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Living and Working Longer in an Aging Society: Toward Increasing Inequalities?

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Living and Working Longer in an Aging Society:
Toward Increasing Inequalities? ¹

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Translated by Mélanie Léger St-Cyr.

Key Findings

1. Along with population aging, the last 50 years have seen major transformations in the life cycle of individuals, at the personal, familial and professional level. These transformations may very well have had an impact on the observed trend toward delayed retirement since the mid-1990s; a delay that began without any significant changes made to the public pillars of our retirement income system.
2. The Canadian retirement income system has been successful, up to now, at combatting poverty among older people and at preventing a significant fall in the living standards of retirees, while spending less on public pensions than the majority of OECD countries.
3. Many countries have adopted significant reforms of their retirement income system over the last few years, including increasing normal retirement age. In doing so, they wanted to insure the financial sustainability of the public retirement schemes, retain older workers in the labour market, reduce the effect of the continued raise in life expectancy and promote intergenerational equity.
4. As desirable as delayed retirement can be, it raises serious equity issues. For example, there are significant disparities in life expectancy and healthy life expectancy by socio-economic status, before and after age 65; disparities that seem to be widening. The notion of intergenerational equity is often brought up in discussions over population aging. Over the coming years, delayed retirement could remind us that these discussions should not ignore the notion of equity within a generation.

Executive Summary

Population ageing raises questions about the sustainability of the public pillars of the retirement income system and about inter-generational equity. In response to this, a number of countries have raised the normal retirement age in an attempt to reduce projected future expenditures on their state pension system. In this context, private savings and later retirement represent the best ways of avoiding a major fall in living standards when retiring. Increased life expectancy at age 65 appears to justify this policy trend. But there are substantial differences in life expectancy and healthy life expectancy between people of different socio-economic status, and these seem to be widening. There is a danger that in the name of inter-generational equity, we will in fact be moving towards increased social inequality among the pensioners of the future.

Discussion

As of 1 July 2014, there were 5.6 million people in Canada aged 65 or over. In 2036, there will be between 9.9 and 10.9 million. This age group represented about 15.7% of the population in 2014 and will account for between 23% and 25% in 2036, by which time the baby boom generation will be between 70 and 90 years old. A performance review of the Canadian retirement income system, although not without its challenges, would, in many respects, compare favorably to the majority of the retirement income systems in economically advanced countries. It is a system which fulfils its objectives and which, in terms of proportion of GDP, has lower costs than the OECD average.

This brief sets out research findings which shed light on some possible effects of pursuing the drive towards delayed retirement on social inequalities among older people in a context of population ageing and steadily rising life expectancy. This report comprises three sections focussing on this issue.

Getting older is not what it used to be!

The main feature of the baby boom generation was its large numbers, a consequence of the sharp rise in fertility after the Second World War. But the impact of these age cohorts was not just one of size. The 1960s saw the beginnings of major changes in Canadian society, whose effect was to delay the transition to adulthood. Young baby boomers stayed at school longer, and delayed their entry into the labour market. Women entered the job market in unprecedented numbers. Marriage and family formation took place later in life. These couples then had fewer children, and more often saw their union ended in divorce or separation.

In addition to these trends, there were also lower rates of coverage by private pension schemes, rising household indebtedness, decreasing return rates on investment, and other developments which resulted in delayed retirement for these age cohorts. At the same time, Canada made significant progress in reducing poverty in old age, and living standards in retirement were, on average, close to those enjoyed before retirement.

Why raise the normal retirement age?

Although raising the normal retirement age is the measure which provokes the greatest reaction, a number of other reforms have been passed or proposed to respond to the challenges of an ageing population. Since the 1980s we have seen a rising tide of discussion about the financial viability of state pension systems. The main arguments raised to justify these reforms are:

- Increasing the growth rate, or even slow down the decline, of the labour force
- Stimulating GDP growth
- Lowering the contribution rates to the state pension system
- Promoting intergenerational equity
- Compensating for longer life expectancy
- Lowering the risk of a significant decline in the standard of living of future retirees
- Ensuring the sustainability of the state pension system

Life expectancy and inequality

The wide differences in life expectancy between social groups mean that, if they retire at the same age, workers from better-off socio-economic groups will be receiving pension benefits for a longer time than those from poorer groups. These differences could be even more pronounced if we take into account the number of years of pension contributions; this is because workers from better-off socio-economic groups usually enter the labour market later in life, following longer periods of education and training. Furthermore, these disparities may increase still further because the better-off socio-economic groups are tending to enjoy greater improvements in life expectancy.

In general, reforms which aim to relieve the pressure of population ageing on the public finances tend to enhance the role of private savings and delayed retirement in the financial planning of future retirees, and this will also be likely to increase social inequality. The effects of this trend towards privatisation of the retirement income system are also not gender neutral. For example, the degree of coverage by private pension schemes is closely related to a number of characteristics such as age, level of education, income, type of employment, full or part-time status and having dependent children.

Table 1: Remaining life expectancy at age 25, percent expected to survive to age 75, and remaining health-adjusted life expectancy at age 25, by income decile and sex, population aged 25 and over excluding pensioners in institutional establishments, Canada, 1991-2001

Income decile	Remaining life expectancy at age 25		Percent expected to survive to age 75		Remaining health-adjusted life expectancy at age 25	
	Men	Women	Men	Women	Men	Women
Decile 1 (lowest)	48.6	56.5	51.2	69.4	37.0	42.9
Decile 2	49.5	57.0	53.6	73.1	40.0	45.6
Decile 3	51.1	58.2	58.7	76.6	43.0	48.4
Decile 4	52.1	59.1	61.7	78.9	43.7	49.3
Decile 5	52.9	59.4	64.2	80.1	46.4	49.7
Decile 6	53.2	59.8	65.4	80.8	46.5	51.2
Decile 7	53.8	59.9	67.3	81.7	47.4	50.7
Decile 8	54.4	60.1	69.1	82.0	48.4	51.8
Decile 9	54.8	60.6	70.9	83.4	49.0	52.2
Decile 10 (highest)	56.0	61.0	74.6	84.4	51.1	52.4
Difference D10 – D1	7.4	4.5	23.3	15.0	14.1	9.5

Source : McIntosh C.N., Fines P., Wilkins R., Wolfson, M.C. Income disparities in health-adjusted life expectancy for Canadian adults, 1991 to 2001. Health Reports 2009; 20(4): 55-64

Conclusion

Population ageing and improvements in life expectancy are exerting ever-increasing pressure to raise the normal retirement age. Canada's retirement income system already leaves a considerable role to private savings, and there has been a noticeable movement towards later retirement since the mid-1990s. A number of trends suggest that future pensioners, among them the baby boomers, will have to delay their retirement even further if they want to avoid a significant drop in living standards when they retire. The decision to raise the age of eligibility for the Old Age Security and the Guaranteed Income Supplement benefits from 65 to 67 only reinforces this.

However, Canada is still in an enviable position in terms of its capacity to make reforms to its retirement income system. This relatively favourable position means that decisions can be made in the light of long term considerations of equity, both between and within generations. Such reforms will have to take into account population ageing, its long term and irreversible progression, and also the possibility that life expectancy at age 65 may undergo further unexpected advances, while at the same time recognising that this trend has the potential to widen inequalities between retired people in the future. Delaying retirement may bring important benefits both for individuals and for society as a whole, but it also has the potential to increase inequalities among older people, especially if postponing retirement becomes an unavoidable path to escape poverty or a significant drop in living standards.

INTRODUCTION

On July 1, 2014, there were 5.6 million people aged 65 and older in Canada (CANSIM Table 051-0001). By 2036, this figure will have risen to between 9.9 and 10.9 million. Elderly people accounted for about 15.7% of the population in 2014 compared to between 23% and 25% of the population in 2036 (Statistics Canada, 2010, Cat. 91-520), when all the baby-boomers will be between 70 and 90 years old. Contrary to what may suggest the significant drop in fertility following the Baby-boom, which resulted in a decrease in the number of births, the number of elderly people will continue to grow after every Baby-boom cohort has passed away. Indeed, it could exceed 12 million by 2061 and possibly 15 million by 2100 (United Nations, 2013). High immigration and, to a lesser extent, a life expectancy that is still increasing will result in the continuous growth of the number of people aged 65 and older long after the death of all the Baby-boom cohorts (Carrière et al, 2014). Also, the weight of the elderly population will not have ceased to grow and could represent between 24% and 28% of the Canadian population in 2061, and over 30% in 2100. Therefore, a decrease in the number or the proportion of people aged 65 and older in Canada is not expected once the effect of the Baby-boom is over.

While population aging will continue beyond 2036, during the next two decades it will experience its most significant growth. Subsequently, we will speak less of an aging population than a population that has reached, at least for a while, the maturation of its aging process. Then, we shall speak of an aged population rather than an aging population. Of course demographers have not been able to predict neither the Baby-boom nor the Baby-bust or the significant gains in mortality at advanced ages we have witnessed in the past few decades. Sooner or later, the different components of population growth could have some surprises awaiting us along the way. However, there is one certainty: the Canadian population will be older, and in the medium-term there should be a relative stabilization, at 25% to 30%, of the proportion of people aged 65 and older.² In the long term, changes in life expectancy will be critical for the evolution of this proportion, which could grow significantly depending on the projection scenario (Vallin, 2002).

Although aging has long been expected, its outcomes are more difficult to predict and the debates they generate sometimes lead to radical standpoints on important issues, such as the sustainability of the health or public pension system. Moreover, several studies on the possible consequences of population aging are based on assumptions that rarely foresee relatively large changes in the behavior and characteristics of individuals and families (Clavet et al, 2013; Godbout et al, 2014; Regan 2011). Although quite useful, they could possibly overestimate the magnitude of some of the challenges related to population aging, or even ignore other challenges that deserve particular attention.

Yet, as in most advanced economies, not only did the Canadian population aged; it has also changed radically. The changes were so significant and widespread in the majority of economically developed countries that the theory of the second demographic transition, which links these changes to the decline in fertility observed from the 1960s onwards and to the accelerated aging of the population, has been put forward (Lesthaeghe 1995).

Widespread access to contraception, a rise in the number of years of education, late entry in the labor market, marked increase in women's labour force participation, delay in the formation of couples,

² Since fertility, mortality, and especially net migration vary significantly by province and region, the proportion of elderly people will show significant gaps across the country.

increasingly frequent common-law union, postponement of childbearing, and union dissolutions are all trends that have contributed to the decline in fertility and the shaping of the Canadian population age structure (Beaujot, 2004; Le Bourdais and Lapierre-Adamcyk, 2004; and Ravanera et al, 2002).

While major changes were taking place in the main markers of entry at adult ages, at the other end of the life cycle an equally important evolution was taking place. Indeed, the vast majority of individuals of a cohort can now expect to reach the age of 65, and when they do, they will survive on average at least two decades (Canadian Longevity Database). Aging at the bottom of the age pyramid is thus coupled with aging at the top. However, the evolution of the situation of the elderly over the past four decades is not solely characterized by gains on mortality. In Canada, their socioeconomic conditions have improved significantly over the same period. Significant gains in poverty reduction were observed (Osberg, 2001), and on average, the living standards of cohorts arriving at retirement were close to those observed before they reached 65 (LaRochelle-Côté et al, 2008; 2010). Economic conditions have therefore greatly improved, and this is largely due to the maturation of Canada's retirement income system (Myles, 2000).

The outcome of Canada's retirement income system, although imperfect, is in many respects very positive when compared to the vast majority of economically developed countries (Australian Centre for Financial Studies, 2014; Whitehouse, 2010). A system that achieved its objectives and, as a proportion of gross domestic product, entails lower costs than the average of OECD countries. In addition, long-term projections show that despite major reforms to the retirement income system in several of these countries, the Canadian system will continue to have a comparative advantage in terms of costs (Whitehouse, 2010). But will it still be able to properly meet its objectives? Will the continuation of certain trends adversely affect the elderly population in the coming decades?

Population aging will have the effect, among others, to question the long-term sustainability of contributory public pension schemes, and this, in the name of intergenerational equity. Increasing the retirement age, reducing benefits, or raising contributions are the main levers to reinstate the financial equilibrium of those pension schemes. Whatever the reforms adopted, they will lead to an increasing dependence on private savings and an increase in the effective retirement age to prevent a significant loss in living standards during the transition from work to retirement. The continuous increase in life expectancy at age 65 magnifies this issue. However, living longer and having to work longer raises questions of intragenerational equity (Esping-Andersen and Myles, 2005). Indeed, one should not only consider the effects of population aging on intergenerational equity; intragenerational inequalities could also be exacerbated in the process. Given that in the medium-term it is more than a quarter of the population that will be aged 65 and older, we cannot ignore this possibility.

Although it is difficult to predict what will be the main features of Canadian society in 20, 30 or 50 years, we must better understand the potential impact of certain trends that affected the life course of the cohorts that are about to reach age of 65. Having marked Canadian society throughout their life course, by 2050 the baby-boomers will leave their imprint on what could become a new way of living and perceiving the 3rd and 4th ages. These cohorts will characterize the transition from an aging society to one that will reach, at least for a while, its demographic "maturity". Cohorts living increasingly longer will test a retirement income system that, so far, has done fairly well.

This research brief aims to address the main findings of studies that promote a better understanding of the possible effect of a continuing trend of delayed retirement on social inequalities among the elderly people in an aging population where life expectancy is growing steadily. It is around this issue that the

three parts of this document are organized. The first part highlights how the various stages of the life course were modified by the arrival of baby-boomers at adult ages. It also identifies some trends which, in a life cycle perspective, could lead to the postponement of retirement of these same cohorts. Thus, this first part will attempt to answer the following question: Is the trend of delayed retirement likely to continue in the coming years? The second part of the document presents a review of the main arguments put forward to justify the postponement of the age of entitlement to a full pension³ in Canada and other countries faced with population aging. In the third part, studies that promote a better understanding of the possible effect of postponing the normal retirement age on social inequalities among the elderly of tomorrow will be presented. Thus, we will pay particular attention to studies about differential mortality and morbidity by socioeconomic status in economically advanced countries. A few studies that have measured the recent evolution of these differences, as well as the potential effect of increasing the retirement age on inequalities in terms of the time spent in retirement, will also be of interest. Since reforms brought upon different retirement income systems have the effect of reducing the share of income from public sources to future retirees, the link between retirement income sources and socio-economic inequalities among the elderly will also be discussed in the third part of this document.

The document concludes with a discussion linking its different sections together, while offering some conclusions on intragenerational equity in a context where the new reality will probably be to live and work longer.

³ The age of entitlement to a full pension represents what is commonly called the "normal" or "legal" retirement age as part of a public retirement program. Since we are referring to a pension linked to retirement, we are excluding universal pension schemes based exclusively on age and number of years of residence, rather than the number of contribution years to a contributory program linked to employment. In the case of Canada, the age at which we are entitled to a pension from Old Age Security is not considered a retirement age, unlike the Canada Pension Plan and the Quebec Pension Plan. In this document we will use "age of entitlement to a full pension" and "normal retirement age" as synonyms. It should not be confused with the "effective" age of retirement which represents the age at which workers actually retire.

PART I

Life course and delayed retirement

A notable characteristic of the Baby-boom cohorts is, of course, their size owing to the increase in fertility that followed the 1939-45 War. However, the impact of these cohorts is not limited to their sheer number. The 1960s marked the beginning of major changes in the Canadian society that had the effect of delaying the transitions in early adulthood. Apart from the extension of education, a trend that began before the arrival of the baby-boomers, the period that marks the beginning of this gradual transformation coincides quite well with the entrance of the first baby-boomers in adulthood. The postponement of transitions having been well documented in the past (Beaujot, 2004) we will only discuss it briefly. However, we will present other trends that are likely to have a significant effect on the life course of baby-boomers as they gradually cross the threshold of retirement and old age.

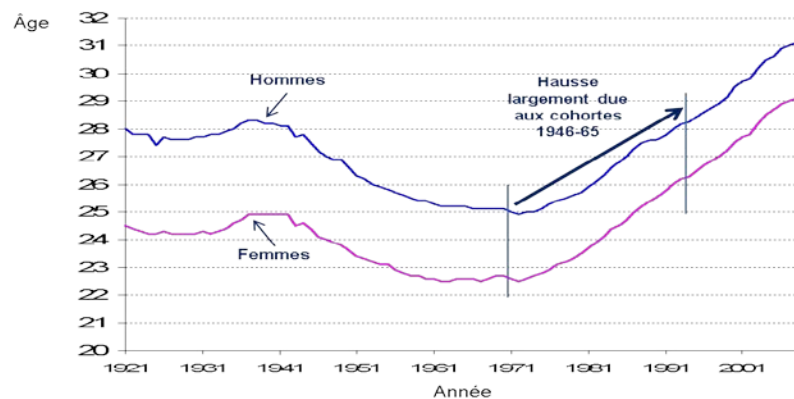
Extension of education

The extension of education is a phenomenon that began several decades ago and has accelerated with the first cohorts of baby-boomers (Nault, 1990). In cohorts born before 1946 we had always observed at least one in four people without a high school diploma, while we see less than one in five people without such a degree in the 1946-1966 cohorts. (Carrière and Pesme, 2012). This extension of education was more significant for women than men. The 1946-1966 cohorts were the first one to exhibit a comparable proportion of women and men with a university degree, and the 1957-1961 cohort was the first to display a higher proportion of women with a university degree.

Postponement of marriage and family formation, smaller families and union dissolution

Union formation and the birth of a first child are important markers of the transition to adulthood. The timing of these transitions is also often a marker of the age of permanent entry in the labor market. The arrival of the Baby-boom cohorts in their early twenties marked the end of a downward trend in the average age at first marriage and the average age of mothers at first birth.

Figure 1: Average age at first marriage, by sex, Canada, 1921-2008

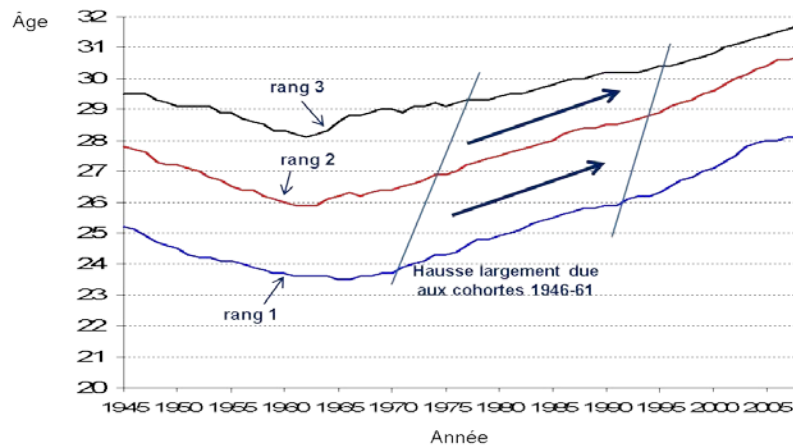


Source : Statistics Canada, <http://www4.hrsdc.gc.ca/.3nd.3c.1t.4r@-eng.jsp?iid=78>

Firstly, Figure 1 shows the evolution of the average age at first marriage for men and women between 1921 and 2008. We identified the points where the difference between the calendar year and the average age at first marriage gives a value between 1946 and 1966. We can then better identify the trend in the average age at first marriage for the first cohort of baby-boomers. Although it is well below the age at first marriage in 2008, which was 31.1 years old for men and 29.1 years old for women, it is important to note that the upward trend began with the first Baby-boom cohorts (Milan, 2000).

Clearly, delaying marriage will have an impact on the average age of mothers at first birth. In the same way as in Figure 1, Figure 2 shows the evolution of the average age of mothers according to their child's birth order. The fertility behaviour of women from the 1946-1966 cohorts is still quite notorious, especially with respect to first-order births. After falling to 23.6 years old, the average age rose to 26.1 years old as women of the baby-boom cohorts were giving birth to their first child. Obviously, the same pattern was observed for births of second and third order.

Figure 2: Average age of mothers at birth by birth order, Canada, 1945-2008



Source : Statistics Canada, <http://www.statcan.gc.ca/pub/91-209-x/2011001/article/11513/figures/desc/desc02-eng.htm>

The fertility of women from the Baby-boom cohorts was not only marked by a postponement of childbearing, but also by a significant decline in fertility. Upon reaching childbearing age, the first cohorts of baby-boomers had the effect of significantly reducing the fertility rate of women aged 20 to 24. However, the increase in fertility among women aged 30-34 and 35-39 corresponds largely to the arrival of the 1946-1966 cohorts in these age groups.

Unions were therefore formed later and were less fertile. There were also increasingly less stable common-law unions, while divorce rates were soaring given changes to the Canadian legislation (Milan, 2000). Partly due to the decline in fertility, it is also a period during which women's participation rates, whether they have children or not, began to increase very significantly (Lindsay and Almey, 2006). These are the same cohorts of women who later had a significant impact on the participation rate of women aged 50-69.

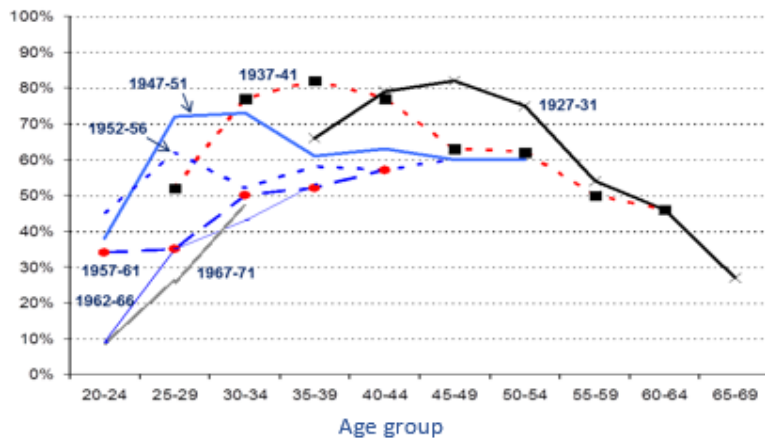
The postponement of transitions at the beginning of adulthood is likely to generate a possible delay of the transition from work to retirement. This deferral can indeed have an impact on the accumulation of financial and property assets, having the effect of delaying the decision to retire (Beaujot, 2004). The

next two sections show the evolution, by cohort, of certain trends that affect the accumulation of retirement savings and household debt, two of the key determinants of retirement⁴ (Chen et al., 2012 ; Gomez and Gunderson, 2011; Lefebvre et al, 2011;. Schirle, 2010; Singh and Verma, 2003; Uppal, 2010).

Contributions to the Canada Pension Plan (CPP) and the Quebec Pension Plan (QPP)

An often overlooked phenomenon will affect the level of CPP/QPP benefits received by the first cohorts of baby-boomers compared to those who will succeed them. In fact, the baby-boomers who will have contributed to the maximum pensionable earnings level, especially among cohorts born after 1951, will be proportionally less numerous than their predecessors. In the 1970’s, the annual increase in the maximum pensionable earnings had been constrained at a time when wage increases were particularly important due to high inflation. The result was a sharp increase in the proportion of men making maximum contributions to the CPP/QPP. At retirement, those years of contributions translate into eligible years for the maximum benefits. However, this opportunity was limited in time. Indeed, the 1980s saw the threshold of the maximum pensionable earnings was increased much faster than actual employment earnings. This had the effect of reducing the proportion of men in a given cohort who had employment earnings at least equal to the maximum pensionable earnings.

Figure 3: Proportion of men who have contributed to CPP and whose employment income was at or above the maximum pensionable earnings, by age and cohort

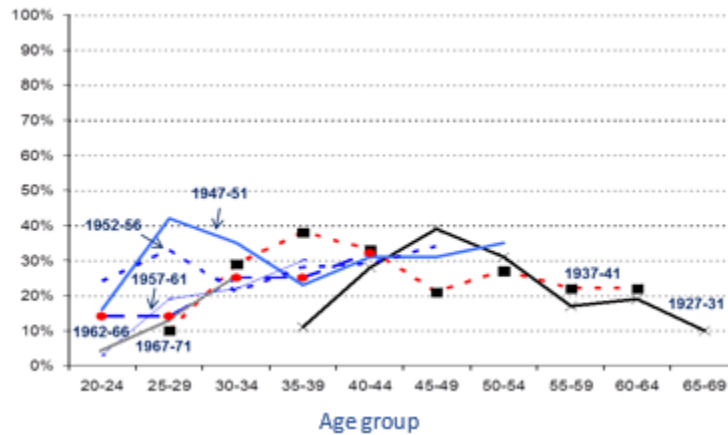


Source: Canada Revenue Agency, Income Statistics, Final Table 4A for all of Canada, Taxable returns by age and sex

As shown in Figure 3, the phenomenon is obvious for the 1952-56 cohorts, but even more so for those born from 1957 (Carrière et al, 2016). This phenomenon affects both women and men. However, comparing Figures 3 and 4 we can see how the proportion of women having contributed to the maximum pensionable earnings has never been particularly high, even in the 1970s (Carrière, 2010). Nevertheless, although still significant, the gap between men and women is less important today than it was at the time.

⁴ For an extensive review of the literature of the determinants of retirement in Canada, see Bélanger, Carrière and Sabourin (2015).

Figure 4: Proportion of women who have contributed to CPP and whose employment income was at or above the maximum pensionable earnings, by age and cohort



Source: Canada Revenue Agency, Income Statistics, Final Table 4A for all of Canada, Taxable returns by age and sex

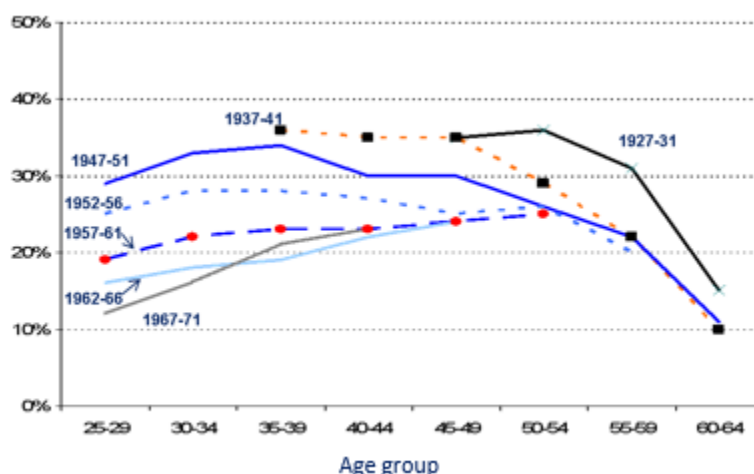
Coverage of registered pension plans (RPPs)

An analysis of data from Revenue Canada (Figure 5) shows that the proportion of a cohort of men who contributes to a registered pension plan (RPP) has dropped significantly over the years (Carrière et al, 2016)⁵. Cohorts that preceded the baby-boomers appear to have benefited the most from these plans. For example, at 35-39 years old, it is 37% of men born between 1942 and 1946 that were contributing to a RPP. At the same age, from the 1947-51 cohort to the 1962-66 cohort, the proportion gradually decreased to 34%, then 28%, before eventually reaching 19%. For women the situation is different; they have filled an important gender gap and now show a favorably comparable coverage rates compared to men.

We should not, however, limit the analysis to only the proportion of a cohort covered by an RPP. The changing nature of these plans must also be taken into account. Retirement income from an RPP is an important determinant in taking the decision to retire (Chen et al, 2012; Schirle, 2010). However, even if a defined contribution pension plan may be beneficial for a worker, it does not have the advantages of a defined benefit plan. But as RPP coverage was declining, the proportion of covered workers who were contributing to defined contribution RPPs has been increasing (Gougeon, 2009). In 1982, 94% of workers covered by an RPP adhered to a defined benefit plan. Since then, it has fallen steadily to 73% in 2012. In the private sector, it is now less than one in every five workers who adheres to a defined benefit RPP (CANSIM Table 280-0020). So workers are less and less covered by an RPP, and a growing proportion of those who are covered contribute to a plan that puts more financial risk on the worker.

⁵ Note that this is the proportion of the whole cohort of men and not the proportion of those who are employed. Since inactive people are included in the denominator, coverage rates are here much lower than the figures most often presented.

Figure 5: Proportion of men reporting deductions for contributions to RPPs, by age and cohort



Source: Canada Revenue Agency, Income Statistics, Final Table 4A for all of Canada, Taxable returns by age and sex

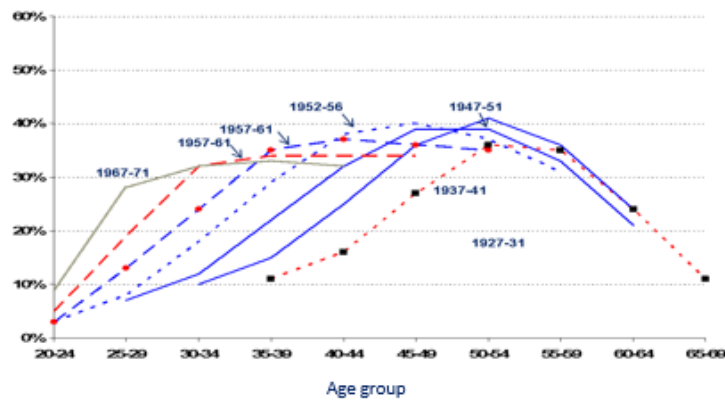
Contributors to a Registered Retirement Savings Plan (RRSP)

CPP/QPP and RPPs account for only a share of the retirement savings of Canadians. Registered retirement savings plans (RRSPs) also represent an important financial vehicle to prepare for retirement. Since the early 1990s, RRSPs have gained in popularity as changes to their tax treatment made them more attractive to future retirees. Using data from the Canada Revenue Agency, it is possible to estimate the proportion of individuals who have contributed to an RRSP in a given year.

Figure 6 gives a good idea of the evolution of this ratio within a given cohort (Carrière et al, 2016). During the period 1986-1996, there is a strong growth in the proportion of contributors for each cohort. A significant part of this growth can be attributed to the new tax treatment of RRSPs. Among cohorts we are mostly interested in, we note a strong growth in the proportion of contributors with age. This relationship is true up to age 45-49 for the 1947-1951 and 1952-1956 cohorts, but up to age 40-44 for the 1957-1961 cohort, and only up to age 35-39 for the 1962-66 cohort. The 1967-1971 cohort seems to confirm a tendency to reach a maximum proportion of contributors at a younger age. This trend can be explained, among other things, by an "artificial" increase between 1986 and 1996, increasing household debt, the 2008 financial crisis and, more recently, the arrival of Tax Free Savings Accounts (TFSA).

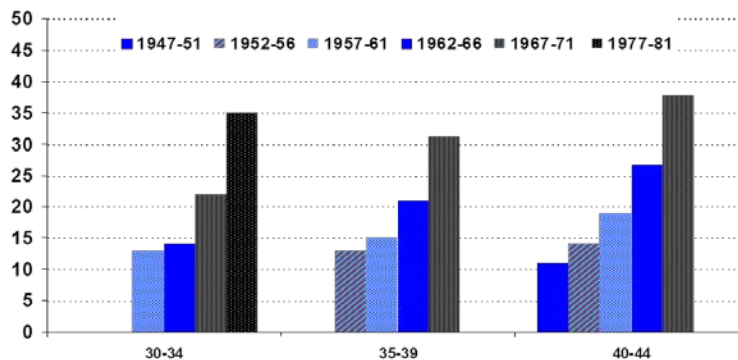
To get a clearer picture of attitudes towards retirement savings, it is important not only to analyze trends regarding investments in RRSPs, but also to pay particular attention to premature withdrawals of those same RRSPs. Figure 7 shows how it can be misleading to ignore this tendency to withdraw RRSPs for reasons other than retirement. This Figure shows the number of people who withdrew amounts from their RRSPs for 100 contributors in the same age group and cohort (Carrière et al, 2016).

Figure 6: Proportion having declared contributing to an RRSP, by age group and cohort, for both sexes



Source: Canada Revenue Agency, Income Statistics, Final Table 4A for all of Canada, Taxable returns by age and sex

Figure 7: Number of people who withdraw from their RRSP for 100 people that contribute to an RRSP, by age and cohort



Source: Canada Revenue Agency, Income Statistics, Final Table 4A for all of Canada, Taxable returns by age and sex

It is quite apparent that if RRSPs are used for retirement savings, they are also used for many other purposes.⁶ At 40-44 years old, the 1947-51 cohort had a little over 10 people withdrawing part their RRSPs for every 100 contributors at the same age. This ratio increased to 14: 100 for the 1952-56 cohort, to 19: 100 for the 1957-61 cohort and to 27: 100 for the 1962-66 cohort. The trend accelerated to a ratio of 37: 100 for the 1967-71 cohort when themselves aged 40-44 years old.

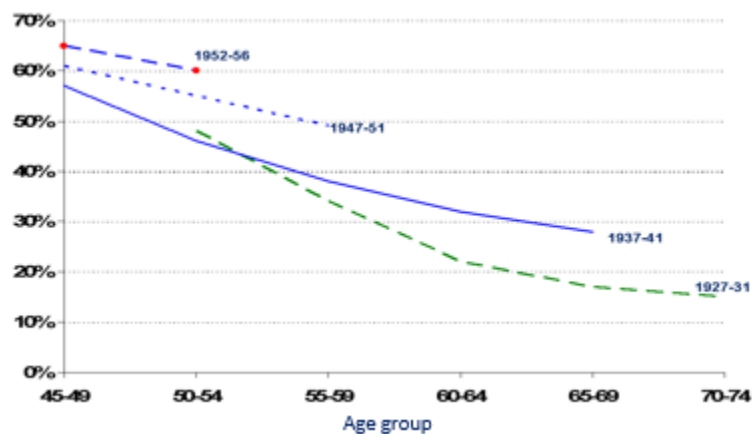
In conclusion, RRSPs have increased sharply between 1986 and 1996. Since then, the proportion of contributors in a given cohort leveled earlier in the life course. In addition, premature withdrawals expanded greatly making it increasingly difficult to associate RRSPs solely with retirement savings.

⁶ This figure does not include withdrawals for the purchase of a first home or to finance a return to school if these amounts are repaid as planned.

Mortgage and debt

Another important socioeconomic characteristic in the life course of a cohort is access to property and the presence or absence of a mortgage at a given age. The delay in the transitions that mark the entrance to adulthood may have an effect on the purchase of a first home, but also on the presence of a mortgage at older ages. Interest rates and household debt will also influence the ability and pace of the repayment of a mortgage. Furthermore, having a mortgage at ages often associated with retirement may mean accepting a lower standard of living when retiring or even having to delay retirement.

Figure 8: Proportion of homeowners with a mortgage by age group and cohort, Canada



Source: Census of Canada (1981, 1986, 1991, 1996, 2001, 2006)

Figure 8 shows that the proportion of individuals of a given cohort with a mortgage decreases with age (Carrière, 2016). For example, for the 1927-31 cohort, this proportion goes from almost 50% at 50-54 years old to less than 20% among those 65 and older. However, when comparing older cohorts to the 1947-1961 cohorts, we observe an upward trend in these proportions. At 55-59 years old, for example, this proportion increased from 34% for the 1927-1931 cohort to 43% and 49% for the 1947-1951 and 1952-1956 cohorts, respectively. There is no indication that this trend will be reversed at 60-64 or 65-69 years old.

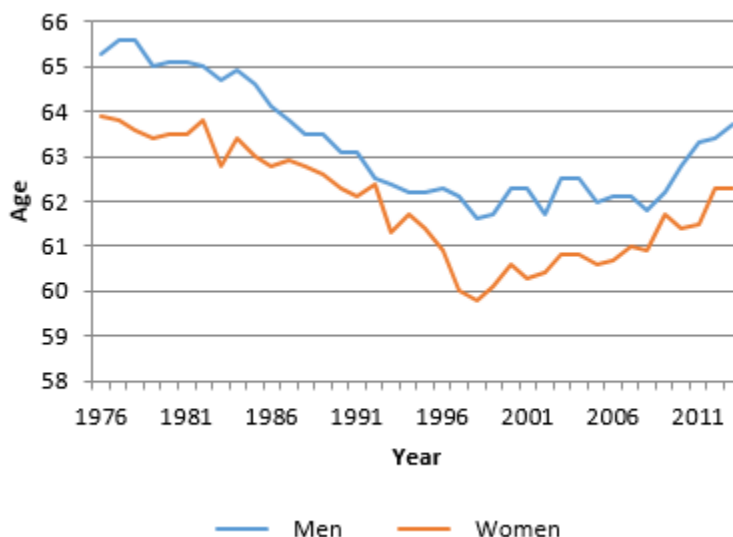
This trend also reflects on household debt. If younger households have the highest levels of debt, it is for those aged 65 and older that the highest rate of growth of debt was observed between 2001 and 2011 (Burlleton and Petramala, 2011). Their liabilities having increased twice as fast as their assets during this period, the increase in household debt for the 65 and older accounted for half the global growth in household debt. Also, the proportion of borrowers among the 65 and older increased from 27.4% to 42.5% between 1999 and 2012 (Battams et al, 2014).

Recent trend in retirement age

Several indicators are used to try to sense if there was or not postponement of retirement in recent years. A brief analysis of the evolution of participation rates tends to show that there is a tendency toward postponing retirement. Indeed, between 1996 and 2014 the employment rate of people aged 55-69 years old increased quite significantly in Canada. For example, the participation rate of men rose

from 71.6% to 78.4% in the 55-59 age group, 43.5% to 59.7% in the 60-64 age group and 16.5% to 32.4% in the 65-69 age group. For women, these rates increased from 48.4% to 69.4%, from 23.2% to 47.6% and from 7.1% to 20.1%, respectively (CANSIM Table 282-0002). Although the increase in the participation rates among the 55-69 years old started in the mid-1990s, they are still increasing due to the gradual transition of the Baby-boom cohorts in this age group since 2001.

Figure 9: Average age at retirement, by sex, Canada, 1976-2013.

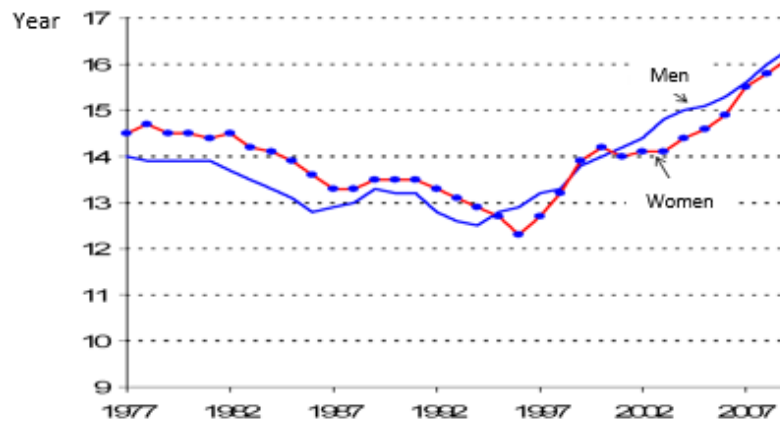


Source: Statistics Canada, Labour Force Survey (LFS), CANSIM table 282-0051.

While there was an increase in participation rates of Canadians aged 55 and older, the average age at retirement had stabilized in the early 2000s and then began to increase in recent years (Figure 9). This indicator not being adequate to measure changes in behavior in terms of retirement, some researchers opted to construct a measure of active life expectancy at age 50, conditional on being employed at that age (Carrière and Galarneau, 2011; Denton et al., 2009). Taking into account retirement rates by age, it is easier to capture if there is delaying of retirement or not. Although of prospective nature, similar to the calculation of period life expectancy, this measure shows how much attitudes concerning retirement are changing (Figure 10).

As mentioned previously, this trend is desirable in a context of population aging. Up until 2031, baby-boomers represent a significant workforce labour force potential which could play a central role in the future evolution of our aging society. This upward trend in both the labour force participation rates at age 55 and older and the age of retirement has been observed in many OECD countries (Maestas and Zissimopoulos 2010). But contrary to what has been observed in several of these countries, in Canada this increase occurred without major changes to the public pension system (Cooke, 2006).

Figure 10: Active life expectancy at age 50, by sex, Canada, 1977-2009.



Source: Carrière, Y. and D. Galarneau (2012)

Future trend in retirement age

To assess a possible continuation of the upward trend in the retirement age, one must first understand why this age has increased in recent years. For example, Blau and Goodstein (2010) estimate that the increase in labour force participation rates among the 55-69 age group in the United States is essentially linked to an improvement in educational levels of the population. If this is the case and delayed retirement is due to the composition effect of the labour force, given the relative cap on improvement of education levels, such postponement is about to stagnate. Gomez and Gunderson (2011) instead believe that the delay of retirement is related to changes in the preferences and constraints of workers rather than a change in the composition of the workforce. For Lefebvre et al. (2011) factors such as the improvement of the health status of older workers and less generous pension plans have led to the increase in the effective age of retirement since the 2000s.

Preferences and constraints may take different forms. Health, family status, working conditions, characteristics of the retirement income system, labor market, are all factors known to influence the decision to retire (Barnay and Debrand, 2006; Chen et al, 2012; Park 2010; Schellenberg and Ostrovsky, 2008; Schirle, 2008). Concerns were also raised regarding the ability of future retirees to avoid a significant drop in their standard of living during the transition from work to retirement (Horner, 2009; Moore et al, 2010; MacDonald et al, 2011; Wolfson, 2013). These concerns may push many older workers to postpone their effective retirement age. Also, as the growth of the workforce will slow down with the arrival of baby-boomers at retirement, some believe employers will be more responsive to the needs of older workers, encouraging the delay of retirement (Maestas and Zissimopoulos 2010). If this is the case, not only will they be tempted to stretch the number of years before retirement due to financial reasons, but perhaps also for reasons related to favorable employment conditions.

The first part of this research brief has succinctly highlighted the importance of changes in the timing of transitions in early adulthood among cohorts who are about to join the 65 and over age group over the next two decades. It also demonstrated that several trends among these cohorts could have the effect of heightening, for a time at least, the delay of retirement observed since the mid-1990s.

If one of the main characteristics of the Baby-boom cohorts has been their size, behavioral changes they initiated have been at least as significant. Today, these cohorts are aged between 50 and 70 years old and their behavior could have a major impact on the nature and magnitude of the challenges facing our aging society, as well as on the perceptions Canadians have of this society. After having marked the transitions of early adulthood, they now have the opportunity to redefine what life will be like after age 65. The delay of retirement could be an important element of this process.

The increase in the effective retirement age has for several years been presented as an important element of the solution to the challenges posed by population aging. Whether the result of a legislation raising the normal retirement age or of the transformation of family and professional life cycles, postponement of retirement itself raises issues that we are only starting to study. Before presenting a literature review of these studies, the second part of this research brief will review the main justifications put forward in the debate over raising the age of eligibility for a full pension. This will be followed by presenting a literature review on the subject. In Canada, such a reform has not yet been adopted, although the age of eligibility for the Old Age Security (OAS) pension is scheduled to be gradually raised from 65 to 67 years old between 2023 and 2029. This reform will undoubtedly have an effect on the delay of retirement even though the OAS pension is not connected to the professional life cycle.

PART II

Why raise the normal retirement age?

This second part begins by outlining the main arguments used to justify the profound transformations of public pension systems put forward in several advanced economies faced with population aging. While the increase in the normal retirement age causes the most reactions, several other reforms have been adopted or proposed to meet the challenges posed by the aging of the population age structure. We briefly discuss some of these measures before situating Canada in the debate over retirement age.

A combination of factors leads to a series of reforms

It is mainly from the 1980s onwards that the discourse on the financial sustainability of public pension systems gained importance (OECD, 1988). Several trends interact and lead to the conclusion that profound changes need to be made to these systems, some countries being in a more critical situation than others. Although population aging began several decades before, in the 1980s this demographic shift is combined with a significant decline in the participation rates of 55 years old and older and of average retirement age, as well as a marked increase in the life expectancy at age 65. Also, the oldest baby-boomers are approaching their fifties and maturation of these retirement schemes is looming on the horizon. More than ever, population aging challenges the performance of retirement income systems based on some form of redistribution. Ironically, while many countries have put in place incentives for early retirement in the 1980s, these measures exacerbate the funding problem of pension plan in most OECD countries (Leibfritz, 2002). Many countries need to reverse the trend and encourage older workers to remain in the labour force by removing incentives towards early retirement.

That was the beginning of a cycle of more or less important reforms using a series of arguments, the most common of which being:

- Increase the growth rate, or in some cases slow the decline, of the workforce
- Stimulate growth of the gross domestic product
- Decrease the contribution rates related to the public pension system
- Promote intergenerational equity
- Compensate for the increase in life expectancy
- Lower the risk of a significant drop in the living standards of future retirees
- Ensure the sustainability of the public pension system

In the United States in the early 1980s the projected increase of the normal retirement age to 67 years old was justified essentially in terms of the financial sustainability of the social security program. More recently the argument put forward to further raise the age of entitlement to a full pension is the increase in life expectancy (Kollmann, 2002). In the UK, the increase in the retirement age is seen as a necessity. It is a policy with the objective of retaining older workers in the labour force to secure the future of the pension system for future generations. This is seen as the only option to ensure a rise in gross domestic product in the future (Robinson, 2005). In Norway, it is first and foremost the argument of the sustainability of the pension system that is put forward due to the growing number of retirees and increasing life expectancy, while the number of workers will decrease (Stupar, 2013). In Sweden, rather than raising the normal retirement age, the particularly generous system in place is altered by increasing from 30 to 40 years the number of years of contributions needed for a full pension (Marier, 2013). In addition, longevity is included as a variable in the calculation of the pension (Thode, 2003). The

idea is to ensure the viability of the system which, over time, is set to become less generous. Recently, the OECD (2014) warned that public spending related to pensions in the EU might increase by 1.5 to 2 percentage points of GDP over the next 50 years. The expected growth of the weight of these expenditures is related to gains in life expectancy and the retirement of baby-boomers which will put pressure on the GDP, particularly if the effective retirement age remains unchanged.

Despite numerous discussions about the increase in the normal retirement age, it should be noted that only three OECD countries: United States; Norway; and Iceland, required an age above 65 for eligibility to a full retirement pension in 2010. Since then, a few countries have followed suit by raising the normal retirement age beyond 65 years (Italy, Israel, Ireland), while others have planned such an increase in the future (Poland and Germany for example). However, in the case of Italy and Israel, it currently only applies to men. In fact, other countries have indeed raised the age of eligibility, but it remains less than or equal to 65 years old (Chomik and Whitehouse, 2010).

There is little doubt about the effect of the increase in the normal retirement age in the contribution rates and the level of expenses related to the public pension system (Hering and Klassen, 2010a). Projections have shown that an increase of two, three, or four years of the legal retirement age would significantly reduce the expected increase in the contribution rate and pension expenses. Modifying age of eligibility to a pension, however, does not necessarily require an increase of the age of eligibility for a full pension (OECD, 1988). For example, access to early retirement can be restricted by raising the minimum age of entitlement to an actuarially adjusted pension. Other pension system parameters were also modified in the past to meet the challenges listed above. The choice of reforms affects three types of parameters (Martin and Whitehouse, 2008). Firstly, the level of benefits can be reduced by adjusting the method of calculation or the valuation and indexation of the pension. This method has been applied by France, Sweden and Finland, among others. Secondly, another type of reforms specifically targets incentives for early retirement by increasing its financial penalty .. Portugal, the United Kingdom and Austria, among others, have modified this parameter. Finally, some countries like Sweden, Poland, and Mexico have opted for the transition from a defined benefit plan to a defined contribution plan, at least in part. Of course, in most cases, the reforms adopted affect more than one parameter.

The debate in Canada

In 1996, Canada adopted its most serious reform of the retirement income system since the late 1960's. The long-term sustainability of the Canada Pension Plan (CPP) and the Quebec Pension Plan (QPP) was then questioned (Federal, Provincial and Territorial Governments of Canada, 1996; Régie des rentes du Québec, 1996). On the one hand, life expectancy had increased significantly since the late 1960s when the current structure of Canada's retirement income system was implemented. Life expectancy at age 65 increased from 15.3 years in 1966 to 18.4 years in 1995. On the other hand, over the years enhancements were made to the program and the Disability benefits (CPP) program was made more flexible. System costs were therefore higher than originally planned. In addition, the decline in fertility and the upcoming gradual arrival of the baby-boomers at retirement only amplified the difficulties faced by the CPP/QPP. Important reforms are then deemed necessary.

Increasing the age of entitlement to a full pension would have restricted the increase in the contribution rate to ensure the viability of the system in the long term, but the idea was dismissed (Townson, 2006). It was estimated that raising the normal retirement age from 65 to 67 would reduce the time spent in retirement by about 10% while reducing CPP expenditures by 4.2% (Federal, Provincial and Territorial

Governments of Canada, 1996; Régie des rentes du Québec, 1996). However, the same document warns that due to the transfer of pension expenditures to disability benefits for the 65-66 years old, savings would probably not have been as important. Several reforms were adopted instead, the most important being the rapid increase to the contribution rate to ensure fairness between generations.

In recent years, with the expected increase in the normal retirement age in some OECD countries, the idea of raising it in Canada has resurfaced. For example, Hogan and Lise (2003), without necessarily advocating such a policy show that with a slight increase in the retirement age, the length of retirement would remain constant given the gains in life expectancy. Beaujot et al (2007) saw this as a possible response to the rising costs of the public pension system. In the same vein, Denton and Spencer (2011) show the effect of continuous gains in life expectancy on the relative importance of the population of retirees in the future. The gradual and modest increase in the age of eligibility for public pension benefits would help to moderate the inevitable decline in the size of the workforce in relation to the size of the retired population, while reducing the contribution rate. Hering and Klassen (2010a; 2010b) suggest that such an increase actually makes possible a reduction in the contribution rate needed to maintain the public component of the retirement income system, while promoting intergenerational equity. Wolfson (2013) also proposes a major reform of the CPP/QPP that would significantly increase the replacement rate, while increasing the normal retirement age given, among other things, the gains in life expectancy.

Without emphasizing the urgency of such a measure for Canada, Hicks (2012) presents several arguments in favor of raising the normal retirement age. In addition to the usual justifications, such as the effect on growth of the workforce and reducing the pressure on the public pension system, Hicks points out, like Dodge et al (2010) and Maestas and Zissimopoulos (2010), the potentially positive effect of delayed retirement on the financial status of future retirees. As mentioned earlier, this last argument weights in the balance following the results of several studies showing that younger cohorts seem much more likely to experience a significant drop in their standard of living during the transition from work to retirement (Horner, 2009; Mintz and Wilson, 2013; Moore et al, 2010; MacDonald et al, 2011; Wolfson, 2013). In fact, in Canada the debate focuses more on whether or not to raise the replacement rate related to the public components of the retirement income system than on increasing the normal retirement age. However, Hicks (2012) stresses that these studies, not taking into account the tendency to postpone the effective retirement age, have the effect of overestimating the projections of the proportion of future retirees likely to experience a significant drop in their living standard at retirement.

It seems undeniable that raising the age of entitlement to a full pension would have the effect of relieving some of the challenges posed by an aging population. In Canada, this argument was put forward when anticipated changes to the age of eligibility for OAS were adopted (Government of Canada, 2012). This solution, which may seem rational at first, has not yet been introduced in the CPP/QPP. However, in the Canadian context, given the long-term sustainability of the CPP, the need (Townson, 2006) and urgency (Hicks, 2012) of such a measure were sometimes questioned.

Although the reasons behind the adoption of such a policy are numerous, questions have been raised in recent years about the link between the increases in life expectancy, the increase in the effective retirement age - whether or not linked to an increase in the normal retirement age - and social inequality among the elderly. The third part of this research brief focuses on studies bringing some

answers to these questions. It promotes the introduction of an intragenerational perspective in a debate that often only leaves room to the intergenerational perspective.

PART III

Life expectancy differential, normal retirement age and social inequalities

There is a common trend in almost all OECD countries: employment rates among 55-69 years old have been rising for a number of years (Maestas and Zissimopoulos 2010). If we can rejoice because of the lesser pressure caused by population aging on economic growth and the costs of the retirement income system, this trend also raises serious questions. In recent years there has been growing interest in the potential effect of raising the normal retirement age on social inequalities taking into account, for example, the differential evolution of life expectancy and disability-free life expectancy. Would raising the normal retirement age on behalf of intergenerational equity not have particularly adverse consequences on intragenerational inequalities and this, within generations for which we would like to ensure fairness? Would an increase in the effective retirement age, whether or not related to an increase in the normal retirement age, risks widening social inequalities?

The third part of this research brief is divided into four sections. The first two sections consist of a brief review of the literature on inequalities in mortality and morbidity. A few studies that focused on inequalities before and after age 65 were of particular interest. The third section presents studies on the effects of inequalities in life expectancy on the length and quality of retirement. Since reforms adopted to transform retirement income systems tend to increase the weight of private savings at the expense of income from government sources, the last section focuses on studies about the link between the sources of income at retirement and inequalities.

Inequalities in mortality

Gains on mortality have been spectacular during the twentieth century. In Canada, life expectancy at birth, for both sexes, increased from 57 years in 1921 to 81.3 years in 2011 (Canadian longevity Database). When the CPP/QPP was implemented in 1966, life expectancy was 71.9 years. In more recent times, life expectancy at 65 also experienced significant growth. Indeed, it increased from 13.6 years in 1921 to 15.2 years in 1966, a gain of less than two years. However, between 1966 and 2011 it gained more than five years, with life expectancy at 65 reaching 20.5 years. These significant gains partially explain population aging. They are also used as an argument for raising the normal retirement age. The magnitude of future gains is a source of debate, but life expectancy is still progressing significantly and relatively continuously (Bourbeau et al., 2011).

But is life expectancy relatively similar between different socioeconomic groups, and are the gains distributed equally? Whitehouse and Zaidi (2008) reviewed some fifty studies on the link between socioeconomic status and mortality, for different countries and periods. Whether socioeconomic status is determined by the profession, educational level, or income, the results of these studies are unanimous: the socio-economic status is an important determinant of differential mortality among individuals; the impact is greater on men than women; and, importantly, the differences tend to increase rather than decrease. Moreover, the advantage in favour of the most privileged is apparent both before and after retirement age.. However, gaps may vary significantly between countries. For example, the gaps in life expectancy at age 30 by educational level in Sweden were 2.9 years for women and 3.9 years for men compared to 3.8 years and 7.8 years, respectively, for OECD countries as a whole (OECD, 2013a).

Jemal et al. (2008) concluded that the growing inequalities between socioeconomic groups in the United States for the 1993-2001 period were the result of ever increasing gains on mortality among the better educated, and a stagnation, or even deterioration, of mortality for the less educated. Cutler et al. (2010) also wanted to better understand the reasons behind these divergent trends. It seems that the benefits associated with a better education have increased over the years for two reasons. On the one hand, access to medical care and adherence to a regimen prescribed by a health professional to improve one's life expectancy may have become more important but also more difficult, and the better educated have higher adherence rates. On the other hand, the environment, both in terms of job characteristics and the natural environment may have improved more significantly for the better educated.

Focusing on the situation in six European countries (Finland, Sweden, Norway, Denmark, England, and Italy), Mackenbach et al. (2003) analyzed the same issue. They first observed that relative inequalities measured by education level and occupations (manual and non-manual) increased in the six countries during two recent periods, 1981-1995 and 1991-1995. In most of these countries, the fall in mortality related to cardiovascular disease happened at a faster rate in the highest socioeconomic group. Smoking being more common among men from lower socioeconomic classes, Jha et al. (2006) wanted to estimate its effect on mortality inequalities in men aged 35-69 in England, Wales, Poland, the United States, and Canada in the mid-1990s. In each of these countries, the death risk was about twice higher in the most disadvantaged groups compared to the most privileged ones. Over half of this differential risk could be explained by smoking-related mortality.

Several Canadian studies have also confirmed the existence of differential mortality in favor of the most privileged (James et al., 2007; Mustard et al., 1997; Pampalon and Raymond, 2003; Roos et al., 2004; Wilkins et al. 2008). Using different measures to identify socio-economically disadvantaged individuals (education level, occupation, or income), the Canadian Follow-up study on mortality based on the 1991 census demonstrated that they exhibit higher mortality rates than socioeconomically advantaged people (McIntosh et al., 2009; Wilkins et al, 2008). Table 1 shows that life expectancy at 25 increases with each income decile; the difference between the opposite deciles being 7.4 years for men and 4.5 years for women. It is important to note that if European studies seem to show a widening gap between the life expectancy of the most privileged and underprivileged, it is not necessarily the case in Canada. In a study covering the 1971-1996 period, James et al. (2007) conclude that the gap in mortality between the two groups may have decreased.

Of course, one can think that differential life expectancies will lead to differences in the probability of surviving until the normal retirement age and in the years spent in retirement. A study by McIntosh et al. (2009) provides an important element by estimating the probability for a person aged 25 to reach age 75 (Table 1). Among men aged 25 in the poorest income decile, barely one in two could expect to reach 75 years old, against three in four among those in the highest income decile. For women, these proportions were 69.4% and 84.4%, respectively.

Table 1: Remaining life expectancy at age 25, percentage expected to survive to age 75, and health adjusted life expectancy, by income decile and sex, population aged 25 and over excluding institutional residents, Canada, 1991 to 2001

Income Decile	Life expectancy at 25 years old		% expected to survive to 75 years old		Health adjusted life expectancy	
	Men	Women	Men	Women	Men	Women
Decile 1 (the lowest)	48,6	56,5	51,2	69,4	37,0	42,9
Decile 2	49,5	57,0	53,6	73,1	40,0	45,6
Decile 3	51,1	58,2	58,7	76,6	43,0	48,4
Decile 4	52,1	59,1	61,7	78,9	43,7	49,3
Decile 5	52,9	59,4	64,2	80,1	46,4	49,7
Decile 6	53,2	59,8	65,4	80,8	46,5	51,2
Decile 7	53,8	59,9	67,3	81,7	47,4	50,7
Decile 8	54,4	60,1	69,1	82,0	48,4	51,8
Decile 9	54,8	60,6	70,9	83,4	49,0	52,2
Decile 10 (the highest)	56,0	61,0	74,6	84,4	51,1	52,4
Difference D10 – D1	7,4	4,5	23,3	15,0	14,1	9,5

Source: Census Mortality Follow-Up Study, 1991 to 2001, McIntosh et al. (2009). Tables 2 and 4.

Very few Canadian studies have estimated life expectancy gaps by socioeconomic status at age 65. Yet, it is essential to know whether the gap in life expectancy at birth is present throughout the life cycle. A first study by Wolfson et al. (1992) used the administrative files of the CPP to estimate the differential mortality among men between the ages of 65 and 74 over a period ending in 1988. The CPP data allowed the estimation of average employment earnings over a period of 10 to 20 years before reaching 65 years old. This study, based on a sample of 500,000 individuals, revealed the existence of a significant gradient in mortality according to income. The authors concluded that the Canadian public pension system was perhaps not as progressive as first thought. Furthermore, a study by Mustard et al. (1997) found that mortality was lower among seniors who had a higher income or level of education, but this relationship was weaker than in adults under 65 years old. Also, elderly people in the lowest income or education quartile had a lower mortality than their counterparts from the next quartile. It should be noted, though, that the study only covered Manitoba and excluded elderly people living in institutions. If the less fortunate have a greater likelihood of living in an institution, the results could be affected.

Two recent studies by the Office of the Chief Actuary (OCA) present interesting results, especially since it concerns OAS beneficiaries. The first (OCA, 2006) compared the life expectancy at age 65 in 2001 of OAS beneficiaries of three distinct groups: those who did not received the Guaranteed Income Supplement (GIS) and from whom some of their OAS was recovered (the well-off); those without GIS and recovery; and finally those receiving the GIS, the less well-off of all recipients. This approach provides an estimate of the life expectancy gap between socioeconomic groups. The results show that the advantage of the well-off persists even after age 65 (Table 2). Indeed, for men life expectancies at 65 were of 19.5, 17.2, and 15.0 years, respectively; a difference of 4.5 years between the most advantaged and the less well-off. For women, life expectancies for the same three groups were of 22.4, 21.1, and 19.0 years, respectively; a smaller gap compared to men, but still 3.4 years in favor of the most advantaged.

Table 2: Life expectancy of the beneficiaries of Old Age Security at age 65, by type of benefits and sex, 2001 and 2007 (in years)

Type of benefits	Men		Women	
	2001	2007	2001	2007
Total (of OAS beneficiaries)	16,6	17,8	20,2	21,0
Basic OAS pension with GIS	15,0	16,2	19,0	19,8
Basic OAS pension without GIS	17,4	18,6	21,1	21,9
Without basic pension recovery	17,2	---	21,1	---
With basic pension recovery	19,5	---	22,4	---

Sources: Office of the Chief Actuary, 2006 (Table 20), 2012 (Table 27)

While the first study referred to the 2001 mortality table, a second study (OCA, 2012) presents results for 2007. This time we can only compare two groups: OAS beneficiaries who did not receive the GIS and those who did (here the two wealthiest groups of the 2006 study are grouped together). Again, the results show an advantage for the wealthy (Table 2). For men, life expectancy at age 65 is 18.6 and 16.2 years, a difference of 2.4 years in favor of the most advantaged; equal to the gap observed in 2001⁷. For women, life expectancy at age 65 is 21.9 years and 19.8 years in favor of the more affluent, a gap of 2.1 years; identical to that observed in 2001. This study also shows the probability of survival between age 65 and 80 according to the type of OAS benefit received. For men, the probability of survival was 55% (against 50% in 2001) for a beneficiary with GIS, while it was 67% for those without GIS. For women, these probabilities were respectively 70% (around 67% in 2001) and 79%. These results appear to be very relevant for a discussion about the raising of the retirement age.

Another Canadian study recently focused on the Canada Pension Plan (CPP) and the Quebec Pension Plan (RRQ) retirees (Adam, 2012). Mortality between socioeconomic groups defined by their level of CPP/QPP benefits is analyzed for the period 1992-2007. The most advantaged group is defined as one receiving at least 95% of the maximum benefit, while the second group receives between 35% and 94% of that maximum benefit. The results show a much lower mortality in the most advantaged group, but also that the gap has increased over the period. Although these results apply to both men and women, the differences are greater for men and especially between 60 and 75 years old. If this trend was to continue, the ratio of years of contribution to the years spent in retirement for the most advantaged socioeconomic groups would decrease more than that of lower socioeconomic groups. This study, although covering a more recent period, arrives at conclusions very similar to that of Wolfson et al. (1992) conducted twenty years ago from the same data source.

Inequalities in morbidity

A growth in life expectancy does not necessarily translate into similar gains in good health. In fact, Desjardins and Légaré (1984) raised this issue and suggested a new definition for the threshold of old age and retirement. Instead of using age 65 as the threshold of old age, they proposed, as Ryder had already suggested before (1975), to define old age from a fixed number of years to live. This threshold would therefore increase with gains in life expectancy. For example, the normal retirement age could be set at an age where life expectancy would be equal to 10 years. Based on this example, that age would have been 71 years old in 1980 (Desjardins and Légaré, 1984). However, taking into consideration the quality of years to live alter the threshold of old age, but also of retirement. Their analysis showed that by taking into account healthy life expectancy, and defining the normal retirement age as the age at

⁷ Data not available in the study published in 2006

which that life expectancy would be equal to 10 years, the retirement age would have been 62 years for men. The link between life expectancy and healthy life expectancy brings a new dimension to the debate on the postponement of the retirement age (Légaré and Desjardins, 1987). As highlighted by Zweimüller and Staubli (2011), an increase in the retirement age to ages where disability rates are higher can even raise concerns about the transfer of state spending from pensions to disability and unemployment benefits. Also, we need to consider the inequalities in healthy life expectancy between socioeconomic groups. Indeed, if there are significant differences in the life expectancy of these groups, the disparities are at least as striking when it comes to healthy life expectancy.

In the UK the gap between life expectancy and healthy life expectancy is about 8 years for men and 9 years for women (Sinclair et al, 2014). The proportion of years of life spent in good health, however, shows significant differences between socioeconomic groups. For example, the men at the bottom of the social ladder can expect to live 87.3% of their life in good health and 77.3% without disability, while those occupying the top of the social ladder can expect to live 95.6 % of their life in good health and 87.5% without disability. For women, these proportions were 87.2% and 76.8% for those at the bottom of the social ladder against 93.7% and 83.8% for those who occupy the top of the social ladder. In the US, Crimmins and Saito (2001) showed that between 1970 and 1990 inequalities in healthy life expectancy by level of education were more important than inequalities in life expectancy. More worrying is the fact that during the same period a compression of morbidity among the better educated as opposed to an expansion of morbidity among the least educated was observed. Finally, a literature review of Elo (2009) concluded that, in America, Europe and Mexico, the highest level of education is a significant predictor of mortality, disability and perceived health.

Several Canadian studies have focused on the healthy life expectancy differential according to socioeconomic groups. A first measure of life expectancy without disability for Canada is carried out by Wilkins and Adams (1983) and results are presented according to the income quintile. The gap in life expectancy between the extreme quintiles is 6.3 years for men and 2.8 years for women (Table 3). If it is a significant gap, especially for men, the one observed in the calculation of life expectancy without disability is much more striking: this gap is 14.3 years for men and 7.6 years for women. The men of the poorest quintile were likely to spend a quarter (25.5%) of their lives with a disability, twice the proportion of the most advantaged men (12.4%). For women, these proportions were 21.8% and 15.0%, respectively.

Based on the Canadian census mortality follow-up study , McIntosh et al (2009) also analyzed life expectancy at age 25 adjusted for health according to the income decile (see the last two columns of Table 1). This time, we have results for the late 1990s. With a different health measure than what had been used by Wilkins and Adams (1983), we arrive at fairly comparable results. While men in the lowest income decile have a health adjusted life expectancy which is only three-quarters (76.9%) of their life expectancy at age 25, this proportion reached 91.2% for the men of the more affluent decile. For women, these proportions were 75.9% and 85.9%, respectively. With a different methodology in the measure of health and deprivation quintiles, Pampalon and Raymond's (2003) study on the population of Québec displays results quite comparable to those of McIntosh et al. (2009) in the late 1990s.

Table 3: Life expectancy (LE) and disability free life expectancy (DFLE) at birth by income quintile and sex, Canada, late 1970s

Type of benefits	Men		Women	
	LE	DFLE	LE	DFLE
Quintile 1	67,1	50,0	76,6	59,9
Quintile 2	70,1	57,9	77,6	61,8
Quintile 3	70,9	61,1	78,5	64,3
Quintile 4	72,0	62,6	79,0	63,5
Quintile 5	73,4	64,3	79,4	67,5
Difference Q5 – Q1	6,3	14,3	2,8	7,6

Source: Wilkins and Adams (1983), Table 3

Although there are many studies on the health status of the elderly in Canada or elsewhere, few of them estimate healthy life expectancies by socioeconomic status for the 65 years and older. However, using education as a measure of socioeconomic status, Majer et al (2011) demonstrated, for ten European countries, that better educated people live longer in good health before retirement and enjoy longer retirement. Differences in partial disability free life expectancy (DFLE) between the ages of 50 and 65 were of 2.1 years for men and 1.9 years for women, to the benefit of people with the highest level of education. In terms of life expectancy at age 65, the gap in favour of the latter was 3 years for men and 1.9 years for women, and for DFLE it was 4.6 years and 4.4 years, respectively. Similar trends were observed in the 10 European countries studied, even though inequalities tend to be higher in the South.

In France, studies have compared the life expectancy and DFLE of manual workers and managers before and after retirement (Cambois, Laborde and Robine, 2008; Cambois and Robine, 2011; Cambois and Barnay 2010). The results show that for both men and women, manual workers have a lower life expectancy and DFLE than managers. In terms of the trend in the gap between socio-economic groups, Crimmins and Saito (2001) estimated for the United States, the trend in life expectancy and healthy life expectancy at age 65 from 1970 to 1990 for men and women, according to the highest level of education attained and the ethnic group. Among white men with less than 9 years of schooling, the proportion of years lived in good health dropped from 49.4% to 45.3% between 1970 and 1990. Among the better educated, it has remained stable going from 62.2% to 62.0%, thus widening the gap over time. We are witnessing the same phenomenon among white women while these proportions went from 53.7% to 45.7% among the least educated, and from 60.9% to 61.1% among the highly educated.

Involuntary retirement and length of retirement: the effect of inequalities in morbidity and mortality

A lower life expectancy coupled with a marked disadvantage in the proportion of years lived in good health, means that it is much more likely for a socioeconomically disadvantaged person to be forced into involuntary retirement for health reasons. Stattin (2005) estimated at about 6% the number of Europeans forced to retire for health reasons. According to Finnish pension records, upper white-collar men retire on average three years later than manual workers (Lahelma et al, 2012). Essentially the same phenomenon is observed for women, but the difference is smaller. These differences are partly due to the higher risk of disability among manual workers. In 2010, one third of new Finnish pensioners have retired due to disability. These differences between socioeconomic groups raise the question of the quality of years spent in retirement or even the existence of retirement for some workers (Cambois and Robine, 2011). For example, manual workers are more likely to have a retirement period that will be short and in poor health, or they may never even retire (Cambois and Barnay, 2010).

After citing a number of recent studies showing the gap in life expectancy between different socioeconomic groups in favor of the most advantaged, and even in some cases the widening of these gaps in recent years, the OECD (2014) points out that these differences have implications on the ratio of years of contribution to the public pension system and years spent in retirement. This ratio will be inferior for those with a greater life expectancy. If they retire at the same age, workers in higher socioeconomic groups will receive pension benefits over a longer period than those from lower socioeconomic groups. Gaps that are likely to increase if we take into account the number of years of pension contributions since workers in higher socioeconomic groups often enter the labor market later after prolonged studies. This implies that at equal effective retirement age, workers in lower socioeconomic groups spend more time contributing to pensions. Finally, these disparities could also increase since the socioeconomically advantaged groups are also experiencing higher gains on mortality.

These results suggest that to benefit from a similar time spent in retirement, the less well-off would do well to retire earlier than the wealthy. It seems to be the case, at least in France. Andrieux and Chantel (2013) showed that the time spent in retirement is not systematically shorter for those of lower socioeconomic status for French men. Using occupational categories as a point of comparison, the results of their study show that for the 1942 cohort, the retirement age largely compensates for a lower life expectancy. However, for women, they found out that those who have longer life expectancy also take early retirement, increasing inequalities with regards to the life spent in retirement.

From the observation of a significant advantage in terms of life expectancy for the most advantaged, Whitehouse and Zaidi (2008) looked at the effect of an increase in the normal retirement age on financing the public pension system. Are disadvantaged people with a lower life expectancy really the big losers of an increase in the normal retirement age by funding the retirement of the most advantaged? According to their study, although the latter are slightly less penalized, raising the retirement age would have a similar effect on the value of a life annuity regardless of the socioeconomic group.

Privatization of the retirement income system, gender, and inequalities

In general, reforms to ease the pressure of population aging on government finances lead towards privatization of pensions (Martin and Whitehouse, 2008; Orenstein, 2011). Martin and Whitehouse (2008) showed the effect of reforms to retirement income systems in several OECD countries on the income replacement rate during the transition from work to retirement for future cohorts of retirees. It is clear that this replacement rate will decline in all of these countries, which will have the effect of increasing the importance of private savings, or postponing the effective retirement age, in order to minimize the risk of a significant drop in the standard of living upon retirement.

This greater importance of private savings does not necessarily require an increase in the normal retirement age. For example, several Canadian studies have shown the effect of the valuation of Old Age Security (OAS) based on prices, not wages, on the replacement rate of the public pension system over the years (Moore et al, 2010; MacDonald et al, 2011; Wolfson, 2013). The fall is important and will ensure that a greater proportion of replacement income will have to be provided by private savings during the transition from work to retirement. The gradual increase of the age of eligibility for OAS starting from 2023 may exacerbate this effect. Furthermore, it seems that an increase in the proportion of retirement income from private savings will lead to greater income inequality among the elderly (Van Vliet, 2012). This link had also been raised by Brown and Prus (2004; 2006) by comparing income

inequalities among the elderly in many countries based on the importance of private components in the retirement income. In general, these components make up a smaller share of total household income in countries with low levels of income inequality. However, we should note that in the past, Canada displayed similar income inequalities for the 65 years old and older to some countries where the proportion of retirement income from public components is significantly higher (Brown and Prus 2004). Moreover, the effect of increasing income inequalities within a cohort should not be overlooked. For example, McDaniel et al. (2013) showed that such income inequalities have an effect on self-reported health status within the same cohort.

The effect of the privatization of the retirement income system is not necessarily gender neutral. Various characteristics such as age, education level, income, job type, full/part-time status, and having dependent children are all associated with the private pension coverage rate. To the extent that private pensions represent a more important source of income once retired, greater will be the income inequalities between those with intermittent work histories or low-paid jobs and those with favorable working conditions (Foster and Smetherham, 2013). One might conclude that women are then more likely than men to be vulnerable to a trend towards privatization of the retirement income system; system which will tend to further reproduce gender inequality found on the labor market (Vara, 2013). Moreover, the Canadian Labour Congress (2012) showed that the expected increase in the age of eligibility for OAS in Canada will have a greater impact on women and the least advantaged, and that this measure will increase the low-income rate of those aged 65 and 66 years old by 6% and 17%, respectively (Clavet et al, 2013). The situation of women is exacerbated by a longer life expectancy which would be more affected by an inadequate or inexistent indexation of their retirement income from private sources (Ginn & MacIntyre, 2013). Also, raising the normal retirement age increases the possibility of having to leave the labour market before reaching the age of eligibility for a full pension because of the need to care for others, a possibility that is significantly higher among women (Guberman and Maheu, 1999; Fast et al., 2001; Keating et al, 2012;. Medjuk and Keefe, 1997; Proulx, 2014; Sinclair et al, 2014).

DISCUSSION AND CONCLUSION

Population aging, accelerated by the gradual arrival of the baby-boomers in the 65 and older age group and the continuous rise in life expectancy at age 65, has the effect of slowing the growth of the workforce and the economy, and feeds the discussions on intergenerational equity. Many advanced economies have responded to this challenge by raising the normal retirement age or adopting reforms mainly aimed at delaying retirement and reducing the weight of public pension programs within the retirement income system.

The first part of this research brief showed that in Canada some trends are playing in favor of a rise in the effective retirement age, this, even in a context where no action would be taken to explicitly raise the normal age of retirement. This finding is related, among others, to the fact that Canada already has a retirement income system that leaves a relatively large place for private savings for middle and high-income workers who would rather avoid a significant decrease in living standard upon retirement (Horner, 2009). The professional and family life cycle, attitudes towards savings and debt, as well as job and labour market characteristics then become important determinants of the effective retirement age. In addition, health has always played an important role in the decision to retire. The consequences of

poor health are particularly important when delayed retirement is essential to maintaining the standard of living.

In the context of population aging and the increase in life expectancy, the postponement of the effective retirement age represents a positive trend. For some, delaying retirement will be a voluntary decision and the opportunity to pursue a rewarding professional activity in favorable conditions. However, facing the prospect of having to postpone retirement, Turner (2011) identified three groups of vulnerable workers: those whose life expectancy is lower; those who are not able to work at older ages due to physical limitations or physically demanding jobs; and those who become unemployed before reaching the age of eligibility for retirement and cannot find another job. For these vulnerable workers, relying on a few more years in the labour market to avoid a significant loss in standard of living upon retirement can pose significant risks, both at the individual, family or societal level. The results of studies on the link between socioeconomic status and life expectancy and healthy life expectancy are unanimous. Regardless of the indicator of socioeconomic status used, studies show a positive correlation between these measures. The less fortunate live on average less healthy and shorter lives. They are therefore more at risk of being unable to sufficiently extend their time in employment to reach a normal retirement age that would be raised, or to simply to avoid a significant drop in living standards upon retiring.

In addition, a widening of the gaps in life expectancy and healthy life expectancy would have the effect of widening social inequalities. If European and US studies generally show a widening gap between the life expectancy of the most and least advantaged social groups, the situation is more obscure in Canada. On the one hand, the Census Mortality Follow-Up Study of 1991 shows that the gap is significant. On the other hand, few studies on the evolution of these differences were conducted over the past two decades. OCA studies (2006 and 2012) on mortality suggest that, among those 65 years old and older, the gap persists, but remains constant in terms of years, though both studies only cover the 2001 to 2007 period. However, a study by Adam (2012) shows that the gap in mortality between 60 and 94 years old has widened among CPP/QPP beneficiaries over the 1992-2007 period. This trend was more important for men than women. If future gains in life expectancy at age 65 are greater among the better-off, pushing back the normal retirement age may also increase inequalities in terms of life expectancy at retirement among future cohorts of retirees. The generations in whose name the notion of intergenerational equity has been defended would risk being those that would bear the brunt of growing social inequalities once retired. It is essential to develop studies in order to monitor the evolution of these measures according to socioeconomic status in the coming years.

Canada's retirement income system is seen as one of the most effective because of its performance in tackling poverty among elderly people, as well as its ability to prevent a significant drop in the standard of living after retirement. Canada achieves these goals while the cost of the public pension system in percentage of GDP is one of the lowest among OECD countries (Australian Center for Financial Studies, 2014; Whitehouse, 2010). For most of these countries, projections of public spending on pensions as a percentage of GDP in 2060 show, despite the adoption of significant reforms, that they will exceed what is expected for Canada (OECD, 2013b). However, as we have seen, Canada is not immune to a trend of growing inequalities among the elderly in the coming decades. Especially since the most redistributive part of the system, the Old Age Security, is likely to see its age of eligibility increase from 65 to 67. In fact, one might think that if the socioeconomic inequalities were to decrease in the future, it will be more because the middle class and the wealthy will have experienced a significant decline in living

standards once retired. There would then be a decline in inequalities at the expense of a significant decline in living standards for a large portion of new retirees, and of a widening gap between the living standards of Canadians of working age and those who are retired.

However, Canada is in an enviable position to undertake reforms of its retirement income system. This allows taking decisions based on long-term objectives in terms of both the intragenerational and intergenerational equity. Reforms must take into account population aging, its inevitable and sustainable character, and the possibility to see unexpected gains in life expectancy at age 65, all the while realizing that these gains are likely to widen inequalities among future retirees. If, in a context of population aging, delaying retirement brings significant benefits to both the individual and the society, it can also result in growing inequalities among the elderly, especially if this postponement becomes a prerequisite to avoid poverty or a significant drop in living standards. In a debate that for years was almost exclusively centered on intergenerational equity, longer life and the need to postpone retirement now adds an important element: one must wonder about the potential effects of delayed retirement on intragenerational equity (Esping-Andersen and Myles, 2005). Over the next two decades, the living conditions of more than a quarter of Canada's population will depend largely on the success of our retirement income system. Failure would not only be disastrous for the elderly; it would be for the society as a whole if only because of their demographic weight.

This research brief also allowed identifying a significant lack of data in Canada to estimate life expectancy and healthy life expectancy by socioeconomic status, and especially the evolution of these estimates. This gap⁸ is especially important when the population under study is limited to people aged 65 years and older. In some cases, studies excluded people living in institutions, which is also particularly problematic when we are interested in the elderly population (Légaré et al, 2015). The use of administrative data such as those from the CPP/QPP and OAS appear essential in order to answer questions of particular concern for these programs which have a decisive impact on the welfare of the elderly.

⁸ Using data from the 2012 Canadian Survey on Disability it could be possible to make recent estimate of these differential life expectancies

REFERENCES

- Adam, L. (2012). *The Canadian Pensioners Mortality Table Historical Trends in Mortality Improvement and a Proposed Projection Model Based on CPP/QPP Data as at December 31, 2007*, Université Laval, QC, Canada.
- Andrieux, V. and C. Chantel (2013). « Espérance de vie, durée passée à la retraite », Direction de la recherche, des études, de l'évaluation et des statistiques (DREES), *Dossiers Solidarité et Santé*, no 40, 34p.
- Australian Center for Financial Studies (2014). *Melbourne Mercer Global Pension Index Report*. 78p.
- Barnay, T. and T. Debrand (2006). La participation à l'emploi des seniors : l'importance de la santé. *Actes des colloques de l'AIDELF*, pp. 579-590. <http://www.erudit.org/livre/aidelf/2006/001434co.pdf>.
- Canadian Longevity Database, <http://www.bdlc.umontreal.ca/BDLC/index.htm>
- Battams N., N. Spinks and R. Sauvé (2014). *L'état actuel du budget de la famille canadienne : rapport 2013-2014*. L'Institut Vanier de la famille (June 2014).
- Beaujot, R. (2004). « Retardement des transitions de la vie : Tendances et conséquences ». *Tendances contemporaines de la famille*. Ottawa, L'Institut Vanier de la Famille : 53p.
- Beaujot, R., K. McQuillan and Z. Ravanera (2007). "Population change in Canada to 2017 and beyond: the challenges of policy adaptation". *Horizons*, 9 (4): 3-12.
- Bélanger, A., Y. Carrière and P. Sabourin (2015). *Canadian National Report, Joint Programming Initiative "More Years, Better Lives - The Challenges and Opportunities of Demographic Change"*.
- Blau, D.M. and R. M. Goodstein (2010). Can Social Security Explain Trends in Labour force Participation of Older Men in the United States? *Journal of Human Resources*, 45 (2): 329-363
- Bourbeau, R., J. Légaré and M. Ouellette (2011). *Revue de la littérature sur l'évolution future de l'espérance de vie et de l'espérance de vie en santé*. SEDAP Research Paper no. 289, 101p.
- Brown, R.L. and S.G. Prus (2004). « Social Transfers and Income Inequality In Old Age", *North American Actuarial Journal*, 8(4): 30-36.
- Brown R.L. and S. G. Prus (2006). "Income inequality over the later-life course : a comparative analysis of seven OECD countries", *Annals of actuarial science*, published by the Institute of Actuaries and the Faculty of Actuaries 1(2): 307-317.
- Burleton, D. and D. Petramala (2011). « L'endettement des ménages canadiens prend de l'âge ». *Commentaire Service économique TD*, 4p.
- Cambois and Barnay (2010). « Espérances de vie, espérances de vie en santé et âges de départ à la retraite: des inégalités selon la profession en France », *Retraite et Société*, 59 :194-205.
- Cambois, E., C. Laborde and J-M Robine (2008). « La double peine des ouvriers : plus d'années d'incapacité au sein d'une vie plus courte », *Population et Sociétés*, Bulletin d'information 441, 4p.
- Cambois, E. and J.-M. Robine (2011). « Pour qui la retraite sonnera ? Les inégalités d'espérance de vie

en bonne santé avant et après 65 ans », *Bulletin épidémiologique hebdomadaire de l'Institut national de veille sanitaire*, n° 8-9, mars 2011, pp82-86.

CANSIM, Tableau 051-0001. Population selon le sexe et le groupe d'âge, par province et territoire. Statistique Canada.

CANSIM, Tableau 280-0020. Régimes de pension agréés (RPA), adhérents et valeur marchande de l'actif, selon la méthode de calcul des cotisations de l'employeur, le secteur, le genre de régime et l'état contributif du régime. Statistique Canada.

CANSIM, Tableau 282-0002. Enquête sur la population active (EPA), estimations selon le sexe et le groupe d'âge détaillé. Statistique Canada.

Carrière, Y., J. Légaré and J. Purenne (2016, accepted for publication). « Vivre et travailler plus longtemps : la réalité des baby-boomers », *Cahiers québécois de démographie*.

Carrière, Y. and D. Galarneau (2011). "Reporter sa retraite : une tendance récente ?", *L'emploi et le revenu en perspective*, Statistique Canada, catalogue no. 75-001, hiver 2011, 3-18.

Carrière, Y and S. Pesme (2012). *Évolution des caractéristiques des baby-boomers : Participation au marché du travail, revenu et passage à la retraite*. Entretiens Jacques Cartier (colloque sur la démographie). Lyon (France), novembre 2012.

Carrière, Y., L. Martel, J. Légaré and J.-F. Picard (2014). *La contribution de l'immigration à la taille et à la diversité ethnoculturelle des futures cohortes de personnes âgées au Canada*, 18e Colloque international de l'AIDELF, Bari, Italie, 26-29 mai 2014.

Chen, X., M. Fougère and B. Rainville (2012). Financial Factors and Labour Market Transitions of Older Workers in Canada. *International Journal of Population Research*, 2012.

Chomik, R. and E. Whitehouse. 2010. «Trends in pension eligibility ages and life expectancy, 1950-2050». *OECD Social, Employment and Migration Working Paper*, OECD. 27p.

Clavet, N.-J., J.-Y. Duclos, B. Fortin and S. Marchand (2014). *Reforming Old Age Security : Effects and Alternatives*. Cahier de recherche/Working paper, Chaire de recherche Industrielle Alliance sur les enjeux économiques des changements démographiques, 14-10, décembre 2014, 18 p.

Clavet, N.-J., J.-Y. Duclos, B. Fortin, S. Marchand and P.-C. Michaud (2013). *Les dépenses en santé du gouvernement du Québec, 2013-2030: projections et déterminants*, Série scientifique, CIRANO, 12p.

Congrès du travail du Canada (2012). *Répercussions de la hausse de l'âge d'admissibilité à la sécurité de la vieillesse*. <http://www.congresdutravail.ca/sites/default/files/implications-raising-age-of-eligibility-2012-01-31-fr.pdf>, 11p.

Cooke, M. (2006). "Policy Changes and the Labour Force Participation of Older OWrkers: Evidence from Six Countries." *Canadian Journal of Aging*, 25(4): 387-400.

Crimmins, E.M. and Y. Saito (2001). Trends in healthy life expectancy in the United States, 1970–1990: gender, racial, and educational differences. *Social Science & Medicine*, 52(11):1629-1641.

Cutler, D.M., Lange, F., Meara, E., Richard, S., and Ruhm, C.J. (2010). *Explaining the Rise in Educational Gradients in Mortality*. NBER Working Paper No. 15678. Cambridge, MA: National Bureau of Economic Research. Available: <http://www.nber.org/papers/w15678> [accessed January 7, 2011].

- Denton, F.T., C.H. Feaver and B.G. Spencer. 2009. *Cohort Working Life Tables for Older Canadians*, SEDAP, Research Paper n° 247, Social and Economic Dimensions of an Aging Population, Hamilton, McMaster University, 69 p.
- Denton, F. and B. Spencer (2011). "Age of Pension Eligibility, Gains in Life Expectancy, and Social Policy." *Canadian Public Policy*, 37(2): 183-199.
- Desjardins, B. and J. Légaré (1984). « Le seuil de la vieillesse; quelques réflexions de démographes », *Sociologie et sociétés*, vol. 16 (2), pp. 37-48.
- Dodge, D.A., A. Laurin and C. Busby (2010). *The Piggy Bank Index: Matching Canadians' Saving Rates to Their Retirement Dreams*. Pension Papers, C.D. Howe Institute, 10p.
- Elo, I.T. (2009). Social class differentials in health and mortality: Patterns and explanations in comparative perspective. *Annual Review of Sociology*, 35, 553–572.
- Esping-Andersen, G. and J. Myles (2005). *Sustainable and equitable retirement in a life course perspective*. DemoSoc Working Paper no. 2005-03, 20p.
- Fast, J., J. Eales and N. Keating (2001). *Economic Impact of Health, Income Security and Labour Policies on Informal Caregivers of Frail Seniors*, Status of Women Canada, 79p.
- Federal, Provincial and Territorial Governments of Canada (1996). *An Information Paper for Consultations on the Canada Pension Plan*. 62p.
- Foster, L. and J. Smetherham. (2013). "Gender and Pensions: An Analysis of Factors Affecting Women's Private Pension Scheme Membership in the United Kingdom." *Journal of Aging & Social Policy* 25(3): 197-217.
- Ginn, J. and K. MacIntyre. (2013). "UK Pension Reforms: Is Gender Still an Issue?". *Social Policy and Society*, 12, 91-103.
- Godbout, L., S. St-Cerny, M. Arseneau, N. H. Dao and P. Fortin (2014). *La soutenabilité budgétaire des finances publiques du gouvernement du Québec*. Document de travail 2014/01, Chaire de recherche en fiscalité et en finances publiques, Université de Sherbrooke, 66p.
- Gomez, R. and M. Gunderson (2011). « For Whom the Retirement Bell Tolls: Accounting for Changes in the Expected Age of Retirement and the Incidence of Mandatory Retirement in Canada." *Canadian Public Policy*, 37(4), 513-539.
- Gougeon, P. (2009). « Les pensions en transition », *L'emploi et le revenu en perspective*, Statistique Canada, catalogue no. 75-001, 10(5), 17-25.
- Government of Canada (2012). *Emplois, croissance et prospérité à long terme: Le plan d'action économique de 2012. Le budget en bref*. <http://www.budget.gc.ca/2012/rd-dc/brief-bref-2012-fra.pdf>.
- Guberman, N. and P. Maheu (1999). « Combining Employment and Caregiving: An Intricate Juggling Act", *Canadian Journal on Aging / La Revue canadienne du vieillissement*, 18(1) : 84-106.
- Hering, M. and T.R. Klassen (2010a). *Strengthening Fairness and Funding in the Canada Pension Plan: Is Raising the Retirement Age an Option?* Social and Economic Dimensions of an Aging Population Research Papers 263, McMaster University, 61p.

Hering M. and T. R. Klassen (2010b). *Is 70 the new 65? Raising the eligibility age in the Canada Pension Plan*, Mowat Centre for Policy Innovation, 20 p.

Hicks, P. 2012. «Later retirement: the Win-Win solution». Commentary no. 345, C.D. Howe Institute, 23p.

Hogan, S. and J. Lise (2003). «Espérance de vie, espérance de vie en santé et cycle de vie». *Horizons*, 6, 2: 17-20.

Horner, K. (2009). *Retirement Saving by Canadian Households*. Report for the Research Working Group on Retirement Income Adequacy. <http://www.fin.gc.ca/activty/pubs/pension/ref-bib/horner-eng.asp>

James, P.D., R. Wilkins, A.A. Detsky, P. Tugwell and D.G. Manuel (2007). "Avoidable mortality by neighbourhood income in Canada: 25 years after the establishment of universal health insurance". *Journal of Epidemiol Community Health*, 61:287-296.

Jemal, A., Ward, E., Anderson, R.N., Murray, T., and Thun, M.J. (2008). "Widening of socioeconomic inequalities in U.S., death rates, 1993–2001". *PLoS ONE*, 3(5), e2181.

Jha, P., Peto, R., Zatonski, W., Boreham, J., Jarvis, M.J., and A.D. Lopez. 2006. « Social inequalities in male mortality, and in male mortality from smoking: Indirect estimation from national death rates in England and Wales, Poland, and North America. », *Lancet*, 368, 9533 : 367–370.

Keating, N., D. Lero, J. Fast, S. Lucas and J. Eales (2012). *A framework and literature review on the economic costs of care*, Center for Families, Work and Well-Being, Research on Aging, Policies and Practice, 107p. The Contribution of Long Term Economic Costs to

Keefe, J.M. and S. Medjuk (1997). "The Contribution of Long Term Economic Costs to Predicting Strain Among Employed Women Caregivers", *Journal of Women & Aging*, 9(3): 3-25.

Kollmann, G. (2002). *Social Security : raising the retirement age. Background and Issues*. CRS Report for Congress, Congressional Research Service : 6p.

Lahelma, E., H. Uusitalo and P. Martikainen (2012). « Longer work careers through tackling socioeconomic inequalities in disability retirement », *European Journal of Public Health*, 22(3):299–300.

LaRochelle-Côté, S., G. Picot and J. Myles (2010). « Remplacement du revenu pendant la retraite », *L'emploi et le revenu en perspective*, Statistique Canada, catalogue no 75-001, août 2010, pp. 5-13.

LaRochelle-Côté, S., J. Myles and G. Picot (2008). « Sécurité et stabilité du revenu à la retraite au Canada », Statistique Canada, catalogue no 11F0019, no 306, 62 p.

Le Bourdais, C. and É. Lapierre-Adamcyk (2004). Changes in conjugal life in Canada: Is cohabitation progressively replacing marriage? *Journal of Marriage and Family*, 66 (4) : 929–942.

Lefebvre, P., P. Merrigan and P.-C. Michaud (2011). *The Recent Evolution of Retirement Patterns in Canada*, McMaster University, Social and Economic Dimensions of an Aging Population Research Papers. 50p.

Légaré, J., Y. Décarie, K. Deslandes and Y. Carrière (2015) "Canada's Oldest Old: A Population Group which is Fast Growing, Poorly Apprehended and at Risk from Lack of Appropriate Services," *Population*

Change and Lifecourse Strategic Knowledge Cluster Discussion Paper Series/ Un Réseau stratégique de connaissances Changements de population et parcours de vie Document de travail: Vol. 3: Iss. 1, Article 9. Available at: <http://ir.lib.uwo.ca/pclc/vol3/iss1/9>

Légaré, J. and B. Desjardins (1987). « Pour une remise en question de l'universalité de l'âge normal de la retraite », *European Journal of Population/Revue Européenne de Démographie*, 3 :123-129.

Leibfritz, W. (2002). « Retiring later makes sense », *Observer*, No. 234 October 2002, pp.36-38.

Lestheaghe, R. (1995). "La deuxième transition démographique dans les pays occidentaux: une interprétation", in *Transitions démographiques et société. Chaire Quetelet, 1992*, Académia/ Harmattan, 133-180.

Lindsay, C. and M. Almey (2006). « Travail rémunéré et non rémunéré », *Femmes au Canada : Rapport statistique fondé sur le sexe*, cinquième édition, Ministre de l'Industrie, catalogue no. 89-503, pp. 107-140.

MacDonald, B-J., Moore, K., Chen, H., and R. Brown. 2011. "Canadian National Retirement Risk Index: Employing Statistics Canada's LifePaths to Measure the Financial Security of Future Canadian Seniors." *Journal of Canadian Public Policy* 37(1): 73-94.

Mackenbach, J.P., Bos, V., Andersen, O., Cardano, M., Costa, G., Harding, S., Reid, A., Hemström, Ö., Valkonen, T., and Kunst, A.E. (2003). Widening socioeconomic inequalities in mortality in six Western European countries. *International Journal of Epidemiology*, 32(5), 830–837.

Maestas, N and J. Zissimopoulos (2010). « How longer work lives ease the crunch of population aging ». *Journal of Economic Perspectives*, 24(1): 139-160.

Marier, P. (2013). "Sweden's pension system: still a social model? The Swedish pension reform and its aftermath." *Inroads: A Journal of Opinion*, 33 (Summer-Fall 2013) pp.54-59.

Majer, I. M., et al. (2011). "Socioeconomic inequalities in life and health expectancies around official retirement age in 10 Western-European countries." *J. Epidemiol. Community Health* 65(11): 972-979.

Martin J. P. and E. Whitehouse (2008). *Reforming retirement-income systems: Lessons from the recent experiences of OECD countries*. OECD Social, Employment and Migration Working Paper, 66: 27p.

McDaniel, S., A. Gazso, H. McCague and R. Barnhart (2013). « Les disparités en matière de santé au fil du vieillissement: une comparaison du parcours de vie des premiers baby-boomers et des pré-baby-boomers au Canada ». *Sociologie et Societies*, XLV(1): 43-65.

McIntosh, C.N., P. Finès, R. Wilkins and M.C. Wolfson (2009). "Disparités selon le revenu dans l'espérance de vie ajustée sur la santé chez les adultes au Canada, 1991 à 2001". *Rapports sur la santé*, Statistique Canada, no. 82-003-X, 20(4): 59-70.

Milan, A. (2000). "Les familles: 100 ans de continuité et de changement", *Tendances sociale canadiennes*, Statistique Canada, Catalogue no. 11-008, 13 p.

Mintz, J. and Wilson, T. (2013). *Reform proposals for replenishing retirement savings*. SPP Research Papers 6 :9, University of Calgary School of Public Policy.

Moore, K. D., W. Robson and A. Laurin (2010). *Canada's Looming Retirement Challenge: Will Future Retirees Be Able to Maintain Their Living Standards upon Retirement?* Pension papers, no. 317, December 2010, Toronto, C.D. Howe Institute, 25 p.

- Mustard, C.A., S. Derksen, J.M. Berthelot, M. Wolfson and L. Roos (1997). "Age-specific Education And Income Gradients In Morbidity And Mortality In A Canadian Province.", *Social Science Medecine*. 45(3): 383-397.
- Myles, J. (2000). "The Maturation of Canada's Retirement Income System: Income Levels, Income Inequality and Low Income Among Older Persons", *Canadian Journal of Aging/La revue canadienne du vieillissement*, Volume 19, No. 03, Fall 2000, pp 287-316.
- Nault, F. (1990). « Vieillissement et scolarisation de la population québécoise ». *Cahiers québécois de démographie*, 19, 2 : 309p.
- Office of the Chief Actuary (OCA) (2006). *Étude actuarielle no 5 : Programme de la Sécurité de la vieillesse – Résultats de la mortalité*. Bureau de l'Actuaire en chef. Bureau du surintendant des institutions financières Canada, février 2006, 65p.
- Office of the Chief Actuary (OCA) (2012). *Étude actuarielle no 11 : Programme de la Sécurité de la vieillesse – Résultats de la mortalité*. Bureau de l'Actuaire en chef. Bureau du surintendant des institutions financières Canada, juillet 2012, 96p.
- Orenstein, M.A. (2011). "Pension privatization in crisis: Death or rebirth of a global policy trend?", *International Social Security Review*, 64(3):65-80.
- Organisation for Economic Co-operation and Development (OECD) (1988). *La réforme des régimes publics de pensions*. Paris.
- Organisation for Economic Co-operation and Development (OECD) (2013a). *Health at a Glance 2013: OECD Indicators*, OECD Publishing.
- Organisation for Economic Co-operation and Development (OECD) (2013b). Projections de dépenses publiques de retraite, 2010-60, in *Panorama des pensions 2013*, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/pension_glance-2013-table91-fr
- Organisation for Economic Co-operation and Development (OECD) (2014). *OECD Pensions Outlook 2014*, OECD Publishing, 205p.
- Osberg, L. (2001). "Poverty among Senior Citizens: A Canadian Success Story", in Patrick Grady & Andrew Sharpe (ed.) *The State of Economics in Canada: Festschrift in Honour of David Slater*, Centre for the Study of Living Standards, pages 151-181, 2001.
- Pampalon R. and G. Raymond (2003). Indice de défavorisation matérielle et sociale : son application au secteur de la santé et du bien-être. In: *Santé, Société et Solidarité*, n°1, 2003. Pauvreté et exclusion. pp. 191-208.
- Park, J. 2010. « Facteurs de santé et retraite anticipée chez les travailleurs âgés ». *L'emploi et le revenu en perspective*, Statistique Canada, catalogue no. 75-001, 11, 6 : 5-14.
- Proulx, C. (2014). *Juggling Spheres of Life: The Provision of Unpaid Care over the Life Course and Its Impact on Men's and Women's Employment Trajectories*. Thesis submitted to McGill University in partial fulfillment of the requirements of the degree of Doctor of Philosophy, October 20th, 2014.
- Ravanera, Z.R., R. Fernando, T.K. Burch and C. Le Bourdais (2002). « The Early Life Courses of Canadian Men: Analysis of Timing and Sequences of Events". *Canadian Studies in Population*, 29(2), pp. 293-312.

- Regan, C. (2012). *Canada's Looming Fiscal Squeeze Updated*. A Macdonald-Laurier Institute Publication, 35p.
- Régie des rentes du Québec (1996). *Pour vous et vos enfants: garantir l'avenir du régime de rentes du Québec*. Document de consultation, Une réforme du Régime des rentes du Québec, 50p.
- Robinson, P. (2005). "Working later. Raising the effective age of retirement". In *Working later. Raising the effective age of retirement*, P. Robinson, T. Gosling and M. Lewis, Institute for Public Policy Research, pp. 1-30.
- Roos L.L., J. Magoon, S. Gupta, D. Chateau and .P.J. Veugelers (2004). « Socioeconomic determinants of mortality in two Canadian provinces: Multilevel modelling and neighborhood context”, *Social Science and Medicine* 59: 1435-1447.
- Ryder, N. (1975). "Notes on Stationary Populations”, *Population Index*, 41(1):3-38.
- Schellenberg, G. and Y. Ostrovsky (2008). « Rapport de l'Enquête sociale générale de 2007. Planification de retraite et attentes des travailleurs plus âgés ». *Tendances sociales canadiennes*, Statistique Canada, catalogue no. 11-008, 86 : 11-35.
- Schirle T. (2008). « Why have the labor force participation rates of older men increased since the mid-1990s? ». *Journal of Labor Economics*, 26, 4: 549-594.
- Schirle, T. (2010). "Health, pensions, and the retirement decision: Evidence from Canada”, *Canadian Journal on Aging*, 29(4), 519-527.
- Sinclair, D., K. Moore and B. Franklin (2014). *Linking state pension age to longevity, tackling the fairness challenge*. ILC-UK report.
- Singh, G. and A. Verma (2003). « Work history and later-life labor force participation: evidence from a large telecommunications firm”, *Industrial & Labor Relations Review*, 56(4), pp. 699-715.
- Statistics Canada (2010). *Population Projections for Canada, Provinces and Territories, 2009 to 2036*. Catalogue no. 91-520, 248p.
- Stattin, M. (2005). "Retirement on grounds of ill health”, *Occupational and Environmental Medicine*, 62:135–140.
- Staubli, S. and J. Zweimüller. 2011. « Does Raising the Retirement Age Increase Employment of Older Workers? », The Institute for the Study of Labor, Discussion paper No. 5863.
- Stupar, D. (2013). *Norwegian consumer's ability to make optimal financial decisions and save for retirement: a behavioural economic perspective*. Norwegian University of Life Sciences. UMB School of Economics and Business Master Thesis: 82p.
- Thode, E. (2003). "Securing pensions for the next fifty years - achievements of recent reforms in selected countries : pension reforms in Europe." CESifo DICE report : *Journal for Institutional Comparisons*, 1(1): 3-10.
- Townson, M. (2006). *Growing older, working longer: the new face of retirement*. Canadian Centre for Policy Alternatives, 254p.
- Turner, J. A. (2011). Longevity policy : facing up to longevity issues affecting social security, pensions, and older workers. Kalamazoo, Michigan, W.E. Upjohn Institute for Employment Research.

- United Nations (2013). *World Population Prospects: The 2012 Revision*. Department of Economic and Social Affairs, Population Division.
- Uppal, S. (2010). "Labour market activity among seniors", *Perspectives on Labour and Income*, Statistics Canada, catalogue no. 75-001, 11(7): 18p.
- Vallin, J. (2002). "The end of the demographic transition: Relief or concern?", *Population and Development Review*, vol. 28, no. 1 (March, 2002), pp. 105-120.
- Van Vliet, O., et al. (2012). "Pension reform and income inequality among older people in 15 European countries." *International Journal of Social Welfare*, 21: S8-S29.
- Vara, M. J. (2013). "Gender Inequality in the Spanish Public Pension System." *Feminist Economics* 19(4): 136-159.
- Wilkins, R. and O. Adams (1983). Health Expectancy in Canada, Late 1970s: Demographic, Regional, and Social Dimensions", *American Journal of Public Health*, 73(9):1073-1080.
- Wilkins, R., M. Tjepkema, C. Mustard and R. Choinière (2008). « Étude canadienne de suivi de la mortalité selon le recensement, 1991 à 2001 », *Rapports sur la santé*, Statistique Canada, catalogue 82-003, vol.19, no 3, pp. 27-48.
- Whitehouse, E.R. (2010). *Canada's retirement-income provision: An international perspective*, Department of Finance, Canada. <http://www.fin.gc.ca/activity/pubs/pension/ref-bib/whitehouse-eng.asp>.
- Whitehouse, E. R. and A. Zaidi (2008), "Socio-Economic Differences in Mortality: Implications for Pensions Policy", *OECD Social, Employment and Migration Working Papers*, No. 71, OECD Publishing.
- Wolfson, M. (2013). *Not-So-Modest Options for Expanding the CPP/QPP*. Institute for Research on Public Policy, IRPP Study 41, 25 p.
- Wolfson, M., G. Rowe, J.F. Gentleman and M. Tomiak (1992). *Revenus de carrière et décès : Une analyse longitudinale de la population âgée masculine du Canada*. Direction des études analytiques, Document de recherche no. 46, Statistique Canada, 47p.