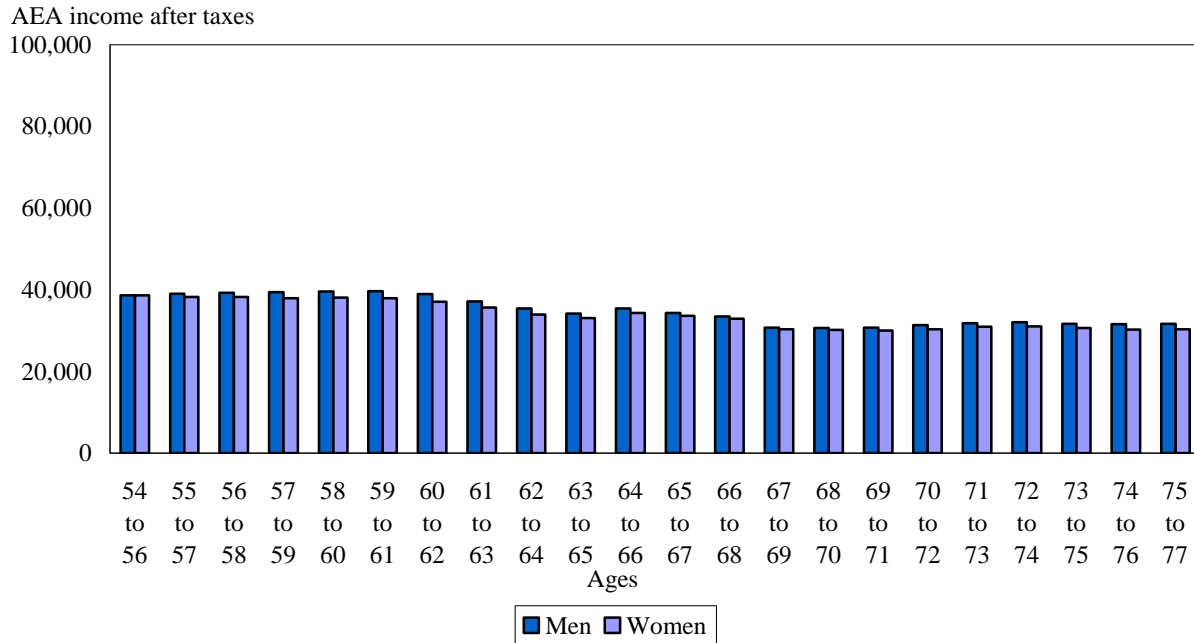
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 14
Average adult-equivalent-adjusted (AEA) income after taxes, in 2005 constant dollars, men and women from 54 to 56 years old in 1983, bottom quintile



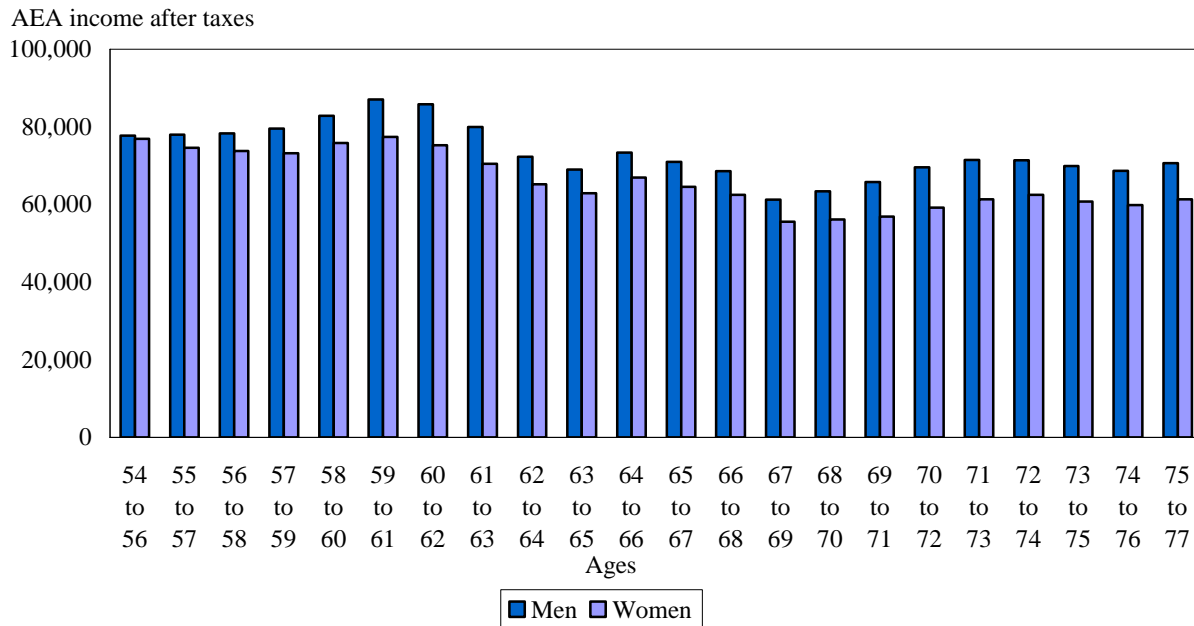
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 15
Average adult-equivalent-adjusted (AEA) income after taxes, in 2005 constant dollars, men and women from 54 to 56 years old in 1983, middle quintile



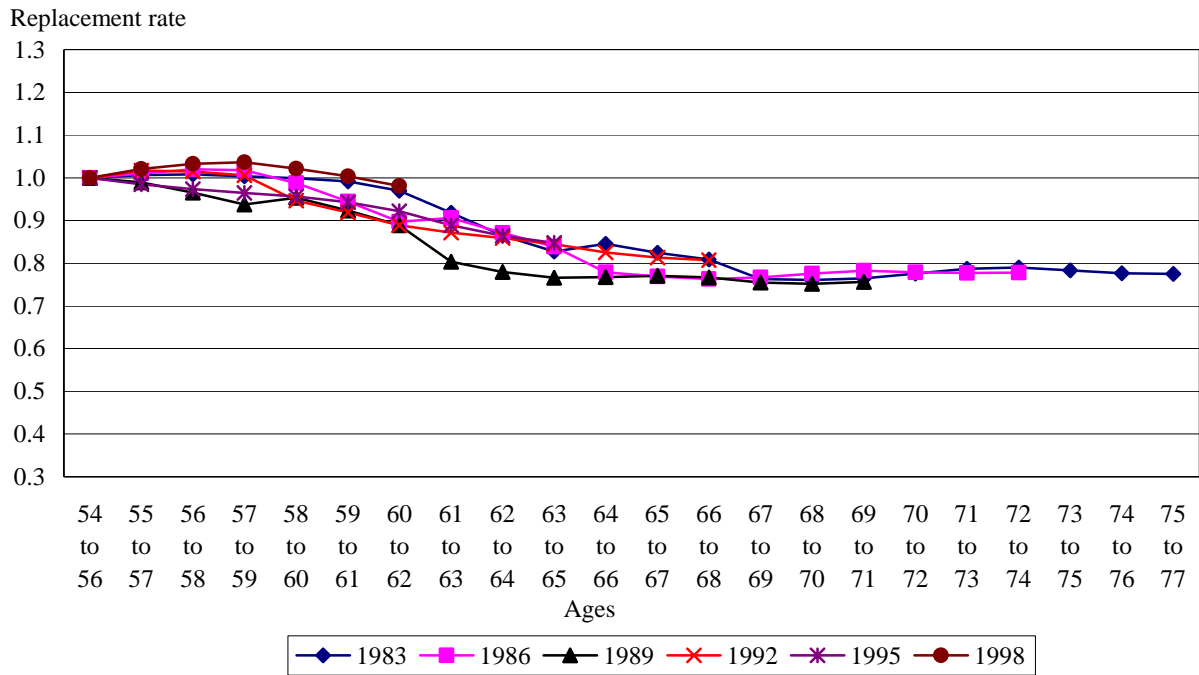
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 16
Average adult-equivalent-adjusted (AEA) income after taxes, in 2005 constant dollars, men and women from 54 to 56 years old in 1983, top quintile



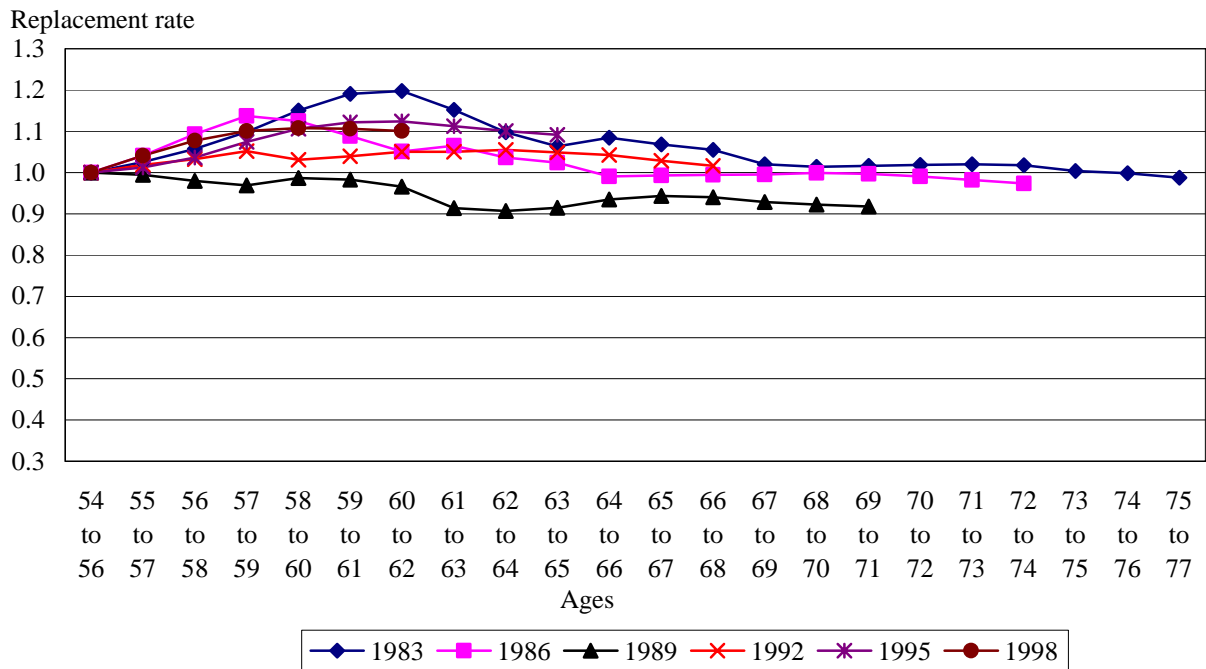
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 17
Median replacement rates of total adult-equivalent-adjusted income after taxes



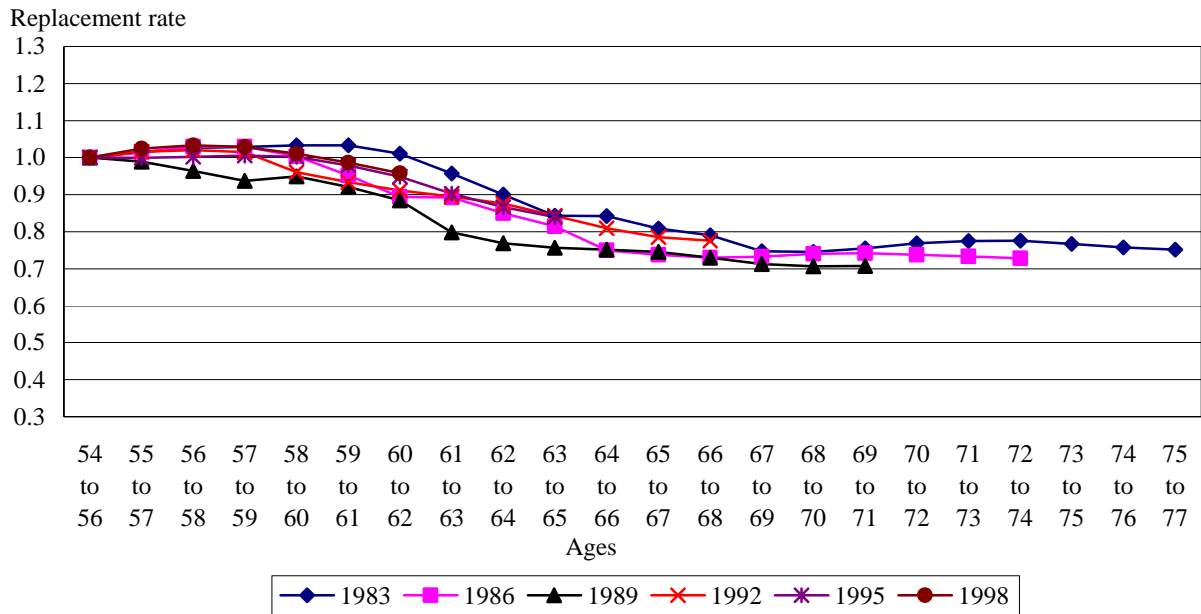
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 18
Median replacement rates of total adult-equivalent-adjusted income after taxes, bottom quintile



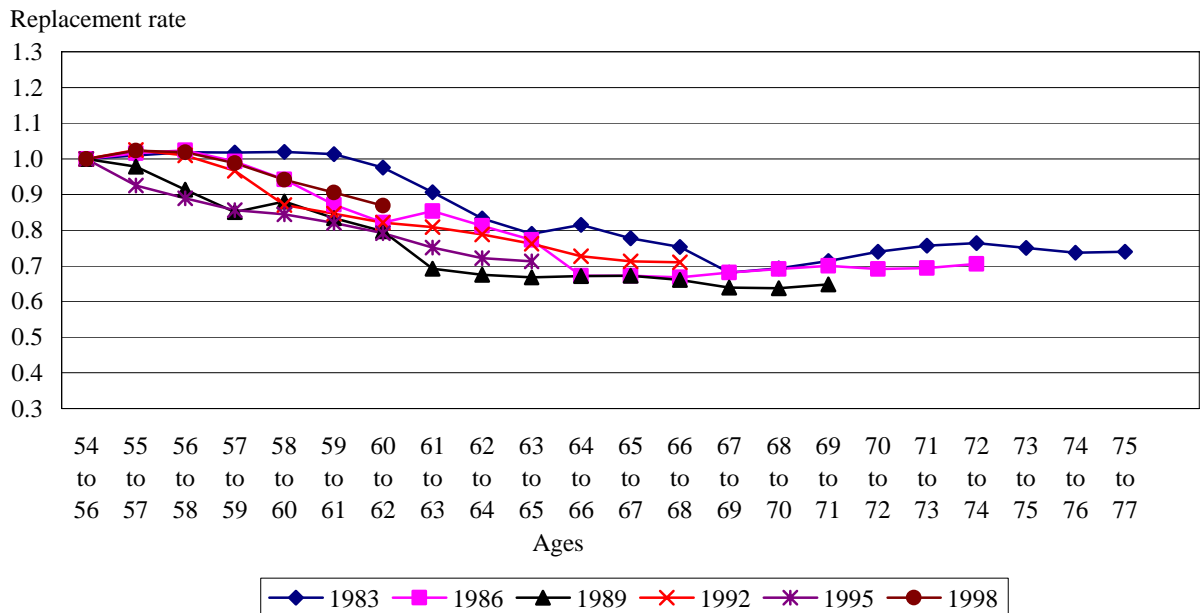
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 19
Median replacement rates of total adult-equivalent-adjusted income after taxes, middle quintile



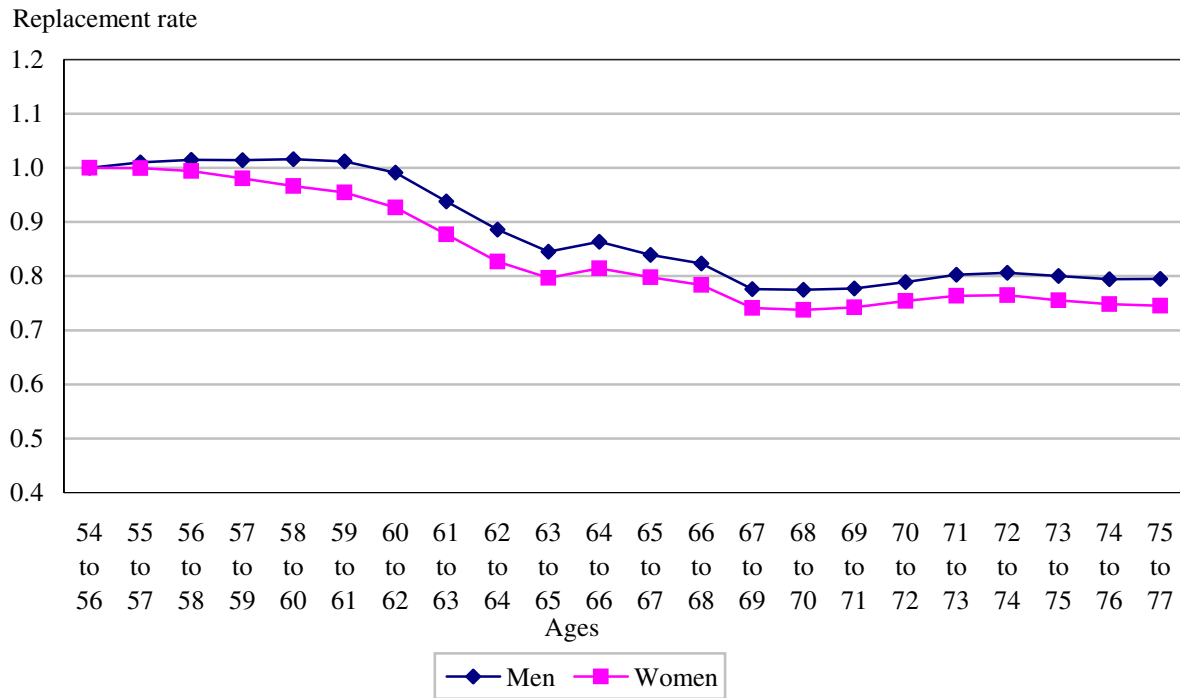
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 20
Median replacement rates of total adult-equivalent-adjusted income after taxes, top quintile



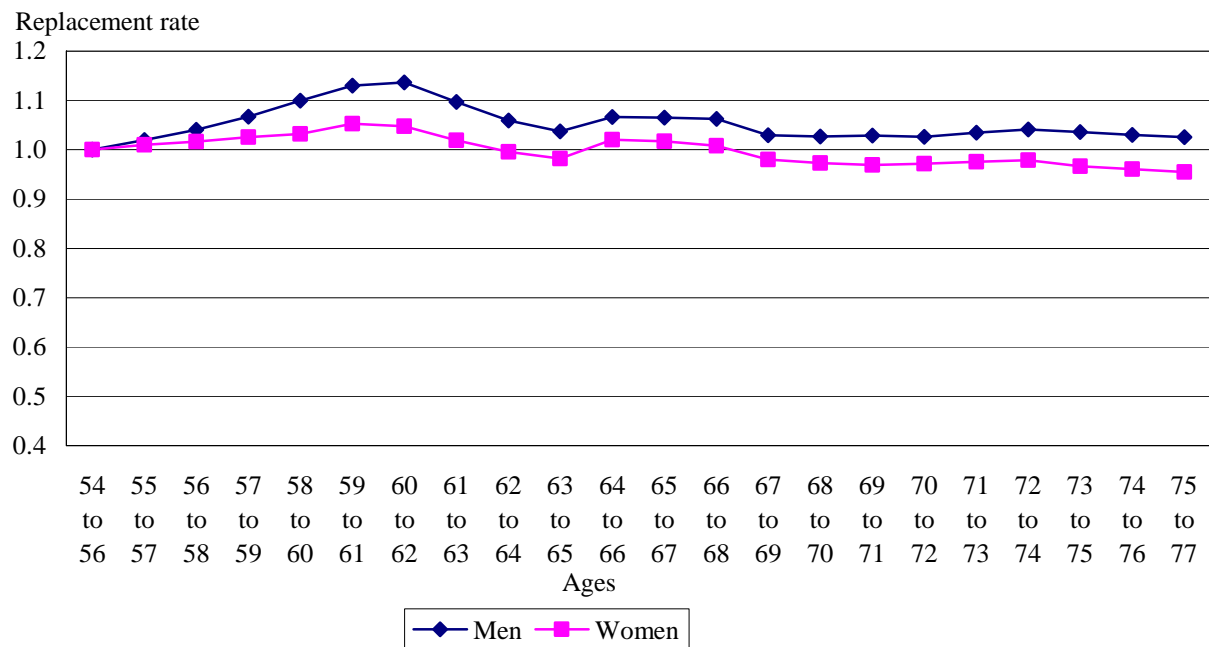
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 21
Median replacement rates of total adult-equivalent-adjusted income after taxes, men and women



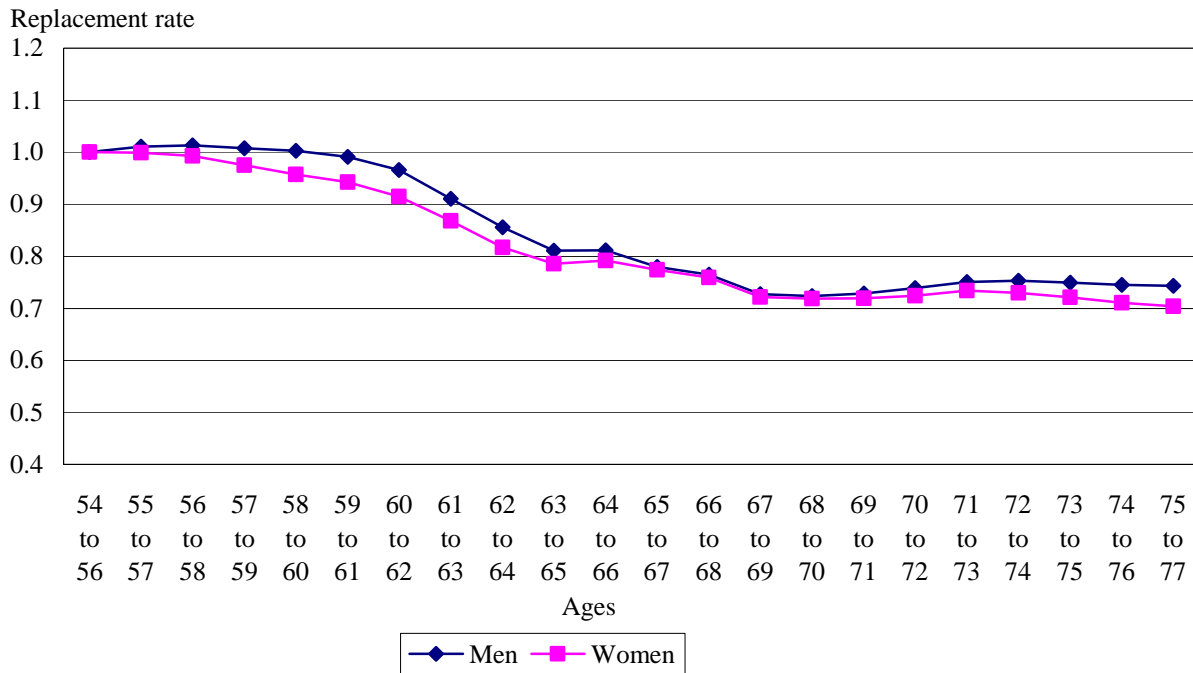
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 22
Median replacement rates of total adult-equivalent-adjusted income after taxes, men and women, bottom quintile



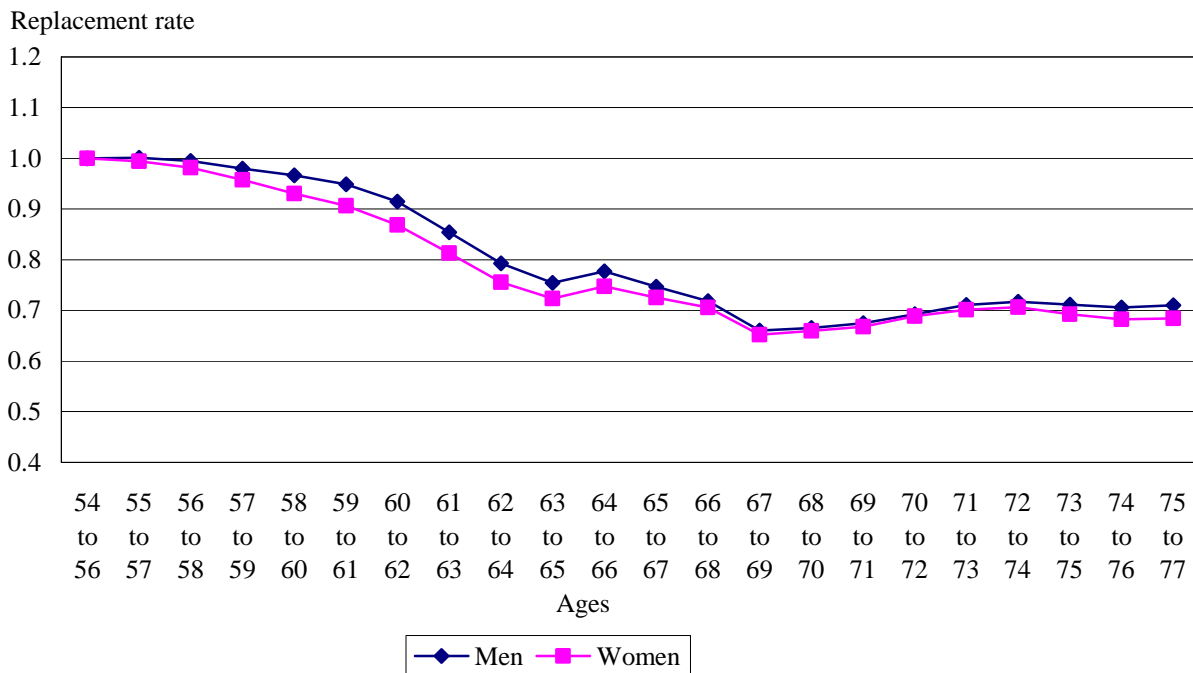
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 23
Median replacement rates of total adult-equivalent-adjusted income after taxes, men and women, middle quintile



Source: Statistics Canada, Longitudinal Administrative Data base.

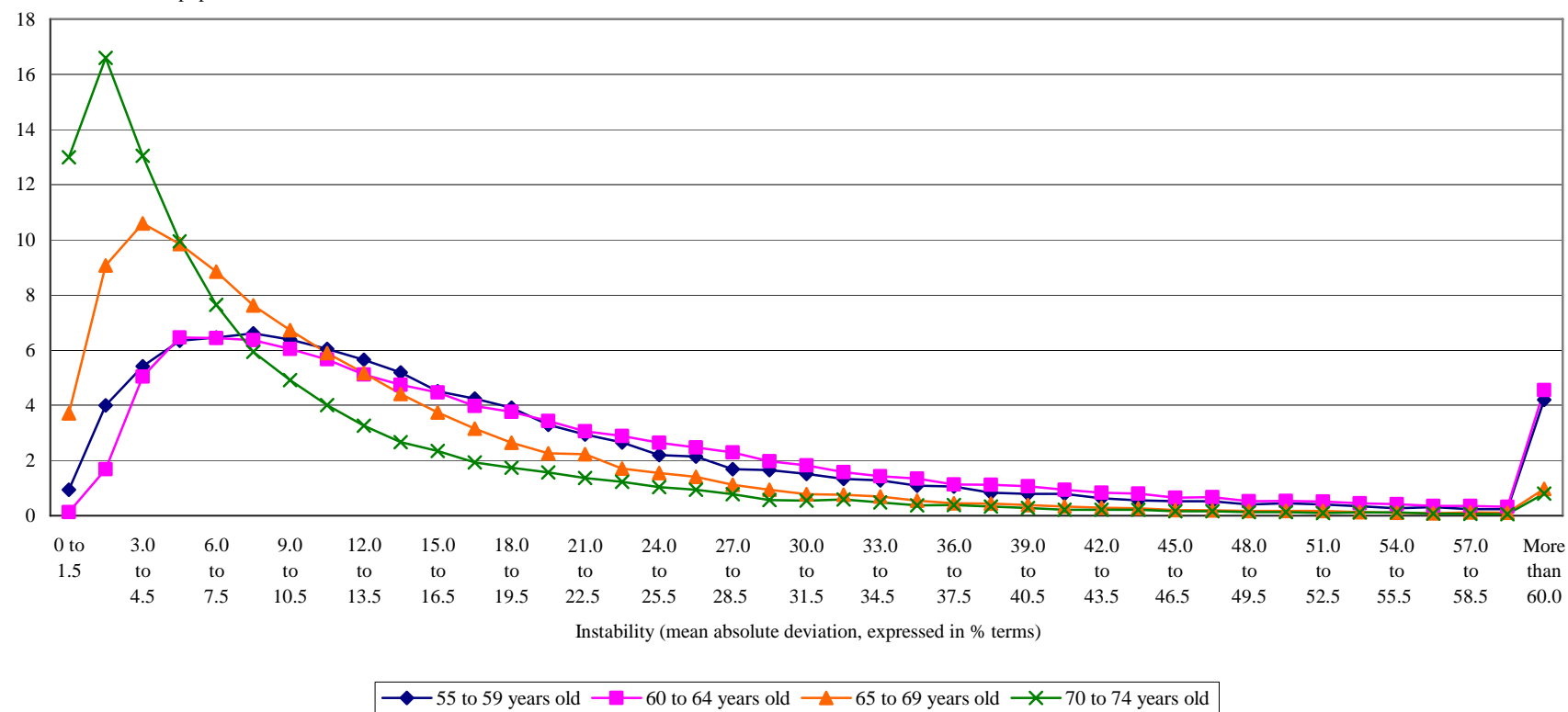
Figure 24
Median replacement rates of total adult-equivalent-adjusted income after taxes, men and women, top quintile



Source: Statistics Canada, Longitudinal Administrative Data base.

Figure 25
Percentage distribution of the population across mean absolute deviation levels, by age group

Percent share of the population



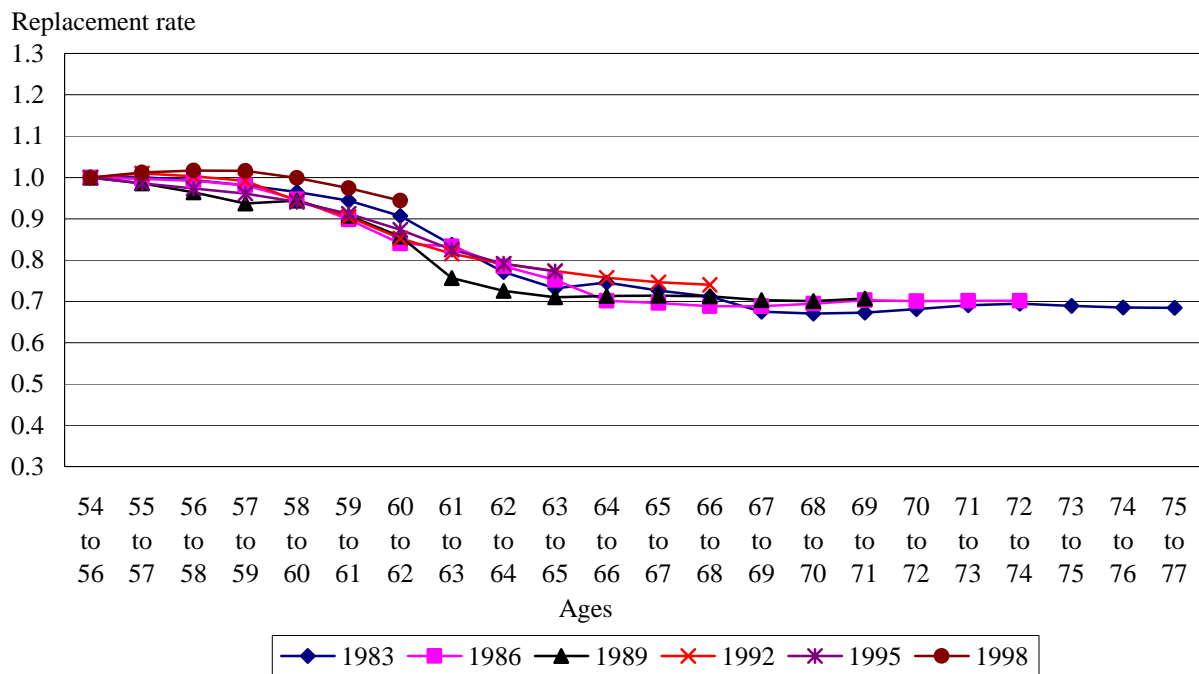
Source: Statistics Canada, Longitudinal Administrative Data base.

Appendix A

Replacement rates obtained with individual income

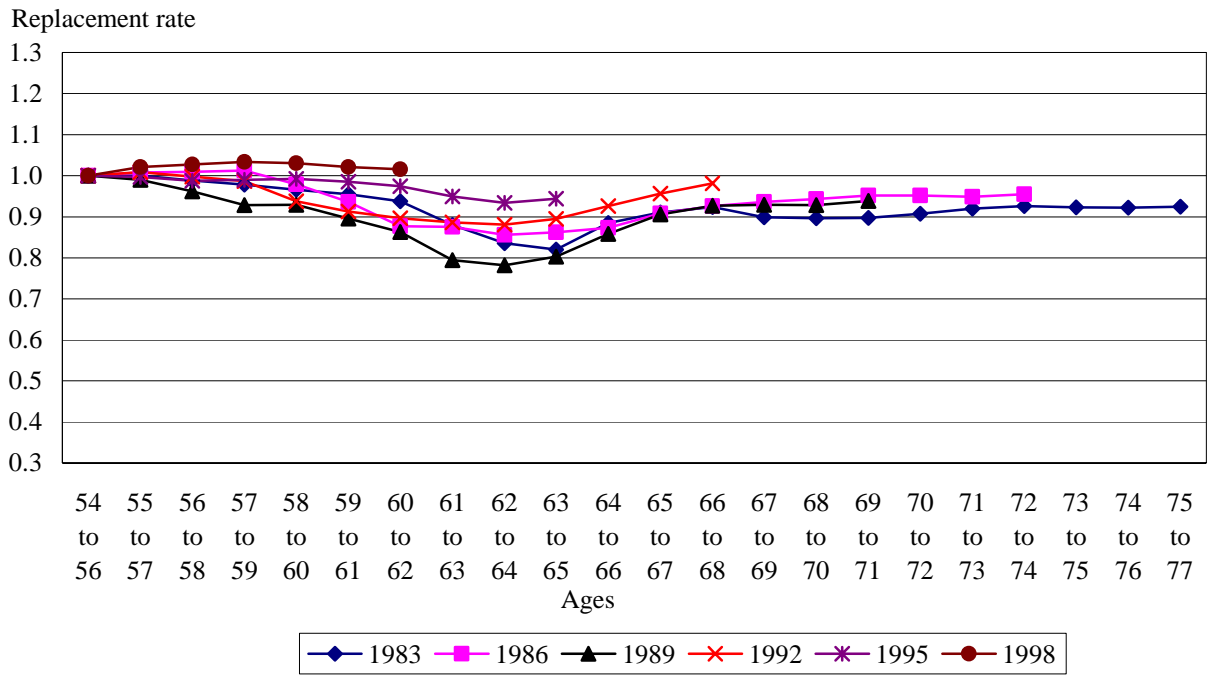
For the most part, the results of this paper are based on family income. We use family income because this is the best possible approximation of the level of financial well-being experienced by individuals. However, we also calculated replacement rates based on individual income levels. In Figure A.1, we provide median replacement rates based on individual income levels for all individuals. The other figures provide median replacement rates based on individual income levels among individuals in the bottom, middle and top quintiles of income. By and large, results indicate that replacement rates after age 65 are approximately 10 percentage points lower than those obtained with family income. Similar results were found across quintiles.

Figure A.1
Median replacement rates of individual income after taxes, all individuals



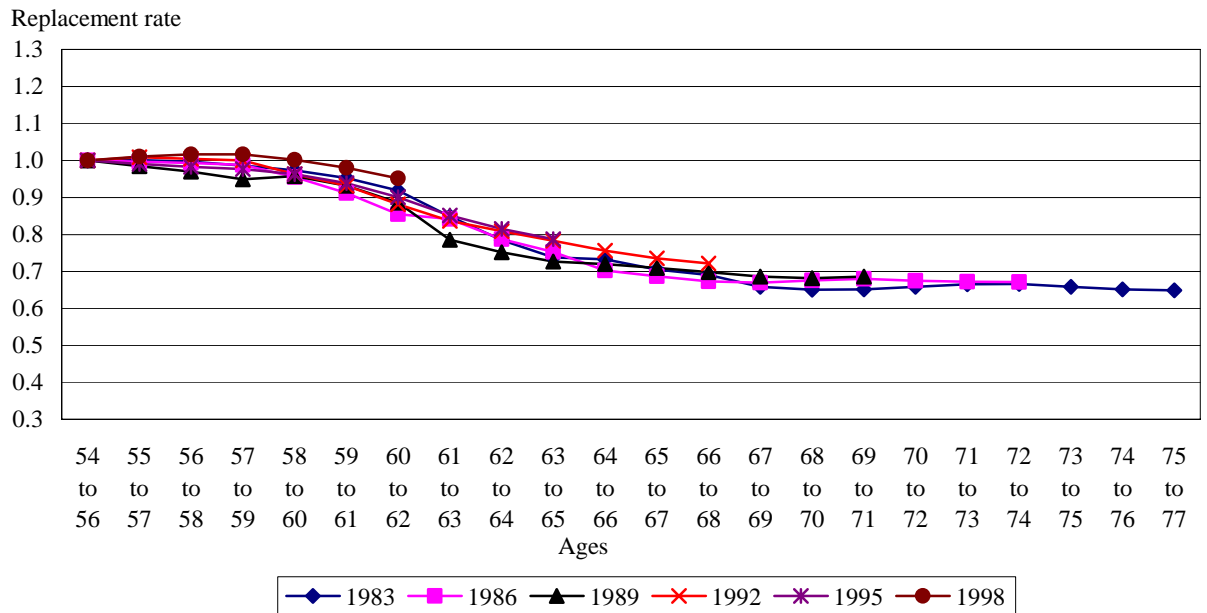
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure A.2
Median replacement rates of individual income after taxes, bottom quintile



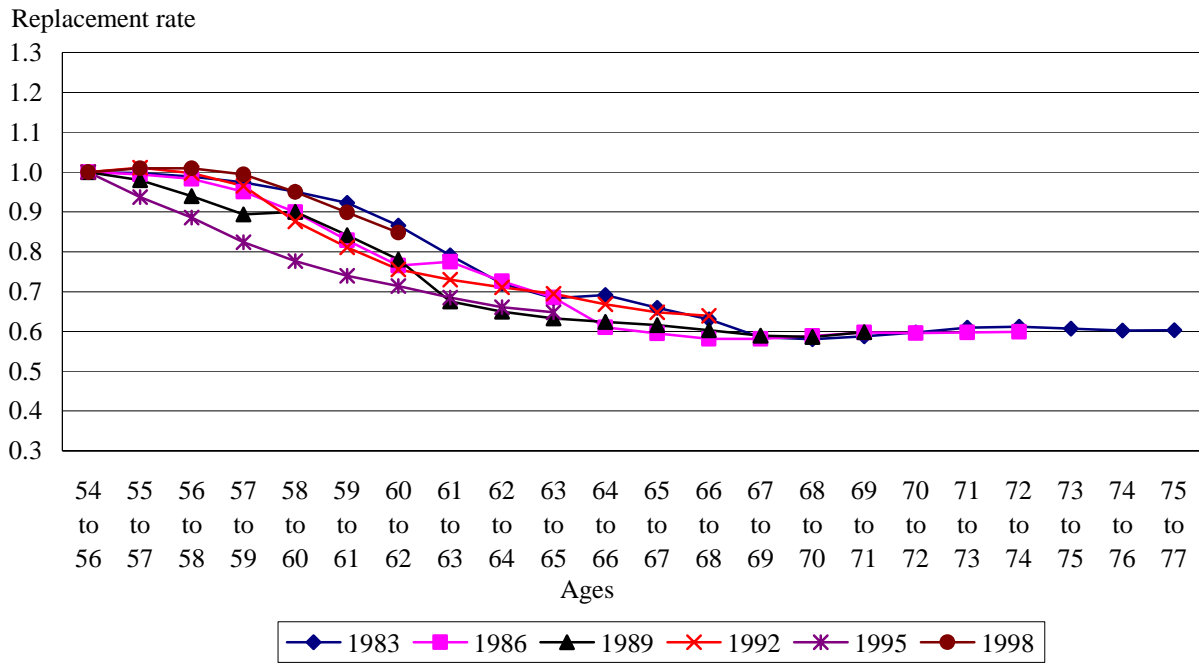
Source: Statistics Canada, Longitudinal Administrative Data base.

Figure A.3
Median replacement rates of individual income after taxes, middle quintile



Source: Statistics Canada, Longitudinal Administrative Data base.

Figure A.4
Median replacement rates of individual income after taxes, top quintile



Source: Statistics Canada, Longitudinal Administrative Data base.

Appendix B

Distribution of individuals across categories of replacement rates

Table B.1
Percentage distribution of individuals across replacement rate categories, all individuals

	Distribution 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
Aged 55 in 1983					
Replacement rate					
<= 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	34.2	32.4
> 0.8 and <=1.0	100.0	25.5	21.0	21.5	22.5
> 1.0 and <=1.5	0.0	38.9	24.0	17.1	17.9
> 1.5	0.0	10.0	10.6	5.7	6.0
Aged 55 in 1986					
Replacement rate					
<= 0.4	0.0	3.0	4.2	2.7	...
> 0.4 and <=0.6	0.0	9.2	19.1	17.5	...
> 0.6 and <=0.8	0.0	19.3	29.7	32.4	...
> 0.8 and <=1.0	100.0	26.2	20.9	22.5	...
> 1.0 and <=1.5	0.0	34.8	19.8	18.2	...
> 1.5	0.0	7.5	6.3	6.7	...
Aged 55 in 1989					
Replacement rate					
<= 0.4	0.0	4.7	5.0	3.9	...
> 0.4 and <=0.6	0.0	10.4	19.1	19.4	...
> 0.6 and <=0.8	0.0	19.9	30.4	33.5	...
> 0.8 and <=1.0	100.0	24.6	20.9	21.3	...
> 1.0 and <=1.5	0.0	31.7	18.8	16.1	...
> 1.5	0.0	8.7	5.8	5.8	...
Aged 55 in 1992					
Replacement rate					
<= 0.4	0.0	3.9	3.7	...	...
> 0.4 and <=0.6	0.0	10.5	15.3	...	...
> 0.6 and <=0.8	0.0	20.5	27.7	...	...
> 0.8 and <=1.0	100.0	26.0	21.9	...	...
> 1.0 and <=1.5	0.0	33.0	22.9	...	...
> 1.5	0.0	6.1	8.5	...	...
Aged 55 in 1995					
Replacement rate					
<= 0.4	0.0	3.8	...	...	...
> 0.4 and <=0.6	0.0	10.6	...	...	...
> 0.6 and <=0.8	0.0	19.0	...	...	...
> 0.8 and <=1.0	100.0	23.6	...	...	...
> 1.0 and <=1.5	0.0	35.0	...	...	...
> 1.5	0.0	8.1	...	...	...

Table B.1
Percentage distribution of individuals across replacement rate categories, all individuals
 (concluded)

	Distribution 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
Aged 55 in 1998					
Replacement rate					
<= 0.4	0.0	2.7	...	...	...
> 0.4 and <=0.6	0.0	7.2	...	...	...
> 0.6 and <=0.8	0.0	16.0	...	...	...
> 0.8 and <=1.0	100.0	23.6	...	...	...
> 1.0 and <=1.5	0.0	41.2	...	...	...
> 1.5	0.0	9.3	...	...	...

... not applicable

Source: Statistics Canada, Longitudinal Administrative Data base.

Table B.2**Percentage distribution of individuals across replacement rate categories, bottom quintile**

	Distribution by age (percent)				
	54 to 56 years old	59 to 61 years old	64 to 66 years old	69 to 71 years old	54 to 56 years old
Aged 55 in 1983					
Replacement rate					
<= 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
Aged 55 in 1986					
Replacement rate					
<= 0.4	0.0	3.5	2.0	0.2	...
> 0.4 and <=0.6	0.0	5.7	6.3	1.8	...
> 0.6 and <=0.8	0.0	11.8	18.5	18.3	...
> 0.8 and <=1.0	100.0	20.7	23.8	28.2	...
> 1.0 and <=1.5	0.0	41.8	33.3	34.1	...
> 1.5	0.0	16.4	16.2	17.4	...
Aged 55 in 1989					
Replacement rate					
<= 0.4	0.0	6.1	2.6	0.3	...
> 0.4 and <=0.6	0.0	8.1	8.3	2.9	...
> 0.6 and <=0.8	0.0	14.5	21.6	23.7	...
> 0.8 and <=1.0	100.0	22.1	22.7	28.4	...
> 1.0 and <=1.5	0.0	35.3	30.3	30.4	...
> 1.5	0.0	13.9	14.4	14.3	...
Aged 55 in 1992					
Replacement rate					
<= 0.4	0.0	5.6	2.3	...	...
> 0.4 and <=0.6	0.0	7.0	5.8	...	...
> 0.6 and <=0.8	0.0	13.9	16.8	...	...
> 0.8 and <=1.0	100.0	21.5	22.1	...	...
> 1.0 and <=1.5	0.0	38.8	33.4	...	...
> 1.5	0.0	13.2	19.6	...	...
Aged 55 in 1995					
Replacement rate					
<= 0.4	0.0	3.9	...	...	...
> 0.4 and <=0.6	0.0	5.4	...	...	...
> 0.6 and <=0.8	0.0	10.8	...	...	...
> 0.8 and <=1.0	100.0	19.7	...	...	...
> 1.0 and <=1.5	0.0	42.9	...	...	...
> 1.5	0.0	17.2	...	...	...

Table B.2**Percentage distribution of individuals across replacement rate categories, bottom quintile
(concluded)**

	Distribution by age (percent)				
	59 to 61 years old	64 to 66 years old	69 to 71 years old	54 to 56 years old	59 to 61 years old
Aged 55 in 1998					
Replacement rate					
<= 0.4	0.0	3.2	...	...	...
> 0.4 and <=0.6	0.0	4.7	...	...	...
> 0.6 and <=0.8	0.0	9.3	...	...	...
> 0.8 and <=1.0	100.0	18.0	...	...	...
> 1.0 and <=1.5	0.0	45.2	...	...	...
> 1.5	0.0	19.5	...	...	...

... not applicable

Source: Statistics Canada, Longitudinal Administrative Data base.

Table B.3
Percent distribution of individuals across replacement rate categories, middle quintile

	Distribution by age (percent)				
	64 to 66 years old	69 to 71 years old	54 to 56 years old	59 to 61 years old	64 to 66 years old
Aged 55 in 1983					
Replacement rate					
<= 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
Aged 55 in 1986					
Replacement rate					
<= 0.4	0.0	2.0	2.6	1.0	...
> 0.4 and <=0.6	0.0	8.1	21.0	21.0	...
> 0.6 and <=0.8	0.0	20.5	34.1	37.5	...
> 0.8 and <=1.0	100.0	29.6	22.3	22.4	...
> 1.0 and <=1.5	0.0	35.5	16.9	14.9	...
> 1.5	0.0	4.3	3.1	3.2	...
Aged 55 in 1989					
Replacement rate					
<= 0.4	0.0	2.6	3.1	1.7	...
> 0.4 and <=0.6	0.0	9.8	20.7	23.6	...
> 0.6 and <=0.8	0.0	21.7	34.2	38.1	...
> 0.8 and <=1.0	100.0	26.8	21.9	20.7	...
> 1.0 and <=1.5	0.0	32.1	17.2	13.0	...
> 1.5	0.0	7.0	2.9	2.9	...
Aged 55 in 1992					
Replacement rate					
<= 0.4	0.0	2.3	2.2	...	...
> 0.4 and <=0.6	0.0	9.3	15.7	...	...
> 0.6 and <=0.8	0.0	21.3	31.1	...	...
> 0.8 and <=1.0	100.0	29.5	24.0	...	...
> 1.0 and <=1.5	0.0	33.6	22.1	...	...
> 1.5	0.0	3.9	4.9	...	...
Aged 55 in 1995					
Replacement rate					
<= 0.4	0.0	1.9	...	...	...
> 0.4 and <=0.6	0.0	8.9	...	...	...
> 0.6 and <=0.8	0.0	20.3	...	...	...
> 0.8 and <=1.0	100.0	27.2	...	...	...
> 1.0 and <=1.5	0.0	36.9	...	...	...
> 1.5	0.0	4.7	...	...	...

Table B.3
Percent distribution of individuals across replacement rate categories, middle quintile
 (concluded)

	Distribution by age (percent)				
	54 to 56 years old	59 to 61 years old	64 to 66 years old	69 to 71 years old	54 to 56 years old
Aged 55 in 1998					
Replacement rate					
<= 0.4	0.0	1.5	...	...	...
> 0.4 and <=0.6	0.0	6.0	...	...	...
> 0.6 and <=0.8	0.0	17.1	...	...	...
> 0.8 and <=1.0	100.0	26.4	...	...	...
> 1.0 and <=1.5	0.0	43.0	...	...	...
> 1.5	0.0	6.0	...	...	...

... not applicable

Source: Statistics Canada, Longitudinal Administrative Data base.

Table B.4
Percent distribution of individuals across replacement rate categories, top quintile

	Distribution by age (percent)				
	54 to 56 years old	59 to 61 years old	64 to 66 years old	69 to 71 years old	54 to 56 years old
Aged 55 in 1983					
Replacement rate					
<= 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
Aged 55 in 1986					
Replacement rate					
<= 0.4	0.0	5.4	10.2	8.4	...
> 0.4 and <=0.6	0.0	15.0	28.3	26.5	...
> 0.6 and <=0.8	0.0	23.2	29.2	32.3	...
> 0.8 and <=1.0	100.0	24.5	15.3	16.3	...
> 1.0 and <=1.5	0.0	25.4	12.8	11.2	...
> 1.5	0.0	6.5	4.2	5.3	...
Aged 55 in 1989					
Replacement rate					
<= 0.4	0.0	8.3	12.3	...	...
> 0.4 and <=0.6	0.0	14.4	26.0	...	...
> 0.6 and <=0.8	0.0	21.0	28.3	...	...
> 0.8 and <=1.0	100.0	21.4	15.8	...	...
> 1.0 and <=1.5	0.0	27.2	12.8	...	...
> 1.5	0.0	7.6	4.9	...	...
Aged 55 in 1992					
Replacement rate					
<= 0.4	0.0	6.6	8.9	...	...
> 0.4 and <=0.6	0.0	16.3	23.2	...	...
> 0.6 and <=0.8	0.0	23.8	28.8	...	...
> 0.8 and <=1.0	100.0	23.2	17.0	...	...
> 1.0 and <=1.5	0.0	25.0	15.6	...	...
> 1.5	0.0	5.1	6.6	...	...
Aged 55 in 1995					
Replacement rate					
<= 0.4	0.0	8.3	...	...	...
> 0.4 and <=0.6	0.0	19.1	...	...	...
> 0.6 and <=0.8	0.0	23.8	...	...	...
> 0.8 and <=1.0	100.0	19.8	...	...	...
> 1.0 and <=1.5	0.0	22.4	...	...	...
> 1.5	0.0	6.6	...	...	...

Table B.4
Percent distribution of individuals across replacement rate categories, top quintile
 (concluded)

	Distribution by age (percent)				
	54 to 56 years old	59 to 61 years old	64 to 66 years old	69 to 71 years old	54 to 56 years old
Aged 55 in 1998					
Replacement rate					
<= 0.4	0.0	5.4	...	...	...
> 0.4 and <=0.6	0.0	12.3	...	...	...
> 0.6 and <=0.8	0.0	20.0	...	...	...
> 0.8 and <=1.0	100.0	22.3	...	...	...
> 1.0 and <=1.5	0.0	32.7	...	...	...
> 1.5	0.0	7.4	...	...	...

... not applicable

Source: Statistics Canada, Longitudinal Administrative Data base.

References

- Baldwin, Bob. 2006. "A shaky third pillar: The vulnerability of retirement incomes." In *New Frontiers of Research on Retirement*. Leroy O. Stone (editor in chief). Catalogue no. 0010675-511-XIE. Ottawa: Statistics Canada.
- Department of Finance. 1979. *The Retirement Income System in Canada: Problems and Alternative Policies for Reform*. Task Force on Retirement Income Policy. Ottawa: Minister of Supply and Services Canada.
- Department of Finance. 1995. *Background on Tax Assistance for Retirement Saving*. Prepared for the Public Accounts Committee of the House of Commons. Ottawa.
- Gottschalk, Peter, and Robert Moffit. 1994. "The Growth of Earnings Instability in the U.S. Labor Market." *Brooking Papers on Economic Activity*. 2: 217–272.
- Gower, Dave. 1998. "Income transition upon retirement." *Perspectives on Labour and Income*. 10, 4: 18–23. Catalogue no. 75-001-XIE1998004. Ottawa: Statistics Canada.
- Heisz, Andrew, and Sébastien LaRochelle-Côté. 2006. *Work Hours Instability in Canada*. Analytical Studies Research Paper Series. Catalogue no. 11F0019MIE2006278. Ottawa: Statistics Canada.
- Horner, Keith. 2007. *Emerging Challenges and Policy Responses within Canada's Retirement Income System: A Focus on Workplace Pensions, Private Savings and Income Security*. Working draft prepared for the Retirement and Ageing Division of HRSDC. Ottawa: Human Resources and Social Development Canada.
- Li, Jinyan. 2006. "Separation, linkage and blurring in the public and private pillars of Canada's retirement income system." In *New Frontiers of Research on Retirement*. Leroy O. Stone (ed.). Catalogue no. 0010675-511-XIE. Ottawa: Statistics Canada.
- Martel, Laurent, and Éric Caron-Malenfant. 2006. *Portrait of the Canadian Population in 2006, by Age and Sex: Findings*. Census Analysis Series Catalogue no. 97-551-XWE2006001. Ottawa: Statistics Canada.
- Maser, Karen. 2003. "An introduction to Canada's retirement income programs." In *Canada's Retirement Income Programs: A Statistical Overview (1990–2000)*. Karen Maser and Josée Bégin. (eds.). Income Statistics Division. Catalogue no. 0010074-507-XIE. Ottawa: Statistics Canada.
- Morissette, René, and Yuri Ostrovsky. 2005. "The instability of family earnings and family income in Canada, 1986–1991 and 1996–2001." *Canadian Public Policy*. 31, 3: 273–302.
- Morissette, René, and Marie Drolet. 1999. *The Evolution of Pension Coverage of Young and Prime-aged Workers in Canada*. Analytical Studies Research Paper Series. Catalogue no. 11F0019MIE1999138. Ottawa: Statistics Canada.

- Myles, John. 2000. "The maturation of Canada's retirement income system: income levels, income inequality and low income among the elderly." *Canadian Journal on Aging*. 19, 3: 287–316.
- Myles, John. 2006. "From pension policy to retirement policy: Towards a new social agenda?" In *New Frontiers of Research on Retirement*. Leroy O. Stone. (ed.). Catalogue no. 0010675-511-XIE. Ottawa: Statistics Canada.
- Palameta, Boris. 2003. "Profiling RRSP contributors." *Perspectives on Labour and Income*. 4, 1. Catalogue no. 75-001-XIE2003001. Ottawa: Statistics Canada.
- Schulz, James H. 1992. *The Economics of Aging*. 5th ed. New York: Auburn House.
- Smith, James P. 2003. "Trends and projections in income replacement during retirement." *Journal of Labor Economics*. 21, 4: 755–781.
- Turcotte, Martin, and Grant Schellenberg. 2007. *A Portrait of Seniors in Canada, 2006*. Catalogue no. 89-519-XWE. Ottawa: Statistics Canada.