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A Longitudinal Analysis of Entries Into and Exits from the Canada's Guaranteed Income Supplement Regime Among Seniors[*]

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Abstract

We focus on one particular pillar of the public retirement income network in Canada, namely receipt outcomes of the Guaranteed Income Supplement (GIS) regime. This empirical analysis is carried out in a dynamic framework. We address the extent to which individuals enter the state of GIS receipt at various ages as well as the extent to which individuals who receive GIS benefits at the earliest age of eligibility subsequently exit the regime. We first measure these transition rates, and then we focus our analysis primarily on the impact of the following three attributes of recipients: changes in marital status, entry cohort, and current age. The econometric equations include both simple transition models of both entries and exits, as well as hazard models of the probability of exiting the GIS regime. Among our many empirical findings is a non-trivial incidence of delayed entry into the regime as well as exit from the regime conditional on prior receipt of benefits. Women who transit from married to single status are more likely to enter, but the opposite finding is discerned for men. The hazard model for the risk of exiting the GIS regime conditioned on the duration of the on-going spell of receipt reveals a sharp pattern of negative duration dependence. The probability of entering the regime, conditioned on the event of not having received the benefit when one is initially eligible, becomes less and less likely as individuals age.

Key words: *Old age income security, benefit receipt, marital status, transitions between states, duration effects.*

JEL Classification: H55, I38, J14.

Résumé

Dans cette étude, nous portons notre attention sur un pilier du réseau de prestations de retraite publiques au Canada, le régime de supplément de revenu garanti (SRG). L'analyse empirique est effectuée dans un cadre dynamique. La question qui nous intéresse est de savoir à quel âge les individus entrent dans le régime et si ceux qui reçoivent le SRG dès l'âge minimal d'admissibilité quittent le régime par la suite. Nous mesurons ces taux de transition et nous nous penchons ensuite sur les trois caractéristiques suivantes : les changements dans l'état civil, la cohorte d'entrée et l'âge du prestataire. Les équations économétriques incluent des modèles simples de transition ainsi que des modèles de hasard de la probabilité de sortir du régime SRG. Parmi les résultats présentés dans cette étude, il est à noter qu'il y a une incidence non-triviale de délai dans les entrées dans le programme et dans les sorties, conditionnellement à la réception antérieure d'une prestation. Les femmes qui transitent du mariage au célibat sont plus enclines à entrer, alors que c'est le contraire pour les hommes. Les modèles de hasard de la probabilité de sortir du programme SRG, conditionnellement à la durée de la prestation, révèlent un effet négatif de dépendance de la durée. La probabilité d'entrer dans le régime, conditionnellement à n'avoir reçu aucune prestation lorsque l'individu est éligible, diminue avec l'âge.

Mots clés : *Sécurité de revenu des personnes âgées, prestations, état civil, transitions entre deux états, effets de durée.*

Classification JEL : H55, I38, J14.

1. Introduction

Canada's public old-age pension and income security programs have generally been considered to be a policy success story. It has been argued that the framework of private savings vehicles combined with government benefit programs targeting seniors "appears to be doing relatively well in ensuring basic standards of well-being among seniors who had a substantial attachment to the labour force, at least for individuals near the median (of family income)" (La Rochelle-Cote *et al.*, 2008, p. 73). Others have noted that the retirement income system has dramatically reduced the incidence of low income among seniors over time (Myles 2000, Uppal *et al* 2009).

Despite this phenomenon, however, the income security of retired Canadians has increasingly become a major challenge for policy makers due to factors which are enumerated in Abbott *et al.* (2008). First, over the last 25 years, there has been a significant decline in the coverage of workplace pensions in the private sector and a dramatic shift in the structure of private-sector pensions away from defined-benefit towards defined-contribution plans. Second, some employees covered by workplace pensions in the private sector have been forced to accept major pension reductions in the face of under-funded plans. Third, life expectancies are continuing to rise such that pensions need to last longer. Another demographic factor is the fact that the network of retirement income programs will face a cumulative outflow of approximately 8 million baby boomers retiring from the labour force over the next 15 years (about 42 percent of the stock of the labour force in 2015). These forces can be expected to place severe financial pressures on these programs, with implications for the economic well-being of future retirees.

This paper consists of an empirical analysis of the receipt patterns of one particular pillar of the public retirement income network, namely the Guaranteed Income Supplement (GIS) benefit.[1] The GIS regime complements the Canada/Quebec Pension Plan (CPP/QPP) and the Old Age Security Pension (OAS) by serving as the income source of last resort for seniors deemed to be in financial need. Funded from general revenues, it is the only means-tested, 'safety net' type provision designed for seniors.[2] It is estimated that without it, 30 percent of Canadian retirees would not have adequate incomes. [3]

In our prior work (Finnie *et al.* 2013), we conducted a multi-variate, empirical analysis of the incidence of GIS receipt among the age-eligible population (i.e., 65 years or older) within an essentially static, cross-sectional framework. In this current paper, we extend the scope of analysis from static to dynamic patterns based on data drawn from the Longitudinal Administrative Databank (LAD) from 1992 through 2008. The primary outcome on which we focus in this paper is *entries* by older individuals into the state of GIS receipt – perhaps because they have out-lived their savings, delayed their retirement from the labour market, or undergone a change in marital status. Another outcome on which we focus is exits from the GIS regime by individuals who received benefits at the age of initial eligibility for reasons such as re-entering the labour market, receiving an increase in investment income (such as an inheritance or life-insurance payment), or undergoing a change in marital status. The estimating equations include both simple transition models of both entries and exits, as well as a hazard model of the probability of exiting the GIS regime conditioned on having started a spell.

The conceptual underpinnings for our empirical analysis involve a number of mechanisms that might cause people in this target population to meet the income-tested qualification criteria. A predominant factor is likely to be a lifetime of low labour market earnings such that one could not afford to save. A second factor is a lifetime of relatively high earnings coupled with the outcomes of unsound and/or unlucky saving or investing choices. A third factor is a lifetime of relatively high earnings coupled with the outcomes of disability or unduly high living expenses. A fourth factor is a lifetime of adequate earnings and saving activity followed by the outcome of exhaustion of savings by outliving the expected lifespan (i.e. the longevity risk). Whatever the source of the low-income status, the GIS regime is designed to function as an income top-up provision, and as such is thought to be a positive aspect of social insurance.

In addition to those economic factors, the policy design features of the GIS regime also play an important role in shaping receipt patterns. The entitlement provisions generate a fair number of transitions in and out of receipt status due to the tight means-testing criteria (featuring a sharp clawback formula) and the concentration of a large number of retirees whose income levels are near the qualifying thresholds. Such transitions can result from two channels. First, individuals' income levels can fluctuate in either direction about the thresholds. Second, those thresholds vary according to marital status.

One set of empirical results that we highlight involve the impact of changes in marital status on GIS receipt patterns. These estimates reflect the impact of income shocks coupled with shifting of the statutory qualification thresholds. Another set of results that we present are those associated with cohort years, which might reflect

business cycle effects. We also pay some attention to age profiles, as they are indicative of persistent use of the GIS program.

While the scope of the analysis is broad-based, the methodology remains descriptive. The statistical associations and econometric results are derived from reduced-form equations, and thus we cannot make inference regarding specific, underlying behavioural channels. Nonetheless, our empirical findings are indicative of shocks to income - both positive and negative - that affect the receipt patterns for top-up provisions within old-age social insurance networks, such as the GIS.

2. Literature Review and Background

The following brief description of the rules and provisions for the GIS benefit is borrowed partly from Milligan and Schirle (2008). It is paid to eligible residents of Canada aged 65 years and older. One must also qualify for OAS benefits but receive little in the way of other income. Beneficiaries must initially take the initiative to apply for it, but thereafter they no longer need to re-apply provided that they file an income tax return each year. The payment of GIS benefits is based on this filing requirement, which permits us to observe the event of GIS receipt. The benefit amount is indexed to consumer price inflation, but unlike the CPP and the OAS benefits, GIS benefits are not taxable. Technically, benefits under either the GIS or the OAS programs are payable separately to individuals rather than to couples. Each partner of a couple declares his/her allocation separately on separate tax returns. Eligibility for the GIS depends on the reported income of the beneficiary, which is determined in the same fashion as for federal income tax purposes, with the exception that OAS income is exempted. In the case of

beneficiaries with partners, the combined income must be declared and is taken into account in the determination of the benefits, and the amount depends on the pensioner's marital status. As of 2014, the maximum monthly GIS benefit was $ 748 for a single individual and $ 496 for each spouse of a couple.

There are two basic components of the benefit. The first applies to two cases: a) single pensioners, including widowed, divorced, or separated persons, and b) married pensioners whose partners do not receive either the basic OAS pension or the OAS Spousal Pension Allowance (paid to partners of an OAS recipient between the ages of 60-65). The second component applies to couples for whom both spouses are OAS pensioners; both spouses/partners receive the GIS benefit, but the per-person amount is lower than in case a).[4]

Given its income-tested nature, the GIS payments are subjected to very high clawback rates. For each marginal dollar of income received from any source, the GIS benefit is reduced by $ 0.50 for the singles' benefit and by $ 0.25 for each partner of the married peoples' benefit. In 2014 the break-even annual income level at which the entire GIS benefit is clawed back was $ 16,728 for a single person and $ 22,080 for a couple in which both are GIS recipients. The clawback thresholds vary according to marital status and whether the spouse received the Spousal Pension Allowance, regular GIS, or neither benefit.[5]

A few reforms have been implemented over the past fifteen years, such as the 'outreach' program that was implemented in 2002. This measure was designed to better inform potential beneficiaries of their entitlements and to facilitate their applications for GIS benefits – an awareness campaign targeting low-income retirees. In 2003 the federal

government also streamlined the application process. In order to strengthen the incentive for recipients to work part-time, in 2008 the implicit tax rate applied to labour market earnings was cut considerably. In our empirical analysis, we attempt to discern evidence regarding their impact, although the change of 2008 occurred too late in order for us to discern its effect, since that is the last year of our sample.

The public policy issue that is most relevant for our study is the adequacy of the governmental benefits in providing income security and stability to retirees. From the pensioners' perspective, the relevant issues are the eligibility conditions and the benefit levels of the public pension plans. From the government's perspective, our findings do have repercussions for the long-term financial viability of the GIS regime.

Some of the debate and suggestions for reform have dealt with the labour market incentives inherent in the public pension schemes (Baker *et al.* 2003, Milligan 2005, Milligan and Schirle 2008, HRSDC Round Table 2008). One of their conclusions is that the GIS program as it was designed at the time may have had the unintended consequence of inducing low-income seniors to retire prematurely.[6]

There are a few studies that have focused narrowly on the workings of the GIS regime. Luong (2009) and Poon (2005) examine empirically the application rates and take-up rates among the eligible population. Perhaps surprisingly, a minority of this group does not apply for the benefit.[7] Poon (2005) also compares the financial profiles of senior GIS families to senior non-GIS families. Uppal *et al.* (2009) conduct an empirical analysis of the incidence of GIS receipt and its determinants using the same data set that we exploit through the year 2006. The outcome variable for their study is the receipt of benefits for three consecutive years for those aged 66 to 68 years. In a similar vein as

Finnie *et al.* (2013), their primary explanatory variables are indicators for the subjects' prior income levels, indicators for major changes in prior income levels, and proxies for the degree of stability of labour market income. They do not analyze any dynamic effects, but they do mention them by noting that "…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 receipt because of one-time factors such as RRSP withdrawals or investment gains" (p. 11).

In contrast to modeling the event of receiving GIS benefits over the 65-67 year age window mentioned above, we include in our analysis all observations of GIS receipt (or its absence) *at an annual frequency* until the individual is no longer observed in order to derive and analyze transitions in and out of GIS-receipt status. The methodology for this task is borrowed from a number of studies from the literature dealing with poverty dynamics for the working-age population, such as Finnie and Sweetman (2003).

LaRochelle-Côté *et al.* (2012) deals with one of the issues that we investigate, namely the impact of loss of a spouse. Although those authors do not deal directly with GIS benefits, they do focus on the income security of Canadian seniors, as measured by income replacement ratios. They determine that marital dissolution has a greater effect among women in higher income quintiles, which they attribute to the greater availability of transfer income (including the GIS benefit) for low-income women; "…the present public pension system mitigates much of the potentially negative effect of widowhood and divorce on women`s incomes". (p. 490) Among men, however, they determine that the events of divorce or widowhood have little impact on the income replacement rate.

4. Description of Data

The Longitudinal Administrative Database (LAD) has the advantage of having very large sample sizes. It consists of a random 20 percent sample of the T1 general tax file that is quite representative of the underlying population of adult Canadians.[8] It contains detailed and accurate information at an annual frequency on both the levels of income as well as a breakdown of income by source, which is particularly useful for our purposes. Its longitudinal nature allows us to track individuals for long periods of time (up to 26 years in some cases), which allows us to derive transitions. It links individuals as couples and contains information on whether or not the individual (and/or the spouse) received GIS income in any given year, as well as the respective amounts.

The LAD also has disadvantages compared with labour market surveys such as the *Labour Force Survey* and the (now discontinued) *Survey of Labour and Income Dynamics*. There is little information regarding demographic traits, and there is no information regarding educational attainment and skills acquisition.

The critical record is a flag for receipt of GIS benefits, which is reported at individual level and is labeled "Net Federal Supplements – GIS or spouse's allowance". For individuals aged exactly 65 years, the amount reported could refer to either the spousal allowance, the GIS, or a combination of both (spousal allowance received for the months before the 65 birthday, and GIS received thereafter). For any individual 66 or older, the amount reported refers unambiguously to GIS. Given that we are dealing with a discrete choice of whether or not the individual received GIS benefits, this particular distinction is not relevant for our analysis.[9] Before 1992, this information was reported as part of the overall amount of non-taxable income rather than reported separately, and

therefore an explicit entry for GIS income was not available in the LAD. Since 1992, however, not only has GIS information been reported explicitly on a separate line on the tax return, but it has been required that these 'net federal supplements' be included in total income. Our sampling interval, therefore, commences in 1992. We follow all individuals until they are no longer observable, which is usually caused by their deaths.

Eligibility for the GIS benefit is determined half-way through the reference calendar year based on the level of income that was declared in the previous calendar year. Benefits are then paid at that revised rate from July 1 of the reference year until June 30 of the following year, at which time eligibility will be re-evaluated based on the income declared during the current reference year. Due to the particularities of these eligibility conditions and to processing lags in payments, it is possible for a 65-year old worker to be eligible for the GIS benefit and receive it without that benefit being reported on his/her tax return for that same calendar year. In this case, the benefit would not be reported in the LAD file until the subsequent year, and that worker-year observation would be mis-classified for the reference year. Almost all cases of receipt or non-receipt, however, should be correctly reported for the reference year during which the individual turns 66 years old as well as for all subsequent years. While we include all of the observations for all individuals who are 65 years or older in our estimating sample, we treat the age of 66 as the benchmark reflecting the first complete year of eligibility.

We make no attempt to account for the labour force status of the subjects for two reasons. First, as Halliwell (2008) points out, the event of formal retirement from the labour force does not have a precise definition, and it is not straightforward to pinpoint the exact timing. Second, we view it as a secondary issue that is not central to our

primary focus on this particular social insurance regime. We are interested in the behavior of those who meet the age eligibility criteria for GIS receipt. Any such individual who is not retired from the labour force will face a very high clawback rate on their labour market earnings, and might not qualify GIS benefits at all.

The unit of observation is the person-year, and the 17-year interval for these observations runs from 1992 to 2008. These data points are structured into 26 cohorts which are identified by the year in which the individual turned 65. The earliest cohort that we include in our data set turned 65 in 1982, while the latest one turned 65 in 2007. For the 10 older cohorts who turned 65 before 1992, we only observe their GIS status starting in 1992, which constitutes only part of the post-65 period for members of those cohorts.[10] The structure of the cohorts is presented in Table A1.

4. Empirical Approach

The outcomes for our analysis are transitions into and out of the state of GIS receipt. To this end we exploit the longitudinal nature of the data by tracking individuals from age 65 and thereafter. For the econometric analysis, there are two sets of equations modelling the transitions: one for entries and one for exits. Most of the equations are simple discrete choice models, but there is also a hazard model for exits that includes duration terms.

The first endogenous variable is the probability of transiting into GIS receipt (i.e. entries) at the age of initial eligibility. During the first year, the individual is 65 years old, and his/ her benefit receipt status is not totally observable for reasons provided above. During the second year, however, the receipt status is known with certainty. The

second endogenous variable is the probability of entering the state of GIS receipt after the age of initial eligibility conditional on *not* having received it in the preceding year. The risk set for this equation consists of those who are at least 67 years old and have *not* received GIS benefits during the first two years of potential eligibility. Although this is a selected sample, it is well-defined and is designed to address the question of the extent of delayed entry into the regime, which we define as occurring after the year of initial eligibility. We track this individual on an annual basis for every subsequent year in which he/she did not receive benefits. For each of these consecutive observations, we model the hazard probability of entry. For most individuals, there are multiple observations that are treated as independent.

The third endogenous variable is the probability of *exiting* the state of GIS receipt after age 66 conditional on having received it in the preceding period. For an individual who is 67 years old, this can be interpreted as the hazard probability of exiting given that he/she did receive benefits when he/she first became eligible. We track each individual on an annual basis for every year of the spell of benefit receipt. For each of these consecutive observations, we model the hazard probability of exit.

The second exit equation consists of a hazard model that includes a set of duration terms in order to capture duration dependence effects. These terms are specified as a set of binary variables indicating that an ongoing spell of receipt has lasted for a certain number of years. The structure of the baseline hazard is therefore a flexible-form step function. In summary of the multivariate framework, in addition to the hazard equation, there are a total of nine specifications that model those three distinct observed events for three different samples: men pooled with women, men, and women.

The parametric form of all of the estimating equations is the linear probability model (LPM). They are estimated using the least squares technique, and the standard errors are adjusted for clustering around the individual.

The explanatory variables are divided into three major categories: demographic, calendar year, and geographic. The demographic attributes are the following: current age, cohort year (identified by when subjects turned 65), gender, current marital status, a *change* in marital status, minority language status, residency status in Canada, and immigrant status (including indicators for years since immigration).[11] There is a set of binary variables that is included to capture the cohort-specific effects. In addition to reflecting business cycle effects, we search for evidence regarding the impact of certain policy changes that were mentioned above. The geographic variables include indicators for the province of residence and the area-size-of-residence, the latter being a measure to capture the effects of population density and the urban/rural split.

The baseline specification for all of the estimating equations takes the following form:

$$Y_{it} = \beta + D_{it}\,\alpha_{durdep} + Z_{1\,it}\,\gamma_{age} + Z_{2\,it}\,\gamma_{cohort} + Z_{3\,it}\,\gamma_{chmarst} + X_{it}\,\delta + \varepsilon_{it}$$

for which β is the constant term. D_{it} consists of a set of binary variables for the elapsed duration of a spell of benefit receipt; its coefficient (α) is restricted to 0 for the transition equations. Z_1 refers to the set of binary variables for age; γ_{age} is the corresponding vector of coefficients. Z_2 refers to the set of binary variables for the cohort of entry; γ_{cohort} is the corresponding vector of coefficients. Z_3 refers to the set of binary variables for the cohort of entry; $\gamma_{chmarst}$ is the corresponding vector of coefficients. X_{it} is a matrix containing all of the other exogenous variables.

The estimating sample consists of all potential transitions that are observed between 1992 and 2008, for which there are a total of 9,772,375 (person-year) observations. In the cases of annual entries and exits, the sample sizes are 5,735,715 for the entry equation and 3,295,760 for the exit equation.[12] For the sample consisting of the initial transitions, there are 742,675 individuals.

5. Empirical Results

5.1 Descriptive Statistics

Table 1 contains information on the shares of GIS transitions (relative to the set of all potential transitions) cross-tabulated by age, marital status, and change in marital status. The unit of observation is the individual observed over two consecutive years. These are not conditional probabilities but rather shares of the sample. The figures reported in the four right-most columns sum refer to the shares of the four potential outcomes and sum horizontally to 100. The figures reported in the first column show the shares of the total sample; they also appear in Table A2.

The figures presented in the top row of Table 1 indicate that 4.6 percent of all observed potential transitions are entries, while only 1.4 percent are exits. 61.7 percent and 32.3 percent of them reflect continuations of individuals remaining off and on the GIS rolls, respectively. Among those of the initial age of eligibility, just under one-third of potential recipients enter. Among all older age groups, the share of entries is between 2-3 percent, while the share of exits declines monotonically with age from 2.6 to 1 percent. For all four marital status-sex categories, entries account for about 5 percent of observations, while exits account for between 1 and 2 percent. In regards to changes in

marital status, the findings are somewhat unexpected. Relative to the other six categories, the shares of *entries* for both men and women going from single to married status are relatively high, and the shares of *exits* for men going from married to single status are also relatively high.

Descriptive statistics regarding the exogenous variables are listed in Table A2. The shares of the entire sample cross-tabulated by age decline monotonically with age, as expected. Single women outnumber single men by about three to one. Changes in marital status are a rare event, comprising a total only 2.7 percent of all potential transitions.

Table 2 contains the relative frequencies for the distribution of a particular measure of GIS incidence, namely the number of years during which an individual reported receiving benefits over a five-year window. The possible realizations for this count variable are 0,1,2,3,4, and 5. The sample consists of all individuals who are between 66 and 70 years of age (inclusive), whom we track for the entire five-year interval. The values listed in the first six columns sum horizontally to 100. The top line of Table 2 contains the figures for the entire sample. While approximately 68 percent of them do not receive GIS benefits when they are 66, only 58.6 percent of them do not receive GIS benefits during *any* year during this window of eligibility. At the opposite end of this distribution, 26.2 percent of them receive it during every single year over this window. In the middle range of the distribution, 15.2 percent receive GIS benefits for only part of the window of eligibility (4.8 + 3.8 + 3.3 + 3.3). The figures reported in the last column reflect the proportion of all beneficiaries that exhibit persistent use, defined as receiving benefits for more than 3 years over the 5-year window. The value for the

overall sample is 71.3 percent ((3.3 + 26.2) / (100 – 58.6)), indicating that conditional on drawing any benefits at all, over 70 percent are persistent users, but there exists a significant minority of users that rely on GIS benefits only intermittently.

The rows below the top lines of table 2 display the distribution of years of receipt cross-tabulated by the attributes of cohort year, gender crossed with marital status, immigration status, province, area size of residence, and minority language status. All of these attributes are measured at the age of 66 years. Starting at around 1996, the share of those senior individuals who did *not* receive GIS benefits at all between the ages of 66 and 70 trends downward, which implies that some of the other relative frequencies (for the non-zero realizations of years of receipt) must have risen over this period. Conditional on having benefitted for at least one year, however, the share who exhibited persistent use also trends downward from almost three quarters to just over two-thirds, while the importance of the intermittent recipients was rising gradually.

The breakdown by gender crossed with marital status indicates that the latter attribute plays a far more important role than gender in determining incidence rates. Unattached individuals are far more dependent on the GIS regime. Conditional on having received GIS benefits at all, over 80 percent of this group, whether male or female, were persistent users. Whereas 42 percent of single women and 47 percent of single men did not receive any benefits at all, the corresponding figures for couples are 66 percent and 62 percent.

Immigration status is also an important determinant of GIS receipt patterns. 59 percent of the Canadian-born (this category also includes long-time immigrants who landed over 15 years ago) did not receive benefits at all during the five-year window, but

this rate drops sharply to 13.5 percent for those immigrants who landed 10-15 years ago (and thus likely met the residency rule). This group of relatively recent immigrants also exhibits a very high degree of persistence; 93 percent of recipients took up benefits for virtually the entire five-year window of eligibility. By contrast, conditional on receiving GIS benefits for at least one year, immigrants who arrived more recently were much less likely to receive benefits for all five years, perhaps because they had to wait until they reached their late 60s before they met the residency requirements.

In regards to the provincial patterns, the east-west divide is striking for both the broad measure of incidence as well as the measure of persistent take-up; they are much higher for the five eastern provinces. The case of Newfoundland and Labrador is a salient outlier – only 31 percent of that population does not collect benefits at all over the window of eligibility, compared to 67 percent in Ontario. The pattern associated with the area-size-of-residence variable is remarkable; population density is inversely related to the incidence of persistent take-up.

The conditional proportions of individuals transiting into and out of GIS receipt status are shown in figures 1 and 2. Figure 1 displays the *entry* rate by age: the percentage of each age group that transits from the state of non-receipt in the prior year to the state of receipt in the current year. 32.4 percent of those who were 64 years old in the earlier period (during which none were eligible) are receiving it by the time they are 66 years old.[13] Another 4.2 percent enter the state of receipt by the time they are 67 years old (left-most bar). This estimated transitional probability falls to just over 3 percent at age 74, and then rises monotonically up to 5.8 percent by the time individuals reach the age of 90. This age profile of the estimated conditional probability of entry exhibits a

shallow U-shape. The estimated proportion of entries cross-tabulated by *calendar* year (averaged over all cohorts) is volatile, ranging from 2.5 percent in 2000 to 7.1 percent in 2002, which was up from 2.8 percent in 2001 (not shown). That particular jump might reflect the outreach initiative that was mentioned above.

The calculated proportions of *exit* from GIS receipt status by age in the current period conditional on receipt in the preceding year are displayed in figure 2. It is clear that the event of exit is not uncommon; while most recipients who receive GIS benefits at age 66 will continue to benefit thereafter, a non-trivial minority leave the rolls for at least one year. The first bar shows that conditional on having received GIS benefits at age 66, 8 percent of such individuals no longer receive it by age 67. Among those who do receive benefits at age 67, 6 percent leave the rolls at age 68. This exit percentage tends to decline monotonically to 1.8 percent by age 90. These estimated probabilities of exit appear to exhibit a pattern of negative duration dependence; the longer that an individual has been receiving GIS benefits, the lower is his/her probability of exit. The values for the exit rate by *calendar* year (averaged over all cohorts) range from 2.5 to 4 percent (not shown). The lowest values occurred in 1994 and 2001, the highest value occurred in 2008, and there is no obvious visible trend. The exit rate was quite stable at about 3.5 percent between 2003 and 2007.

5.2 Multi-variate Statistical Analysis of Dynamics

5.2.1 Transition models of entries and exits

The observed transitions are generated by fluctuations in income levels around the income thresholds above which the subject no longer qualifies for benefits. A fairly

small increase (decrease) in income can occasion a loss (gain) in eligibility, which translates into a discrete change in the value of our binary regressand. Since the thresholds themselves are determined by marital status and the presence of a spouse younger than 65, they can fluctuate as well, providing a second channel for observed variation in GIS receipt status.

The set of exogenous variables includes the full sets of age and cohort year dummies as well as indicators for *changes* in marital status, current province of residence, current area size of residence, majority language status, and immigration status. The provincial effects are specified by a set of binary indicators for 11 provinces and territories, with Ontario serving as the reference category. Those who do not report a province of residence are assigned an indicator for non-residence in Canada. The set of indicators for the area size of residence variable are: greater than 500,000 inhabitants (omitted), ii) 100,000-500,000, iii) 30,000-100,000, iv) 15,000-30,000, v) 1,000-15,000, and vi) below 1,000. The categories for the indicator of language status are those who speak French outside of Quebec, English in Quebec, and those who speak the majority language (omitted). The categories for the immigrant status variables are native-born Canadians (omitted), those who immigrated i) 0-5 years ago, ii) 6-10 years ago, and iii) 11-15 years ago.

The regression results are presented in table 3. The first three columns are for the pooled sample, the second three columns are for men, and the final three columns are for women. Within each of these three samples, the left-most column contains the results for *entry* at the initial age of eligibility, the middle column contains the results for the annual *entries* after age 66, and the final column contains the results for the annual *exits* after age

66. There is one observation per subject for the first equation, but usually multiple observations per subject for the second and third equations. The constant term pertains to individuals with the following attributes: age 67, cohort year 2001, males remaining single, residing in Ontario, residing in an area with 500,000 + inhabitants, speaking the majority language, and non-immigrant.

The estimates for the outcome of the probability of *entry* at the time of initial eligibility (between the ages of 64 and 66) are listed in columns one, four, and seven of Table 3. We discern a marked and mostly monotonically declining trend from cohort year 1994 until cohort year 2007, especially among men (point estimates are plotted in Figure 3). The point estimates by province are relatively high in the five east-most provinces. In accordance with eligibility conditions, the point estimate for non-residents of Canada is strongly negative. The point estimate for immigrants who arrived between 10-15 years earlier is very high in relative terms.

In the case of the equations for annual *entries* (columns two, five and eight of Table 3), the baseline probability is approximately 0.04. The differences across provinces (Ontario is the reference) range in magnitude from + 0.003 to + 0.016. The entry probabilities tend to be slightly higher in rural and less densely populated areas, but they are very high for immigrants who have been in Canada for 11-15 years. The estimated coefficients for the age effects, which represent deviations relative to the omitted age of 67 years old (i.e. the first year they are at risk of entry after the initial, benchmark year of eligibility) are negative and fairly stable until men reach their early eighties and women reach their mid-seventies. They tend to increase thereafter (point estimates are plotted in figure 4). While they are of quite low magnitude, they are

relatively higher among women. The estimated cohort year effects tend to be negative and flat between 1982 and 1996 (relative to the omitted category of 2001), but thereafter the estimates tend to be small in magnitude (figure 5). Prior to the early 2000s, therefore, the annual entry probabilities were approximately one percentage point lower. The finding that the highest values are discerned for the 2002 and 2003 cohorts is at least consistent with the intended impact of the 'GIS outreach' initiatives (mentioned above) that were launched at that time.

In regards to the equations for annual *exits* (columns three, six, and nine of Table 3), the baseline probability is approximately 0.08. Compared to the estimate for Ontario, the event of exit is less likely in all other provinces. While this probability is the lowest in the five eastern provinces, the estimates for the western provinces are small in magnitude. The probability of exit falls over the ages of 67 to 76 but essentially levels off for older ages (figure 6). There does not appear to be a marked gender-related difference. The cohort-year effects are lower in early 80s (relative to the omitted year of 2001), stable over the cohorts from 1987-1992, and then rising (but still negative) over the cohorts from 1993 to 1999. The highest values are estimated for the 2000-2003 cohorts (figure 7).

The estimated coefficients for the *changes* in the marital status variable appear in Table 3. For both genders, the omitted category (among a total of eight groups) is the event of non-transition of being single over the two consecutive years. Columns 4 (for men) and 7 (for women) list the effects associated with *entries* at the time of initial eligibility. For both genders we obtain the expected results that relative to those who remain single, those who remain as couples are much less likely to enter the GIS regime.

In the case of women, we find that relative to those who remained single, women who were married but then became single have a higher probability of starting to collect benefits. On the other hand, women who experienced the opposite transition of going from single to married status are also *more* likely to start collecting benefits, which at first glance is surprising. In the case of men, those who were married but then became single have a lower probability of starting to collect benefits, which is the opposite of the finding for women.

Turning to the annual transitional probabilities of *entry* (after the point for earliest possible entry), we obtain the expected findings that those who have partners over both years are less likely to enter (column 5 for men and 8 for women). We obtain the unexpected finding that for both men and women, compared to those who remained single, those who got married are much *more* likely to start collecting GIS benefits. On the other hand, in the case of women transiting from couple to single status, the estimate is positive, as expected.

Turning to the transitional probabilities of *exit* (column 6 for men and 9 for women), we obtain the expected findings that those who have partners over both years are more likely to exit. Surprisingly we find that for men in particular, relative to those who remained single, those who were married but became single are much *more* likely to stop collecting GIS benefits. The corresponding estimate for women is also positive but much lower in magnitude. In the case of both genders, for those who make the opposite transition - from single to couple status - the estimated impact is negative (i.e. exiting is less likely), but the magnitudes are very small.

The unexpected positive effects on the probability of entry that were discerned for those transiting from single to married status merit further discussion. As shown in the descriptive statistics listed in Table A2, for both genders only about 0.3 percent of the sample in the risk set for a change in GIS receipt status transited from single to married status over two consecutive years. These particular estimates are thus identified by very particular samples for which idiosyncratic influences could impact the estimates. It is possible that certain anomalous, unobservable, and endogenous influences are at work rendering the change in marital status a choice variable in some cases. A single individual who is not receiving benefits during the first year yet planning to marry in the second year will probably consider the financial repercussions as far as sharing the living expenses and GIS eligibility are concerned. If the new spouse has little or no income, the newly-formed couple could qualify.[14]

With respect to the transition from couple to single status, for men (women), 0.7 percent (1.4 percent) of all potential transitions took that form. The following scenario could explain how some individuals who recently lost partners could *exit* from GIS receipt status during the next period, despite the fact that it seems counter-intuitive. When a spouse dies, the ceiling that applies to income that can be received before the GIS benefit is clawed back increases on a *per-person* basis (from $ 11,040 to $ 16,728, according to 2014 provisions). This has the effect of loosening the eligibility criteria for singles, which militates towards remaining on GIS. This effect, however, has to be weighed against the change in the survivor's income, which could conceivably increase enough to disqualify him/her for benefits.[15] For instance, the surviving spouse obtains part of the late spouse's CPP benefit, which raises his/her income a bit. Furthermore, any

death benefit that is paid out in the form of income will also count against eligibility for that year. Such one-time payments could push him/her above the eligibility threshold, but he/she might return to receipt status in subsequent years.

5.2.2 Hazard models for exits

The second set of regressions is a hazard model based on the transition equations but including duration terms. The focus is now on the effect of the preceding spell length on the conditional probability of a transition. The events that are incorporated into a hazard model for *exits* are: i) exiting given that the subject received GIS benefits at the point at which he/she was previously eligible (i.e. age 66 years or older, and ii) a re-exit from a subsequent spell of GIS receipt. The age and the duration effects on this hazard are identified through the following channels. First, individuals can commence their initial spells of GIS receipt at different ages, e.g. 66, 67, 68, etc. Second, for some individuals, the hazard equation also includes observations from subsequent spells of GIS receipt.[16]

Two well-known cases of duration effects are positive (or negative) duration dependence, under which the probability of exiting becomes monotonically more (less) likely the longer the preceding spell of receipt. One might anticipate a pattern of negative duration dependence, whereby exiting becomes less and less likely as time passes. We impose few restrictions on the empirical structure of duration dependence by specifying it with a flexible, semi-parametric form using a set of categorical variables for the length of the preceding spell. The structure of the estimated duration terms takes the form of a step

function; these binary indicators are labeled T + 1 through T + 10, with T + 1 serving as the omitted category.[17]

In the interests of expositional brevity, we show only the estimated coefficients of the duration terms as plots. The estimated coefficients of the remaining covariates (that were included in the exit equations discussed in the preceding sub-section) are qualitatively robust to the inclusion of duration terms.[18] Figure 8 reveals a strong pattern of negative duration dependence for the hazard probability of exiting from a spell of receipt. Two step functions are plotted: one that includes the effects of the age terms and one that excludes them. Relative to the omitted category of the first year during which they are at risk of exit (year T + 1), the hazard probability of exit is 0.08 lower when the age variable is included, and 0.04 lower when it is excluded. Thereafter there is a strong pattern of negative duration dependence which flattens out at year T + 6. When the age terms are excluded from the equation, the structure of the hazard remains, but it declines in magnitude such that the negative duration dependence pattern is not as sharp. The estimated duration dependence effects are biased downward (relative to the true effects) when the age variable is omitted given the positive correlation between the included and the excluded regressors and the sign of the effect of the age variable on the probability of exits. These point estimates for men and women are very similar qualitatively and fairly similar quantitatively.

6. Conclusion

This paper consists of a multi-variate statistical analysis of the dynamic aspects of the receipt patterns of the Guaranteed Income Supplement Program, which is the income-

tested component of Canada's social safety net for retired persons. Slightly more than 30 percent of Canadians claim these benefits as soon as they reach the minimum age of eligibility, and many subsequently remain dependent on them. Nevertheless, there is a potential for age-eligible individuals to transition in and out of the state of receipt because a significant number of them have income levels that are close to the qualification thresholds, rendering them susceptible to falling below it (and thus becoming eligible) in any given year, while others currently collecting GIS may be susceptible to rising above that threshold (and thus losing eligibility).

One important influence generating such transitions, to which we pay particular attention, is *changes* in marital status, which simultaneously affect two relevant variables: the income level and the qualification threshold. Changes in marital status have ramifications for other policy measures related to old-age income security, such as entitlement for Canadian Public Pension benefits or Registered Retirement Plan withdrawals, which in turn can influence transitions in or out of the GIS regime. We also analyze the effects of the individual's current age and cohort-specific effects on entries and exits from the GIS regime.

Our descriptive results indicate that there are some individuals who do not receive benefits when they first reach the age of eligibility of 65 years, but subsequently enter the regime at older ages. While almost three quarters of the group of all recipients between 66 and 70 years of age display a pattern of persistent use, a significant minority of them do not rely on GIS benefits over that entire window of eligibility. The average annual *entry* rates by age among those eligible for GIS benefits display a shallow U-shaped profile, falling from 4.2 percent for 67-year olds to 3 percent for those in their mid-70s,

and then rising to 5.8 percent by age 90. We also discerned a spike in the entry rate in the year 2002, which corresponds to the timing of the federal government's 'GIS outreach initiative'. The univariate average annual *exit* rates by age among those receiving GIS benefits are calculated at 8 percent for 67 year-olds (the youngest age for exiting in our data set), and they decline monotonically thereafter.

In regards to the multi-variate results, the probability of *exiting* conditional on receipt of GIS benefits in the preceding year declines monotonically between the ages of 67 and 76 and subsequently levels off. Relative to native-born Canadians and long-time immigrants, more recently-arrived immigrants have a very high probability of *entry*. Women who transit from married to single status are more likely to enter the GIS regime, as expected. We obtained the unexpected results that for both genders, the event of *becoming* married, while rarely occurring in our sample, is associated with both higher probabilities of entry and lower probabilities of exit. We attribute this finding in part to program design effects tied to the income eligibility thresholds. The hazard model for the risk of exiting the GIS regime conditioned on the duration of the on-going spell of receipt reveals a sharp pattern of negative duration dependence; moving off GIS becomes less and less likely the longer that the spell lasts. The probability of entering the regime, conditioned on the event of not having received the benefit when one is initially eligible, becomes less and less likely as the individual ages.

An extensive agenda for future research could be pursued with this data set. One avenue would be to exploit information on the amounts of GIS benefits received rather than the approach that we adopted of modeling discrete transitions into and out of the state of GIS receipt. In this fashion one could focus more sharply on the specific

channels that generate the passages, such as decomposing transitions into a change in the qualifying threshold versus a change in the individual's income level. In the case of the latter, one could, for example, determine which particular source of income changed enough to cause a change in GIS receipt status. There are a number of additional related topics that could be investigated separately but in greater detail, such as delayed entry into the GIS regime caused by individuals exhausting their savings, delaying their retirement from the labour force, or converting their retirement savings into annuitized income flows. Finally, among individuals in their mid-60s, one could examine the interface between social assistance receipt and GIS receipt, as there is a seam between coverage of the two income maintenance regimes (one federal and one provincial) as individuals turn 65 years old.

Figure 1: Entry Rate into GIS Receipt by Age of Individual Conditional on Non-Receipt in Prior Year (%)

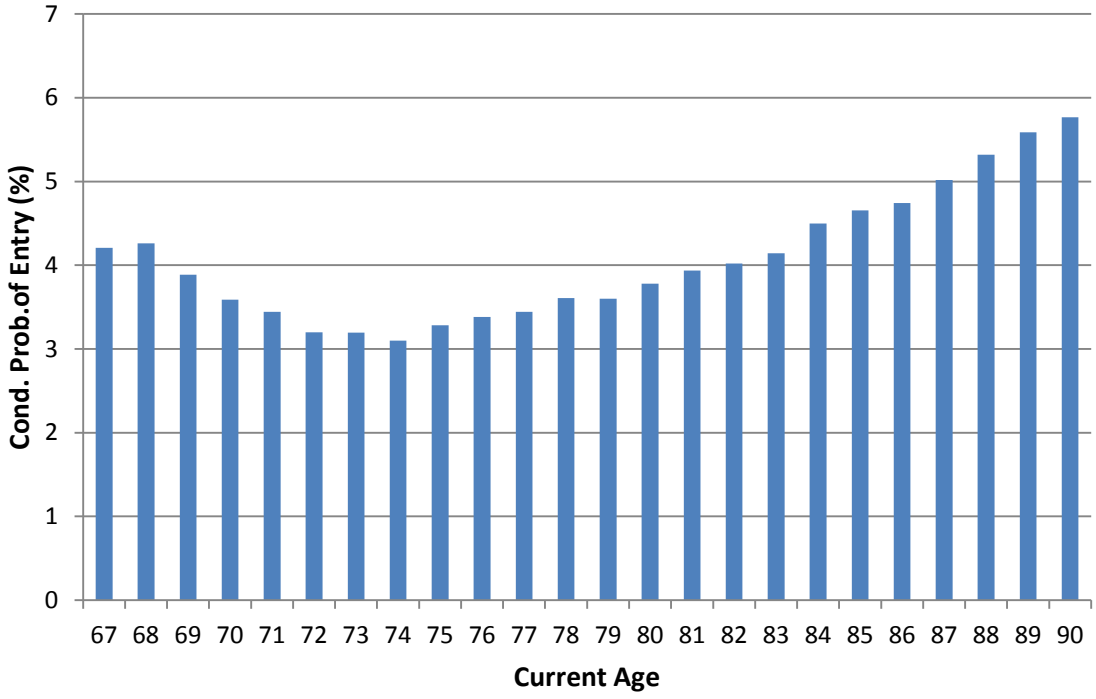

Figure 2: Exit Rate From GIS Receipt by Age of Individual (%)

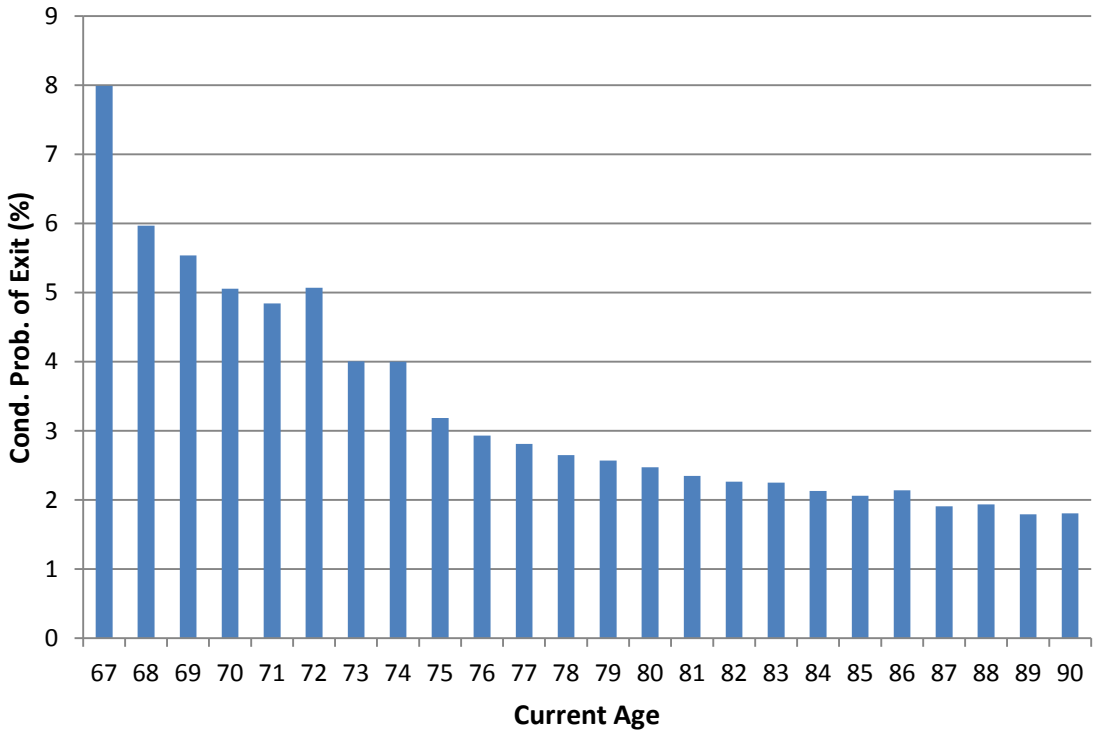

Figure 3: Marginal Probability of Entering GIS at Age 65/66, Cohort Year Effects (2001 Omitted)

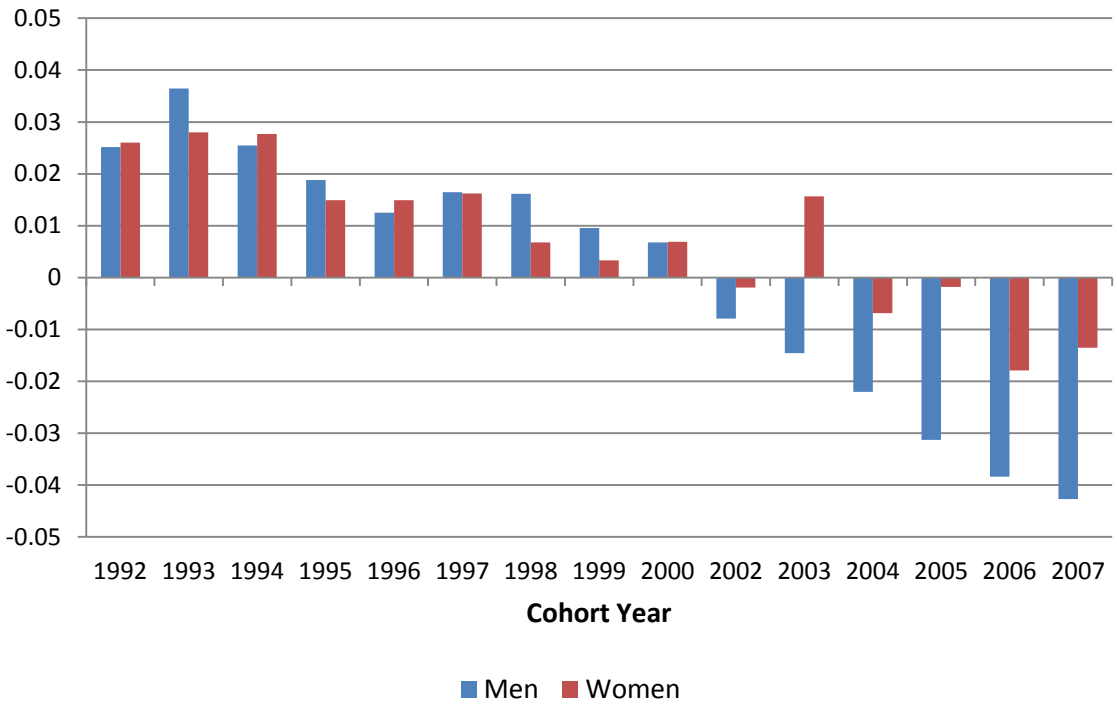

Figure 4: Marginal Probability of Entering GIS After Age 66, Age Effects (Age 67 Omitted)

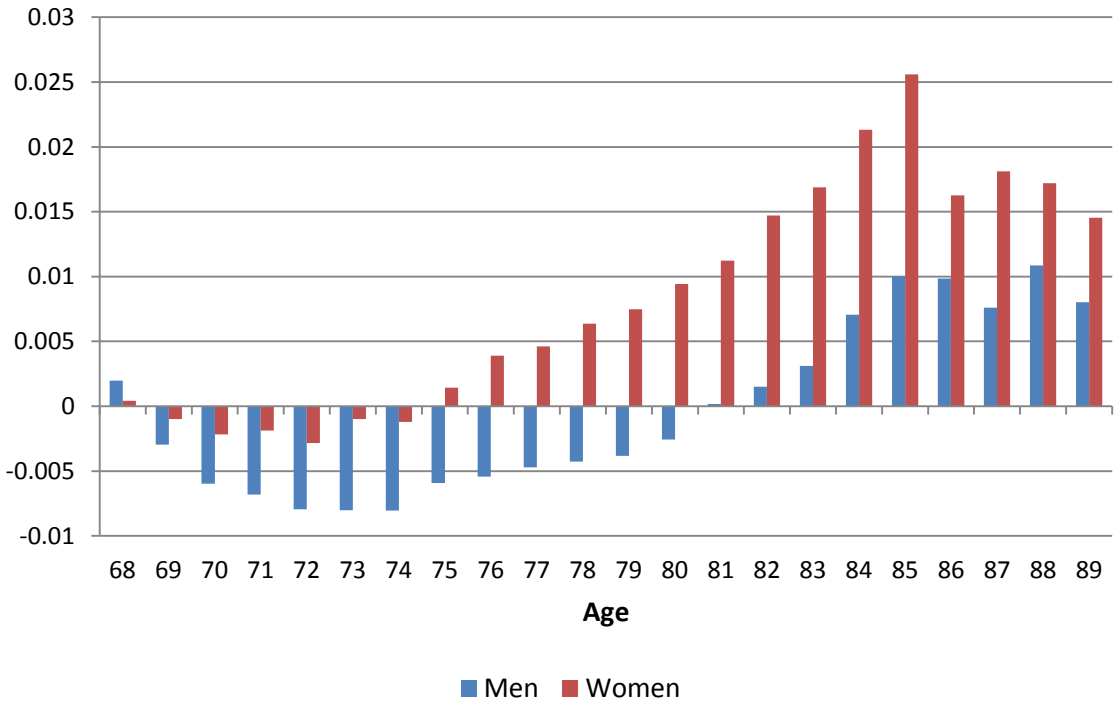

Figure 5: Marginal Probability of Entering GIS After Age 66, Cohort Year Effects (2001 Omitted)

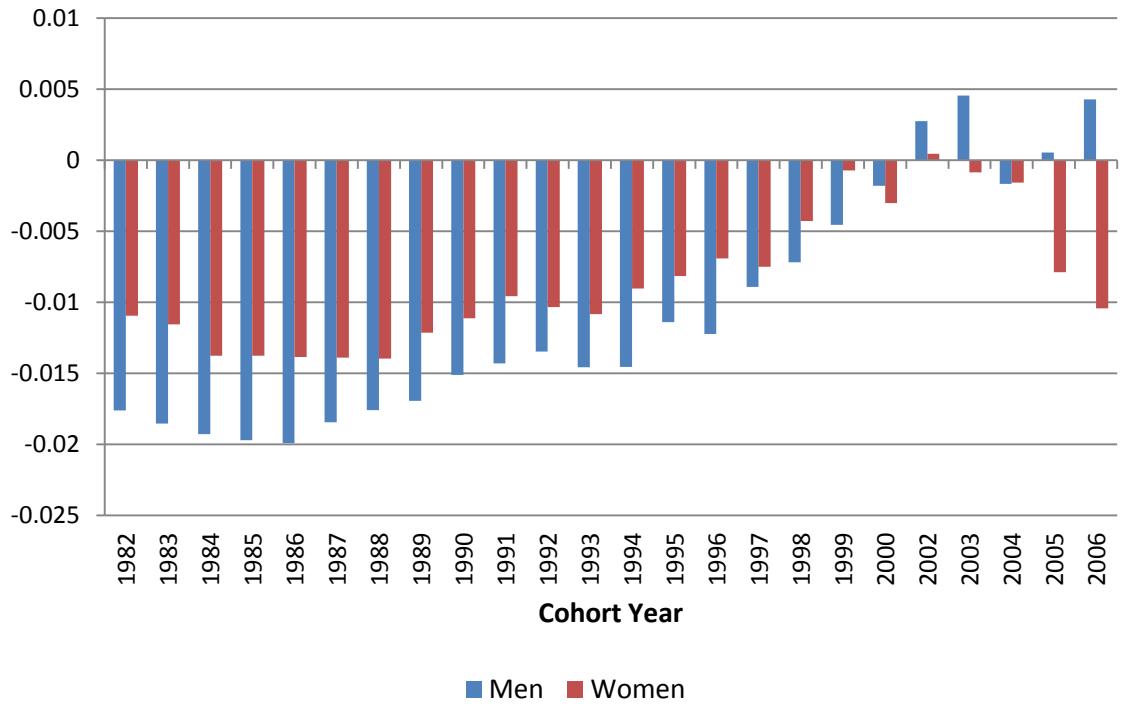

Figure 6: Marginal Probability of Exiting GIS, Age Effects (Age 67 Omitted)

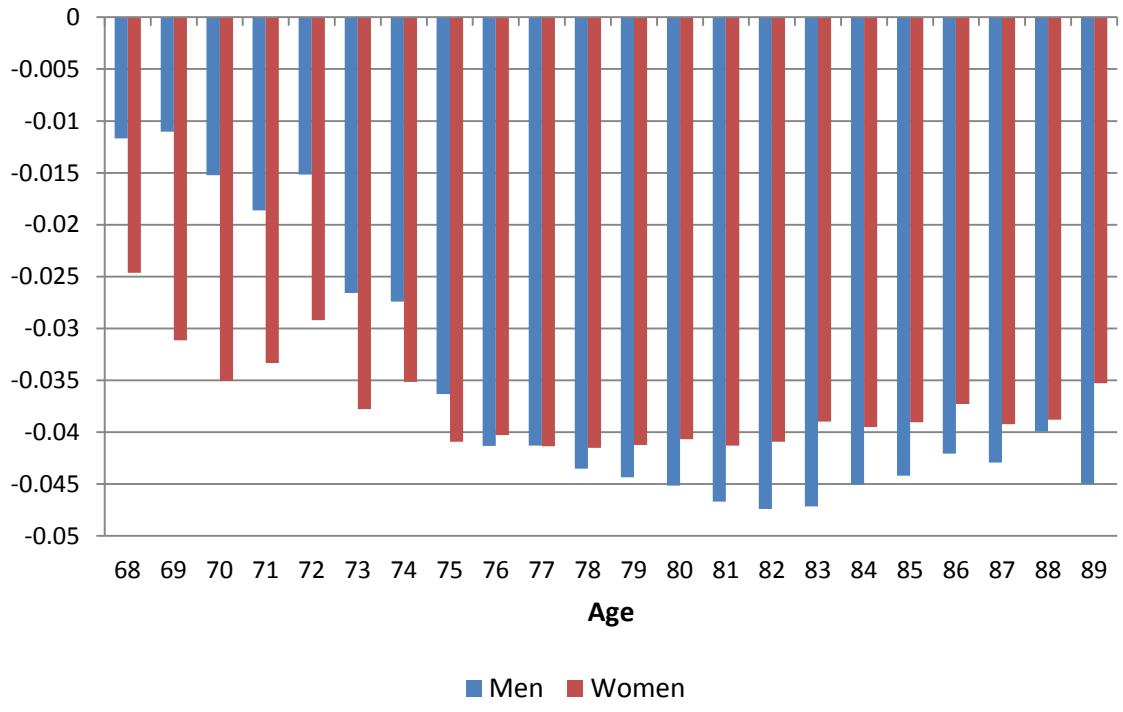

Figure 7: Marginal Probability of Exiting GIS, Cohort Year Effects (2001 Omitted)

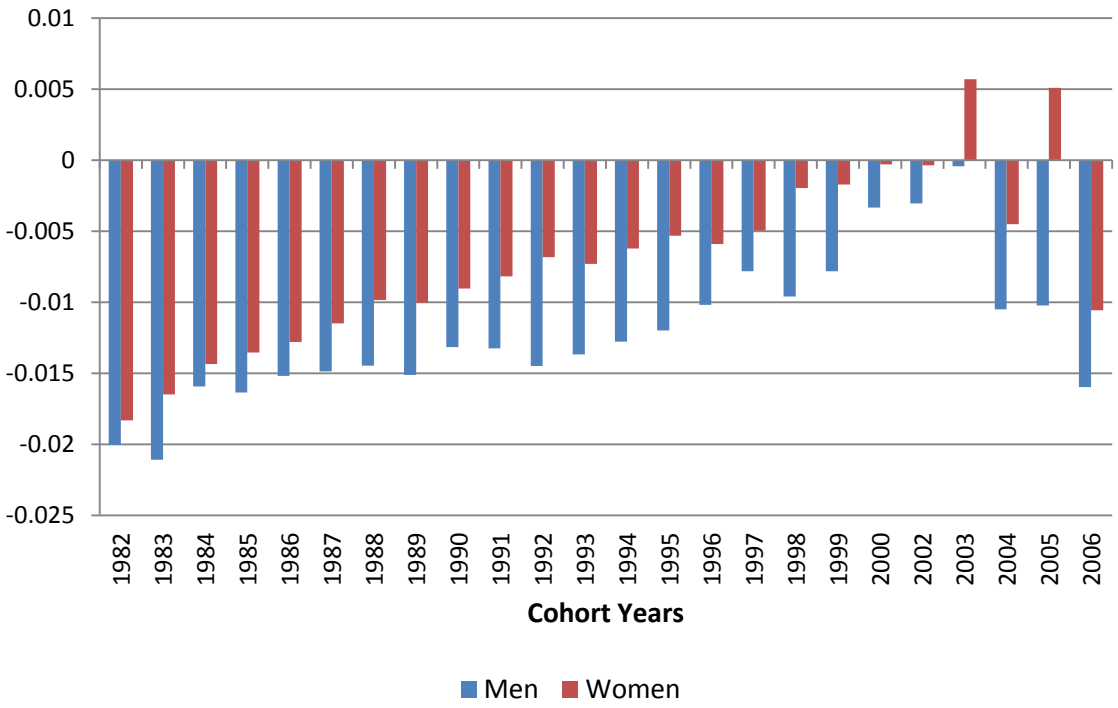

Figure 8: Duration Effects - Marginal Probability of Exiting GIS Conditional on Current Spell Length

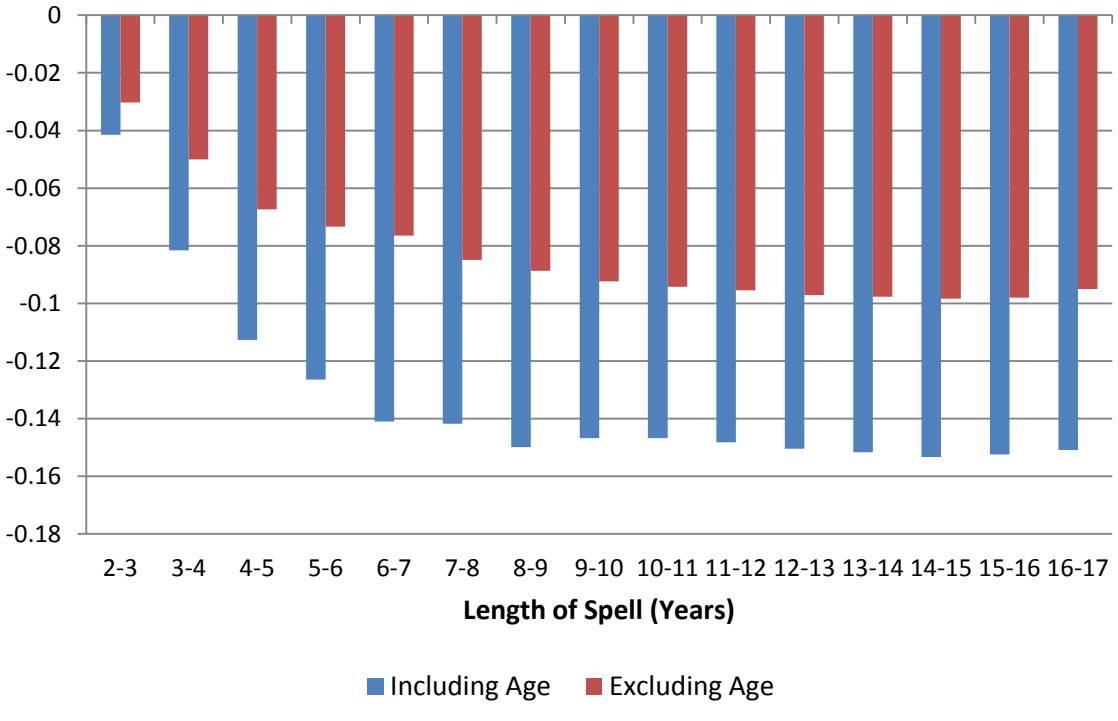

Table 1: Shares of GIS Transitions Cross-Tabulated by Age, Marital Status, and Change in Marital Status

Variable	Share of Sample	Outcomes for GIS transitions			
		Entry	Exit	Remain Off	Remain On
	%	%	%	%	%
All	100	4.6	1.4	61.7	32.3
Age					
66	7.6	32.3		67.7	
67	7.4	2.9	2.6	64.7	29.8
68	7.2	2.9	1.9	64.4	30.7
69	7.0	2.9	1.9	63.9	31.7
70	6.8	2.9	1.7	63.6	32.3
71	6.6	2.3	1.7	63.3	32.7
72	6.4	2.1	1.8	63.1	33.0
73	6.2	2.1	1.4	63.0	33.5
74	5.9	2.0	1.4	62.5	34.0
75	5.6	2.1	1.2	61.9	34.8
76	5.3	2.1	1.1	61.0	35.8
77	4.7	2.1	1.1	60.2	36.6
78	4.2	2.2	1.0	59.3	37.5
79	3.7	2.2	1.0	58.4	38.4
80	3.2	2.2	1.0	57.5	39.2
81	2.7	2.3	1.0	56.5	40.2
82	2.3	2.4	1.0	55.3	41.3
83	1.9	2.5	1.1	54.0	42.4
84	1.5	2.6	1.1	52.6	43.6
85	1.2	2.8	1.1	51.0	45.2
86	0.9	2.4	1.2	49.3	47.1
87	0.7	2.3	1.1	47.8	48.7
88	0.5	2.3	1.2	45.7	50.8
89	0.3	2.1	1.3	43.8	52.8
90	0.2	2.2	1.3	41.8	54.6
Sex / Marital Status					
Single Male	9.5	5.0	1.5	54.7	38.8
Single Female	28.2	4.5	1.4	45.3	48.8
Male with Spouse	34.8	4.6	1.7	69.3	24.5
Female with Spouse	27.5	4.6	1.0	71.2	23.2

Variable	Share of Sample	Outcomes for GIS transitions			
		Entry	Exit	Remain Off	Remain On
	%	%	%	%	%
Change in Marital Status					
Male, Stay Single	8.8	5.1	1.0	54.7	39.2
Male, Stay Couple	34.5	4.5	1.7	69.5	24.4
Male, Single to Couple	0.3	19.7	0.9	44.3	35.1
Male, Couple to Single	0.7	4.4	7.9	54.7	33.0
Female, Stay Single	26.8	4.3	1.3	45.5	49.0
Female, Stay Couple	27.2	4.5	1.0	71.6	22.9
Female, Single to Couple	0.3	14.2	1.3	33.8	50.7
Female, Couple to Single	1.4	8.7	2.6	42.5	46.2

Notes: The unit of observation is the person-year. The outcome shares sum to 100 (horizontally). The reported values are not hazard rates but instead refer to the shares of the total sample that exhibit that particular transition. Source: authors' calculations

Table 2: Relative Frequencies of Number of Years Receiving GIS Over a 5-year Period When Aged 66-70

	# of Years (%)						% Persistent Beneficiaries Among All
	0	1	2	3	4	5	
All	58.6	4.8	3.8	3.3	3.3	26.2	71.3
Cohort							
1991	59.1	4	3.3	3.2	3.6	26.8	74.3
1992	59	3.9	3.5	3	3.7	26.9	74.6
1993	58.9	4.2	3.4	2.9	3.1	27.5	74.5
1994	60.1	4	3.3	2.6	3.1	26.8	74.9
1995	60.2	4.2	3.3	2.9	3	26.3	73.6
1996	60.3	4.2	3.1	2.7	3.1	26.5	74.6
1997	59.4	5.4	3.3	2.8	2.9	26.3	71.9
1998	58.6	5.4	4.5	2.9	3	25.5	68.8
1999	57.6	5	4.3	4.2	3.3	25.6	68.2
2000	57.1	5.4	4.2	3.9	3.6	25.7	68.3
2001	57.5	5.1	4.6	3.8	3.6	25.5	68.5
2002	56.9	5.7	4.3	4.1	3.6	25.5	67.5
2003	57.3	5.4	4.4	3.9	3.5	25.5	67.9
Gender & Marital Status at Age 66							
Single Male	47.2	4	3.4	3.2	3.7	38.6	80.1
Single Female	42.3	4	3.3	3.1	3.3	44	82
Male with a spouse	62.1	5.5	4.2	3.9	3.9	20.5	64.4
Female with a spouse	65.9	4.6	3.7	2.9	2.6	20.3	67.2
Immigration Status at age 66							
Recent Immigrant (< 5 years)	89.8	3	1.6	1.2	1.5	3	44.1
6-10 years	19	13.9	15.5	16.5	15.8	19.3	43.3
10-15 years	13.5	1.8	1.7	2.6	3.8	76.6	92.9
Canadian Born or > 15 years	59.2	4.7	3.7	3.2	3.1	26.1	71.6
Province at age 66							
NF	30.5	3.4	3.1	3.1	3	56.9	86.2
PEI	46.5	4.8	3.6	3.6	4	37.5	77.6
NS	51.2	4.4	3.3	3.2	3.1	34.8	77.7
NB	45.5	4.4	3.4	3.1	3	40.5	79.8
QC	47.3	4.6	3.9	3.4	3.7	37.1	77.4
ON	66.7	4.9	3.8	3.2	3	18.3	64
MN	58	5	4	3.4	3.3	26.2	70.2

	# of Years (%)						% Persistent Beneficiaries Among All
	0	1	2	3	4	5	
SK	57.1	4.6	4	3.8	3.9	26.7	71.3
AL	60.7	5	3.8	3.4	3.4	23.7	69
BC	64.3	5	3.9	3.4	3.3	20.1	65.5
Territories	44.8	5	5.4	4.8	4.4	35.5	72.3
Non-resident	95.8	1.5	1.6	1			0
Area Size of Residence at Age 66							
Urban, 500,000 and more	62.6	4.7	3.7	3.2	3.2	22.6	69
Urban, 100,000-499,999	65	4.7	3.7	3.1	2.9	20.7	67.4
Urban, 30,000-99,999	57.9	4.9	4	3.3	3.3	26.6	71
Urban, 15,000-29,999	55.7	4.8	4.1	3.4	3.2	28.9	72.5
Urban, 1,000-14,999	50.3	4.7	4	3.5	3.7	33.8	75.5
Rural, below 1,000	44.3	5.3	4.1	3.8	4.1	38.3	76.1

Notes:

All information on characteristics is based on the status of the person in the first year of the 5-year period.

The percentage of beneficiaries who are persistent users is those who claimed 4-5 years over the five year period. Source: authors' calculations

Table 3: Regression Estimates of Annual Entry/Exit Probabilities, Linear Probability Model

	Men and Women			Men			Women		
	Initial Entry	Annual Entry	Annual Exit	Initial Entry	Annual Entry	Annual Exit	Initial Entry	Annual Entry	Annual Exit
Age of Individual (67 Omitted)									
68		0.001***	-0.019***		0.002***	-0.012***		0.000***	-0.025***
		(0.000)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
69		-0.002***	-0.022***		-0.003***	-0.011***		-0.001***	-0.031***
		(0.000)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
70		-0.004***	-0.026***		-0.006***	-0.015***		-0.002***	-0.035***
		(0.000)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
71		-0.004***	-0.027***		-0.007***	-0.019***		-0.002***	-0.033***
		(0.000)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
72		-0.005***	-0.023***		-0.008***	-0.015***		-0.003***	-0.029***
		(0.000)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
73		-0.004***	-0.033***		-0.008***	-0.027***		-0.001***	-0.038***
		(0.000)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
74		-0.005***	-0.032***		-0.008***	-0.027***		-0.001***	-0.035***
		(0.000)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
75		-0.002***	-0.039***		-0.006***	-0.036***		0.001***	-0.041***
		(0.000)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
76		-0.001	-0.040***		-0.005***	-0.041***		0.004***	-0.040***
		(0.000)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
77		0.000	-0.041***		-0.005***	-0.041***		0.005***	-0.041***
		(0.000)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
78		0.001**	-0.042***		-0.004***	-0.044***		0.006***	-0.042***
		(0.000)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
79		0.002***	-0.042***		-0.004***	-0.044***		0.007***	-0.041***
		(0.001)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
80		0.004***	-0.041***		-0.003***	-0.045***		0.009***	-0.041***
		(0.001)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
81		0.006***	-0.042***		0.000	-0.047***		0.011	-0.041***
		(0.001)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
82		0.008***	-0.042***		0.002*	-0.047***		0.015*	-0.041***
		(0.001)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
83		0.010***	-0.041***		0.003***	-0.047***		0.017***	-0.039***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)
84		0.015***	-0.040***		0.007***	-0.045***		0.021***	-0.039***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)
85		0.018***	-0.040***		0.010***	-0.044***		0.026***	-0.039***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)

	Men and Women			Men			Women		
	Initial Entry	Annual Entry	Annual Exit	Initial Entry	Annual Entry	Annual Exit	Initial Entry	Annual Entry	Annual Exit
86		0.013***	-0.038***		0.010***	-0.042***		0.016***	-0.037***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)
87		0.013***	-0.039***		0.008***	-0.043***		0.018***	-0.039***
		(0.001)	(0.001)		(0.002)	(0.002)		(0.002)	(0.001)
88		0.014***	-0.038***		0.011***	-0.040***		0.017***	-0.039***
		(0.002)	(0.001)		(0.002)	(0.003)		(0.002)	(0.001)
89		0.011***	-0.037***		0.008***	-0.045***		0.015***	-0.035***
		(0.002)	(0.001)		(0.003)	(0.003)		(0.003)	(0.002)
Cohort - Year Turning 65 (2001 Omitted)									
1982		-0.014***	-0.020***		-0.018***	-0.020***		-0.011***	-0.018***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)
1983		-0.015***	-0.019***		-0.019***	-0.021***		-0.012***	-0.016***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)
1984		-0.016***	-0.015***		-0.019***	-0.016***		-0.014***	-0.014***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)
1985		-0.017***	-0.015***		-0.020***	-0.016***		-0.014***	-0.014***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)
1986		-0.017***	-0.014***		-0.020***	-0.015***		-0.014***	-0.013***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)
1987		-0.016***	-0.013***		-0.018***	-0.015***		-0.014***	-0.011***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)
1988		-0.016***	-0.012***		-0.018***	-0.014***		-0.014***	-0.010***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)
1989		-0.014***	-0.013***		-0.017***	-0.015***		-0.012***	-0.010***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)
1990		-0.013***	-0.011***		-0.015***	-0.013***		-0.011***	-0.009***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)
1991		-0.012***	-0.011***		-0.014***	-0.013***		-0.010***	-0.008***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.001)	(0.001)
1992	0.026***	-0.012***	-0.010***	0.025***	-0.013***	-0.014***	0.026***	-0.010***	-0.007***
	(0.003)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.004)	(0.001)	(0.001)
1993	0.032***	-0.013***	-0.010***	0.036***	-0.015***	-0.014***	0.028***	-0.011***	-0.007***
	(0.003)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.004)	(0.001)	(0.001)
1994	0.027***	-0.012***	-0.009***	0.025***	-0.015***	-0.013***	0.028***	-0.009***	-0.006***
	(0.003)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.004)	(0.001)	(0.001)
1995	0.017***	-0.010***	-0.008***	0.019***	-0.011***	-0.012***	0.015***	-0.008***	-0.005***
	(0.003)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.004)	(0.001)	(0.001)
1996	0.014***	-0.010***	-0.008***	0.013***	-0.012***	-0.010***	0.015***	-0.007***	-0.006***
	(0.003)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.004)	(0.001)	(0.001)

	Men and Women			Men			Women		
	Initial Entry	**Annual Entry**	**Annual Exit**	**Initial Entry**	**Annual Entry**	**Annual Exit**	**Initial Entry**	**Annual Entry**	**Annual Exit**
1997	0.016***	-0.008***	-0.006***	0.016***	-0.009***	-0.008***	0.016***	-0.007***	-0.005***
	(0.003)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.004)	(0.001)	(0.001)
1998	0.011***	-0.006***	-0.005***	0.016***	-0.007***	-0.010***	0.007***	-0.004***	-0.002***
	(0.003)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.004)	(0.001)	(0.001)
1999	0.006**	-0.003***	-0.004***	0.010**	-0.005***	-0.008***	0.003**	-0.001***	-0.002***
	(0.003)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.004)	(0.001)	(0.001)
2000	0.007**	-0.002***	-0.002	0.007	-0.002*	-0.003*	0.007	-0.003*	-0.000*
	(0.003)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.004)	(0.001)	(0.001)
2002	-0.005	0.002**	-0.002	-0.008*	0.003**	-0.003	-0.002*	0.000**	-0.000
	(0.003)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.004)	(0.001)	(0.002)
2003	0.001	0.002**	0.003**	-0.015***	0.005***	-0.000	0.016***	-0.001***	0.006
	(0.003)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.004)	(0.001)	(0.002)
2004	-0.014***	-0.002*	-0.007***	-0.022***	-0.002	-0.010***	-0.007***	-0.002	-0.005***
	(0.003)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.004)	(0.001)	(0.002)
2005	-0.016***	-0.004***	-0.002	-0.031***	0.001	-0.010***	-0.002***	-0.008	0.005***
	(0.003)	(0.001)	(0.002)	(0.004)	(0.001)	(0.003)	(0.004)	(0.001)	(0.002)
2006	-0.028***	-0.003**	-0.013***	-0.038***	0.004**	-0.016***	-0.018***	-0.010**	-0.011***
	(0.003)	(0.001)	(0.002)	(0.004)	(0.002)	(0.004)	(0.004)	(0.002)	(0.003)
2007	-0.028***			-0.043***			-0.013***		
	(0.003)			(0.004)			(0.004)		
Sex-Marital Status (Male Stay Single Omitted)									
Male Stay Couple	-0.155***	-0.005***	0.038***	-0.155***	-0.006***	0.037***			
	(0.002)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)			
Male Single to Couple	0.005	0.245***	-0.003**	0.006	0.244***	-0.004***			
	(0.009)	(0.004)	(0.001)	(0.009)	(0.004)	(0.001)			
Male Couple to Single	-0.066***	0.002*	0.168***	-0.066***	0.002**	0.169***			
	(0.008)	(0.001)	(0.003)	(0.008)	(0.001)	(0.003)			
Female Stay Single	0.051***	0.007***	0.003***						
	(0.002)	(0.000)	(0.000)						
Female Stay Couple	-0.176***	-0.004***	0.016***				-0.228***	-0.010***	0.013***
	(0.002)	(0.000)	(0.000)				(0.002)	(0.000)	(0.000)

	Men and Women			Men			Women		
	Initial Entry	**Annual Entry**	**Annual Exit**	**Initial Entry**	**Annual Entry**	**Annual Exit**	**Initial Entry**	**Annual Entry**	**Annual Exit**
Female Single to Couple	0.130***	0.199***	-0.001				0.078	0.194***	-0.003***
	(0.010)	(0.004)	(0.001)				(0.010)	(0.004)	(0.001)
Female Couple to Single	0.112***	0.088***	0.028***				0.061***	0.082**	0.025***
	(0.006)	(0.001)	(0.001)				(0.006)	(0.001)	(0.001)
Province (ON Omitted)									
Nfld	0.305***	0.017***	-0.038***	0.320***	0.017***	-0.048***	0.288***	0.017***	-0.030***
	(0.004)	(0.001)	(0.001)	(0.006)	(0.002)	(0.001)	(0.006)	(0.002)	(0.001)
PEI	0.116***	0.003**	-0.023***	0.126***	0.004*	-0.030***	0.107***	0.003*	-0.018***
	(0.009)	(0.002)	(0.001)	(0.012)	(0.002)	(0.002)	(0.012)	(0.002)	(0.002)
NS	0.121***	0.003***	-0.021***	0.126***	0.002**	-0.028***	0.116***	0.004**	-0.017***
	(0.003)	(0.001)	(0.001)	(0.005)	(0.001)	(0.001)	(0.005)	(0.001)	(0.001)
NB	0.168***	0.006***	-0.022***	0.181***	0.005***	-0.031***	0.156***	0.007***	-0.017***
	(0.004)	(0.001)	(0.001)	(0.006)	(0.001)	(0.001)	(0.005)	(0.001)	(0.001)
Que.	0.180***	0.017***	-0.023***	0.186***	0.015***	-0.028***	0.174***	0.018***	-0.019***
	(0.001)	(0.000)	(0.000)	(0.002)	(0.000)	(0.001)	(0.002)	(0.000)	(0.000)
Man.	0.066***	0.007***	-0.007***	0.075***	0.006***	-0.011***	0.057***	0.008***	-0.005***
	(0.003)	(0.000)	(0.001)	(0.004)	(0.001)	(0.001)	(0.004)	(0.001)	(0.001)
Sask.	0.051***	0.009***	-0.007***	0.057***	0.010***	-0.010***	0.045***	0.009***	-0.006***
	(0.003)	(0.001)	(0.001)	(0.005)	(0.001)	(0.001)	(0.004)	(0.001)	(0.001)
Alb.	0.036***	0.007***	-0.005***	0.036***	0.006***	-0.007***	0.037***	0.007***	-0.003***
	(0.002)	(0.000)	(0.001)	(0.003)	(0.000)	(0.001)	(0.003)	(0.000)	(0.001)
BC	0.011***	0.002***	-0.006***	0.009***	0.002***	-0.009***	0.014***	0.002***	-0.003***
	(0.002)	(0.000)	(0.000)	(0.002)	(0.000)	(0.001)	(0.002)	(0.000)	(0.001)
Territories	0.085***	0.019***	-0.007*	0.082***	0.023***	-0.016***	0.089***	0.014***	0.002***
	(0.015)	(0.004)	(0.004)	(0.020)	(0.006)	(0.005)	(0.023)	(0.006)	(0.005)
Non-Resident	-0.232***	-0.031***	0.677***	-0.218***	-0.029***	0.733***	-0.250***	-0.033***	0.624***
	(0.005)	(0.001)	(0.027)	(0.006)	(0.001)	(0.034)	(0.008)	(0.001)	(0.040)

	Men and Women			Men			Women		
	Initial Entry	**Annual Entry**	**Annual Exit**	**Initial Entry**	**Annual Entry**	**Annual Exit**	**Initial Entry**	**Annual Entry**	**Annual Exit**
Linguistic Status (Majority Language Omitted)									
Eng in Que.	-0.079***	-0.011***	0.010***	-0.072***	-0.010***	0.008***	-0.087***	-0.013***	0.011***
	(0.003)	(0.000)	(0.001)	(0.005)	(0.001)	(0.001)	(0.004)	(0.001)	(0.001)
French out of Que.	0.112***	0.007***	-0.015***	0.114***	0.007***	-0.018***	0.110***	0.008***	-0.014***
	(0.006)	(0.001)	(0.001)	(0.008)	(0.002)	(0.002)	(0.008)	(0.002)	(0.001)
Area Size of Residence (500 K + Omitted)									
100-500 k	0.005***	0.001***	0.010***	0.006***	-0.002***	0.011***	0.003***	0.003***	0.009***
	(0.002)	(0.000)	(0.000)	(0.002)	(0.000)	(0.001)	(0.002)	(0.000)	(0.000)
30-100 k	0.050***	0.007***	0.002***	0.051***	0.005***	0.004***	0.050***	0.008***	0.001***
	(0.002)	(0.000)	(0.000)	(0.003)	(0.000)	(0.001)	(0.003)	(0.000)	(0.001)
15-100 k	0.050***	0.006***	0.001**	0.049***	0.005***	0.004***	0.050***	0.006***	-0.000***
	(0.003)	(0.001)	(0.001)	(0.005)	(0.001)	(0.001)	(0.004)	(0.001)	(0.001)
1-15 k	0.100***	0.013***	-0.004***	0.099***	0.013***	-0.006***	0.100***	0.013***	-0.004***
	(0.002)	(0.000)	(0.000)	(0.002)	(0.000)	(0.001)	(0.002)	(0.000)	(0.000)
1 k and Below	0.152***	0.019***	-0.009***	0.147***	0.020***	-0.012***	0.158***	0.017***	-0.007***
	(0.002)	(0.000)	(0.000)	(0.003)	(0.001)	(0.001)	(0.003)	(0.001)	(0.000)
Immigration Status (Non-Immigrant Omitted)									
Imm. Recent Arrival	-0.218***	-0.019***	0.044***	-0.189***	-0.018***	0.052***	-0.246***	-0.020***	0.041***
	(0.002)	(0.000)	(0.006)	(0.003)	(0.001)	(0.013)	(0.004)	(0.001)	(0.007)
Imm. Arrive 6-10 Years Ago	-0.049***	0.121***	-0.015***	-0.052***	0.115***	-0.024***	-0.046***	0.127***	-0.009***
	(0.004)	(0.001)	(0.002)	(0.006)	(0.001)	(0.004)	(0.006)	(0.001)	(0.002)
Imm. Arrive 11-15 Years Ago	0.537***	0.198***	-0.050***	0.504***	0.182***	-0.065***	0.561***	0.215***	-0.039***
	(0.004)	(0.003)	(0.000)	(0.007)	(0.004)	(0.001)	(0.005)	(0.005)	(0.000)
Constant	0.322***	0.037***	0.079***	0.323***	0.043***	0.084***	0.372***	0.037***	0.080***
	(0.003)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)
Number of Obs.	742,675	5,735,715	3,295,760	358,505	2,712,710	1,263,810	384,170	3,023,005	2,031,945

Notes: *** p<0.01, ** p<0.05, * p<0.1; standard errors in ( ); OLS regression with clustering for the individual. Source: authors' estimates.

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Table A1: Structure of Cohorts for Estimating Sample

Cohort year (aged 65)	Age in Calendar Year																										
	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1982	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91
1983	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
1984	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89
1985	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
1986	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
1987	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
1988	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
1989	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
1990	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83
1991	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
1992	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81
1993	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
1994	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
1995	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78
1996	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77
1997	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
1998	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
1999	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
2000	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
2001	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
2002	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
2003	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
2004	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69
2005	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
2006	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
2007	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
2008	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65

* shaded area: sample for which we observe GIS receipt status of age-eligible individuals

Table A2: Population Size (#) and Share (%) for the Explanatory Variables, All Cohorts, (Full Sample)

Variable	#	%
Age		
66	742,765	7.6
67	721,940	7.4
68	703,210	7.2
69	683,945	7
70	664,660	6.8
71	644,345	6.6
72	624,735	6.4
73	602,820	6.2
74	576,070	5.9
75	547,540	5.6
76	518,385	5.3
77	463,415	4.7
78	411,070	4.2
79	359,765	3.7
80	312,715	3.2
81	267,590	2.7
82	225,465	2.3
83	186,545	1.9
84	150,830	1.5
85	118,725	1.2
86	90,630	0.9
87	65,920	0.7
88	45,140	0.5
89	28,145	0.3
90	16,005	0.2
Cohort		
1982	247,970	2.5
1983	283,310	2.9
1984	314,935	3.2
1985	388,065	4
1986	420,650	4.3
1987	451,085	4.6
1988	472,970	4.8
1989	511,310	5.2
1990	534,085	5.5
1991	557,985	5.7
1992	579,155	5.9
1993	566,840	5.8

Variable	#	%
1994	530,300	5.4
1995	531,420	5.4
1996	485,720	5
1997	460,310	4.7
1998	406,130	4.2
1999	379,535	3.9
2000	341,995	3.5
2001	306,085	3.1
2002	265,425	2.7
2003	234,580	2.4
2004	191,260	2
2005	151,225	1.5
2006	103,660	1.1
2007	56,375	0.6
Calendar Year		
1993	387,790	4
1994	422,750	4.3
1995	454,405	4.6
1996	489,190	5
1997	521,800	5.3
1998	[19]553,080	5.7
1999	581,390	5.9
2000	608,865	6.2
2001	635,510	6.5
2002	660,025	6.8
2003	682,575	7
2004	707,100	7.2
2005	730,890	7.5
2006	755,350	7.7
2007	780,180	8
2008	801,480	8.2
Sex and Marital Status		
Single Male	931,895	9.5
Single Female	2,751,815	28.2
Male with Spouse	3,402,315	34.8
Female with Spouse	2,686,345	27.5

Variable	#	%
Sex and Change in Marital Status		
Male, stay single	863,220	8.8
Male, stay couple	3,370,960	34.5
Male, single to couple	31,355	0.3
Male, couple to single	68,675	0.7
Female, stay single	2,617,240	26.8
Female, stay couple	2,656,475	27.2
Female, single to couple	29,875	0.3
Female, couple to single	134,580	1.4
Province		
Newfoundland and Labrador	155,445	1.6
PEI	42,975	0.4
Nova Scotia	310,895	3.2
New Brunswick	248,185	2.5
Quebec	2,435,100	24.9
Ontario	3,722,430	38.1
Manitoba	381,650	3.9
Saskatchewan	352,935	3.6
Alberta	774,720	7.9
British Columbia	1,317,690	13.5
Territories	9,660	0.1
Non Residents	15,400	0.2
Unknown	5,290	0.1
Minority Language Status		
Majority Language	9,312,535	95.3
English in QC	357,100	3.7
French outside of QC	97,450	1
Unknown	5,290	0.1
Area Size of Residence		
500,000+	4,416,940	45.2
100,000-499,999	1,630,760	16.7
30,000-99,999	914,865	9.4
15,000-29,999	312,485	3.2
1,000-14,999	1,322,340	13.5
Less than 1,000	1,049,025	10.7
Unknown	125,960	1.3

Variable	#	%
Immigrant Status		
Non Immigrants	9,421,810	96.4
Immigrants landed less than 5 years	77,525	0.8
Immigrants landed 6-10 years	105,920	1.1
Immigrants landed 11-15 years	128,395	1.3
Unknown	38,725	0.4

Notes: N = 9,772,375; Unit of analysis is person-year. The shares for each variable over the nodes sum to 100. Source: authors' calculations.

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[1] Its counterpart in the United States is the Supplemental Security Income (SSI) program, but there is an important difference. While the SSI program targets three groups of low-income individuals who are deemed unable to work, the aged, the blind, and the disabled, and the majority of the beneficiaries belong to the latter two groups, only the first group is covered by the Canadian GIS program. See Daly and Burkhauser (2003) for an authoritative survey of the SSI program.

[2] Like the US Social Security System, the CPP is a 'pay as you go' system whose benefits depend on the worker's contribution history. The OAS benefits are funded from general revenues. They are means tested, but the low clawback rate of 15 % applies only at a high income threshold.

[3] Muzyka, D. and G. Hodgson "Which Party is Ready to Deal with Demographics?" *The Globe and Mail*, 28 August 2015 p. B4

[4] More specifically, there are four categories of GIS recipients: a) unattached GIS recipients (the never-married, the widowed, divorced, etc.). These individuals can also collect OAS benefits. b) GIS recipients whose spouse/partner is also a GIS recipient. Both of these individuals can also collect OAS benefits, but the per-person amount for the GIS benefit is lower than in case a). c) GIS recipients whose spouse/partner receives no income-tested benefits under the GIS program, neither the GIS nor the Spousal Pension Allowance (but might still receive regular OAS). The maximum benefit entitlement is the same as in case a). d) GIS recipients whose spouse/partner receives the Spousal Pension Allowance. The GIS recipient has the same maximums as a GIS recipient under category (b). The Spousal Pension Allowance maximum is always equal to the maximum combined GIS and OAS for a GIS recipient in the married category. For the couple, the total benefit would be the same as for category (b).

[5] The regulations regarding the spousal pension allowance are more complicated. It is paid only to individuals between 60 and 64 years of age. As our analysis is restricted to those retirees aged 65 and over, we do not sample anyone who receives it.

[6] The 2008 Federal Budget implemented a reform that partially addressed these disincentives. It raised the level of exempted (from clawback of GIS benefits) earned income from a trivial $ 500 to $ 3,500 annually.

[7] McGarry (1996) shows that this is also a widespread phenomenon for the Supplemental Security Income regime in the USA.

[8] The representativeness of the LAD file stems from the requirement that all low-income individuals must file in order to obtain partial rebates for the ad valorem taxes that they pay.

[9] Because we restrict our sample to those aged 65 or older, there is only one case in which the spousal allowance enters into our analysis, namely that of an individual who is turning 65 and has a spouse or partner between 60 and 65 years of age and who is receiving the spousal allowance before his/her birthday in that year. In cases for which there is no partner between 60 and 65 years of age, this individual must be a GIS recipient for the reference year.

[10] Consider the following two examples. We follow the oldest cohort from 1992 (when they were 75 years old) until 2008 (when they turned 91); there are no observations for them before 1992. We follow the youngest cohort over a very short window from 2007 (when they tuned 65) until 2008 (when they turned 66), which is the last year of our sample.

[11] According to program regulations, any recipient must have been residing in Canada for 10 years in order to qualify, which renders relatively recent immigrants ineligible.

[12] As explained above, GIS transitions cannot be observed until the two-year period of 1992-1993. We therefore only observe the 1982 cohort when they reach 75 years of age, the 1983 cohort when they reach 74 years of age, etc.

[13] The event of initial entry is measured over the window between the ages of 64 and 66 years (skipping over 65) due to the reporting lags that were mentioned earlier in this paper.

[14] Here is a precise example given the 2014 provisions. If the new partner has less than $5,352 in annual income, and last year the other partner received just over the threshold for singles of $ 16,728, the couple will qualify.

[15] According to 2014 provisions, if the survivor's income annual increased by more than $5,352 and the couple was jointly receiving just under the $ 22,080 threshold annually, the survivor would no longer qualify. This scenario is more likely for male survivors than for widows, and this is borne out in our results.

[16] The event for the hazard model for *entries* is the outcome of entering the GIS regime given that the subject did not receive benefits when he/she was initially eligible (i.e. 66 years of age). No subsequent entries (i.e. re-entries) into spells of GIS receipt can be included in this equation, and thus it is not possible to identify the effects of the duration terms separately from the effects of the age terms, because those two variables are perfectly collinear. For that reason we do not estimate this particular equation including duration terms.

[17] To give an example, T + 2 will assume a value of unity in the exit equation if a subject has been receiving GIS benefits for two consecutive years. It is the second year during which he/she was in the risk set for exiting.

[18] They are also fairly robust quantitatively with the exception of the coefficient estimates for the indicators for ages 68 to 78 and for the indicators for immigration status.