Income replacement during the retirement years

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The retirement income sources of Canadians have received increased attention recently with a spate of   new proposals emerging from governments, think tanks and labour organizations. Some of this attention is due to recent economic events that have affected private retirement savings and registered pension plans. But longer-term trends—such as increasing longevity, lower savings rates and higher household debt levels—also play a role.

Income support programs for seniors have a long history in Canada. The federal Old Age Security program began in 1952, replacing provincial programs dating from the 1920s. The Canada Pension Plan, designed to replace a portion of employment earnings, was introduced in 1965. Shortly thereafter, policy analysts began to question whether the retirement income system would be effective in replacing income earned during the working years.[1]

An assessment of retirement income replacement requires two key components. First, long-term data on individuals' income are required. Such data covering a span of more than one-quarter of a century are available based on a sample of tax records (see *Data source and definitions*). Second, an operational definition of 'replacement rate' is required. The approach used here is to establish a baseline total income for individuals in their mid-fifties and track their inflation-adjusted income through to their mid-seventies. Incomes are adjusted to reflect changes in family size so that the replacement rates account for the estimated spending requirements of the household.

Using this definition, an earlier study focused on those with strong labour market attachment (LaRochelle-Côté et al. 2008). It found that the family income of a typical individual in his or her mid-seventies was nearly 80% of that person's income around age 55.[2] Among low-income individuals, the typical replacement rate was 100%; among middle-income individuals, 80%; and among high-income individuals, about 70%. The study also found that income during the retirement years has increased over time.

Other studies expanded the study of replacement rates to examine differences in various sub-groups (Schellenberg and Ostrovsky 2009) or examined alternative definitions of income (Brown et al. 2010 and Denton et al. 2009) and found similar results. The consensus is that the current retirement income system, blending public programs and private savings, provides adequate replacement rates for median workers—at least in contrast with the more pessimistic predictions of the 1960s and 1970s.

Yet median replacement rates only capture the central tendencies of the population or a defined group. They do not indicate how all individuals in the group fare. For example, the 2008 study found that one-quarter of middle-income individuals had replacement rates below 60% by the time they reached their mid-seventies. This raises the possibility that many middle-income Canadians experience a decline in economic well-being in retirement.

One key question is whether most Canadians—not just those with strong labour market attachment—achieve similar levels of retirement income. For example, spouses who have full-time employed partners, but who themselves are not working or are working part time, would have been excluded from the earlier study. Yet, the extent to which individuals maintain their pre-retirement living standards in their senior years is no less important. In all, about 50% of the population was excluded from the earlier study. This study

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expands the scope to include 80% to 85% of the population approaching retirement and measures the extent to which family income levels are maintained in individuals' senior years.[3]

Income sources

Since families generally share resources, total family income is a better indicator of financial resources than individual income. All income sources from all family members are thus included in the analysis: government transfers (Old Age Security, Guaranteed Income Supplement, Canada Pension Plan, Quebec Pension Plan, and all other government transfer programs), private sources (registered pension plans and registered retirement savings plan income, earnings, investments, dividends, and capital gains) as well as income from 'other' sources. Since families also achieve some economies of scale, income levels are also adjusted to account for the size of the family.[4] To limit the potential impact of short-run fluctuations, all income values are calculated by three-year moving averages. Income values have been deflated by using the national Consumer Price Index to represent constant 2006 dollars.

As in LaRochelle-Côté et al. (2008), tax data from the Longitudinal Administrative Databank (LAD) are used to examine the evolution of income among a group of individuals age 54 to 56 in 1983 until they reached 77 to 79 years of age in 2006 (see *Data source and definitions*). Cosidering individuals age 54 to 56 was necessary to increase the sample size, enabling more detailed analyses. The unit of analysis is the individual, but all incomes are reported at the family level. Income components are reported in the same manner, for instance, the values reported for investment do not refer to individual investment income, but the income of the family to which the individual belongs.

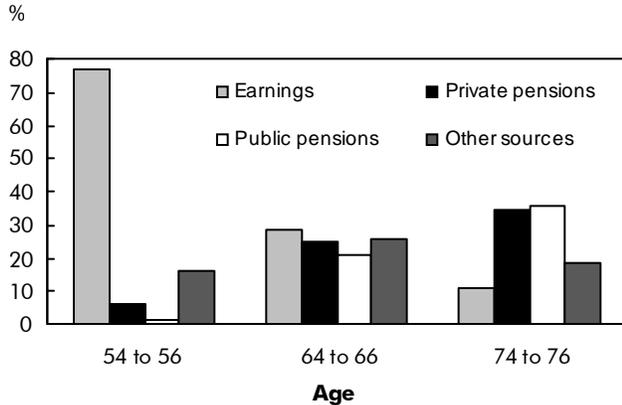In addition to total income, four sub-categories are examined:

- earnings obtained as an employee or from self-employment;

- private pension sources, which include benefits from registered pension plans (RPP), registered retirement saving plans (RRSP), retirement income funds (RIF) and 'other income' (including severance payments, annuity payments, and other sources of private pension income);

- public pension sources, including Old Age Security (OAS), the Guaranteed Income Supplement (GIS) and the Canada and Quebec Pension Plans (CPP and QPP);

- other sources, including income from investments, capital gains and dividends, and from miscellaneous sources (e.g., employment insurance benefits, Goods and Services Tax credits).

Average total income declines with age

When they were in their mid-fifties, individuals averaged about $50,000 in family adult-equivalent-adjusted (AEA) income before tax. Ten years later, this figure was down to $46,700, and, 20 years later, the same individuals earned approximately $42,700 in family AEA income.

As Canadians age, their sources of income change (Chart A). At 54 to 56 years of age, more than 75% of family income came from earnings. By age 74 to 76, private pensions accounted for about one-third of all income and public pensions for another one-third, while income from investments, capital gains and dividends account for almost 20%. Employment earnings still generated about 10% of average family income for individuals in their mid-seventies.

Chart A   Average family adult-equivalent adjusted income before taxes

%

Source: Statistics Canada, Longitudinal Administrative Data, 1982 to 2007.

Chart B   Average family adult-equivalent adjusted income before taxes by quintile

%

Bottom quintile

%

Middle quintile
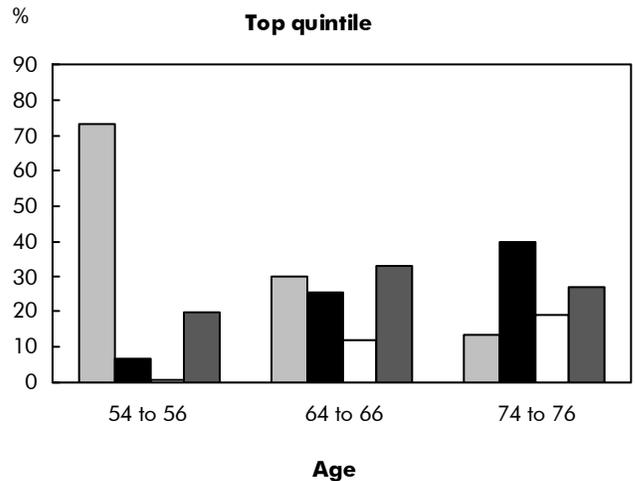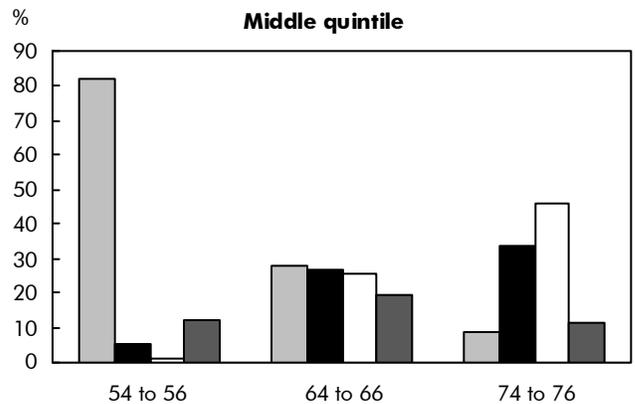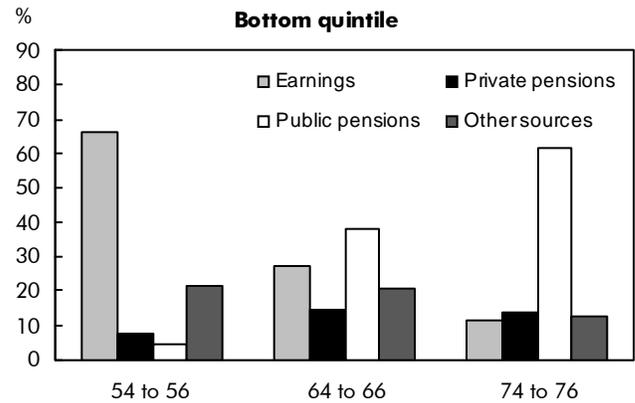

%

Top quintile

Source: Statistics Canada, Longitudinal Administrative Data, 1982 to 2007.

An individual's starting position in the income distribution may affect both subsequent income levels and the sources of income. The key question is: given a certain level of income at the beginning of the period, how do total income and its components evolve over time? Individuals are assigned to income quintiles[5] on the basis of their AEA family income around age 55. Under this approach, each person's quintile remains fixed as he or she ages.

For those in the bottom quintile, average before-tax family income *increases* by age 65. For people in their mid-fifties, family AEA income averaged about $20,000 (before tax) in the bottom quintile. For those in their mid-sixties, total family income rose to $25,000 for the same individuals, and fell back $23,400 by their mid-seventies. Labour income accounted for two-thirds of total income around age 55 for those in the bottom quintile (Chart B). By the time individuals reached their mid-seventies, income from public sources (OAS, GIS, CPP, QPP) represented 62% of total income for this group. Clearly, public pensions play a major role in the maintenance of living standards among lower-income families.

Income trajectories were quite different in the middle quintile. Individuals in that quintile saw average AEA family income fall from $43,100 around age 55 to $38,600 when they were in their mid-sixties, and to $33,300 around age 75. Since income among lower-

income families rose with age, and fell among middle-income families, the income gap between these two groups decreased as the cohort aged.

Earnings comprised 82% of AEA family income of middle-quintile individuals around age 55, but, by age 75, public pensions also played an important role. Public pensions accounted for 46% of before-tax family income, and an additional one-third came from private pensions. Thus while public pensions comprised the largest single source of income for middle-quintile seniors more than one-half of their income came from private pensions and individual savings and investments.

Top-quintile individuals saw their average AEA family income fall as they moved from their mid-fifties to their mid-seventies—from $99,200 to $80,900. At all ages, income from investments, dividends and capital gains comprised a larger portion of total income compared with those in lower quintiles. For individuals around age 55, earnings represented 73% of family income and other sources (investments, dividends and capital gains) comprised 20%. By their mid-seventies, private pensions contributed the most to their family incomes (40%) for the top quintile, followed by income from investments, capital gains and dividends (27%), public pensions (19%), and earnings (14%). Hence, when individuals are in their mid-seventies, public pensions account for one-fifth of income for those in the top quintile, two-fifths for those in the middle quintile and two-thirds for those in the bottom quintile.

Replacement rates

A replacement rate measures the extent to which income flows (mainly earnings) are 'replaced' by various sources of income (public and private pensions, investments and earnings) as an individual makes the transition from the workforce to retirement.

Replacement rates are calculated for each individual in each year based on his or her starting income when those individuals are in their mid-fifties.[6] For example, the replacement rate for an individual

in 2000 is obtained by dividing his or her total family AEA income in 2000 by the total family income of that same individual in 1983 (with both values expressed in three-year moving averages). Then, for every year of the panel, the median replacement rate of a given population is calculated in order to get a sense of what should be interpreted as a 'typical' replacement rate. Since after-tax income is the best measure of 'disposable' income available for this study, it is used in the calculation of replacement rates.[7]

The median AEA family income replacement rate after age 65 is about 0.8 (or 80%) of the mid-fifties income of individuals (Chart C). Median replacement rates for the cohort of Canadians who were age 54 to 56 in 1983 fell from 1.0 (by definition) to 0.8 in the mid-1990s (when they were in their late sixties), and remained stable at this level well into the 2000s (when they were in their late seventies).[8] By and large, these results are similar to earlier findings using a more restricted population (LaRochelle-Côté et al. 2008).

These results pertain to the median worker, and may not be representative other areas of the income distribution. A more complete picture requires an examination of replacement rates across and within quintiles.

Chart C Median replacement rates of family adult-equivalent adjusted income for all individuals age 54 to 56 in 1983
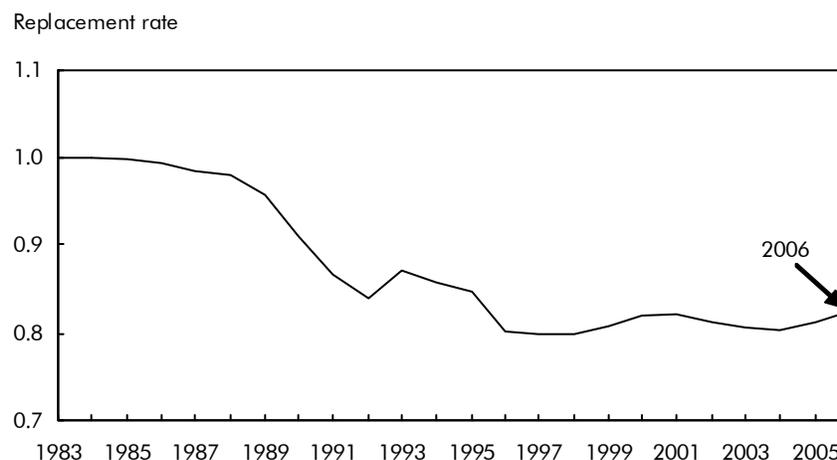
Replacement rate

Source: Statistics Canada, Longitudinal Administrative Data, 1982 to 2007.

Higher replacement rates among lower income groups

Reflecting average income trends, replacement rates vary by the location in the income distribution (Chart D). In general, the higher the income at age 54 to 56, the lower the replacement rate during the retirement years. Based on within-quintile medians, individuals in the bottom quintile (age 54 to 56) had median replacement rates greater than 1.0. In this group, the median replacement rate rose to slightly over 1.1 in the early 1990s, and remained around 1.1 until 2006, when the cohort was age 77 to 79.

Replacement rates were lower in the middle quintile. Their median replacement rate fell to about 0.75 during the mid-1990s (for those in their late sixties), and again remained stable over the 2000s.

Persons in the top income quintile had the greatest amount of income to replace and experienced the lowest replacement rates. Median rates for this group fell to around 0.65 in the mid-1990s, and recovered to about 0.7 in the early 2000s when individuals were in their mid-seventies.

## Replacement rates vary among all income levels

As replacement rates vary across quintiles, they may also vary *within* income quintiles. For example, not all individuals in the bottom income quintile achieved replacement rates above 100%. Similarly, not all individuals in the top income quintile had replacement rates in the 0.6 to 0.7 range. Thus we examine *distributions* of replacement rates within each income quintile at various points in time (Table 1).

By definition, all individuals had a 1.0 replacement rate in 1983. However, even if individuals within a quintile had similar income levels at age 55, replacement rates diverged as they aged.

In the bottom quintile, for example, although most individuals had replacement rates above 100%, about one-third had replacement rates below that threshold in their mid-seventies. Within that group, 24% had replacement rates between 0.8 and 1.0, and another 9% of individuals had replacement rates at or below 0.8. Conversely, more than two-thirds had replacement rates above 1.0 and 23% even had replacement rates above 1.5. To add some perspective, the average income level before tax for individuals in their mid-fifties in the bottom quintile was approximately $25,000.

Compared to those in the bottom quintile, replacement rates in the middle income quintile were lower and more spread out. Just over one-third of individuals who were in the middle quintile had replacement rates between 0.6 and 0.8 in their mid-seventies. Another one-quarter replaced between 0.8 and 1.0 of their earlier income while another one-fifth had rates of 0.6 or below. On the other hand, about one in five in this quintile had replacement rates higher than 1.0. Some have argued that low replacement rates may be indicative of a lack of retirement preparation for a sizeable minority of middle-income earners (Mintz 2009).

Chart D   Median replacement rates of family adult-equivalent adjusted income by income quintile
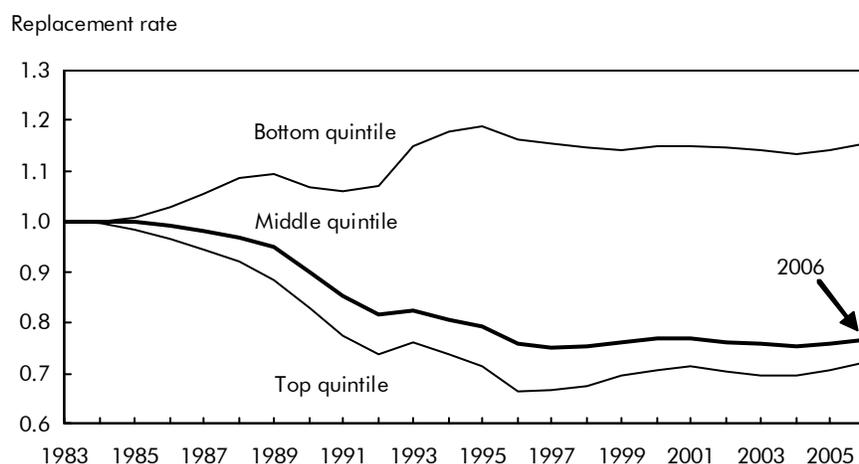
Replacement rate

Source: Statistics Canada, Longitudinal Administrative Data, 1982 to 2007.

Table 1   Replacement rate categories among individuals age 54 to 56 in 1983

	Distribution across age groups				
	Age 54 to 56 in 1983	Age 59 to 61 in 1988	Age 64 to 66 in 1993	Age 69 to 71 in 1998	Age 74 to 76 in 2003
			%		
All individuals					
≤ 0.4	0.0	3.1	3.1	2.4	2.8
> 0.4 and ≤ 0.6	0.0	7.9	13.5	16.6	16.6
> 0.6 and ≤ 0.8	0.0	17.0	25.2	31.2	29.8
> 0.8 and ≤ 1.0	100.0	24.7	20.9	22.0	22.3
> 1.0 and ≤ 1.5	0.0	36.6	25.4	20.4	20.7
> 1.5	0.0	10.7	11.9	7.4	7.8
Bottom quintile					
≤0.4	0.0	5.2	1.9	0.2	0.2
> 0.4 and ≤ 0.6	0.0	6.4	3.6	0.5	0.9
> 0.6 and ≤ 0.8	0.0	11.8	10.9	8.3	8.0
> 0.8 and ≤ 1.0	100.0	17.8	18.9	24.0	24.4
> 1.0 and ≤ 1.5	0.0	37.2	37.9	43.9	43.4
> 1.5	0.0	21.5	26.7	23.0	23.2
Middle quintile					
≤0.4	0.0	2.1	2.0	0.7	0.9
> 0.4 and ≤ 0.6	0.0	7.6	14.2	19.9	21.0
> 0.6 and ≤ 0.8	0.0	17.5	30.5	37.8	35.5
> 0.8 and ≤ 1.0	100.0	27.3	22.8	23.1	23.1
> 1.0 and ≤ 1.5	0.0	38.7	23.0	15.2	16.0
> 1.5	0.0	6.9	7.5	3.1	3.5
Top quintile					
≤0.4	0.0	3.4	6.4	7.7	8.4
> 0.4 and ≤ 0.6	0.0	10.8	21.0	28.1	25.9
> 0.6 and ≤ 0.8	0.0	20.3	27.2	34.1	31.1
> 0.8 and ≤ 1.0	100.0	25.3	17.8	15.6	17.7
> 1.0 and ≤ 1.5	0.0	31.2	19.3	10.6	12.2
> 1.5	0.0	9.0	8.3	4.0	4.7

Source: Statistics Canada, Longitudinal Administrative Data, 1982 to 2007.

by earnings patterns and transfer programs particular to that period, as well as subsequent economic events. This raises the issue of whether the patterns observed for this cohort would apply to more recent cohorts. As such, five subsequent cohorts age 54 to 56 in 1986, 1989, 1992, 1995 and 1998 were followed to 2006 (Chart E). While more recent cohorts have shorter observation spans than older cohorts, they do enable the comparison of trajectories for a minimum of eight years.

Generally, more recent cohorts have higher incomes than the 1983 cohort. When capital gains are excluded from the total, AEA family income around age 55 averaged $49,300 for the 1983 cohort then climbed steadily to $58,100 for the 1998 cohort. These income gains for younger cohorts relative to earlier cohorts were sustained until they were all at least in their early sixties.

Even working from the higher average income base, median replacement rates are also rising for more recent cohorts—particularly among those who reached age 55 after 1990. More detailed calculations (data not shown) indicate that median replacement rates generally increased in the bottom and middle quintiles, but no clear trend was evident for the top quintile.

Factors contributing to this increase in family income include rising earnings for older workers, particularly women, and increasing private pension income for retirees from the early 1980s to the mid-1990s. Since then, employment rates have increased for the population age 55 and over. For more detailed results, see LaRochelle-Côté et al. (2010).

Finally, individuals in the top income quintile also experienced variation in their replacement rates. About one-third of top-quintile individuals had replacement rates of 0.6 or below around age 75, and another one-third had replacement rates located between 0.6 and 0.8. While similar proportions in the top and middle quintiles had income replacement rates above 1.0, those in the top quintile were more likely to have a replacement rate of 0.6 or below (34% versus 22%).[9] Although the replacements rates in the top quintile were somewhat lower than in the middle quintile, it is worth noting that the base-period average AEA income in the top quintile was more than double the average for the middle quintile.

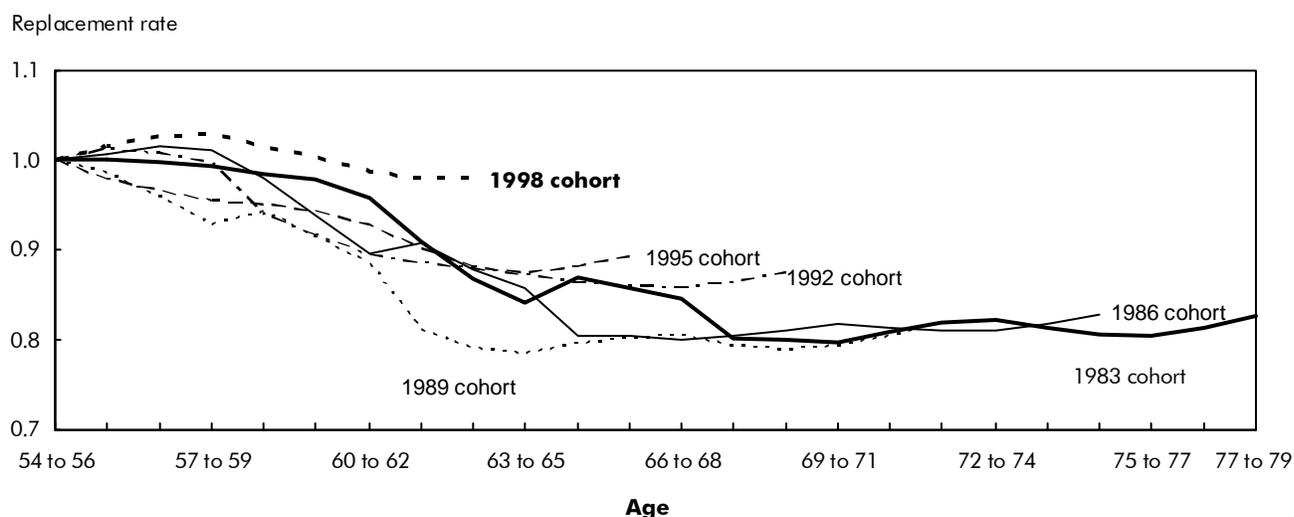## How are more recent cohorts doing?

The cohort followed in this article was 54 to 56 years of age in 1983. Most of those individuals would have retired, fully or partially, by the mid-1990s. Their income replacement rates would thus be affected

Chart E   Median replacement rates of family adult-equivalent adjusted income for all individuals by cohort

Replacement rate

Source: Statistics Canada, Longitudinal Administrative Data, 1982 to 2007.

Summary

In an earlier study, LaRochelle-Côté et al. (2008) analyzed family income replacement rates for individuals who had a substantial attachment to the labour force—about 50% of those in their mid-fifties. The majority of them were able to replace more than three-quarters of their income from the time they were in their mid-fifties, even long after retirement.

This paper extends that analysis to include all those in their mid-fifties with a family income of at least $10,000. As a result, this analysis covers a much larger group than the earlier study—80% to 85% of 54 to 56 year-olds—depending on the cohort studied.

Despite these changes, the results of the two analyses are similar. In 2006, the adjusted family income of the median senior in his late seventies was about 80% of his or her income in his or her mid-fifties. As in the earlier study, the lower the income in individuals' mid-fifties, the higher the replacement rate in their senior years. Individuals in the bottom quintile typically achieved a 110% replacement rate by their mid-sixties, while individuals in the top income quintile had replacement rates in the 0.7 range. There was some

variation within quintiles. For example, more than 20% of middle-income Canadians had replacement rates of 0.6 or below of their mid-fifties income after two decades.

Similar replacement rates were found for other cohorts of retirees who reached retirement age in the 1980s. Although data do not cover as long a period, the results suggest that replacement rates may be marginally higher for cohorts that reached age 55 in the 1990s.

Perspectives

■ **Notes**

1. See Perrin (1969) and the 1980 report of the federal Task Force on Retirement Income Policy (Government of Canada 1980).

2. More specifically, individuals in the sample had to have had wages and salaries of at least $10,000 at age 55 in order to be included in the study. The primary concern during the 1970s was whether Canadians with significant earnings during their working years would see that income replaced as they entered their senior years. LaRochelle-Côté et al. (2008) examined that issue.

3. In this study, all individuals with a moving average of at least $10,000 in family adult-equivalent-adjusted (AEA) income were included in the sample. The choice of this new cutoff was motivated by the fact that individuals who were part of families with less than $10,000 in AEA income had a lower probability of filing an income tax return in the early 1980s.

4. The adult-equivalent-adjusted (AEA) family income is a per capita measure of family income that accounts for economies of scale in larger families. It is calculated by dividing family income by the square root of family size. For example, if a family of four has an unadjusted family income of $50,000, the AEA income for that family would be $25,000.

5. A quintile represents one-fifth of the population by total income. The bottom quintile consists of the lowest 20% in terms of total income, the middle quintile is the middle 20% and the top quintile is the highest 20%.

6. Individuals who died over the period are included in the sample until their last complete year in the data.

7. As noted earlier, a form of 'permanent' income is used, whereby the family income reported at each age is a three-year moving average. For example, the family income of someone age 55 in 1983 is really the average adult-equivalent-adjusted (AEA) family income of that individual at ages 54 to 56 (between 1982 and 1984 inclusively), and income of that same individual at age 78 is the average income over ages 77 to 79 (between 2005 and 2007 inclusively).

8. The small bump in replacement rates seen at the beginning of the 1990s coincided with a change in tax policy whereby individuals could no longer claim a deduction for capital gains realized after February 1994. This encouraged individuals to declare higher-than-usual capital gains in order to benefit from any part of their $100,000 unused capital gains exemption. Replacement rates were smoother when capital gains were removed from the numerator and denominator. The effect of the policy change also had effects on two more years as all income figures are expressed in terms of three-year moving averages.

9. To the extent that those in the top income quintile have greater available wealth on which they can draw, as evidenced by high levels of investment earnings, replacement rates may underestimate their level of economic well-being in comparison to those in lower quintiles.

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