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Population Ageing and the Effective Age of Retirement in Canada

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Abstract

Although the population is living longer, the trend in most OECD countries is towards older workers to retire at an earlier age. If current trends persist, the negative labour supply shock generated by early retirement behaviour will intensify in the future with population ageing. To address this question in more details, this paper evaluates the potential economic cost of early retirement trends in Canada at the national and regional level in the context of population ageing. This exercise is done using a regional overlapping generations model. The paper's key findings indicate that the long run economic costs of early retirement, in term of unused production capacity are quite large. Consequently, the benefits of working longer could be substantial. For example, the marginal effect of working one more year would generate additional economic gains equivalent to 3.5% of real per-capita GDP in the long run, while achieving and maintaining an average retirement age at 65 would provide economic benefits of about 12% of real per-capita GDP. In addition, future labour market pressures would be reduced substantially. The effective age of retirement also varies quite significantly across region. Correspondingly, achieving an effective retirement age at 65 in all provinces would generate the largest long run economic gains to the provinces where the average retirement age is the lowest.

Résumé

Même si la population vit plus longtemps, les travailleurs ont tendance à prendre leur retraite plus jeune dans la plupart des pays de l'OCDE. Si ces tendances se poursuivent, l'effet négatif sur l'offre de travail généré par la retraite hâtive va s'intensifier dans le futur avec le vieillissement démographique. Cette étude examine le coût économique potentiel de la tendance à la retraite hâtive au Canada dans le contexte du vieillissement démographique, au niveau national et régional. Cet exercice est effectué à l'aide d'un modèle régional calculable à générations imbriquées. Les principaux résultats indiquent que le coût économique à long terme de la retraite hâtive en termes de capacité de production non utilisée est considérable. En conséquence, les gains économiques d'un départ à la retraite plus tardif pourraient être élevés. Par exemple, l'effet marginal de travailler une année supplémentaire entraînerait un gain économique correspondant à 3,5% du PIB réel par habitant, alors qu'une hausse de l'âge de la retraite à 65 ans entraînerait des gains d'environ 12% du PIB réel par habitant. De plus, les pressions futures sur le marché du travail seraient réduites de façons importantes.

1. Introduction

As documented in many studies, despite the substantial increase in longevity, the trend towards early withdrawal of older workers from the labour force has become more widespread in OECD countries.[1] A large body of research has identified alternative explanation for early retirement trend in OECD countries associated with both labour supply and demand factors.[2] On the labour supply side, incentive effects such as wealth, accrual rates, earnings test, taxes and defined-benefits versus defined-contributions employer pension systems would play a significant role in the retirement decision of older workers. On the labour demand side, the rising gap between the actual wage rate due to seniority and the marginal product of older workers is a factor that may provide incentives for firms to opt for early retirement instead of dismissals. Another possible factor is the increasing difficulty for older workers to find another job when they are unemployed, because of their shorter remaining labour market tenure.

Early retirement trends raises important public policy challenges as they reduce labour supply and output. Moreover, in the context of population ageing, the negative labour supply shock due to early retirement will intensify given that there will be more people in the 55-64 age group. According to the conventional view, population ageing may trigger important socio-economic, labour market and fiscal consequences in the future, as well as rising challenges for the financing of social security and health care.[3] Early retirement trend may in turn exacerbate the situation. In light of these challenges, many countries plan to adopt new policies to remove the disincentives to work for older workers.[4] According to the proponent of these policy reforms, the economic costs of early retirement in terms of output loss, reduced social security benefit payments and lower tax base are substantial.[5] However, too few studies have attempted to quantify the economic benefits of working longer. In addition, most of the analysis done so far has either used an accounting approach or partial analysis framework and have therefore not considered the general equilibrium implications of early retirement. Also to our knowledge, no study has examined so far the regional implications of raising the effective retirement age.

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[1] See for example, OECD (2002).
[2] For a summary of alternative theories, see for example, Herbertsson (2001).
[3] See for example, Group of Ten (1998) and OECD (2000) for a discussion on the potential economic consequences of ageing.
[4] For a summary of recent reforms across OECD countries, see for example, Casey et al. (2003).
[5] See for example, the arguments raised by Pestieau (2003).

To help address this question, this paper uses a computable general equilibrium model (CGE) with overlapping generations (OLG) to evaluate the economic impact of raising the effective retirement age by estimating the forgone benefits or reduction in "unused productive capacity" as proposed by Gruber and Wise (1999). These calculations also account for the fact that the Canadian population is ageing and that accordingly, the cost of early retirement is expected to increase during the demographic transition as the proportion of individuals 55-64 increases. Moreover, given that the average effective age of retirement in Canada differs quite substantially across region, the model also calculates the difference in the economic impact across regions.

It must be noted, however, that in this exercise, only the benefits of later retirement are considered. There may also be costs associated with working longer. For example, it can be argued that because of labour market rigidities, such as labour contracts with seniority clauses, some older workers could be paid above the value of their marginal product and therefore would be more costly for employers.[6] There are also costs associated with the retraining of older workers and in adaptability of workplace practices to accommodate older workers. These costs are not considered in this analysis. Therefore, the numbers presented here must be considered as an upper bound.

The paper is divided as follows. Section 2 presents some stylised facts on Canada's retirement trends and demographic pressures. Section 3 discusses some issues and evidence on the economic cost of early retirement. Section 4 presents the methodological issues by describing the regional CGE overlapping generations model used for the calculations and the main calibration parameters. Section 5 presents the main simulation results. Section 6 raises a few caveats. Finally, Section 7 draws some conclusions.

2. Some Stylised Facts on Canada's Retirement Trend and Demographic Pressures

Retirement Trends

In Canada, although the entitlement age for receiving old age security (OAS) pension benefits is 65, the average effective age of retirement is well below 65. To illustrate this point,

[6] See, for example, Haegeland and Klette (1999) using Norwegian data and Crépon *et al.* (2001) using French data who find that older workers are paid more relative to their productivity than younger workers. However, Aubert (2003) finds that these results may be biased because older workers are more likely to be found in less productive establishments.

[7] For more information on the methodology used to measure the age of retirement, see Gower (1997).

Chart 1 presents the average age of retirement in Canada for the period 1976 to 2003. As indicated in the chart, during the 1970s and early 1980s, the average age of retirement was near 65. It declined more or less steadily during the mid-1980s and 1990s, to achieve 60.9 in 1998, although it has increased slightly in recent years.[8]

The drop in 1986 and 1987 is likely explained by the lowering of the minimum age at which one could receive Canada/Quebec Pension Plan (CPP/QPP) retirement benefits. In addition, the significant drop which occurred during the second half of the 1990s is likely explained by the effect of cutbacks in the public sector and by the restructuring and downsizing in the private sector. Many establishments have provided early retirement incentive packages in their workforce adjustment strategy. Another indication that Canadians retire at a younger age is that according to the Labour Force Survey, 43% of people reported having retired before age 60 over the period of 1997-2000, compared to 29% over the period of 1987-1990.

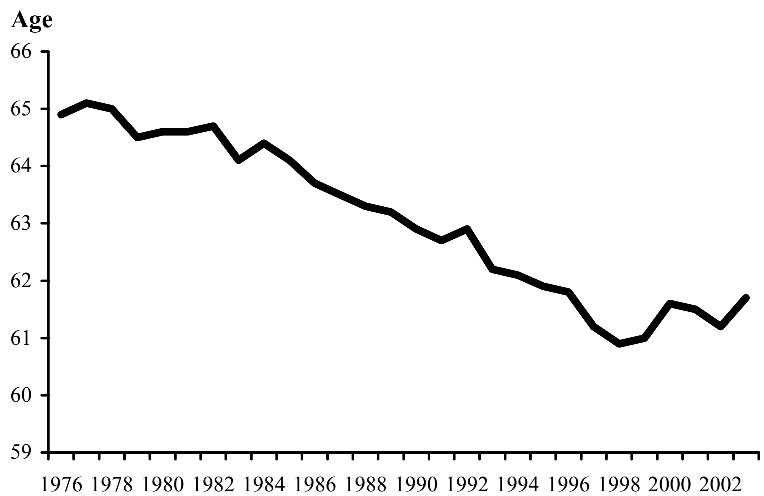
The effective age of retirement also varies quite significantly across workers by industry and occupation. The effective age of retirement remains very high across workers in occupations unique to primary industries, remaining around age 65. This is explained in good part by agriculture workers. Workers in professional and business services also retire at an older age compared to other industries. We also observe relatively higher retirement age in trades, transport & equipment operators occupations. By contrast, workers in public utilities, public administration and education industries and occupations tend to retire at a much younger age. These workers are usually covered by defined-benefit employer pension plans, which may explain the incentives for early retirement behaviour (see Tables A1 and A2 in Appendix).

Another way to look at early retirement trends is to examine the participation rate of older workers. Chart 2 presents the participation rate for age groups 55-59, 60-64 and 65+ for both sex. As can be seen, the participation rate for age groups 55-59 has remained fairly stable to about 60% until 1998 and has increased in recent years, although the situation between men and women differs drastically. For men, the participation rate has declined continuously until 1998, and the participation rate has risen since. For women, the participation rate has increased steadily since the 1980s. The evidence of early retirement trend is more evident among age groups 60-64, since the

[8] For more information on the methodology used to measure the age of retirement, see Gower (1997).

participation rate has declined by about 15 percentage points between 1976 and 1995. However, more recently the trend in the participation rate has reversed and the participation rate has regained more than half of the loss. The recent increase in the participation rate comes from both men and women. Finally, the participation rate for age groups 65+ has remained below 10% over the past 25 years.

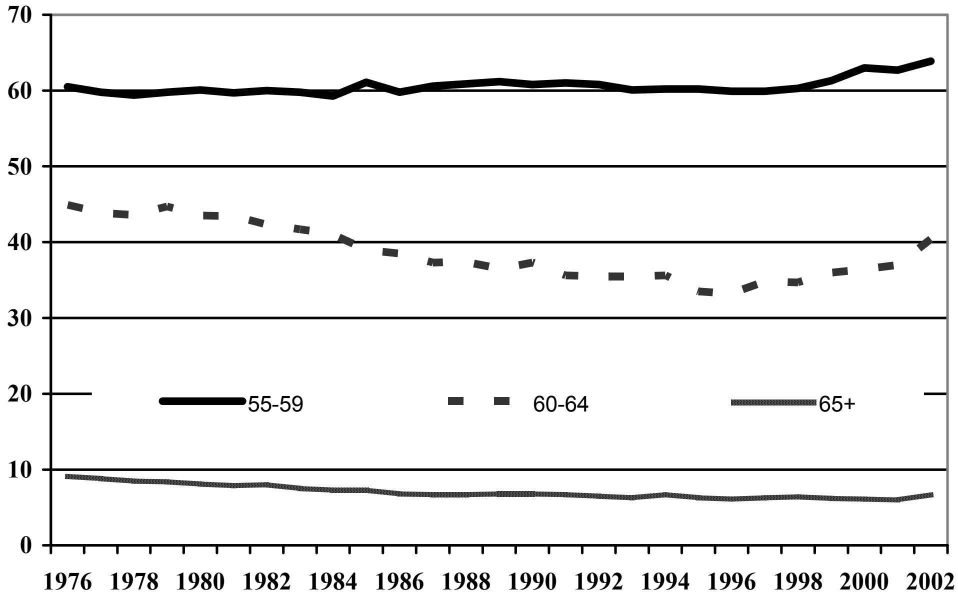
Chart 1
Average Retirement Age in Canada, 1976-2003



Source: Labour Force Survey

When we look at the provincial distribution of retirement age in Table 2, the numbers indicate that back in the 1970s, the median age of retirement was 65 across all provinces. However, since the 1990s, the median retirement age has come down very significantly in most provinces except for Alberta and Saskatchewan, whose retirement age has remained almost unchanged. The numbers for Saskatchewan are consistent with the fact that the median retirement age has remained very high across workers in the agriculture sector, the largest industrial sector in this province. By 2001, Quebec, Newfoundland and Nova Scotia had the lowest median age of retirement to about 60, followed by New Brunswick and PEI with near 61. Ontario and Manitoba have followed a similar trend and level, coming down to about 61. Finally, the median retirement age has come down only recently in British Columbia to 62.

Chart 2
Participation Rate of Older Workers, 1976-2002



Source: Labour Force Survey

Table 2
Median Age of Retirement by Province

	1976-1980	1991-1995	2001
Canada	**64.9**	**62.3**	61.2
Newfoundland	64.9	60.4	60.0
Prince Edward Island	65.2	62.3	60.8
Nova Scotia	65.0	60.7	60.3
New Brunswick	64.9	60.7	60.6
Quebec	64.9	61.1	59.7
Ontario	65.0	62.3	61.4
Manitoba	65.0	62.2	61.3
Saskatchewan	65.1	64.2	64.2
Alberta	64.9	63.0	64.4
British Columbia	64.8	64.1	62.3

Source: Labour Force Survey

Demographic Pressures

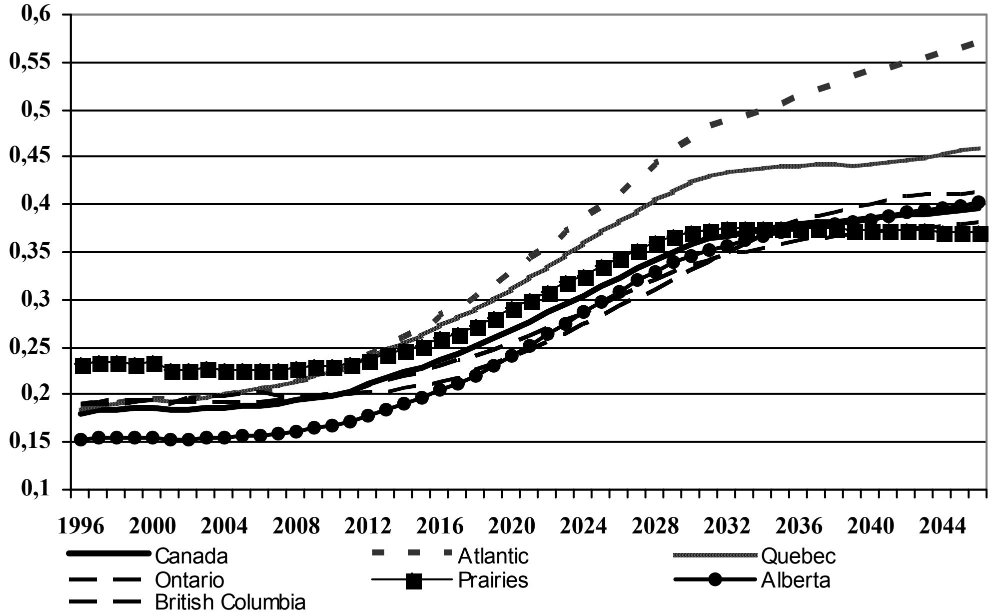
As indicated in introduction, the population in Canada is ageing rapidly because of low fertility rate and the increase in life expectancy. As a result, the elderly dependency ratio (ratio of the population aged 65 to the working-age population) is expected to at least double over the next several decades. Moreover, because of substantial differences in provincial fertility rates, the regional location of recent immigrants and interprovincial migration flows, the pace of demographic changes is expected to vary substantially across the Canadian regions.

Table 3
Main Demographic Assumptions

Province	**NF**	**PEI**	**NS**	**NB**	**Qc**	**Ont**	**Man**	**Sask**	**Alb**	**BC**
Fertility rate	1.21	1.56	1.42	1.45	1.47	1.53	1.81	1.81	1.70	1.45
Life expectancy (2044)										
Men	78	79	79	81	80	82	80	80	81	81
Women	82	85	85	85	85	86	84	86	84	85
Annual share of emigrants (% of Pop)	0.05	0.03	0.07	0.04	0.16	0.28	0.16	0.11	0.26	0.22
Annual share of new immigrants	0.21	0.07	1.04	0.35	14.3	55.4	1.85	0.80	6.26	19.6

To illustrate the difference in future demographic pressures by region, we have used the demographic model MEDS[9] to generate a demographic projection by province. The main demographic assumptions are presented in Table 3. Chart 3 presents the projected national and regional elderly dependency ratio over the period 1996 to 2046, while Table 4 compares the regional difference between 2000 and 2046. As indicated in the chart, Canada's elderly dependency ratio is expected to double over the next 40 years and the regional increase in the elderly dependency ratio is expected to vary considerably across regions over the same period. According to the calculations, the Atlantic region and the province of Quebec will experience the largest increase in the elderly dependency ratio, while Alberta will have the third largest increase, although its initial level in 2000 was well below the national average. In contrast, the Prairies and Ontario will come across a smaller increase in the elderly dependency ratio. Finally, the rising proportion of the older population in British Columbia is projected to be similar to the national average.[10]

Chart 3
Projected Elderly Dependency Ratio by Region in Canada



Mercenier and Mérette (2002) and Fougère *et al.* (2003) have shown that the long-term macroeconomic and regional disparity implications of population ageing are likely to be substantial in Canada. However, their analysis assumed that the effective retirement age in Canada is 65. Moreover, they did not account for the fact that the effective age of retirement differs quite sharply by province. In fact, according to the numbers shown in Table 2, accounting for the regional difference in effective retirement age would likely generate a much larger negative impact on regional income disparity in the future.

Table 4
Regional Elderly Dependency Ratio, 2000-2046

Region	Canada	Atlantic	Quebec	Ontario	Prairies	Alberta	BC
2000	0.19	0.19	0.19	0.19	0.23	0.16	0.19
2046	0.40	0.57	0.46	0.38	0.37	0.40	0.41
Difference	0.21	0.38	0.27	0.19	0.14	0.24	0.22

[9] See Models of economic-demographic system (MEDS), Research Institute for Quantitative Studies in Economics

3. The Economic Cost of Early Retirement: Issues and Recent Evidence

As mentioned in the introduction, early retirement trends are a serious concern in the context of population ageing, given that the proportion of older workers will significantly increase and intensify the negative labour supply effect of early retirement. For example, according to our demographic projection, the proportion of the population aged 55-64 is expected to move from 9.2% of the total population in 2000 to 14% in 2020, before stabilizing to about 13% in the long run. Gruber and Wise (1999) emphasize the implications of the withdrawals of older employees in terms of forgone productive capacity. By reducing labour supply, early retirement decreases the level of output, thereby reducing the resources available for consumption. It also results in a reduction of the labour income tax base to finance personal income taxes and social security contributions, such as the Employment Insurance System and Canadian/Quebec Pension Plans, thereby lowering public savings.

There are many factors that may explain the trend in early retirement behaviour. An important economic incentive to early retirement is rising wealth and increased preference for leisure. A number of studies have also indicated that institutional factors, such as the set up of pension systems in OECD countries may provide incentives for early retirement.[11] If indeed, social security systems provide a distortion to the labour-leisure choice by creating incentives for early retirement, the induced reduction in the labour supply is sub-optimal.

There is, however, mixed evidence that the Canadian public pension system provides significant incentives for early retirement. For example, Canadian residents are entitled to receive Old Age Security pensions at age 65. They can receive CPP/QPP benefits at the age of 60 but with a penalty. Baker *et al.* (2003) provide an empirical analysis of the retirement incentives of the Canadian Income Security system and find that the work disincentives inherent in the Canadian Income Security system have significant impacts on retirement. On the other hand, Compton (1998) concludes that limited changes to CPP/QPP benefit levels will not have a large impact on the labour force behaviour of older workers. This finding is also supported by Maloney *et al.* (2003).

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and Population, McMaster University, Hamilton.

[10] For more information on Canada's demographic trends, see for example, Statistics Canada (2001, 2003).

[11] See for example, Blöndal and Scarpetta (1998) and Gruber and Wise (1999).

There are also costs associated to later retirement. First, in a life-cycle framework, it can be argued that by working longer, household do not need to save as much for retirement purposes. As a result, later retirement may lead to lower private savings. In addition, as mentioned in introduction, it can be argued that because of labour market rigidities, such as labour contracts with seniority clauses, older workers are paid on average above the value of their marginal product and therefore are more costly for employers. For example, in a case-study with two large US corporations, Medoff and Abraham (1981) have found that more experienced workers have higher than average salaries and their earnings differential cannot be explained by productivity. Also, Flabbi and Ichino (1998), Haegeland and Klette (1999) and Crépon *et al.* (2001) using Italian, Norwegian and French data files, respectively, support Medoff and Abraham's findings. However, Hellerstein, Neumark and Troske (1999) and Aubert (2003) do not support these conclusions. In fact, Aubert (2003) argues that the lack of a strong relationship between earnings and productivity for older workers found in previous studies may be biased because older workers are more likely to be found in less productive establishments.

Another cost associated to later retirement is that in the context of technological changes and innovation, maintaining an older workforce productive can be costly for individuals and firms who will need to invest in the retraining of older workers. The return to investment in marketable skills tends to decline with age as the period over which the benefits of increased productivity becomes shorter. An additional cost associated to firms is that they may have to adapt workplaces through more flexible work arrangements to retain older workers and to adjust to the needs and abilities of their ageing workforce.

To our knowledge, very few studies have attempted to quantify the cost of early retirement or the benefits of working longer from an economic point of view. Among the few studies available, Gruber and Wise (1999) compare the labour force participation of older workers across countries and refer to this measure as the unused productive capacity at that age. They note, for example how enormous the difference in unused productive capacity is across fairly similar industrialized countries, in terms of labour force participation reduction. It would range from 23% for Japan to 67% in Belgium. Gruber and Wise's finding provides a useful indication about the potential magnitude but does not offer an estimate in terms of real output or income loss. In addition, the exercise does not account for the fact that the cost of early retirement will increase with an ageing workforce.

Hviding and Mérette (1998) have used overlapping generations models for seven OECD countries to investigate the macroeconomic impact of possible pension reform strategies to deal with an ageing society. Among the scenarios examined, they evaluate the option of raising the retirement age from 64 to 68 for all seven countries. Their results indicate that there are potential significant macroeconomic gains associated with a rise in the retirement age. A four-year increase in the retirement age would generate a real GDP per-capita gain ranging from 11.6% for Italy to 5.7% for the US by 2050. The long-run impact averages 7% for Canada. However, in their calibration, they assume that the effective retirement age in Canada is 64 in their baseline solution, although it is 61 and varies by province. In addition, the net marginal effect of raising the retirement age after age 64 may not be the same than after age 61 if the profile of labour productivity varies by age and eventually declines after reaching a certain age. Finally, Hviding and Mérette do not present an evaluation of the impact of raising the retirement age at the regional level for Canada.

More recently, Herbertsson and Orszag (2001) developed a simple framework to measure the unused productive capacity associated with early retirement by taking account of wages and incorporating the effect of increased employment on wages. Using this simple approach, they assess the economic cost of early retirement in OECD countries. For example, they estimate that as a share of potential GDP, the cost of early retirement was 6.3% in 1998 on average in the OECD, 6.7% in Canada, and 4.7% in the US. One weakness about using this approach is that for simplicity, the authors assume that there is no capital income. It also uses a partial equilibrium framework and therefore does not account for possible interaction effects, coming from savings, wealth, the capital stock and productivity. Finally, the analysis does not account for projected changes in the demographic structure of the population which will substantially influence the economic impact of early retirement decisions.

Rowe and Nguyen (2003) use the dynamic microsimulation model called LifePaths, calibrated on the Canadian Census, to examine the impact of early retirement from the perspective of forgone earnings. They look at two scenarios: delaying retirement by one year and delaying retirement until age 65. These scenarios are examined under alternative assumptions. The first is that older workers who delay retirement experience normal labour market transitions during the delay. The alternative assumption is that they are exempted from job loss during the delay. The results indicate that the job prospects have a large impact on family earnings potential. For example, with normal job loss probability, the median forgone earnings when delaying retirement by one year is $17,000 per household compared to $25,000 with no job loss probability. When retirement is delayed to age 65, the median forgone earnings achieves $72,000 per household with normal job loss probability and $176,000 with no job loss probability. Rowe and Nguyen provide valuable information on forgone earnings but the approach used remains an accounting framework. It does not capture the economic and general equilibrium effects of raising the retirement age on real per-capita income and GDP.

Verma and Rix (2003) use a macroeconometric model[12] of the United States to simulate the impact of raising the retirement age. In their initial scenario, they assume that the labour force participation rate for persons aged 65 and over is 15.4% by 2029 as projected by the Bureau of Labor Statistics (BLS). In the shock scenario, they assume that by 2029, the participation rate of older workers returns to the level reached in 1950 of 26.7%. The simulations reveal that the rise in retirement age has a substantial positive impact on macroeconomic variables. For example, real GDP rises by more than 10% by 2029, compared to the initial scenario. Gross private savings, labour productivity and compensation per hour also rise. The long-run equilibrium properties of the model used by Verma and Rix are derived from the neoclassical paradigm. However, the transmission effect of changes in the demographic structure to savings, consumption, wealth and physical capital works indirectly in this model since it does not use an overlapping generations framework. Therefore, the long-run effects of ageing on productivity, savings and wealth and their induced effects on real per capita income in the model are questionable.

Finally, the Policy Research Initiatives (2004) provides long-term simulation scenarios of the impact of population ageing on total hours worked using Lifepaths. Their analysis indicates that by extending the working life to all workers by 3 years, average annual hours worked would increase by about 6% by 2025, relative to a situation with no policy change.

[12] Macroeconomic Advisors, LLC (MA) econometric model.

4. The Regional CGE Overlapping Generations Model

The model is dynamic and represents the economy of Canada. The structure of the model is based on a regional OLG model developed by Mercenier and Mérette (2003) for Human Resources Development Canada. The model used in this paper is composed of six regions: the region of the Atlantic (Newfoundland, Prince-Edward Island, Nova Scotia and New Brunswick), Quebec, Ontario, the Prairies (Manitoba and Saskatchewan), Alberta and British Columbia. In the model, each region produces one differentiated good, that is a good imperfectly substitutable with other regions' production good and is very open to trade with the other regions. In response to the demographic shock, the Canadian economy responds like a closed economy. This assumption is tolerable since the projection of demographic changes in Canada over the next 50 years is similar to that in other OECD countries.[13]

There are four types of economic agents in each region: a representative firm, one household per age group, six regional and one national governments. The model has six final goods, two factors of production (physical capital and labour), and two financial assets (bonds and capital ownership titles). The model can be separated into several sets of equations relating to the production sector, household behaviour, the government sector and the aggregation and equilibrium conditions. For model description, subscript t corresponds to time period, j for region and g for age groups.

The production sector

The representative firm produces the unique regional good. Its production technology is represented by a Cobb-Douglas function. The regional firm hires labour and rents physical capital. Labour and physical capital are assumed to be immobile across regions, which implies that there is one market for labour and capital in each of these two factors of production in each region. The model's production and investment technologies also differ across regions. Physical capital is a composite good of the six regional final goods. The investment technology is represented by a constant elasticity of substitution (CES) function.

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[13] Fougère and Mérette (1998) have examined the macroeconomic impact of ageing in Canada and six other OECD countries under the closed versus small-open economy assumptions. Given that the anticipated US demographic shock is roughly similar than in Canada, their analysis shows that the simulated economic impact is roughly the same under both assumptions.

The regional economy's production is represented by a Cobb-Douglas function where $Y_{j,t}$ represents the output of region j at time t, K is the capital stock, L the effective labour force and A the scaling variable.

$$(1) \qquad Y_{j,t} = A_j K_{j,t}^{\alpha_j} L_{j,t}^{1-\alpha_j}$$

Firms in each region hire labour and rent physical capital to produce output and operate in a perfect competition market. Factor demand and output are determined by the following conditions for profit maximisation:

$$(2) \qquad \frac{re_{j,t}}{P_{j,t}} = \alpha_j A_j \left(\frac{K_{j,t}}{L_{j,t}} \right)^{\alpha_j - 1} \quad ,$$

$$(3) \qquad \frac{w_{j,t}}{P_{j,t}} = (1-\alpha_j) A_j \left(\frac{K_{j,t}}{L_{j,t}} \right)^{\alpha_j} \quad ,$$

where *re* is the rental rate of capital, w the wage rate per unit of effective labour and P the output price. The regional capital stock (K) is determined as follows:

$$(4) \qquad K_{j,t+1} = Inv_{j,t} + (1-\delta_j) K_{j,t} \quad ,$$

with *Inv* representing investment and δ the depreciation rate of capital.

Household Behaviour

Each region in the model is represented by 15 representative native households, one per age group corresponding to 4 years. An Allais-Samuelson overlapping generation framework also characterises the household's dynamic, with 15 generations living side by side in each period. At any new period, a new generation is born and the eldest one dies. Each native individual enters the labour market at the age of 17 and dies at the age of 77. Younger individuals are assumed to be dependent on their parents. The population growth rate is treated as exogenous.

Each generation optimises a CES type inter-temporal utility function of consumption and bequest subject to lifetime income. The household's optimisation problem consists of choosing the consumption and savings pattern. Savings can be allocated between domestic physical capital ownership titles or regional bonds issued by regional governments. Similarly, consumption expenditures are allocated toward the six available final goods accordingly to households' preferences represented by a CES function.

(5) $$U = \frac{1}{1-\theta}\sum_{g=1}^{15}\left(\frac{1}{1+\rho}\right)^{g}(C_{j,g,t+g-1}^{1-\theta} + \beta_g^{\theta} Beq_{j,g,t+g-1}^{1-\theta}) \quad , 0 < \theta > 1, \beta_{g\neq 15} = 0, \quad \beta_{g=15} > 0 \quad ,$$

where $C_{j,g,t}$ is consumption of an individual in region *j* of age group *g* at time *t*. *Beq* is bequest, ρ the pure are of time preference and θ the inverse of the inter-temporal elasticity of substitution. β is a constant parameter. Since labour supply is assumed exogenous, leisure does not enter the utility function.

Assuming no borrowing constraints and perfect capital markets, the present value of household wealth *W* is the discounted sum of lifetime labour income after deduction of taxes, deduction of public old-age pensions *pens* and inheritance *inh*.

(6) $$W = \sum_{g=1}^{15}\left(\frac{1}{1+ri_{t+g-1}(1-\tau_k)}\right)\left[Y_{L,g,t+g-1}(1-\tau_{w,j,t+g-1} - c_{P,t+g-1}) + inh_{g,t+g-1} + pens_{g,t+g-1}\right] \quad ,$$

where Y_L is labour income, *ri* is the rate of interest, τ_K the tax rate on capital income τ_W the tax rate on labour income and c_P the public pension plan contribution rate. Labour income depends on the individual's productivity or earnings profile *E* which is defined as a quadratic function of age. It is also assumed to be identical across region. The parametric values are chosen to approximate observed earnings profile by age to ensure that the maximum earnings is reached between mid-life and retirement, or around age 52. After age 52, earnings decline slightly until retirement is reached.[14]

(7) $$E_g = \gamma + \lambda g - \psi g^2 \quad , \gamma, \lambda, \psi \geq 0 \quad .$$

Labour income of an individual age group is defined as :

[14] As mentioned in the previous section, we are aware that there is no consensus in the literature about whether changes in the earnings profile by age reflects changes in labour productivity. This issue remains an important caveat.

(8) $$Y_{L,j,g,t} = w_{j,t} E_g \quad , g = 1,2, \ldots,12.$$

Pension benefits of the retirees are a fraction of their average labour earnings. The fraction is determined by the public pension replacement rate *repl* that applies identically across Canada. Pension benefits are thus equal to:

(9) $$Pens_{j,gm,t} = repl \frac{1}{12} \sum_{gj} w_{j,t-14+gj} E_{gj} \quad , \; gm = 13, 14, 15 \; , gj = 1,2,\ldots,12$$

The first-order condition for consumption and bequest can be defined as follows:

(10) $$C_{j,g+1,t+g} = \left[\frac{(1 + ri_{t+g}(1-\tau_K))}{(1+\rho)} \frac{P_{C,j,t+g-1}}{P_{C,j,t+g}} \right]^{(1/\theta)} C_{j,g,t+g-1} \quad ,$$

(11) $$Beq_{j,g,t} = \beta_g C_{g,t} \quad .$$

Bequest is distributed at the end of each generation's lifetime. Inheritances arising from the oldest age group's (g=15) bequests are assumed to be equally distributed to all working generations.

(12) $$Inh_{j,gj,t} Pop_{j,gj,t} = \frac{1}{12} Beq_{j,gn,t} Pop_{j,gn,t} \quad , gn = 15 \; ,$$

where $Pop_{j,g,t}$ is the number of people living in region j of age group g at time t. The population growth rate is treated as exogenous.

The next step in the optimisation problem is for household to allocate their consumption expenditures across the six different final goods. A CES function is used to represent the inter-regional household preference. In the first-order conditions, a final goods produced in region i and consumed by an individual in region j ($ConI_{i,j,g}$) is determined by:

(13) $$ConI_{i,j,g} = \mu_{C,i,j} \left(\frac{P_{C,j}}{P_i} \right)^{\sigma_{C,j}} C_{j,g} \quad ,$$

where P_c is the price of consumption, μ_c is a preference parameter for resident of region j for goods produced in region i and determines the regional distribution of total consumption, and σ_c is the inter-regional consumption elasticity of substitution when all prices are equal.

The price of consumption is determined by a non-linear weighted average of local prices and also depends on the preferences parameters.

$$(14) \qquad P_{C\,j}^{(1-\sigma_C,j)} = \sum_j \mu_C P_i^{(1-\sigma_{C,j})} \quad .$$

The financial market is considered perfectly integrated across regions. This means that financial capital is perfectly mobile across regions and the interest parity condition applies. Rates of returns on savings are thus perfectly identical across regions. The model assumes perfectly competitive markets and perfect foresight agents. Moreover, output prices are flexible, so combined with the assumption of regional differentiated good, relative output prices act as if there were flexible exchange rate across regions. It is also assumed that regional physical capital is entirely detained by local residents and that the holding of bonds is also but not entirely characterised by home bias.

A CES function describes the investment technology. The composition of regional investment is then defined as:

$$(15) \qquad Einv_{i,j} = \mu_{Inv,i,j} \left(\frac{P_{Inv,j}}{P_i} \right)^{\sigma_{Inv,j}} Inv_j \quad ,$$

where μ_{Inv} is a parameter in the CES investment technology and σ_{Inv} is the corresponding elasticity of substitution.

The price of investment is defined as :

$$(16) \qquad P_{Inv,j,t}^{(1-\sigma_{Inv,j})} = \sum \mu_{Inv,i,j} P_{i,t}^{(1-\sigma_{Inv,j})} \quad .$$

As bonds and capital share are assumed perfect substitutes, expected returns on bonds equal expected returns on capital shares. Moreover, financial capital is assumed perfectly mobile across Canadian regions, and an interest parity condition ensures that the interest rate is unique across regions. In equation 17, the unique rate of interest *ri* is expressed as being equal to the rental return on capital *re* minus the depreciation rate plus the capital gains, and this, for all regions *j*:

$$(17) \qquad ri_t = \frac{re_{j,t} + (1-\delta_j)P_{Inv,j,t}}{P_{Inv,j,t-1}}, \quad \forall j \ .$$

The Government Sector

Governments issue bonds to finance their public debt and to satisfy their budget constraint. They tax labour income, capital income and consumption expenditures and spend on public expenditures, health care, education and interest payments on the public debt. The national government also manages the public pension system, which is represented by a simple pay-as-you go pension scheme and financed by contribution rates on labour income. Since the pension program is national, the contribution rate is the same in each region.

The government budget constraint is defined as:

$$(18) \qquad \begin{aligned} &P_{j,t}Bond_{j,t+1} + \sum_g Pop_{j,g,t}(\tau_{w,t}(w_{j,t}E_g + Pens_{j,g}) + \tau_{C,t}P_{C,j,t}C_{j,g} + \tau_{K,t}\sum_i ri_t Lend_{i,g,t}) \\ &= P_{j,t}(Gov_{j,t} + GovH_{j,t} + GovE_{j,t}) + ri_t P_{j,t-1}Bond_{j,t} \end{aligned}$$

Where, τ_c is the effective tax rate on consumption, *Lend* is the stock of wealth accumulated by households, *Gov* is public expenditures, *GovH* health care spending and *GovE* education spending. Pay-as-you-go pension benefits are financed by contribution rates on labour income. The pension program is represented by the following equation:

$$(19) \qquad \sum_{gm} Pop_{j,gm,t}Pens_{j,gm,t} = c_{P,t}\sum Pop_{j,gj,t}E_{j,gj}w_{j,t} \quad , gj = 1,2,\ldots 12 \ , gm = 13,14,15$$

where c_P is the national contribution rate for the pay-as-you-go program.

Market and Aggregation Conditions

The model assumes that all markets are perfectly competitive. There are 6 goods markets in the model. The equilibrium condition for the goods market states that each regional output must be equal to total demand:

$$(20) \quad Y_{j,t} = \sum_{i}(EC_{j,i,t} + EInv_{j,i,t}) + Gov_{j,t} + GovH_{j,t} + GovE_{j,t} \quad .$$

Labour and physical capital are immobile across regions, so a market exists for these two production factors in each region. The stock of effective labour is the number of individuals times their corresponding productivity level:

$$(21) \quad L_{j,t} = \sum_{gj} Pop_{j,gj,t} E_{gj} \quad .$$

The regional markets for regional assets are fully integrated and supply must equal demand for Canada:

$$(22) \quad \sum_{j,g} Pop_{j,g,t} Lend_{j,g+1,t+1} = \sum_{j} P_{j,t} Bond_{j,t+1} + P_{Inv,j,t} K_{j,t+1} \quad .$$

Calibration

The computable general equilibrium model compares two states of the six regional economies in the context of an ageing population, according to alternative assumptions on the average retirement age across regions. To accomplish the comparison we first need to generate an initial steady state equilibrium with constant demographics by calibrating the parameters of the model to replicate what is observed in the data. Since the model is dynamic, the initial equilibrium is in fact a steady state that repeats every period and where the population structure of 2001 remains forever and the effective retirement age is unchanged from current level. A demographic shift is then introduced in the simulation experiments according to the assumptions made in the demographic model. The state of the regional economies will thus change in comparison to the initial steady state. The impact of alternative effective retirement age is compared with a base case scenario of population ageing.

Table 5 reports variable and parameter values that are imposed in the calibration procedure. The inter-temporal elasticity of substitution is assumed to be the same across regions and consistent with values found in the literature. The intra-temporal elasticity of substitution is also assumed identical across the different types of consumption and investment demands and across regions. The value of this parameter is relatively high with respect to the literature to compensate for the fact that Canada is considered in the model as a closed economy.

A matrix of interregional flows is calculated between the six regions and serves to estimate the ownership distribution of wealth (physical capital plus government bonds) across individuals and regions. It is assumed that regional physical capital is owned by regional residents first. This means that residents have a stock of wealth composed of local physical capital ownership titles plus bonds issued by local and outside regional governments. Given this interregional date and the above parameter values, regional rate of time preference was calibrated as to ensure equilibrium in the Canadian financial asset market. For simulation purposes, the general equilibrium of the economy is replicated over the 100 period horizons. The length of horizon is determined to ensure that after the demographic projected shift the economy converges to a long-run steady state.

Table 5
Calibration Parameters

Region	Atlantic	Quebec	Ontario	Prairies	Alberta	BC
Regional Share of GDP	.062	.217	.387	.070	.137	.128
Share of capital in production	.278	.280	.280	.324	.324	.270
Wage income tax rate	.318	.374	.313	.295	.304	.318
Capital income tax rate	.382	.478	.562	.407	.384	.446
Consumption tax rate	.234	.219	.200	.193	.137	.199
Public Health Care/GDP	.077	.066	.053	.066	.045	.070
Public Education/GDP	.060	.052	.032	.039	.041	.045
Government debt	.421	.431	.288	.226	.018	.110
Intertemporal elast. of substitution	1.0	1.0	1.0	1.0	1.0	1.0
Elast. of substitution for consumption	9.0	9.0	9.0	9.0	9.0	9.0
Elast. of substitution for investment	9.0	9.0	9.0	9.0	9.0	9.0

Assumptions on the Effective Retirement Age

As indicated in Table 6, in the baseline solution, we assume that the effective retirement age remains constant in the future to its 2001 level reached at the regional level. Scenario 1 estimates the marginal effect of raising the effective age of retirement by one year in each region. Scenario 1 implies that the effective age of retirement in the province of Alberta is 65.4. Scenario 2 assumes that the effective age of retirement is 65 in all provinces. The difference between the solution in Scenario 2 and the baseline simulation also provides a quantitative estimate of the cost of early retirement at both the national and regional level.

Table 6
Baseline and Alternative Assumptions on the Effective Retirement Age

	Baseline	Scenario 1	Scenario 2
Canada	61.2	62.2	65.0
Atlantic	60.0	61.0	65.0
Quebec	59.7	60.7	65.0
Ontario	61.4	62.4	65.0
Prairies	63.0	64.0	65.0
Alberta	64.4	65.4	65.0
British Columbia	62.3	63.3	65.0

5. Simulation Results

We first present the simulation results of the baseline solution at the national level for the main macroeconomic indicators. The main results at the national level are summarised in Table 7. As seen in the table, according to the OLG model, the simulated future demographic changes may lead to large negative effects on real per-capita GDP and income in the long run. According to the baseline solution, real per-capita GDP will decline by more than 14% by 2050 compared to a situation without demographic changes. The large real GDP per-capita decline is explained by two main factors. The first is the declining share of the working-age population and the rising proportion of older people which generates a negative labour supply shock. This is exacerbated by the fact that the average worker retires earlier (age 61 compared to 65 during the late 1970s).

The second factor leading to the real GDP fall is the negative implications of ageing on national savings and investment. According to the results, the ratio of total investment to GDP declines by 10 percentage points by 2050. The sharp decline in investment is the result of slower growth in effective labour, which reduces the needs for new investment to equip workers. The decline in savings and investment is also consistent with the life-cycle theory of savings, which predicts a decline in savings. The rising proportion of the retired population reduces both public and private savings through a shrinking of the tax base and the dissaving behaviour of retired households. In the long term, lower savings and investment lead to a lower stock of physical capital.

The results also indicate that the negative contribution of ageing to real per-capita GDP begins rapidly, coming very gradually at first but increasing pace over the longer term. This is because over the next 15 years, a large proportion of baby-boomers are in the 40-55 age groups, which according to the model calibration is the most productive working-age period.[15] Initially, this helps to partially offset the negative impact on real GDP.

Table 7
Baseline Scenario
% Shock minus Control
(National Level)

	Real GDP per Capita	**Investment/ GDP (% point)**	**Real Wage Rate**		**Real Return to Capital**
			Before Tax	**After Tax**	
2002	-0.3%	0.0%	0.0%	0.0%	0.0%
2006	-0.5%	-0.5%	0.4%	0.4%	-0.2%
2010	-0.9%	-1.1%	0.9%	0.8%	-0.2%
2014	-1.4%	-1.8%	1.4%	1.2%	-0.3%
2018	-2.1%	-2.6%	1.9%	1.6%	-0.4%
2022	-3.1%	-3.5%	2.4%	1.7%	-0.4%
2026	-4.3%	-4.4%	2.9%	1.7%	-0.5%
2030	-5.6%	-5.3%	3.3%	1.5%	-0.5%
2034	-7.1%	-6.2%	3.5%	0.9%	-0.5%
2038	-8.7%	-7.2%	3.5%	0.0%	-0.5%
2042	-10.5%	-8.1%	3.4%	-1.2%	-0.4%
2046	-12.4%	-9.1%	2.8%	-2.9%	-0.2%
2050	-14.3%	-10.0%	1.9%	-5.1%	0.0%

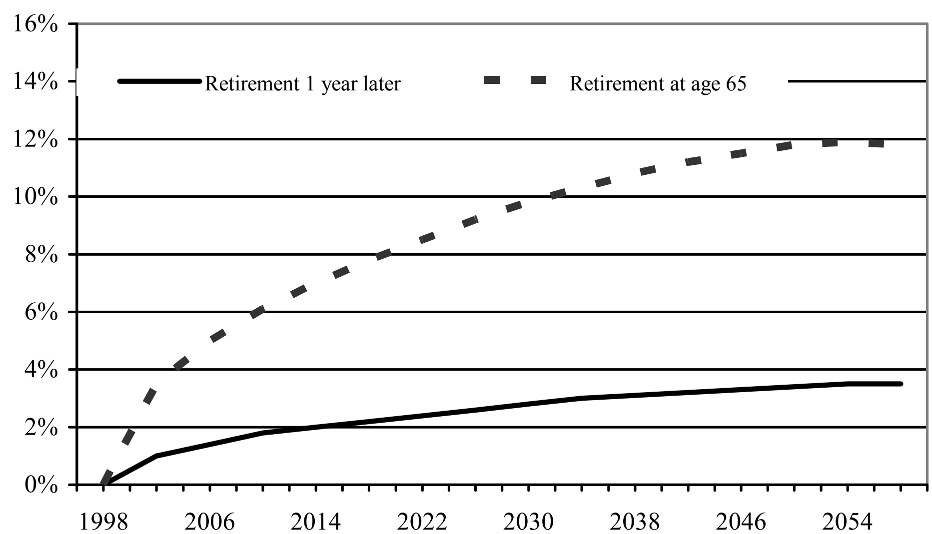
In addition, increased labour demand pressures lead to a real wage increase. Real before-tax wage rates increase by 3.5% by 2034, but the effect on wages diminishes overtime. Real after-tax wages also increase but at a slower pace, peaking to 1.7% by 2026. The induced fiscal pressures associated with ageing lower the labour income tax base and taxes have to rise to

[15] These results are consistent with the economic literature who used OLG models to explore the consequences of population ageing. See for example, Auerbach and Kotlikoff (1987) and Auerbach *et al.* (1989).

maintain the public debt-to-GDP ratio constant. This leads to a reduction in the growth rate of real after-tax wage rates in the long run. The real interest rate declines by about 50 basis points over the long term at an annual rate, as a result of physical capital becoming relatively more abundant.

Chart 4 presents the marginal effect on real per-capita GDP of raising the retirement age by one year, from 61.2 to 62.2, at the national level compared to the baseline solution. It also provides an estimate of the economic impact in term of the real per-capita GDP gain from raising the retirement age to 65 compared to 61.2 in the baseline solution. As indicated in the Chart, the marginal effect of raising the retirement age by one year generates a real per-capita GDP effect of about 3.5% by 2050, which is substantial. Also as can be shown, initially the effect is small, but grows overtime as the proportion of the age group 60-64 increases with ageing. Alternatively, when the effective retirement age is raised to 65, the real per-capita GDP gain achieves 12% over the long term in Canada. It can also be shown that achieving an effective retirement age of 65 would more than fully offset the negative impact of ageing for at least the next 35 years, compared to a situation where the retirement age remains unchanged from current levels. Finally, this estimate is larger but consistent with the estimates presented for Canada by Hviding and Mérette (1998) and by Herbertsson and Orszag (2001) with a simpler approach and for the United States by Verma and Rix (2003).

Chart 4
Real per-capita GDP Effect of Raising the Retirement Age in Canada
% Shock-minus-control impact



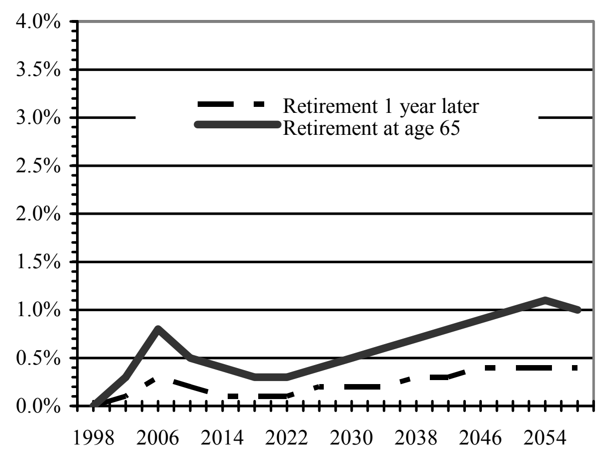
Another positive implication is that the shock leads to an increase in national savings (see Chart 5). The positive impact on national savings is explained by very favourable fiscal effects associated with working longer. In these simulations, we assume that the government maintains the debt-to-GDP constant relative to the baseline level and adjusts wage-income taxes accordingly. This leads to a substantial decline in wage–income tax rates over the simulation period compared to the baseline and stimulates private savings. Alternatively, we could examine a scenario where the government maintains taxes constant and uses the extra revenue to lower the debt-to-GDP ratio. Under this alternative scenario, the net effect on national savings would likely be of similar magnitude, except that we would observe a rise in public savings rather than in private savings.

The impact on real wages is also interesting. In a standard comparative static analysis, the rise in labour supply associated with the rise in retirement age would lead to a decline in real wages. As shown in Chart 6, when we look at the impact on real wages before tax, wages fall initially over the first 15 to 20 years as the standard comparative static would suggest. However, over the long-term the rise in national savings leads to an increase in wealth and the capital stock. This in turn results in an increase in real wages before-tax. Finally, when we account for taxes, real wages after-tax begin to increase by 2006 and continue to rise after 2050.

Chart 5
National Savings Rate

Chart 6
Real Wage Rate

Alternative Scenarios Relative to Baseline Solution



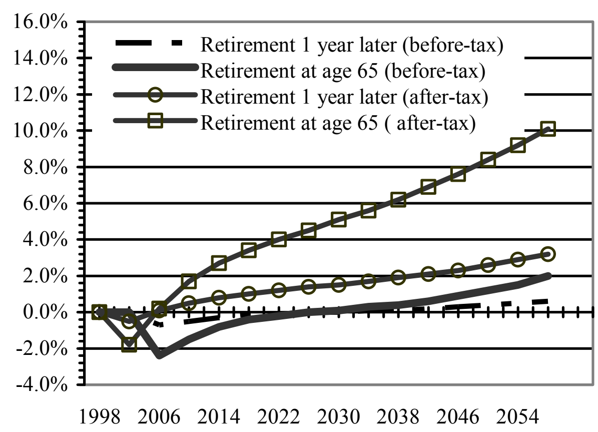
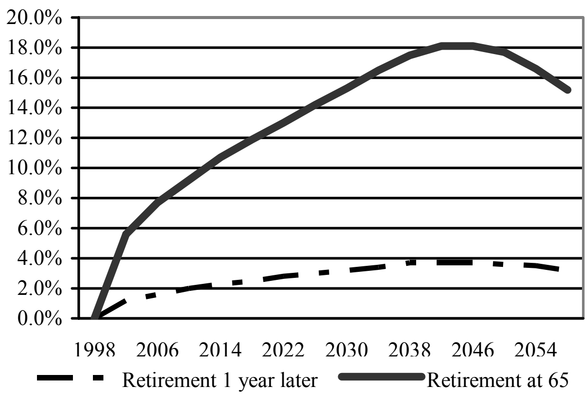
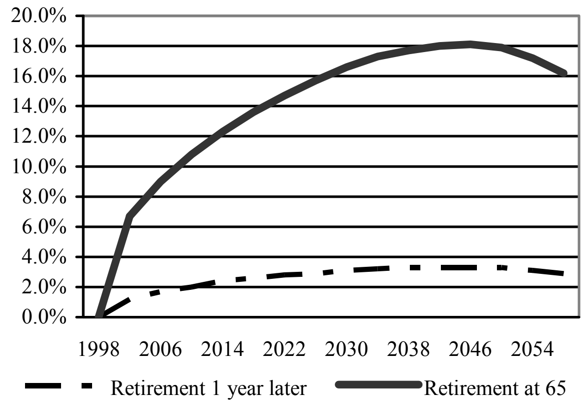


Chart 7
Real per-capita GDP Effect by Region of Raising the Retirement Age
Percentage Point Difference from Baseline

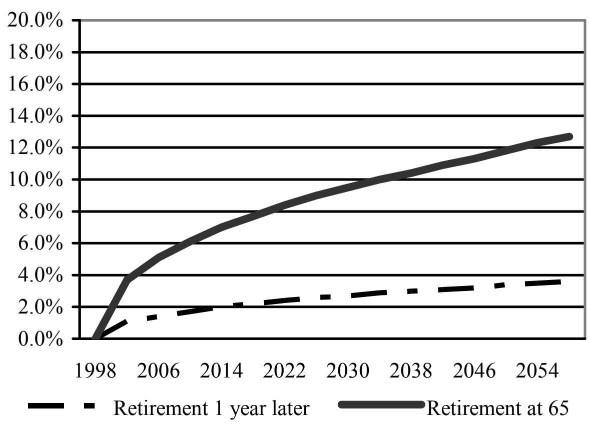
Atlantic



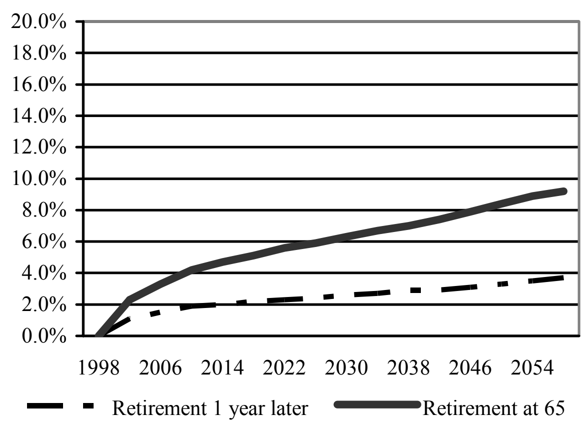
Quebec



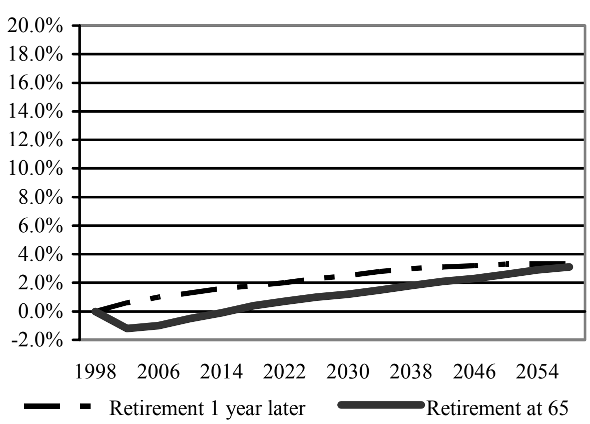
Ontario



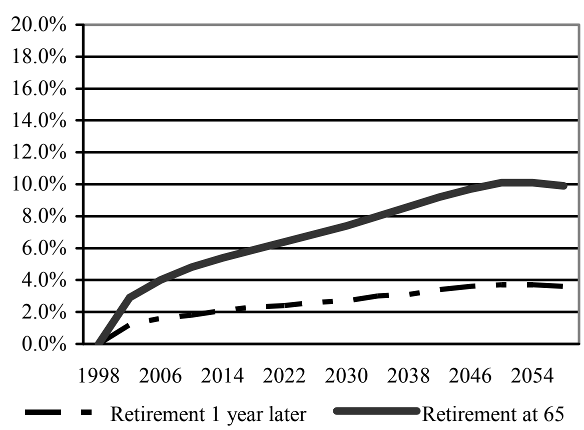
Prairies



Alberta



BC



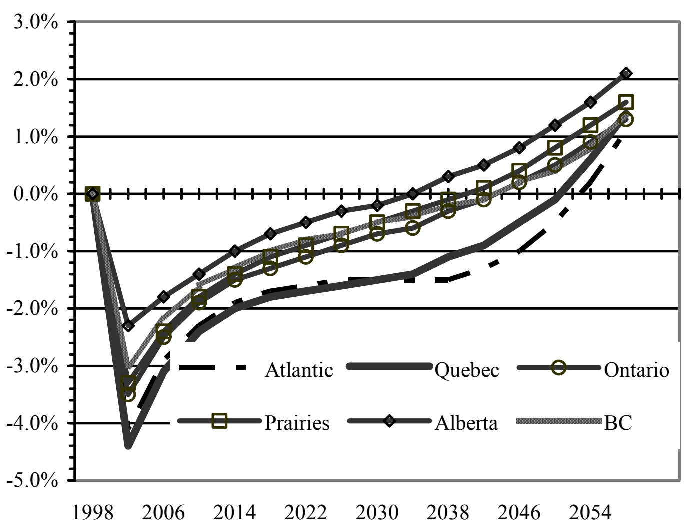
These results help to illustrate the importance of examining these effects in a general equilibrium framework. A standard partial equilibrium model would have predicted a reduction in real wages and a decline in private savings (and possibly also in national savings), leading to lower investment, lower capital stock and lower real economic-welfare gains. However, accounting for the economic interactions with the fiscal effects, relative price changes and savings helps to provide a more accurate picture of the possible outcomes.

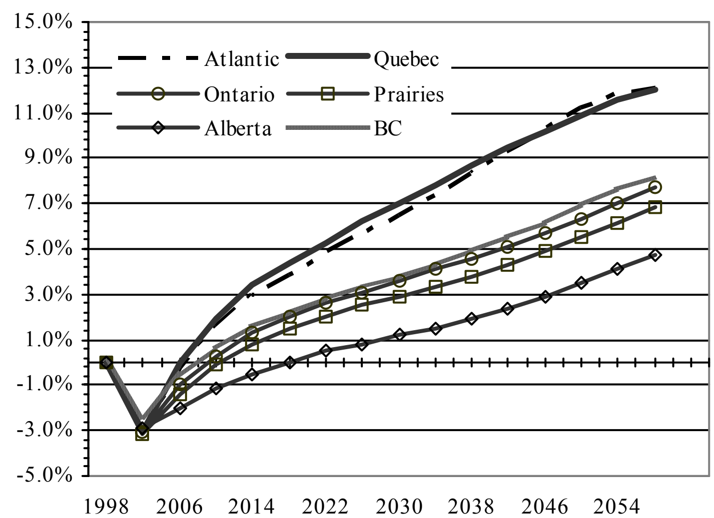
Looking at the regional impact, not surprisingly the economic effects of raising the retirement age by one year is similar across Canada in the long run (see Chart 7). It can also be shown, however, that the economic benefits of raising the retirement age to 65 varies quite drastically by region. For example, since the Atlantic and Quebec have the lowest effective retirement age in the baseline, they obtain the largest benefits in terms of real per-capita GDP gains, reaching 18%. Ontario and BC also obtain significant gains, although smaller than in the East. The maximum benefits also come later in the future, as their population ages at a slower pace. Finally, the Prairies and Alberta receive smaller economic benefits relative to the other provinces. Achieving an effective retirement age of 65 represents less than a 2-year increase for the Prairies and less than a 1-year increase for Alberta.

Chart 8
Real Before-Tax Wage Rate

Chart 9
Real After-Tax Wage Rate

Raising the Retirement Age to 65 Relative to Baseline Solution





Finally, Charts 8 and 9 present the impact on real wages by region of working until age 65. As shown in Chart 8, the positive labour supply shock is strongest in Atlantic and Quebec, and consequently these regions experience the largest decline in real wages before-tax. By contrast, Alberta and the Prairies have the smallest real wage decline and benefit from real wage increases earlier than the rest of Canada. When we account for the fiscal benefits associated with the rise in the retirement age, the Atlantic and Quebec regions obtain the largest benefits in terms of reduction in the effective wage-income tax rate. This also results in much larger increases for these regions in real after-tax wages.

7. Caveats

According to these results, we feel confident to say that the economic impact of raising the retirement is potentially large. However, we would also argue that the results presented in this paper probably represent an upper bound for a number of reasons.

First, the simulations assume that all older workers remain healthy until they retire at age 65. In reality, a non-negligible proportion of older workers leave the labour force before 65 for health related factors, either because they have become disabled or because the deterioration of their health condition considerably reduces their productivity at work.

Second, independently of health related reasons, some workers may leave the workforce because they cannot adapt to increases in skill requirement without retraining. Retraining costs for older workers may be important to consider and for certain categories of workers, they may outweigh the benefits.

Third, early retirement decision can also be explained by a strong increase in the preference for leisure as we get older, especially if it is a planned decision corresponding to consistent wealth accumulation behaviours during the working life. Therefore, it may not be reasonable to assume that these individuals would remain longer in the workforce if it is undesired.

Fourth, the simulations assume that the increase in the effective age of retirement will correspond to full-time jobs only. It is well known that the incidence of part-time employment increases among older workers. Therefore, a significant proportion of older workers may be willing to work more years at the condition that they can gradually move from full-time to part-time jobs. So, unless they are willing to work past age 65, the net labour supply increase would likely be smaller than the one simulated here.

Fifth, the relationship between earnings, experience and productivity has an important influence on the sensitivity of the results. Consistent with the neoclassical framework, the CGE model assumes that real wages are equal to the marginal product of labour across all age groups. Earnings also rise with experience, reaching a maximum around age 52 and declining slightly thereafter. A change in the profile of earnings and productivity for older workers may have a significant influence on the magnitude of the results. For example, under a scenario where productivity continues to increase, the impact of raising the retirement age would be more beneficial for the economy and the labour market. On the other hand, if the profile of earnings for older workers does not reflect labour productivity as some literature suggests, it would reduce the long-run benefits of increasing the retirement age.

Alternatively, the simulations assume in the baseline solution that the effective retirement age will remain unchanged in the future from current levels. However, it is possible that with the increased relative scarcity of workers, market forces will play an incentive role for older workers to remain in the labour force longer. The return to wealth may also decline and force older workers to work longer to accumulate more savings for retirement. Finally, we can also anticipate that future cohorts of women will be more strongly attached to the labour market when they get older than current older cohorts.

8. Conclusion

This paper evaluates the economic effects of raising the effective retirement age in Canada and by region in the context of population ageing with a regional CGE overlapping generations model. According to the results, the marginal effect of raising the retirement age by one year on real GDP and income are substantial. Correspondingly, since the effective age of retirement has diminished quite substantially in Canada over the past 20 years, the economic cost of early retirement in terms of unused productive capacity are quite large.

The results also suggest that if regional trends in early retirement persist in the long run, this will contribute to raise regional income disparity in Canada, with the Atlantic and Quebec being most negatively affected due to both a more ageing workforce and earlier retirement behaviours compared to the rest of Canada.

Finally, these results suggest that an increase in the effective retirement age can significantly offset the consequences of ageing through increases in real income and GDP, a reduction in labour market pressures an improvement in the financing of social security and an increase in the overall tax base. However, an issue that needs to be explored in future research and simulation exercises are the factors that distort labour-leisure decisions of older workers, leading to early retirement behaviours. There is also a need to better address the economic cost of later retirement, such as retraining cost for older workers and the issues whether the life-cycle profile of earnings reflects the profile of productivity by age to make a more comprehensive costs/benefits analysis.

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Appendix

Table A1
Median Age of Retirement by Industry

	1987-1990	1991-1995	1996-2000	2000	2001	2002
Agriculture	65.6	66.2	68.2	65.6	69.6	65.6
Forestry, fishing, mines & Oil and Gas Extraction	62.0	61.7	62.0	60.0	60.8	60.0
Public Utilities	59.6	59.3	57.4	56.2	57.8	56.2
Construction	64.4	63.8	63.8	61.9	64.9	61.9
Manufacturing	63.2	62.0	61.9	60.8	61.4	60.8
Retail and Wholesale Trade	64.3	63.9	62.5	62.1	63.0	62.1
Transportation and Storage	61.4	61.3	61.6	64.0	60.1	64.0
Finance, Insurance and Real Estate	63.9	62.1	60.6	60.0	60.0	60.0
Professional Services	65.2	64.9	64.6	65.3	65.3	65.3
Business Services	64.6	65.4	64.2	63.9	62.0	63.9
Education	61.1	61.2	57.5	57.3	56.4	57.3
Health and Social Services	63.8	62.6	61.0	63.3	61.8	63.3
Information, culture et loisirs	62.4	60.1	61.0	61.1	58.8	61.1
Hébergement et restauration	62.9	64.3	63.3	63.3	61.0	63.3
Other services	65.2	64.9	63.7	63.6	61.2	63.6
Public Administration	61.3	59.8	58.2	59.7	57.0	59.7

Source: Labour Force Survey

Table A2
Median Age of Retirement by Occupation

	1987-1990	1991-1995	1996-2000	1999	2000
Management	61.9	62.1	60.5	59.4	62.3
Business, Finance & Administrative	64.0	61.3	60.3	60.0	60.3
Natural & Applied Sciences	61.3	60.8	60.2	59.2	60.8
Health	63.0	62.4	60.9	61.4	63.2
Social Science, Education, Gov. Service & Religion	59.9	60.2	57.5	56.4	57.3
Art, Culture, Recreation & Sport	62.9	65.3	61.6	64.7	58.1
Sales & Service	64.7	63.7	61.8	61.3	60.8
Trades, Transport & Equipment Operators	63.9	63.2	62.6	62.9	62.8
Occupations Unique to Primary Industry	65.2	64.6	66.5	67.2	64.9
Processing, Manufacturing & Utilities	63.1	62.2	61.9	61.9	60.6

Source: Labour Force Survey