

Pathways into the GIS

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Canada has an array of programs to provide financial security to seniors (see *Transfers, pensions and tax-advantaged savings plans*), which have helped reduce the low-income rate among seniors to about one-half that among younger adults.⁶

The Guaranteed Income Supplement (GIS) is a transfer specifically targeted at low-income seniors. The GIS is income-tested—benefits are based on previous year's income and are reduced with additional income, disappearing altogether when a maximum threshold is reached. In 2006, about 36% of seniors received at least some benefits, amounting to about \$6.8 billion.⁷

Viewed through an income-support lens, the tiered system has succeeded in keeping the majority of seniors above the low-income cut-off. Nevertheless, over one-third of individuals 65 and over qualify for a supplement explicitly intended for low-income seniors. Clearly, both individuals and governments would be better off financially if more seniors had higher incomes from other sources and fewer needed GIS benefits.

How do individuals get to the point of needing GIS benefits? Were most at the lower end of the income distribution in middle age? Did their incomes drop further and faster than those of their contemporaries? Were they not covered by employer pension plans? Did they save less frequently? Become disabled? These questions are addressed by tracking individual income histories from age 45 to age 68. In addition to sources of income, the database used contains other relevant information: pension plan membership, RRSP contributions and withdrawals, disability deductions and time-specific family structure (see *Data source and defini-*

tions). Although other factors related to income and earnings—for example, education and occupation—were not available, most of their impact on GIS receipt likely acts through income history.

Earnings and income trajectories

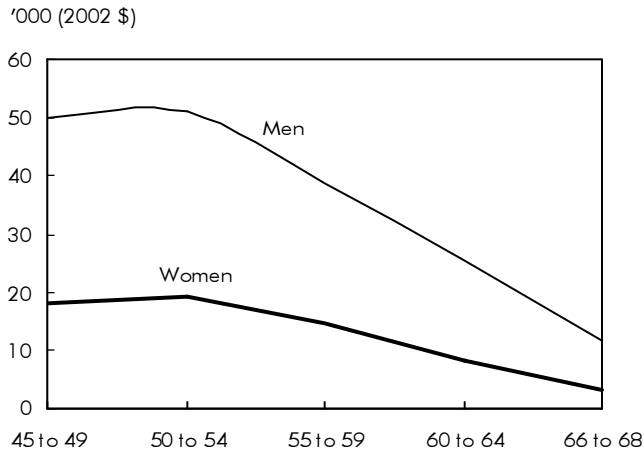
Individuals in their late 40s and early 50s are generally in their peak earnings years (Luong and Hébert 2009). Most will have paid off mortgages and other major debts and will be increasingly focused on saving for retirement. Many are then likely to reduce their work hours as their savings goals are achieved. This pattern dominates aggregate age-earnings profiles.

In some cases individuals may lose their jobs before savings goals are reached. Research has shown that middle-aged displaced workers, particularly those with high seniority, have significant long-term earnings losses (Morissette et al. 2007). Health problems and disability become more prevalent in middle age and can decrease the probability of working, hours of work and earnings (Galarneau and Radulescu 2009). And those at the bottom of the earnings distribution may simply not have the financial capability to save for retirement. Persistent low income in middle age is more prevalent among unattached individuals (Feng et al. 2007). This variety of potential outcomes indicates that a distributional approach that accounts for both levels of and changes in income is appropriate for the study of long-term outcomes, like the eventual receipt of GIS benefits.

Corresponding to the standard aggregate profile, average annual earnings peak for both men and women in their early 50s and decline thereafter

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Chart A Employment earnings for men and women peak in their early 50s

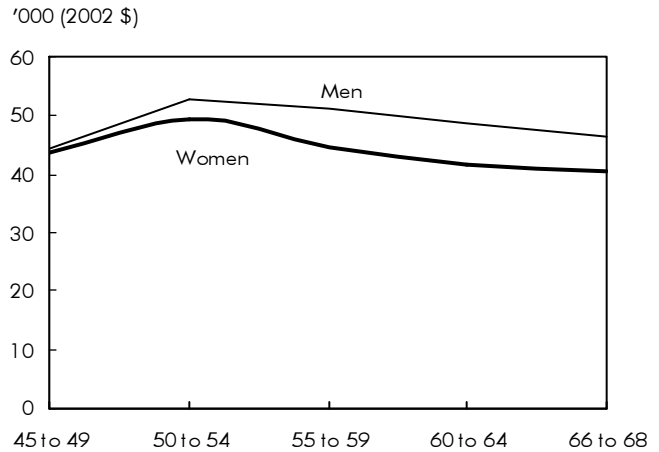


Source: Statistics Canada, Longitudinal Administrative Databank, 2006.

(Chart A). By their late 60s, mean employment earnings have fallen to 23% of their peak value for men and 15% for women.

Size-adjusted family income follows a much different path that corresponds to the life cycle model of income smoothing.¹¹ Like earnings, adjusted income

Chart B Adjusted family income declines gradually after individuals' early 50s



Source: Statistics Canada, Longitudinal Administrative Databank, 2006.

peaks in individuals' early 50s but then declines gradually (Chart B). By their late 60s, women live in families that, on average, retain 82% of the adjusted income experienced in their early 50s. The corresponding figure for men is 88%. These aggregate income replacement ratios are high compared with rules of thumb

Transfers, pensions and tax-advantaged savings plans

Canada has a tiered approach to income support for seniors. The first tier provides transfers to those age 65 and over—the Old Age Security (OAS) pension and the Guaranteed Income Supplement (GIS).¹ The second consists of employment-based public pensions funded by employer and employee contributions—the Canada and Quebec Pension Plans (C/QPP). The third tier comprises tax-sheltered employer pensions and private savings—registered pension plans (RPPs), registered retirement savings plans (RRSPs) and the new tax-free savings account (TFSA).

The tax-advantaged treatment of RRSPs, TFSAs and employer pension plans currently provides incentives to use them for retirement savings. Suggestions have been made to widen this net by developing a readily portable employer pension plan in addition to the CPP (Ambachtsheer 2008).

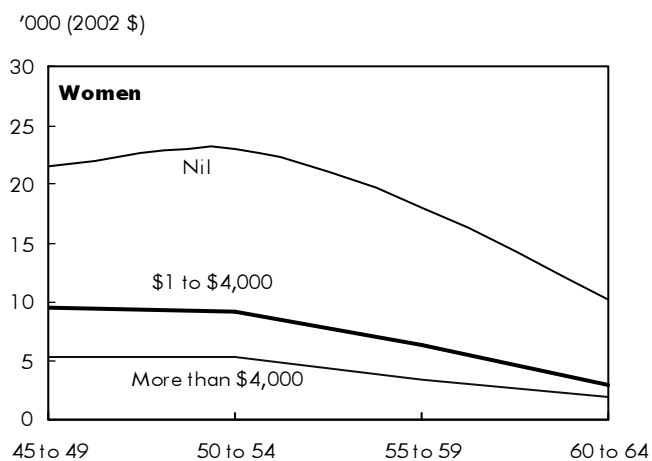
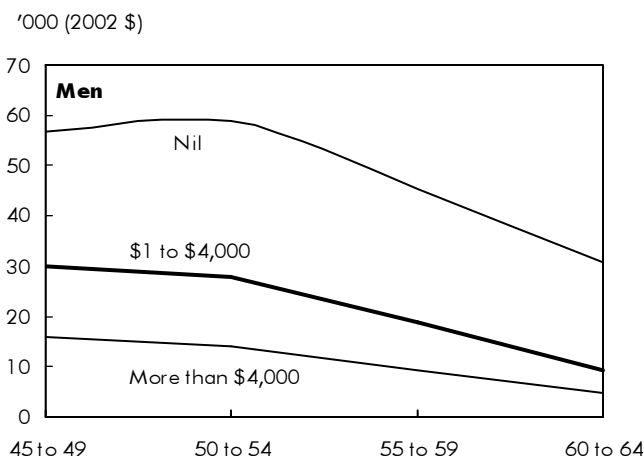
The recently introduced TFSAs overcome some disadvantages of RRSPs noted for low-income earners (Shillington 2003). These plans allow individuals to contribute up to \$5,000 per year, but, unlike RRSP contributions, the amounts are not deductible from taxable earnings. Instead, the original capital and accrued interest or gains can be withdrawn tax-free and

with no impact on social benefits like the GIS.

The OAS is a longstanding program designed to enhance the financial security of seniors. The basic OAS provides a modest complement to income from other sources such as the C/QPP, employer-sponsored pension plans, RRSPs, and other personal savings. To ensure that the incomes of seniors do not fall below a specific threshold, the GIS supplements the basic OAS pension when individuals have little or no other income.

In 2008, the maximum OAS pension was \$6,082.23.² Seniors with little or no other income can have the GIS added to their income. The maximum GIS, paid to seniors with no other income, was \$7,677.03 for single seniors and \$10,139.40 for pensioner couples.³ Combined benefits for seniors with no other income amounted to \$13,759.26 for singles and \$22,303.86 for couples. Since the GIS is reduced by \$0.50 for every dollar of income from other sources (excluding the OAS pension and the first \$3,500 of employment income⁴), no GIS was paid when other sources of income exceeded \$15,672 for singles or \$20,688 for couples.⁵

Chart C Mean employment income at younger ages of persons age 68 or 69 by GIS benefit



Source: Statistics Canada, Longitudinal Administrative Databank, 2006.

discussed in policy documents and recommended by financial advisors, but accord with earlier research that found high rates of adjusted replacement, particularly at the bottom and middle of the income distribution (Larochelle-Côté et al. 2008).

However, aggregates encompass a range of outcomes. Since the outcome of interest is the receipt of GIS benefits, aggregate trajectories were retraced according to the annual average level of GIS benefits received

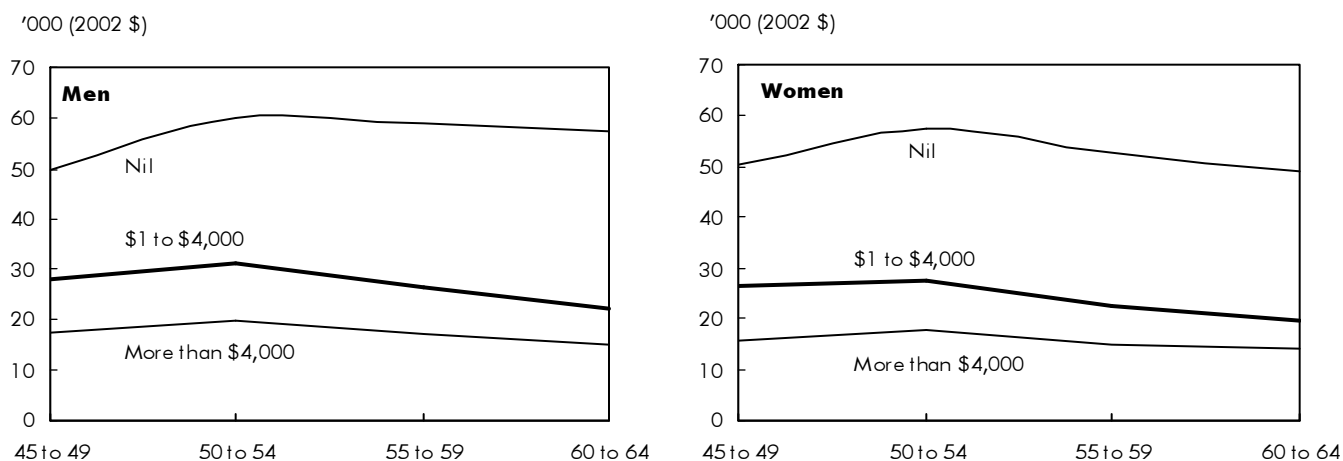
from age 66 to 68: none, \$1 to \$4,000, and more than \$4,000. For both men and women who did not become GIS recipients, earnings peaked in their early 50s and declined swiftly thereafter, albeit not as steeply as in the aggregate picture (Chart C). Those receiving from \$1 to \$4,000 averaged less than one-half of the peak earnings of non-recipients, and those receiving more than \$4,000 in benefits averaged less than one-quarter. These differences in earnings indicate that earnings in middle age are a primary correlate of future GIS receipt. But the trajectory may also be a significant factor since the earnings of GIS recipients were highest in their late 40s, while earnings of non-recipients continued to increase into their early 50s.

The story is much the same for adjusted family income (Chart D). Those not receiving GIS benefits had a peak family income that was, on average, triple that of those receiving GIS benefits of more than \$4,000 and double that of those receiving from \$1 to \$4,000. But differences in trajectory patterns were less clear-cut for family income than for employment earnings.

Not all types of income have the same relationship with future GIS receipt. Since work interruptions in middle age are likely to have long-term financial consequences, retrospective Employment Insurance (EI) benefits were also calculated for the three GIS benefit categories (Chart E). Among men, GIS recipients averaged three to four times more EI benefits in their late 40s and early 50s than non-GIS recipients. The differences in EI benefits were smaller for women, yet significant enough to indicate that receiving EI was likely to be a strong correlate of future GIS receipt. For both men and women, the gaps in EI benefits started to converge in older age groups, as fewer in the cohort remained in the labour market.

As noted, the incidence of disability increases with age and disabilities have a negative effect on hours of work and earnings. Moreover, to claim the disability deduction—used as the indicator of disability—the benchmark is a severe physical or mental disability that noticeably restricts activities of daily living. As could be expected, those who claimed the disability deduction at least once from ages 45 to 64 were much more likely to receive the GIS than those who never claimed (Chart F). The difference in GIS receipt was much larger among men—38% for those with a disability claim compared with 22% for other men—than among women (32% versus 24%).

Chart D Mean family income at younger ages of persons age 68 or 69 by GIS benefit



Source: Statistics Canada, Longitudinal Administrative Databank, 2006.

Distributional mobility

The receipt of GIS benefits was clearly related to the levels of various types of income some 20 years in the past and, to a lesser extent, their subsequent trajectories as individuals approached age 65. As strong as these correlations may be, they present an aggregate picture that may mask movements up and down the income distribution that lead to very different outcomes for individuals who start at the same point.

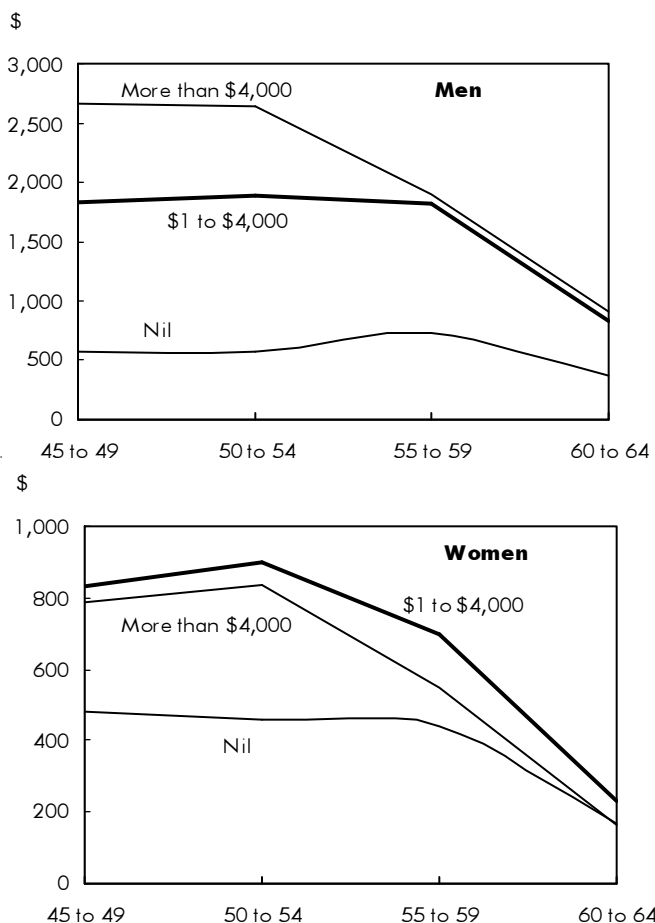
Since LAD follows the same individuals over time, documenting income mobility was simply a matter of determining where someone fit into the income distribution in their late 40s and late 60s. To accomplish this, the sample was divided into five equally sized groups from lowest to highest income for each age group. Cross-classifying these quintiles for each age resulted in a five-by-five matrix (Table 1). For example, 5% of men started in the second income quintile at age 45 to 49 and ended in the bottom quintile at 66 to 68. If everyone had remained within their starting quintile, then 20% of the population would be in each of the diagonal cells from the top left to the bottom right. Incomes were averaged over several years (ages

Table 1 Income mobility of individuals from their late 40s to their late 60s

	Quintile, age 66 to 68				
	Bottom	Second	Middle	Fourth	Top
Quintile, age 45 to 49	%				
Men					
Bottom	11.9	4.2	1.9	1.3	0.8
Second	5.0	7.3	4.2	2.3	1.3
Middle	2.0	5.1	6.7	4.3	2.0
Fourth	0.8	2.4	5.2	7.5	4.1
Top	0.4	1.0	2.1	4.6	11.8
Women					
Bottom	9.9	4.7	2.9	1.5	0.9
Second	6.0	6.2	4.0	2.4	1.4
Middle	3.2	5.6	5.4	3.7	2.2
Fourth	0.8	2.9	5.7	6.7	3.9
Top	0.1	0.7	2.0	5.8	11.5

Source: Statistics Canada, Longitudinal Administrative Databank, 2006.

Chart E Employment insurance benefits at younger ages of persons age 68 or 69 by GIS benefit



Source: Statistics Canada, Longitudinal Administrative Databank, 2006.

45 to 49 and 66 to 68) to smooth out temporary fluctuations and yield a conservative estimate of income mobility.

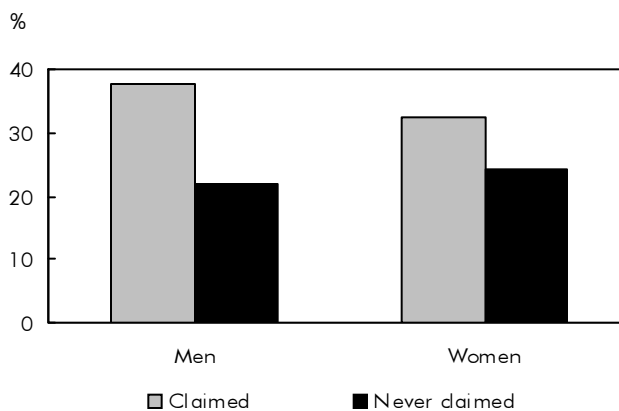
Position in the income distribution remained quite fluid in middle age. More than one-half of the population changed quintiles between their late 40s and late 60s. Although single-quintile moves were the most common, about one in five individuals made at least a two-quintile move. Women were more likely than men to make both single-quintile moves (39% versus 37%) and multiple-quintile moves (21% versus 18%). The

greater mobility of women was evident through the first four quintiles, but women who started in the top quintile were less likely than men to drop into the bottom three quintiles.

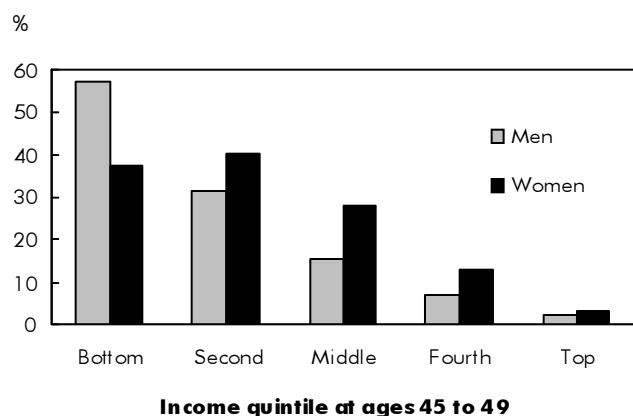
Regardless of the degree of income mobility, a very strong gradient across earlier income quintiles was evident for GIS receipt among men—more than one-half (57%) of those who were in the bottom income quintile in their late 40s would go on to collect GIS benefits in their late 60s (Chart G). Future GIS receipt then dropped by roughly one-half in each subsequent quintile: to 31% in the second, 16% in the middle, 7% in the fourth and 2% in the top. Although the gradient again shows a strong relationship between income and later GIS receipt, it also reveals some significant variation, especially at the bottom end. While less than 5% in the top two quintiles went on to receive some GIS benefits, more than one-half of the bottom two quintiles ended up as non-recipients.

The income–GIS gradient was less clear for women at the bottom of the income scale. Women who were in the second income quintile in their late 40s were more likely to collect GIS in their late 60s (40%) than those in the bottom quintile (37%). The gradient was more evident in the top three quintiles, as future GIS receipt fell from 28% in the middle quintile to 13% in the fourth and 3% in the top. The gradient was not as

Chart F Disability claimants more likely to be GIS recipients



Source: Statistics Canada, Longitudinal Administrative Databank, 2006.

Chart G GIS receipt¹ by late 40s income quintile

1. Age 66 to 68.

Source: Statistics Canada, Longitudinal Administrative Databank, 2006.

well defined for women in this cohort (born in the late 1930s), since those in couples were less likely to work and most who did work earned less than their spouse (84%).¹² Therefore, family income should show more correlation with future GIS receipt for married women.

Overall, these descriptive statistics indicate a strong relationship between earlier income and GIS receipt, but with enough variation to suggest that more detailed models could yield further insight.

Modeling GIS receipt

Past research found some variability in GIS application and take-up rates across personal characteristics (Poon 2005). Although more recent research indicates that application and take-up rates are increasing, as of 2006 a significant number of eligible recipients still did not apply for or receive benefits (Luong 2009). Moreo-

Data source and definitions

The Longitudinal **Administrative Databank** (LAD) is a 20% sample of T1 tax returns. It carried 93,714 individuals age 68 or 69 in 2006 who filed a valid tax return for 2006.⁸ The GIS was missing or zero for one or two years from age 66 to 68 for 12,510 of them. Also, income information was missing for another 21,690 individuals for at least one year between ages 45 and 64. Finally, the average GIS amount was greater than \$7,000 for 150 individuals.⁹ These GIS recipients were also excluded from the sample. The tables are based on 28,533 men and 30,831 women, with income adjusted to 2002 dollars.

The **Guaranteed Income Supplement** (GIS) is a transfer from the federal government to seniors with low or no income. The GIS and the Spousal Allowance are part of the OAS program. Their combined total is shown on tax returns as Net Federal Supplements (NFSL). For the sample used (individuals age 68 or 69 in 2006), the GIS would be equal to the NFSL amount since the 'Allowance' would be zero.

Employment income from T4 slips consists of all wages, salaries and commissions from paid employment.

Other employment income comprises any taxable receipts from paid employment other than wages, salaries and commissions, including tips, gratuities, or director's fees not reported on a T4 slip and some other components that have changed over time.

Self-employment income is all net earnings from self-employment in an unincorporated venture. Income from limited or non-active partnerships may have been included in this variable between 1982 and 1987 when it was part of self-employment business income. Now, only the tax filer's share of active self-employment partnership income is included.

Total income (individual or family) is everything from taxable and non-taxable sources. The definition has changed over the years to reflect changes in the tax form, refundable tax credits, and income calculations.¹⁰

Employment Insurance benefits are paid to eligible individuals experiencing paid employment-income interruptions. Benefits are also available for those who stop working because of sickness, injury, pregnancy, or the birth or adoption of a child.

Social assistance is a provincial or municipal transfer to cover basic needs of low-income individuals or families who have exhausted all other financial resources.

Registered Retirement Savings Plan (RRSP) contributions are the amounts claimed for a taxation year. The contribution limit is a percentage of the previous year's employment income up to an annual maximum, less any pension adjustment from an RPP.

Registered Pension Plan (RPP) contributions made by tax filers may be deducted from their total income. Under an RPP, approved by the Canada Revenue Agency, funds are set aside by an employer (and in many cases, also by the employee) to provide periodic payments to the employee upon retirement.

The **family-size adjustment** takes the total number of adults and children in a family into account to calculate family income adjusted for family size.

Table 2 Logit regression results

	Coefficient	Average marginal effect	Marginal effect for at-risk individual
Men			
Employment income, 45-49	-0.14*	-0.011	-0.035
Change in employment income			
45-49 to 50-54	-0.11*	-0.009	-0.027
50-54 to 55-59	-0.11*	-0.009	-0.027
55-59 to 60-64	-0.11*	-0.008	-0.027
Other individual income, 45-49	-0.21*	-0.017	-0.052
Change in other individual income			
45-49 to 50-54	-0.17*	-0.013	-0.042
50-54 to 55-59	-0.16*	-0.013	-0.040
55-59 to 60-64	-0.13*	-0.010	-0.032
Other family income, 45-49	-0.16*	-0.013	-0.040
Change in other family income			
45-49 to 50-54	-0.12*	-0.009	-0.030
50-54 to 55-59	-0.11*	-0.009	-0.027
55-59 to 60-64	-0.10*	-0.008	-0.025
Years of RRSP contributions	-0.03*	-0.003	-0.008
Years of RPP contributions	-0.04*	-0.003	-0.009
Years with EI benefits	0.08*	0.007	0.021
Years with social assistance payments	0.32*	0.026	0.079
Disability	0.54*
Intercept	3.56*
Women			
Employment income, 45-49	-0.18*	-0.014	-0.042
Change in employment income			
45-49 to 50-54	-0.14*	-0.011	-0.032
50-54 to 55-59	-0.12*	-0.010	-0.028
55-59 to 60-64	-0.11*	-0.008	-0.025
Other individual income, 45-49	-0.21*	-0.017	-0.049
Change in other individual income			
45-49 to 50-54	-0.17*	-0.014	-0.039
50-54 to 55-59	-0.17*	-0.013	-0.039
55-59 to 60-64	-0.10*	-0.008	-0.023
Other family income, 45-49	-0.19*	-0.015	-0.044
Change in other family income			
45-49 to 50-54	-0.15*	-0.012	-0.035
50-54 to 55-59	-0.13*	-0.010	-0.030
55-59 to 60-64	-0.11*	-0.008	-0.025
Years of RRSP contributions	-0.04*	-0.003	-0.010
Years of RPP contributions	-0.06*	-0.005	-0.014
Years with EI benefits	0.08*	0.006	0.019
Years with social assistance payments	0.35*	0.028	0.081
Disability	0.22*
Intercept	4.37*

* statistically significant at the 5% level or better

Note: Dependent variable = 1 if GIS collected all years from age 66 to 68, 0 if never collected.

Income is in thousands of dollars. A cohort dummy and regional dummies were also included in the regression.

Source: Statistics Canada, Longitudinal Administrative Databank, 2006.

ver, some individuals will have income near the boundaries of GIS eligibility and cycle in and out of receipt regularly, while others may drop into or out of GIS receipt because of one-time factors such as RRSP withdrawals or investment gains. To minimize the effect of such variability on model results, the population was limited to those who consistently received full or partial GIS benefits and those receiving no benefits from ages 66 to 68.¹³ Since the relationships seemed to differ for men and women, separate models were run. The probability of consistently receiving GIS benefits was 23% for men and 24% for women, compared with annual rates of 30% and 32% for those age 66 to 68 in 2006.

The models accounted for both income level and trajectory with variables representing levels averaged across ages 45 to 49 and subsequent changes through ages 50 to 54, 55 to 59 and 60 to 64. Three types of income were included: employment income, all other individual income, and total income of other family members adjusted for family size.¹⁴

The models implicitly assume that all types of income have a similar impact on future GIS benefits. This makes sense in terms of marginal impact on individual well-being, since a dollar is a dollar regardless of the source. On the other hand, long-term receipt of EI and social assistance benefits can result in labour market scarring effects, deterioration of human capital, or other unmeasured impediments to employment earnings. To capture these effects, years of non-zero EI and social assistance were included in the models. Similarly, another variable indicated whether the disability deduction was claimed at any time during the study period.

The models included several characteristics likely to reduce the probability of receiving GIS. Since employer pension plans are specifically designed to provide retirement benefits, membership in such plans should decrease the likelihood of GIS receipt relative to others with similar earnings but no pension plan. And because plan benefits are closely related to tenure, the variable counts years with a positive pension adjustment.¹⁵ Similarly, since those predisposed to planning for the future are likely to make use of tax-advantaged savings options, years of RRSP contributions were also included. Controls for current province of residence and birth-year cohort (1937 or 1938) completed the list.

With LAD, some variables of interest were not available. Earnings before age 45, education and occupation are all likely to have some impact on GIS receipt.¹⁶ However, each would also be related to income, especially long-term income, so much of their effects should be captured by the trajectories. CPP contributions were not included in the models since they would be almost perfectly collinear with earnings up to the industrial average. The models do not contain explicit information on marital status—although marital status and changes thereto affect individual finances, they do so mainly through the size-adjusted earnings of other family members.¹⁷ The models were estimated using logistic regressions, the coefficients showing the effects of the different variables on the natural logarithm of the odds ratio.¹⁸

Income levels and trajectories are significantly related to GIS receipt

As expected, income levels and trajectories were the most important factors associated with eventual receipt of GIS benefits (Table 2). For women in their late 40s, all types of income reduced the probability by about the same amount. For example, an extra \$1,000 of other family income diminished the probability by an average of 1.5 percentage points. For men, the effects were similar, with effects for all types of income varying from 1.1 to 1.7 points, for an extra \$1,000 of income.

A \$1,000 increase in income at older ages reduced the probability by 0.8 to 1.4 percentage points. The results also confirmed that changes in income at younger ages had larger effects.

Because the effects of extra income vary with characteristics of individuals and because lifetime GIS receipt is more common among people with lower

career earnings, the effects of changes in income were examined for a representative individual who was more at risk—someone with income, income increases and years of pension and RRSP contributions equal to one-half of the sample mean.

For this person, the effects were much larger. An extra \$1,000 of average income in the individual's late 40s diminished the probability by 4 or 5 percentage points. A similar increase later in life diminished the probability by 2 to 4 points.

RRSP and pension contributions reduce probability of GIS receipt

The probability of becoming a consistent GIS recipient diminished with each year of contributions to a private pension plan or an RRSP. Contributing regularly to these savings vehicles builds a pool of tax-sheltered capital that later provides a retirement income stream. For men, one extra year of contributions to an RRSP or pension plan diminished the probability by 0.3 percentage points. The effects were similar for women, diminishing the probability by 0.3 points for one extra year of RRSP contributions and 0.5 for a private pension plan. For the representative at-risk individual, the effects were much larger. One extra year of contributions led to a 1-point fall in the probability.

Unemployment, social assistance and disability increase likelihood of GIS benefits

Although EI and social assistance benefits were included in other income, which reduced the probability of GIS receipt, looking at them separately actually showed the opposite effect. Average effects were similar for men and women. One extra year of EI benefits increased the probability by 0.7 percentage points. For social assistance, this figure was 3 points. For the at-risk individual, the effects were much larger again: 2 points for EI and 8 for social assistance. Having a disability also increased the probability of becoming a lifetime GIS recipient.¹⁹

Summary

The GIS is an income-tested supplement to the basic OAS pension for seniors with little or no income from other sources. Benefits are reduced as income from other sources increases so that no benefits are paid to individuals with other income exceeding \$15,672 or pensioner couples with income exceeding \$20,688.²⁰

GIS benefits have been instrumental in keeping many seniors above the low-income cut-off. Nevertheless, the program costs the government some \$6.8 billion

dollars per year and seniors would be better off financially if their other sources of income put them above program thresholds.

The primary goal of this study was to document factors contributing to consistent GIS receipt from ages 66 to 68. The key result should surprise no one: the probability of receiving GIS benefits was strongly correlated to earlier income levels, specifically earnings in an individual's late 40s. However, low earnings at that stage do not presage an immutable path into later GIS receipt.

Both the descriptive and multivariate analyses point to non-trivial income mobility in late middle age. More than one-half of men and women change income quintiles between their late 40s and their late 60s, with about one in five moving at least two quintiles. While very few who started in the top quintiles went on to receive GIS benefits, almost one-half of those starting in the bottom two quintiles eventually collected benefits. The multivariate models provided some evidence on how these results came about.

First, subsequent income changes mattered, particularly those that took place in individuals' early 50s. Second, negative labour market and health shocks—measured by years of EI receipt or any claiming of the disability deduction—significantly increased the probability of becoming a GIS recipient. Similarly, social assistance benefits significantly raised the incidence of GIS receipt. Third, employer pension plans and RRSPs reduced the probability of GIS receipt. Finally, all of these effects were stronger at the lower end of the income distribution, accounting for the greater variability of outcomes there.

These results were based on a sample of younger seniors. Among this group, just over one-half (54%) of GIS recipients were women. That proportion steadily rose with age: 57%, 62% and 73% for the age groups 70 to 74, 75 to 79, and 80 and above respectively. Thus income dynamics among older seniors would be a logical extension to the work presented here, particularly as it pertains to the well-being of older women.

Perspectives

■ Notes

1. The OAS program also includes the Allowances for survivors and for spouses or common-law partners of GIS recipients between the ages of 60 and 64. The

Allowances have somewhat different benefit levels and reduction formula than the regular GIS. This article refers only to GIS benefits available to individuals 65 and over.

2. The maximum was paid to seniors meeting the full residence requirements and having incomes of less than \$64,718. The basic pension is reduced by 15 cents for every dollar of income above the threshold. Therefore, the OAS pension was fully recovered when income exceeded \$105,266. These thresholds are adjusted annually. The full OAS pension is paid to seniors who meet the 40-year residence requirement. Seniors with 10 to 39 years in Canada, after age 18, are granted a partial pension at the rate of 1/40 of a full pension benefit for each year of residence. Additional years of residence in Canada do not increase the OAS pension payable once payments have begun.
3. The single rate is also paid when the spouse is not eligible for OAS benefits.
4. All OAS benefits are indexed quarterly to the Consumer Price Index. Thus, GIS recipients in the sample received comparable real benefits up to 2006. Two significant changes have been made since then: the GIS was increased in 2006 and 2007 by a total of 7%, over and above regular indexation; and the GIS earnings exemption was increased from \$500 to \$3,500 in 2008. The GIS earnings exemption enables seniors to exclude some of their employment income from GIS benefit calculations.
5. GIS recipients who choose to work can have slightly higher incomes because of the GIS earnings exemption.
6. According to the Survey of Labour and Income Dynamics, the 2007 low-income rate was 4.8% for seniors, 9.9% for those age 18 to 64 and 9.5% for those under 18.
7. Calculated using Human Resources and Skills Development Canada (HRSDC) administrative data.
8. The data were for individuals residing in the 10 provinces, as the samples for the territories were too small to reach meaningful conclusions.
9. For low-income seniors who qualify for a partial OAS pension and are eligible for the GIS, the GIS is topped up. This is sometimes referred to as 'super GIS.' It provides partial OAS recipients with the same minimum income guarantee (i.e. the total amount of OAS/GIS) as full OAS recipients. The models were rerun to test their robustness to this restriction with these individuals included—with no material changes to the results presented.
10. Statistics Canada's definition of total income (XTIRC) differs from Canada Revenue Agency's definition (TIRC) as follows (see Statistics Canada 2005 for a complete list of variables): XTIRC = TIRC – adjustment for dividends – capital gains + refundable tax credits + other non-taxable income.

11. Family income is divided by the square root of family size to account for changes in demands on family finances over time.
12. Among women who were married from age 45 to 49, 58% reported positive earnings each year compared with 72% among other women (not married for at least one year).
13. The models were also run on a broader population that included occasional recipients with the non-recipient group. The results were similar but with some loss of precision.
14. The proxy is family income, adjusted for family size, minus total individual income. Another model that adjusted the different types of income by family members for family size was also estimated, with nearly identical results.
15. The pension adjustment variable is used rather than the contribution variable since it includes individuals in plans not requiring employee contributions.
16. Other than its effect on income, education may also correlate to retirement-planning skills, but this should be largely accounted for by RRSP contribution history.
17. Models with various formulations of marital status produced inconsistent and sometimes contradictory results. The preferred model thus excluded family status as a separate variable. The variations of family status included indicators for ever being married, number of years married, and the death of a spouse.
18. The odds ratio is $p/(1-p)$, where p is the probability of interest.
19. The presence of a disability was indicated by the claiming of the disability deduction in any year and was statistically significant for both men and women. Average marginal effects cannot be calculated for binary variables.
20. GIS recipients who choose to work can have slightly higher incomes due to the GIS earnings exemption.

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