Disability Insurance and the Labour Force Participation of Older Men and Women in Canada

Michele Campolieti
Division of Management, University of Toronto at Scarborough
Centre for Industrial Relations, University of Toronto

This paper examines the effect of the Canada/Quebec Pension Plan (C/QPP) disability program on the labour force participation rates of older men and women. I use aggregate provincial data and exploit the time series and cross-sectional variation, which results from the different policies used by the C/QPP disability programs, in these data to examine the impact of a number of different aspects of the C/QPP disability program on the labour force participation rates of older men and women in Canada. The results from these regressions indicate that, for the most part, the C/QPP disability program has had a large effect on the participation rates of older men and women.

Introduction

There has been a steady decline in the labour force participation rates of older men in the United States during the last several decades. This decline has been the subject of numerous empirical investigations. Specifically, the papers in this literature have examined to what extent the availability of disability insurance benefits has contributed to the decline in male participation rates. For example, Parsons (1980a, b) and Slade (1984) argue that the increased availability of disability benefits is responsible for virtually all of the decline in male labour force participation since the 1950s. While some have argued about the size of these effects (e.g., Haveman and Wolfe 1984; Bound 1989; and Bound and Waidmann 1992), all agree that this program has at least contributed to some of the decline in the labor force participation rates of older males.1

A similar decline has also been observed in the labour force participation rates of older men in Canada. In this paper, I examine the effect of the program on male participation rates in Canada. I use aggregate provincial data and exploit the time series and cross-sectional variation, which results from the different policies used by the C/QPP disability programs, in these data to examine the impact of a number of different aspects of the C/QPP disability program on the labour force participation rates of older men and women in Canada. The results from these regressions indicate that, for the most part, the C/QPP disability program has had a large effect on the participation rates of older men and women.

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Canada. For example, the participation rate of males aged 45 to 64 fell from 85.2 in 1976 to 77.8 by 1999. Although there is a substantial literature for the United States, which has examined the decline in participation rates and the role of disability benefits, the empirical evidence for Canada is very small. In fact, there have only been a few papers that have examined these issues. Maki (1992) undertook an empirical investigation using both aggregate and micro data. Using aggregate data Maki found that about 35 percent of the decline in the labour force participation rates of males aged 45 to 64 between 1975 and 1983 was due to the Canada/Quebec Pension Plan (C/QPP) disability program. With micro data Maki produced a larger range for his results. The lower bound of his estimates suggested that if the C/QPP disability programs were abolished the probability an average person would be in the labour force would increase by 0.13. On the other hand, the upper bound of his estimates indicated that removing the program would increase the probability of being in the labour force by 0.46 for the average person. More recently, Gruber (2000) undertook an analysis of the effect of a change in CPP benefits in 1987 on the labour force participation decisions of men aged 45 to 59. Gruber obtained his estimates using a difference-in-difference estimator, as well as a fully parameterized model, and found that this policy change led to estimates of the elasticity of non-participation between 0.28 and 0.36, a fairly large response. Both of these papers have only focused on the disincentive effects of benefits, but not the other aspects of the C/QPP disability program, such as changes in eligibility criteria.

The existing literature, for both the United States and Canada, has focused on the labour force participation rates of older men. It has not — except for a very small number of studies for the United States — examined the effects of these disability programs on the labour force participation of older women. This is unfortunate because older women have become a relatively large proportion of the C/QPP disability rolls. In Canada, the percentage of C/QPP disability beneficiaries who are older males has steadily declined for several decades, while the corresponding proportion for older women has been increasing. For example, in 1989 the incidence of new CPP disability beneficiaries cases for women was 2.99 per thousand, by 1994 this incidence rate had increased to 5.79 (Canada Pension Plan Consultations 1996). In addition, many of the changes in eligibility criteria implemented by these programs, which have, for the most part, made it easier to qualify for benefits, may have had a greater impact on women rather than men. This may be especially true in Quebec, where for most of the last few decades the percentage of women eligible for QPP disability benefits has been significantly lower than the eligible male population.

In this paper, I examine the effects of the C/QPP disability programs on the labour force participation rates of older men and women. For convenience and expository ease, I refer to an older person as someone between 45 and 64 years of age. I will examine the effect of different aspects of these programs on the participation rates of both older men and women. In addition to these program variables, which will include the average replacement rate as well as dummy variables controlling for periods of relaxed eligibility, I also include controls, which proxy, for economic conditions and health. I use aggregate annual data from Canada’s ten provinces, beginning in 1976 and ending in 1997, to estimate these regressions. The cross-sectional and time-series structure of these data is advantageous because the CPP and QPP disability programs are administered separately. As a result, if one program adopts a policy that the other does not, a “control” group of sorts is created for the policy change. Since the inception of the C/QPP disability program there have been several changes in eligibility requirements in both programs as well as variation in benefit levels across programs. Consequently, this aggregate data contains time-series and cross-sectional variation in both replacement rates and eligibility criteria. This variation should make it easier to establish the effects of different policies used in the CPP and QPP disability programs on the labour force participation...
rates of both older men and women. Furthermore, this cross-sectional variation also overcomes one of the criticisms often made about studies of disability insurance in the United States, that is, because the disability insurance system in the United States is centrally administered there is no variation in the replacement rate (Bound 1989, 1991).

In the next section I provide an overview of the Canada and Quebec Pension Plan disability programs, which discusses the overall trends in the number of beneficiaries and program expenditures, the demographic changes in the composition of beneficiaries, the computation and level of benefits and the changes in eligibility criteria which have occurred since 1970. In the section that follows, I provide a short description of the data, which are used to estimate the regressions. I present the paper’s empirical findings in the penultimate section and some concluding remarks in the final section.

AN OVERVIEW OF THE C/QPP DISABILITY PROGRAM

The C/QPP disability program, as well as the retirement program, was created in 1966 by an act of Parliament. The disability program began paying benefits in 1970 to persons with a prolonged physical or mental disability which prevents them from working and who also satisfy the contribution requirements to the plan. The expenditures, as well as the number of beneficiaries, of the C/QPP disability program have grown steadily since its inception. For example, the number of beneficiaries per 1,000 of the labour force (in Canada, aged 15 to 64, both sexes) rose from 0.25 in 1970 to 22.75 in 1996, an annual growth rate of 10.9 percent (Campolieti and Lavis 2000). During the same period benefit expenditures, in constant 1996 dollars, rose from $17 million to $2,954 million, a growth rate of 14.7 percent per annum (ibid.).

In addition to these increases in expenditures, there have also been demographic changes in the composition of the beneficiaries. Between 1971 and 1997 the proportion of male CPP disability beneficiaries aged 45 to 64 fell from 78.2 percent to 46.9 percent of all CPP beneficiaries. During the same period, the proportion of female CPP disability beneficiaries aged 45 to 64 grew from 12.8 percent to 35.6 percent. In the QPP disability program the proportion of male beneficiaries between the ages of 45 and 64 fell from 79.7 percent of all QPP beneficiaries in 1971 to 58.4 percent of all QPP beneficiaries in 1997. During the same period, the percentage of female QPP disability beneficiaries in this age group increased from 9.4 percent to 30 percent of all QPP beneficiaries. The most notable difference between these two programs is that a greater proportion of the beneficiaries in the CPP disability program are older women. Part of the difference in the composition of the disability rolls can be attributed to demographic and sociological differences between the CPP provinces and Quebec. However, another contributing factor may be that the proportion of the female population eligible for benefits in Quebec has been and, although it has risen recently, continues to be lower than the percentage in the CPP provinces (HRDC 1996a).

The C/QPP disability programs provide eligible claimants with income replacement benefits as well as some vocational rehabilitation services (HRDC 1996b). C/QPP disability benefits consist of up to three components: (i) a flat rate portion that is unrelated to previous earnings; (ii) a portion that is related to a beneficiary’s labour market earnings; and (iii) beneficiaries with eligible children also receive a payment per eligible child. These benefits have been indexed to the consumer price index since the mid-1970s. As noted earlier, the CPP and QPP programs do not always pay the same level of benefits. Consequently, benefit levels have varied across programs. In particular, benefit levels in the QPP disability program (in nominal dollars) were substantially larger than those in the CPP program between 1973 and 1986. During this period the average monthly payment in the QPP disability program increased from $216.87 to $548.47, while in
the CPP disability program the average monthly payment increased from $132.41 to $371.22. In 1987, the CPP disability program increased the flat rate portion of its disability pension by just over $150 a month to make it comparable to a QPP disability pension. Another difference in the benefit calculations between these programs was the child-rearing drop provision, which allowed the calculations for contributory years to remove those years spent in child-rearing when earnings can be very small. These provisions can make benefits much more generous, particularly for female claimants. The QPP implemented this provision in 1977 and the CPP in 1984.

In addition to varying benefit levels, the eligibility criteria for a disability pension have also varied across programs and through time (HRDC 1996a; Canada Pension Plan Consultations 1996). The eligibility criteria for benefits require that applicants must suffer from a prolonged mental or physical disability which prevents them from working and also that they satisfy the contribution requirements to the plan. Since the inception of these programs there have been changes in the definition of what qualifies as a disability, what “work” is, and contribution requirements. When the CPP disability program was established it required contributions in five of the last ten years to the plan. In 1986, the contribution requirement was changed to two of the last three years or five of the last ten years. The definition of eligible disability conditions was also changed in the late 1980s. Prior to 1989 eligibility was determined solely on medical grounds. However, in 1989 the CPP program also allowed non-medical factors, such as the unemployment rate in a region, the availability of particular sorts of jobs in a region, or a person’s skills to be taken into consideration when determining eligibility for benefits. Finally, in 1992 the CPP program allowed for late applications for disability benefits. Specifically, the program allowed for eligibility for benefits to be determined retroactively to the date of disablement. Previously, some of these “late” applicants would not have been eligible for benefits because they would have applied too late. The CPP tightened its eligibility criteria in 1994. Consequently, the period between 1987 and 1994 can be characterized as a period of relaxed eligibility for the CPP disability program. The principal changes in eligibility for the CPP disability program made in 1994 were not to allow non-medical factors to be considered as disabilities and by eliminating two of the last three years contribution requirement and replacing it with four of the last six years.

The QPP disability program maintained more stringent eligibility criteria, except for workers aged 60 to 64, than the CPP until 1993 (HRDC 1996a). In 1993 the QPP disability program made several changes to their eligibility criteria. First, they changed their requirement for being unable to work from “any job” to “usual job.” Claimants aged 60 to 64 have faced this definition of employability for early retirement benefits since 1984. They also relaxed the contribution requirements from five of the last ten years and one-third of the contributory period to one of the following: (i) two of the last three years, (ii) five of the last ten years, or (iii) half of the contributory period.

These changes in eligibility criteria have increased the percentage of the population, where population is defined as persons between the ages of 20 and 64 (by gender), eligible to apply for benefits in both the CPP provinces and Quebec (HRDC 1996a). Furthermore, these changes in eligibility criteria have had a very large impact on the population of women eligible for benefits in both the CPP and QPP programs. In particular, the largest increase in the eligible population for C/QPP disability benefits has been for women in Quebec. In Quebec, the percentage of women aged 20 to 64 who would be eligible for benefits increased from 40 to 60 percent between 1976 and 1992. These coverage rates were also much lower than the figures for women in the CPP provinces. However, after the QPP relaxed their eligibility criteria in 1993 the eligible female population jumped to more than 80 percent. When the CPP program relaxed their eligibility criteria in the late 1980s and early 1990s there were
also increases in the eligible population of males and females, but the women had a larger percentage increase (ibid.). In addition, although there have been bigger increases in the proportion of the population eligible to receive QPP disability benefits, there has been a much larger increase in the number of beneficiaries in the CPP disability program (see Campolieti and Lavis 2000).

Another difference in the eligibility criteria between these two disability programs is the early retirement provisions, which are available to beneficiaries between 60 and 64 years of age. The CPP disability program introduced an early retirement option in 1987 for claimants who were at least 60 years of age. The QPP disability program had an early retirement option in place, also at age 60, in 1984. However, the QPP guidelines for older workers required them to be unable to work their “usual job” instead of “any job.”

As a result of these changes in C/QPP policy, there has been considerable cross-sectional and time-series variation in both benefit levels, and consequently, the “implicit” replacement rates of benefits, as well as the eligibility criteria used in the C/QPP disability programs. The variation in the level of benefits and administrative rules used by these programs makes it easier to separate the effect of a change in policy from unobserved time effects. Another advantage of this aggregate data is that it captures all of these changes and provides the opportunity to study the effect of these policy changes on the labour force participation rates of both older men and women. This is not possible in other jurisdictions because the programs in other countries are centrally administered. As a result, the estimates from Canada may also be informative for programs in other jurisdictions.

### Description of the Data

I use aggregate provincial data collected between 1976 and 1997 to estimate my regressions. This sample period was selected because the data on participation rates for individuals between the ages of 45 and 64 (by province) are only available beginning in 1976. The labour force participation rates for men and women between the ages of 45 and 64, that is, older men and women, are used as the dependent variables in all the regressions. The explanatory variables used in the regressions include controls for economic incentives, health status, and economic conditions, as well as some of the policy changes that occurred in the CPP and QPP programs.

Economic incentives are measured with the average replacement rate for C/QPP disability benefits, computed as average benefits divided by average gross earnings. I annualized the average monthly benefit payment in the CPP and QPP disability programs as well as the average gross weekly industrial earnings from each province. Although the earnings in the denominator vary from province to province, the benefits in the numerator only differ between Quebec and the rest of Canada. However, the average replacement rates will vary across all provinces because there are provincial differences in the average industrial wage. It should be noted that these average replacement rates are not statutory replacement rates (as are used in many social insurance programs), since a C/QPP disability pension has a fairly large component that is unrelated to previous earnings. As disability benefits become more generous, individuals will substitute market time for more leisure time and we would observe a decline in labour force participation rates. The average replacement rates for C/QPP disability benefits have experienced a considerable amount of growth during the study period. For example, the average replacement rate has been as low as 13.3 percent and has recently been as high as 36.6 percent. Replacement rates have been found to be an important determinant of labour force participation for older males in studies using both aggregate and micro data (Bound and Burkhauser 1999; Haveman and Wolfe 1999).

The provincial unemployment rate (both sexes, ages 25 to 44) is a proxy for differences in economic
and labour market conditions that exist across time and between provinces. As economic conditions worsen, participation rates should fall. This variable may also capture some of the effects of the relaxed CPP eligibility criteria, since during the late 1980s and early 1990s high regional unemployment rates would have been taken into consideration to determine eligibility for a CPP disability pension.

I also include a dummy variable for the province of Quebec in the regressions. This variable will pick up the difference between the administrative procedures of the two disability programs, particularly the more stringent eligibility requirements that have been in place for most of the study period in Quebec. Since the QPP disability program had more stringent eligibility conditions than the CPP disability program during most of the sample period, the parameter estimates for this variable should be positive.

In most studies of disability insurance, health status has been found to be an important determinant of labour force behaviour for older males (Anderson and Burkhauser 1984, 1985; Bound and Waidmann 1992). I control for health status using the average remaining years of life for males and females aged 45 to 64, which are available in the life tables (see Data Appendix). The average remaining years of life at any given age for a particular sex is the mean number of years remaining to be lived by those surviving to that age, on the basis of a given set of mortality rates. Since the remaining years of life are not available in a grouped form (i.e., ages 45 to 64), I averaged the remaining years of life across each of the age groups between 45 and 64 years of age. This measure of health status is classified as an objective measure of health (Bound 1991b) because it does not rely on individual self-reports. Objective measures of health tend to produce larger estimates for the effects of the economic variables than self-reported measures of health (ibid.). Consequently, these estimates may provide an upper bound on the effects of the economic variables on labour force participation rates.

I also use several dummy variables to control for the periods of relaxed eligibility conditions in both the CPP and, more recently, the QPP disability programs. Since eligibility criteria were relaxed during these periods, these variables should be associated with declines in labour force participation rates. A description of all the variables used in the regressions, as well as summary statistics, is presented in Table 1. Data sources are provided in an appendix.

Empirical Results

The basic specification used in the regressions estimated in this paper takes the following form:

$$LFP_{it} = f(REPRATE_{it}, UR_{it}, LE_{it}, Quebec_{it}, POLICY VARIABLES_{it}, Time effects) + u_{it},$$

where $i = 1, ..., 10$, $t = 1976, ..., 1997$, $LFP$ is the labour force participation rate, $REPRATE$ is the average replacement rate for C/QPP disability benefits, $UR$ is the unemployment rate, $LE$ is the average remaining years of life for persons aged 45 to 64, $Quebec$ is a dummy variable for Quebec, $Time effects$ is a set of year-specific dummy variables, $POLICY VARIABLES$ contains controls for differences in eligibility criteria and $u$ is the residual term. There may be a number of other factors that could have affected the labour force participation of older persons. For example, increases in household income, increases in two-earner families or the growth of private pension plans could also have contributed to a decrease in the labour force participation rates of older persons. These omitted variables may have effects that may be, to some extent, time specific. The year-specific dummy variables, that is, the time effects, are included to capture some of these effects. $POLICY VARIABLES$ denotes a number of dummy variables that control for some of the changes in C/QPP administrative rules during the study period, which include: $CPPELIG$, a dummy variable for the period of relaxed CPP eligibility between 1987 and 1994; $QPPELIG1$, a dummy


<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Definition</th>
<th>Mean</th>
<th>Standard Error</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Replacement Rate</td>
<td>Average replacement rate of C/QPP disability benefits, all beneficiaries (computed as annualized average benefits/annualized average industrial earnings).</td>
<td>0.2586</td>
<td>0.0715</td>
<td>0.1325</td>
<td>0.3661</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>Provincial unemployment rate, ages 25 to 44, both sexes.</td>
<td>9.57</td>
<td>3.712</td>
<td>2.6</td>
<td>19.7</td>
</tr>
<tr>
<td>Average Remaining Years of Life</td>
<td>Average remaining years of life for persons aged 45 to 64 (gender specific).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td>23.20</td>
<td>1.106</td>
<td>20.616</td>
<td>25.006</td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td>28.30</td>
<td>1.110</td>
<td>25.773</td>
<td>30.460</td>
</tr>
<tr>
<td>CPP Relaxed Eligibility Criteria</td>
<td>Dummy variable for period of relaxed eligibility in the CPP disability program takes the value 1 between 1987 and 1994 in CPP provinces, and 0 otherwise.</td>
<td>0.3273</td>
<td>0.4703</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>QPP Relaxed Eligibility Criteria</td>
<td>Dummy variable for period of relaxed eligibility in the QPP disability program takes the value 1 between 1993 and 1997 (in Quebec), and 0 otherwise.</td>
<td>0.0227</td>
<td>0.1494</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>QPP Early Retirement</td>
<td>Dummy variable for QPP early retirement provisions, takes the value 1 between 1984 and 1997 and 0 otherwise.</td>
<td>0.0636</td>
<td>0.2447</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Quebec</td>
<td>A dummy variable that takes the value 1 if the province is Quebec and 0 otherwise.</td>
<td>0.10</td>
<td>0.3007</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Labour Force Participation Rate</td>
<td>Provincial labour force participation of persons between the ages of 45 and 64 years of age (gender specific).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td>78.87</td>
<td>6.19</td>
<td>62.5</td>
<td>90.10</td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td>47.85</td>
<td>9.95</td>
<td>21.3</td>
<td>66.60</td>
</tr>
</tbody>
</table>

Notes: Sample statistics computed using data from all ten Canadian provinces for period between 1976 and 1997.
variable for the period of relaxed QPP eligibility between 1993 and 1997; and QPPELIG2, a dummy variable for the period of less stringent early retirement provisions in the QPP between 1984 and 1997.

I estimated the regressions with ordinary least squares (OLS) and adjusted the OLS standard errors for heteroscedasticity and autocorrelation in the residuals using the Newey-West covariance matrix estimator. The estimates are presented in Table 2 for males and Table 3 for females. I estimated three specifications for both men and women: (i) the average replacement rate and the time effects; (ii) the average replacement rate, the unemployment rate, the average remaining years of life, the dummy variables controlling for the periods of relaxed eligibility in the CPP and QPP programs, a dummy variable for Quebec and the time effects; and (iii) all

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
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<tbody>
<tr>
<td>Average Replacement Rate</td>
<td>-0.4622***</td>
<td>-0.2418</td>
<td>-0.2450</td>
</tr>
<tr>
<td></td>
<td>(0.1871)</td>
<td>(0.1795)</td>
<td>(0.1775)</td>
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<tr>
<td>Unemployment Rate</td>
<td>-0.0116**</td>
<td>-0.0117**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0015)</td>
<td>(0.0015)</td>
<td></td>
</tr>
<tr>
<td>Average Remaining Years of Life</td>
<td>0.0245**</td>
<td>0.0245**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0069)</td>
<td>(0.0069)</td>
<td></td>
</tr>
<tr>
<td>CPP Relaxed Eligibility Criteria</td>
<td>0.0513**</td>
<td>0.0251**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0175)</td>
<td>(0.0140)</td>
<td></td>
</tr>
<tr>
<td>QPP Relaxed Eligibility Criteria</td>
<td>-0.0293**</td>
<td>-0.0082</td>
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</tr>
<tr>
<td></td>
<td>(0.0142)</td>
<td>(0.0110)</td>
<td></td>
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<tr>
<td>QPP Early Retirement</td>
<td></td>
<td>-0.0478**</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>(0.0092)</td>
<td></td>
</tr>
<tr>
<td>Quebec</td>
<td>0.0659**</td>
<td>0.0820**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0160)</td>
<td>(0.0149)</td>
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<tr>
<td>R-squared Adjusted</td>
<td>0.1012</td>
<td>0.7449</td>
<td>0.7510</td>
</tr>
<tr>
<td>Sample Size</td>
<td>220</td>
<td>220</td>
<td>220</td>
</tr>
</tbody>
</table>

Notes: All regressions include year-specific effects. Standard errors are presented in parentheses. Standard errors are computed using the Newey-West covariance matrix with four lags. Variable definitions are provided in Table 1. Significance tests are done with one-sided alternative hypothesis, except for the unemployment rate and average remaining years of life. Double asterisk (**) denotes statistically significant at 5 percent level.
the variables in second specification as well as the dummy variable for the period of the less stringent early retirement provisions in the QPP program. In addition to these three specifications, I also estimated specifications (ii) and (iii) for women with male participation rates as an explanatory variable, since there may be a relationship between male and female participation rates, particularly during the earlier part of the study period.14

In Table 2, which contains the results for the male regressions, the average replacement rate has a negative effect, as expected, on labour force participation rates, but is not statistically significant at the 5

<table>
<thead>
<tr>
<th>Variable Name</th>
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<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
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<tbody>
<tr>
<td>Average Replacement Rate</td>
<td>-0.6369**</td>
<td>-0.3889**</td>
<td>-0.4119**</td>
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<td>0.1341</td>
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<tr>
<td></td>
<td>(0.2091)</td>
<td>(0.2095)</td>
<td>(0.2069)</td>
<td>(0.0822)</td>
<td>(0.0820)</td>
</tr>
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<td>-0.0150**</td>
<td>-0.0021**</td>
<td>-0.0021**</td>
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<tr>
<td></td>
<td>(0.0019)</td>
<td>(0.0019)</td>
<td>(0.0008)</td>
<td>(0.0009)</td>
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</tr>
<tr>
<td>Average Remaining Years of Life</td>
<td>0.0273**</td>
<td>0.0281**</td>
<td>0.0091**</td>
<td>0.0091**</td>
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<tr>
<td></td>
<td>(0.0076)</td>
<td>(0.0076)</td>
<td>(0.0023)</td>
<td>(0.0023)</td>
<td></td>
</tr>
<tr>
<td>CPP Relaxed Eligibility Criteria</td>
<td>0.0714**</td>
<td>0.0395**</td>
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<td>(0.0219)</td>
<td>(0.0163)</td>
<td>(0.0074)</td>
<td>(0.0070)</td>
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<td>QPP Relaxed Eligibility Criteria</td>
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<td>-0.0072</td>
<td>0.0145**</td>
<td>0.0142**</td>
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<tr>
<td></td>
<td>(0.0197)</td>
<td>(0.0157)</td>
<td>(0.0068)</td>
<td>(0.0071)</td>
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<tr>
<td>QPP Early Retirement</td>
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<td>-0.0616**</td>
<td>0.0008</td>
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<td></td>
<td>(0.0140)</td>
<td>(0.0140)</td>
<td>(0.0071)</td>
<td></td>
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</tr>
<tr>
<td>Quebec</td>
<td>0.0096</td>
<td>0.0327</td>
<td>-0.0654</td>
<td>-0.0657</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0225)</td>
<td>(0.0220)</td>
<td>(0.0078)</td>
<td>(0.0901)</td>
<td></td>
</tr>
<tr>
<td>Male Labour Force Participation Rate</td>
<td>1.0667**</td>
<td>1.0673**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0519)</td>
<td>(0.0071)</td>
<td></td>
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<tr>
<td>R-squared Adjusted</td>
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<td>0.8290</td>
<td>0.8329</td>
<td>0.9648</td>
<td>0.9651</td>
</tr>
<tr>
<td>Sample Size</td>
<td>220</td>
<td>220</td>
<td>220</td>
<td>220</td>
<td>220</td>
</tr>
</tbody>
</table>

Notes: All regressions include year-specific effects. Standard errors are presented in parentheses. Standard errors are computed using the Newey-West covariance matrix with four lags. Variable definitions are provided in Table 1. Significance tests are done with one-sided alternative hypothesis, except for the unemployment rate and average remaining years of life. Double asterisk (**) denotes statistically significant at 5 percent level.
The magnitude of the effect of the replacement rate on participation rates depends on whether the controls for Quebec, the unemployment rate, and health status as well as the policy variables are included in the regressions. When only the time effects are included with the replacement rate in the regression, the coefficient estimate on the replacement rate is fairly large, $-0.4622$. However, when the other controls are added to the regression, that is, specifications (ii) and (iii), the coefficient estimates on the replacement rate were about $-0.24$. These estimates correspond to elasticity estimates of $-0.1515$, $-0.0793$, and $-0.0803$ for specifications (i) to (iii).

The coefficient estimates on the average replacement rate from the female regressions for the first three specifications in Table 3 were also negative. In addition, only the estimate from specification (ii) was not statistically significant. These estimates were slightly larger than those in Table 2: they lay between $-0.39$ (specification (ii)) and $-0.64$ (specification (i)). The coefficient estimates for the first three specifications in Table 3 produced elasticities of $-0.3446$, $-0.2101$, and $-0.2226$, which are much larger than the elasticities for males. However, when the male participation rates are added to the regressions the coefficient estimates for the replacement rate in Table 3 become positive, although they are not statistically significant at the 5 percent level of significance.

The dummy variable for Quebec had positive coefficient estimates in both the male and female regressions. However, this variable was only statistically significant in the male regressions. Since the percentage of women potentially eligible for QPP disability benefits has been smaller than the male proportion for most of the study period, the more stringent QPP eligibility criteria may not have had a large effect on the participation rates of older women in Quebec.

The dummy variables controlling for the periods of relaxed eligibility, that is, CPPELIG, QPPELIG1, and QPPELIG2, should all have negative coefficient estimates, since they should be associated with declines in participation rates as it becomes easier to qualify for benefits. For males, the estimates of CPPELIG did not always have the expected negative sign, but these estimates were statistically significant. In Table 3, the results for women are similar to those for men. The coefficient estimates for the variable controlling for the period of relaxed QPP eligibility between 1993 and 1997, QPPELIG1, had the expected negative sign in the regressions for men. However, only one of the estimates from specifications estimated for women had the expected negative sign. Finally, the coefficient estimates for the variable controlling for the early retirement provisions of the QPP had the expected negative sign and were statistically significant in most of the regressions in Tables 2 and 3.

The coefficient estimates for the variables controlling for Quebec and the three dummy variables controlling for periods of relaxed eligibility present a range of estimates for the effect of changes in eligibility criteria on participation rates. Some of these estimates did not support the hypothesis that looser eligibility rules decrease participation rates since they were not statistically significant or did not have the expected sign. This is in contrast to the empirical literature for the United States which uses micro data. For example, Gruber and Kubik (1997) found that as the screening process for Disability Insurance (DI) program applicants was made more stringent, that is, as rejection rates for the DI program increased, there were declines in the non-participation rates of older males as well as the number of applications for benefits. More recently, Kreider and Riphahn (2000) found in their study of the determinants of applications for DI benefits in the US that men were more influenced by changes in policy, such as changes in acceptance rates, but women responded more strongly to financial incentives rather than changes in acceptance rates. There is some support for Kreider and Riphahn’s findings in these regression results. Specifically, the regression results from this paper suggest that women’s
participation rates might be more sensitive to the level of benefits than men. For example, the replacement rate elasticities for women from specifications (i) to (iii) are between 2.16 and 2.64 times larger than the estimates for men. In addition, the regression results also suggest that changes in eligibility criteria may have a smaller effect on women’s participation rates.

The estimates in Tables 2 and 3 indicate that some aspects of the C/QPP disability programs may have a strong effect on labour force participation rates. In an effort to determine the magnitude of these effects, I used the regressions in Tables 2 and 3 to project what participation rates for older men and women would have been in absence of the C/QPP disability program in Canada between 1976 and 1997. Specifically, I used the regressions in column (2) from Tables 2 and 3 to project participation rates for older men and women. These two columns should represent the least upper bound for the effect of the C/QPP disability program on participation rates, since the other coefficient estimates for the replacement rate in Tables 2 and 3 tended to be larger than the estimates in column (2). I plot the actual and projected participation rates in Figure 1 for men and Figure 2 for women.

The projection in Figure 1 suggests that participation rates for older men would be higher in the absence of the C/QPP disability program. The largest difference between the actual and projected participation rates occurred in the mid-1990s. The narrowing of the gap between actual and projected participation rates between 1987 and 1994 can be attributed to the estimate of CPPELIG, which did not have the expected sign. Between 1976 and 1997, the labour force participation rate of older males fell by eight percentage points. The drop in the projected participation rate for older males, that is, the participation rates without the effects of the C/QPP

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**Figure 1**
Actual and Projected Participation Rates, Males Aged 45 to 64

![Graph showing actual and projected participation rates for males from 1976 to 1997.](image-url)
disability program, is much smaller: 2.7 percentage points. Taking the ratio of the drop in projected participation rates to actual participation rates suggests that 66.3 percent of the drop in male labour force participation rates during this period could be attributed to the C/QPP disability program. This is almost two times larger than the estimate (35 percent) Maki (1992) attributed to the C/QPP, using aggregate data for the period between 1975 and 1983.\textsuperscript{19} My estimates are also somewhat larger than the effects implied by Gruber (2000), but Gruber’s estimates were only short-run effects, that is, the effect of a change in benefits on new applicants. Gruber (2000) and Bound and Burkhauser (1999) both note that the long-run effects of a change in benefits may be much larger, since the higher benefit elasticity will also affect the behaviour of persons already on the disability rolls, which greatly exceeds the number of new beneficiaries.

The difference between the actual and projected participation rates for women in Figure 2 tended to be larger than the differences observed for men in Figure 1. This is consistent with the elasticity estimates for the replacement rate, which were larger for women. During the study period actual participation rates increased by 17.7 percentage points, but the projected participation rates increased by 24.4 percentage points. The difference between the projected and actual rates has also evolved differently over the study period. The projected participation rates for women tended to be about four to five percentage points more than the actual rates until 1984. Between 1984 and 1986, which includes 1984 — the year when the CPP disability program implemented its child-rearing drop provisions, the gap between projected and actual rates widened to 7.8 percentage points. The gap between the actual and projected rates for women narrowed between 1987
and 1989 because the dummy variable controlling for the relaxed CPP eligibility requirements did not have the hypothesized sign. However, after 1990 the gap between actual and projected participation rates began to widen dramatically; for example, the difference between actual and projected rates was between 11.4 and 11.8 percentage points during 1995 to 1997. This final period corresponds to the time when the replacement rates for benefits were at their highest. This suggests that if women’s participation rates were more sensitive to the level of benefits, there would be a greater impact on their participation rates during periods of high replacement rates.

CONCLUDING REMARKS

This paper estimated the effects of the C/QPP disability program on the labour force participation rates of older men and women. The regression estimates indicated, for the most part, that the “implicit” replacement rates of C/QPP disability benefits have reduced the participation rates of older persons in Canada. Furthermore, the estimates from this paper suggest that the C/QPP disability program has played a strong role in the decline in the labour force participation rates of older men in Canada since 1976. Specifically, as much as 66.3 percent of the decline in the participation rates of older males in Canada could be attributed to the C/QPP disability program. In addition, the results for older women also suggest that the C/QPP disability program has had a large affect on female participation rates.

Although these results indicate the C/QPP disability program has had a sizeable effect on the labour force participation rates of older men and women, most of these effects can be attributed to the benefits paid by the C/QPP disability programs. The empirical findings for the relaxed eligibility criteria in the C/QPP disability programs did not produce consistent results. For example, many of the estimates for the effect of the relaxed CPP eligibility criteria between 1987 and 1994 suggest that this period should be associated with an increase in participation rates. This is not consistent with the substantial growth in the number of the CPP disability program’s beneficiaries after the eligibility criteria were relaxed in 1987. This is unfortunate since it means there is still a large gap in our understanding of how these disability programs affect labour supply. There is clearly a need for more examination of the effects of the relaxed eligibility criteria on the labour supply of older men and women in Canada. Perhaps an examination of Canadian micro data may be able to fill in some of the knowledge gap regarding this dimension of the C/QPP disability program.

NOTES

This research was supported by the University of Toronto’s Connaught Fund New Staff Startup Grant. Please address correspondence to Michele Campolieti, Centre for Industrial Relations, University of Toronto, 121 St. George Street, Toronto, Ontario, M5S 2E8; email: campolie@chass.utoronto.ca. I am grateful to four anonymous referees for helpful suggestions.

1 Detailed discussions of this literature can be found in the recent surveys undertaken by Bound and Burkhauser (1999) and Haveman and Wolfe (1999).

2 Specifically, Gruber examined the effect of the $150 dollar per month increase in the flat rate portion of the CPP disability pension. In 1987, the flat rate portion of the CPP disability pension was increased to make CPP disability benefits comparable to QPP disability benefits.

3 During the same period the incidence rate for males increased from 4.28 per thousand to 6.23 per thousand (Canada Pension Plan Consultations 1996).

4 The breakdown of beneficiaries by age and gender for the CPP and QPP programs are only available beginning in 1971.

5 The reported percentages represent the number of beneficiaries in a demographic group of interest divided by the total number of beneficiaries in all demographic groups.

6 Currently, the earnings related portion of a disability pension is computed as 0.75*(Retirement Benefit). The retirement benefit, in turn, is computed as 0.25*(TPE/TNMC),
where TNMC is total number of months of contributions and TPE is total pensionable earnings, which is a function of maximum pensionable earnings, average yearly maximum pensionable earnings and the number of months of contributions in a year. Further details about the calculation of the disability pension can be found in HRDC (1998).

The CPP ended their period of relaxed eligibility to stem the growth of the disability pension program’s caseload in the second half of 1994 (Canada Pension Plan Consultations 1996).

This is best illustrated by a study where QPP adjudicators reviewed some CPP files. Using the QPP guidelines, the QPP adjudicators rejected 14 percent of the CPP grants and required additional information on another 44 percent of the grants before they could make a decision.

The percentage of women in Quebec eligible for QPP disability benefits continues to remain lower than the coverage rate in the CPP provinces.

CPP disability beneficiaries who choose to retire before 65 years of age see their benefits reduced by 0.5 percent per month for each month before 65 years of age that they claim, for a total reduction of benefits of 30 percent for those who claim at age 60.

I was unable to obtain benefit information by province except for the QPP program, which only operates in Quebec. In addition, data on benefit payments are not available by age or gender. As a result, the average benefits used in this paper are for all beneficiaries.

For example, if the average number of years of life remaining for a 60-year-old male is 19.35, the average age of death for this age group will be 79.35. There is an inverse relationship between mortality rates and the average remaining years of life, that is, as mortality rates decline the average remaining years of life increase.

The Newey-West covariance matrix was estimated with four lags and a Bartlett kernel. The number of lags was selected using the results in Newey and West (1994). Specifically, the number of lags is equal to 

$$\left[\frac{4 \cdot \left(\frac{7}{100}\right)}{2}\right]$$,

where \(\lfloor \cdot \rfloor\) denotes the integer part of the expression.

I am grateful to an anonymous referee for this point.

In an earlier version of this paper, I estimated a large number of specifications, which included a number of interaction terms between the average replacement rate and some of the policy variables and the remaining years of life. Although there was substantial variation in the size of the coefficient estimates for the average replacement rate, which were all statistically significant, the elasticities, at the means, for the replacement rate from these specifications were between –0.094 and –0.132.

I also estimated some alternative specifications, which allowed for interaction terms between the average replacement rate and the dummy variables controlling for the periods of relaxed eligibility criteria and the average remaining years of life for older women. The elasticity estimates, at the means, for the average replacement rate from these specifications were between –0.217 and –0.325.

To see if there were any differences in the estimates of the explanatory variables on participation rates between the CPP and QPP programs, I also ran the regressions by program, for both males and females. However, I had to exclude the policy variables, the control for Quebec and the year-specific effects (the time effects were modeled using a linear time trend) to estimate these regressions. The estimates from these regressions indicated that there were large differences in the parameter estimates between programs. In particular, the coefficient estimates for the replacement rate were always a great deal larger in the regressions that were run on the data from Quebec. A Chow test on the equality of the coefficient estimates between the CPP and QPP disability programs rejected the null hypothesis that the coefficients were equal between programs, for both males and females.

I also estimated, at the suggestion of a referee, the regression models with the employment rate as the dependent variable. Card and Riddell (1993) noted that Canadians are more likely to classify themselves as unemployed — rather than not in the labour force — than Americans, so there may be compositional differences in the labour force participation rates between Canada and the United States.

The results from the male regressions with the employment rate were very similar to those presented in Table 2, for example, the replacement rate elasticities for these regressions were between –0.082 (for specifications (ii) and (iii)) and –0.2262 (for specification (i)). The other controls in employment regressions had coefficient estimates that were also similar to those from the labour force participation rate regressions. Similar estimates were also observed in the regressions for females.

The estimates from column (2), from both Tables 2
and 3, were also smaller than the coefficient estimates discussed in notes 15 and 16.

Maki’s estimates from micro data suggest a very large effect of the C/QPP disability program on labour force participation rates. However, he does not summarize these results with elasticities, so it is difficult to make comparisons.

REFERENCES

DATA APPENDIX

The data used in this paper were obtained from the following sources:

Replacement Rate
The benefit data used in the numerator of the replacement rate were obtained from Statistics Related to Income Security Programs, Statistics, Trend Analysis and Result Measurements Planning and Strategic Studies, Human Resources Development Canada, December 1998.

The earnings data in the denominator were obtained from Employment Earnings, and Hours, Statistics Canada, Labour Division (various years).

Average Remaining Years of Life
Data on average remaining years of life were obtained from Life Tables, Canada and Provinces, Statistics Canada, Health Statistics Division (various years).

Unemployment Rate, Participation Rate, Employment Rate
Source: CANSIM database.

Data on CPP Beneficiaries


Data on QPP Beneficiaries