

# PROMOTING PHASED RETIREMENT

Budget | 2007-2008

**Promoting phased retirement**

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## SUMMARY

### **Promoting phased retirement**

#### **□ Government commitment to encourage phased retirement**

In the wake of the Forum des generations held in October 2004, the government decided on a number of initiatives to meet the challenges posed by Québec's public finances and demographic changes.

One of those initiatives consisted in developing measures to encourage phased retirement in pension plans so as to keep individuals close to the end of their career working for a longer time. Phased retirement enables individuals to leave the labour market gradually by continuing to work part-time for a defined period rather than taking full retirement right away.

The government set up a committee consisting of representatives of several government departments as well as employer and labour groups to propose solutions to make phased retirement more attractive.

In the *2006-2007 Budget Speech*, further to the committee's recommendations, the Québec government made a commitment to work with the federal government for the purpose of implementing the new provisions to encourage phased retirement. In this respect, the Minister of Finance of Québec presented his federal counterpart with the proposals set forth in this document. The federal government is currently analysing these proposals.

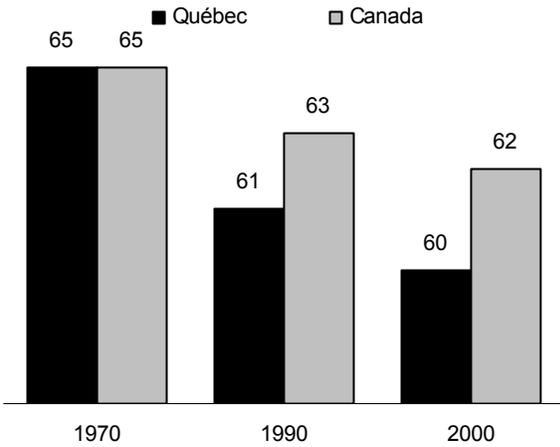
In November 2006, the Québec government passed a recommendation designed in particular to authorize the ministère des Finances du Québec, jointly with the ministère de l'Emploi et de la Solidarité sociale and the Régie des rentes du Québec, to continue talks with the federal government with a view to applying the new provisions promoting phased retirement. In the *2007-2008 Budget Speech*, the Québec government is presenting the detailed analysis behind the proposals for phased retirement.

#### **□ Workers retiring early**

The average retirement age in Québec has fallen substantially over the last 30 years. For example, between 1970 and 2000, the average retirement age of men decreased by five years, from 65 to 60. Although the same trend has been observed for Canada as a whole, it is more heightened in Québec.

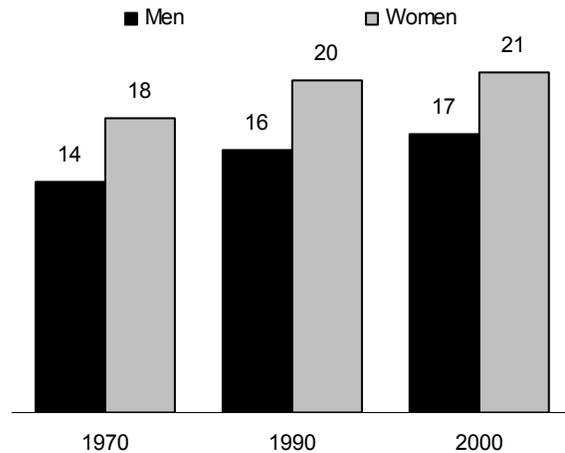
At the same time, in Québec as in Canada, life expectancy at age 65 among men and women increased by three years between 1970 and 2000.

**Average retirement age - Men**



Sources: Statistics Canada and Régie des rentes du Québec.

**Life expectancy at age 65 - Canada as a whole**



Source: Statistics Canada.

As these trends show, the number of years spent in the labour market is dropping while the number of years spent in retirement is rising. In the context of an aging population and the possible labour shortage it may lead to, it will be important to encourage workers to remain in the labour force longer.

### ❑ Pension plans provide little incentive to continue working

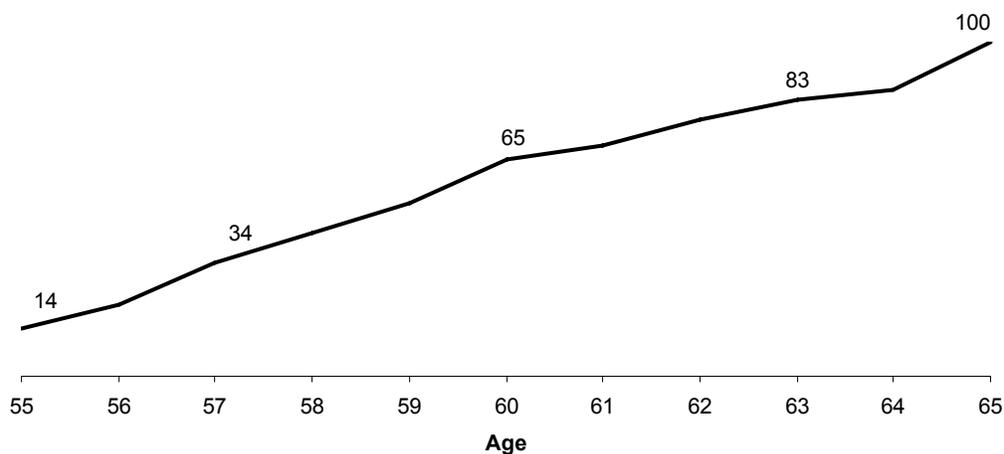
There is little incentive for workers, especially those participating in a private sector supplemental defined benefit plan, to continue working after age 60. According to a statistical portrait of such plans, the average percentage of individuals who are fully retired increases rapidly between the ages of 55 and 60, from 14% to 65%. This proportion increases to 83% at age 63.

This rapid increase in retirement rates between ages 55 and 60, as well as the marked decrease in the average retirement age, is primarily attributable to the financial benefits of early retirement.<sup>1</sup>

<sup>1</sup> For example, lower actuarial reductions applicable to an early retirement pension and payment of a bridging benefit that brings retirement income prior to age 65 to a level comparable with that received after age 65.

## Retirement rates for participants in a supplemental defined benefit pension plan<sup>1</sup> (percent)

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Note: Calculations based on the actuarial assumptions of supplemental defined benefit pension plans of the private sector.

1 Corresponds for each age to the proportion of the participants of a representative cohort who are fully retired.

Sources: Ministère des Finances du Québec and Régie des rentes du Québec.

### ■ The current phased retirement provisions are not attractive to workers

Even though private sector supplemental defined benefit pension plans currently provide for phased retirement, only marginal use is made of this form of retirement, primarily because of the existing tax legislation and the laws regulating pension plans.

For example, a representative worker aged 60 would receive, after taxes and contributions, an additional net income of just \$4.32 for each hour worked during phased retirement, whereas his gross hourly salary is \$28.85.<sup>2</sup> In this case, only individuals with a marked preference for working opt for phased retirement.

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2 Based on the characteristics of participants in private sector supplemental defined benefit pension plans, a representative worker earns a gross income of \$57 695 at the end of his career, which corresponds to a gross hourly salary of \$28.85 assuming the individual works 2 000 hours per year.

## □ Encouraging individuals to prolong their working life

Based on the work carried out by the Comité sur la retraite progressive, the government is proposing new provisions to encourage the use of this form of retirement and enhance the work incentive for individuals close to the end of their career. These terms and conditions would apply to private sector supplemental defined benefit pension plans.

More specifically, the new terms and conditions should aim to:

- enable payment of a pension and employment income simultaneously with the accumulation of service under a retirement plan;
- enable payment of incidental benefits in the case of phased retirement or full-time employment.

To ensure that the new terms and conditions of phased retirement are not more advantageous than full-time employment, which would result in a reduced labour supply:

- access to phased retirement would be allowed as of age 60 or 30 years of service. For example:
  - a worker aged 60 with less than 30 years of service would be eligible for the new phased retirement mechanisms,
  - a worker aged 55 with 30 years of service would also be eligible,
- the pension paid during phased retirement would be proportional to the reduction in work time;
- payment of incidental benefits would be permitted as of age 60 or 30 years of service to encourage late retirement.

Access to these new terms and conditions of phased retirement would not be a right for workers and must be covered by an agreement between them and their employer.

The federal tax legislation and the *Québec Supplemental Pension Plans Act* must be amended in order to apply the new terms and conditions.

## □ Impacts of the proposed changes

The new terms and conditions would make phased retirement more flexible and more attractive. Following an agreement with his employer, a worker could reduce his work time and, in return for his lower income, receive financial compensation from his pension plan while continuing to contribute to it in order to accumulate service on the basis of his full-time salary.

### ■ Impact on income during phased retirement

The new terms and conditions would enable workers to maintain their standard of living, while working part-time rather than full-time. For example, according to one of the scenarios proposed, during his phased retirement, a representative worker would receive a net income of \$35 239 at age 60 while working just three days a week, compared with \$37 002 working full-time.

### Impact of the new terms and conditions of phased retirement on the net income of a representative worker at age 60<sup>1</sup> (dollars)

|   | Full-time work | Phased retirement<br>(3 days/week) |                                | Early retirement |                                |
|---|----------------|------------------------------------|--------------------------------|------------------|--------------------------------|
|   | Income         | Income                             | Difference with full-time work | Income           | Difference with full-time work |
| Labour income   | 57 695         | 34 617                             | - 23 078                       | —                | - 57 695                       |
| Retirement benefits under the private plan <sup>2</sup> | —              | 13 847                             | 13 847                         | 34 617           | 34 617                         |
| Retirement benefits under public plans <sup>3</sup>     | —              | 5 746                              | 5 746                          | 5 746            | 5 746                          |
| <b>Subtotal</b>   | <b>57 695</b>  | <b>54 210</b>                      | <b>- 3 485</b>                 | <b>40 363</b>    | <b>- 17 332</b>                |
| Taxes and contributions                                 | - 20 693       | - 18 971                           | 1 722                          | - 9 946          | 10 747                         |
| <b>NET INCOME AT AGE 60</b>                             | <b>37 002</b>  | <b>35 239</b>                      | <b>- 1 763</b>                 | <b>30 417</b>    | <b>- 6 585</b>                 |

1 Scenario 2 results.

2 Benefits include the participant's retirement pension, the bridging benefit and lump sums.

3 Benefits include the retirement pension paid under the Québec Pension Plan and Old Age Security benefits.

Source: Ministère des Finances du Québec.

## ■ Impact of phased retirement on future income

The new terms and conditions of phased retirement would improve a person's income while working as well as after he retires.

Thanks to the new terms and conditions of phased retirement, the same person would receive \$34 383 more net income during retirement compared with \$15 534 under the current system.

This represents net income of \$9.55 for each hour worked during phased retirement from ages 60 to 63, compared with \$4.32 per hour under the current system.

### Impact of the new terms and conditions of phased retirement on the future income of a representative participant<sup>1</sup>

|   | Current system             |                                  |   | New system  |
|---|----------------------------|----------------------------------|---|---|
|   | Early retirement at age 60 | Full-time work from age 60 to 63 | Phased retirement from age 60 to 63 (3 days/week) | Phased retirement from age 60 to 63 (3 days/week) |
| <b>Present value of future net income<sup>2</sup> at age 60 (dollars)</b>                                     |                            |                                  |   |   |
| - Labour income   | —                          | 165 069                          | 99 041  | 99 041  |
| - Retirement benefits under the private plan <sup>3</sup>   | 375 066                    | 313 899                          | 317 572   | 353 138   |
| - Retirement benefits under public plans <sup>4</sup>   | 133 623                    | 136 126                          | 133 623   | 133 623   |
| <b>Subtotal: Income</b>   | <b>508 689</b>             | <b>615 094</b>                   | <b>550 236</b>                                    | <b>585 802</b>                                    |
| Taxes and contributions   | - 106 371                  | - 162 357                        | - 132 384   | - 149 101   |
| <b>TOTAL</b>  | <b>402 318</b>             | <b>452 737</b>                   | <b>417 852</b>                                    | <b>436 701</b>                                    |
| <b>Difference in income compared with early retirement (dollars)</b>  | —                          | 50 419                           | 15 534  | 34 383  |
| Number of hours worked from age 60 to 63  | —                          | 6 000                            | 3 600   | 3 600   |
| <b>Additional net income for worker compared with early retirement, per hour worked<sup>5</sup> (dollars)</b> | —                          | <b>8.40</b>                      | <b>4.32</b>                                       | <b>9.55</b>                                       |

1 Scenario 2 results.

2 The present value of future net income takes into account the future income a worker may receive from work and retirement benefits under public and private plans, as well as all taxes, social contributions and Québec and federal government transfers. Calculations are based on the characteristics of the representative worker and pension plan, the survival probabilities of men and a discount rate of 4%.

3 Benefits include the participant's retirement pension, the bridging benefit and lump sums.

4 Benefits include the retirement pension paid under the Québec Pension Plan and Old Age Security benefits.

5 Additional net income is calculated by dividing the difference in income compared with early retirement by the number of hours worked from age 60 to 63.

Source: Ministère des Finances du Québec.

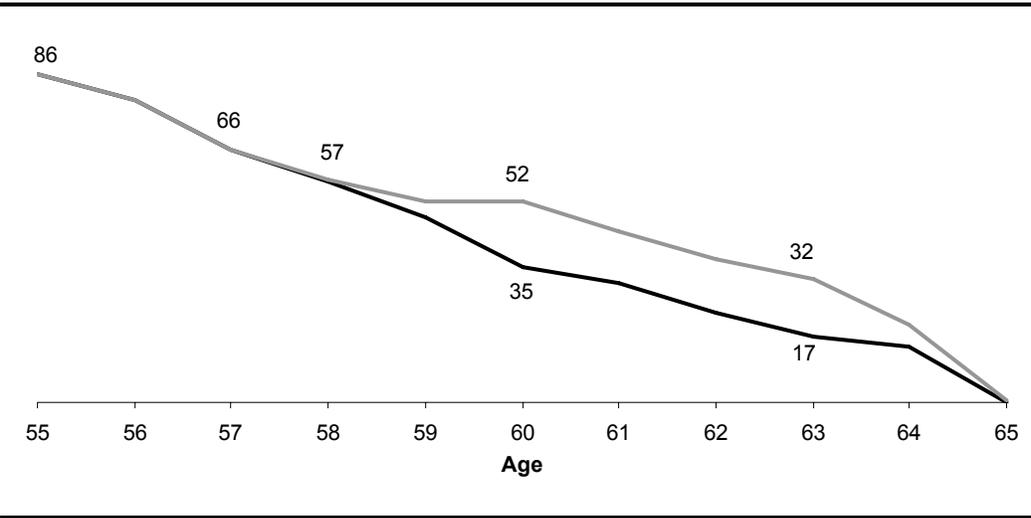
■ **Positive effects on labour supply**

This enhancement would increase income enough during phased retirement to encourage workers to stay in the labour market.

In the example given, the new terms and conditions would push, on average, four out of ten workers aged 55 to 65 to prolong their working life by one year.

**Impact of the new terms and conditions on the labour supply of 55-65 year-olds<sup>1,2</sup>**

(percentage of employed persons)



1 Participant in a private sector supplemental defined benefit pension plan.

2 Scenario 2 results.

Source: Ministère des Finances du Québec.

In the current demographic context, a strategy to encourage workers close to the end of their career to continue working would have several positive effects:

- employers would be assured of skilled and experienced workers who, by remaining at work, would increase productivity and encourage the transfer of knowledge within the business;
- employees would have a new option offering more flexibility in transitioning from work to full retirement;
- these factors would have a positive effect on the supply of labour and would enhance economic growth.



## INTRODUCTION

Over the coming decades, Canada as a whole, but Québec in particular, will be faced with the effects of population ageing. This phenomenon will have major economic and social repercussions and could result in labour shortages in certain economic sectors or regions.

The demographic outlook poses a challenge to all levels of government. In this context, the Québec government has invited the population to think about various approaches that may be taken to mitigate the negative effects of population ageing.

One of the options frequently considered to attenuate the economic effects of population ageing is to improve the work incentive for individuals, especially those close to the end of their career. This can be obtained by encouraging phased rather than full retirement, i.e. by allowing a worker to prolong his career while reducing the length of his work week. Phased retirement is one way to help increase the average retirement age and raise the labour market participation rate of workers eligible for retirement. Moreover, this approach is favoured by both employers and unions in Québec.

This document analyses a number of changes to the phased retirement provisions found in supplemental defined benefit pension plans (DBP) in Québec's private sector, as well as their effect on labour supply. The implementation of new phased retirement provisions is particularly desirable since the current legislation does not encourage the use of this form of retirement.

This document proposes legislative amendments to make phased retirement more attractive and increase the labour supply of individuals close to the end of their career. The document also includes a glossary giving the definitions of the main terms used.

The *2006-2007 Budget Speech* announced the Québec government's commitment to work with the federal government for the purpose of implementing new provisions to encourage phased retirement. In the *2007-2008 Budget Speech*, the Québec government is presenting the detailed analysis behind the proposals for phased retirement.



# 1. THE DEMOGRAPHIC CONTEXT

Population ageing is a challenge for Canada and Québec because of its expected effects on labour and economic growth. The provisions stipulated in pension plans do not encourage workers eligible for retirement to prolong their active life. Changes to private sector supplemental defined benefit plans, in particular regarding phased retirement, could contribute to attenuate the negative impacts of population ageing

## 1.1 Current demographic trends

Over the coming decades, Canada as a whole, and Québec in particular, will face the effects of population ageing. This demographic phenomenon, which has been extensively analysed,<sup>3</sup> results mainly from a substantial decline in fertility rates and rise in the life expectancy since the late 1960s. It implies a falling population growth rate, but also structural changes, such as a significant increase in the share of the population age 65 or over and a decrease in the share of the population considered to be of working age, namely those age 15 to 64.

- Demographic projections by Statistics Canada and the Institut de la statistique du Québec show that between 2005 and 2025, the population growth rate will fall from 0.5% to 0.2% per year in Québec, and from 0.8% to 0.4% in Canada.
- These projections also show that in Québec, during the same period, the share of the population age 15 to 64 will fall from 70% to 62%, while that of the population age 65 or over will rise from 14% to 24%.
- In Canada, the corresponding changes are a decline from 69% to 64% of the population age 15 to 64 and a rise from 13% to 21% of the share of the population age 65 or over.
- This outlook implies that the number of people considered to be of working age per person age 65 or over will fall from five to three between 2005 and 2025, both in Québec and in Canada.

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3 Among others, Statistics Canada (2001, 2003) and Institut de la statistique du Québec (2003, 2004).

TABLE 1

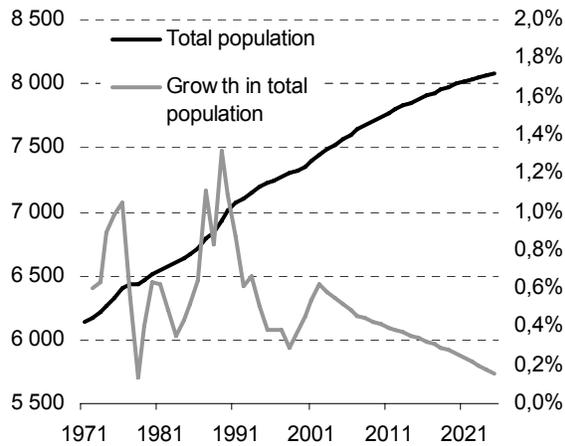
**Demographic changes in Québec and in Canada**  
(1971-2025)

|   | 1971   | 1985   | 1995   | 2005   | 2015   | 2025   |
|---|--------|--------|--------|--------|--------|--------|
| <b>QUÉBEC</b>   |        |        |        |        |        |        |
| <b>Population</b>   |        |        |        |        |        |        |
| - Number (thousands)  | 6 137  | 6 666  | 7 219  | 7 566  | 7 880  | 8 075  |
| - Growth (%)  | n/a    | 0.5    | 0.4    | 0.5    | 0.3    | 0.2    |
| <b>Age distribution</b>                                     |        |        |        |        |        |        |
| - Share of those age 15-64 in the total population (%)      | 63.9   | 69.9   | 68.9   | 69.6   | 67.5   | 62.1   |
| - Share of those age 65 or over in the total population (%) | 6.8    | 9.6    | 11.8   | 13.8   | 17.9   | 23.8   |
| - Ratio of those 15-64 to those 65 or over                  | 9.4    | 7.3    | 5.8    | 5.0    | 3.8    | 2.6    |
| <b>CANADA</b>   |        |        |        |        |        |        |
| <b>Population</b>   |        |        |        |        |        |        |
| - Number (thousands)  | 21 962 | 25 843 | 29 302 | 31 992 | 34 215 | 36 044 |
| - Growth (%)  | n/a    | 0.9    | 1.0    | 0.8    | 0.6    | 0.4    |
| <b>Age distribution</b>                                     |        |        |        |        |        |        |
| - Share of those age 15-64 in the total population (%)      | 62.7   | 68.5   | 67.6   | 69.3   | 68.6   | 64.2   |
| - Share of those age 65 or over in the total population (%) | 8.0    | 10.3   | 12.0   | 13.2   | 16.2   | 20.9   |
| - Ratio of those 15-64 to those 65 or over                  | 7.8    | 6.7    | 5.6    | 5.3    | 4.2    | 3.1    |

Sources: Statistics Canada and Institut de la statistique du Québec.

CHART 1

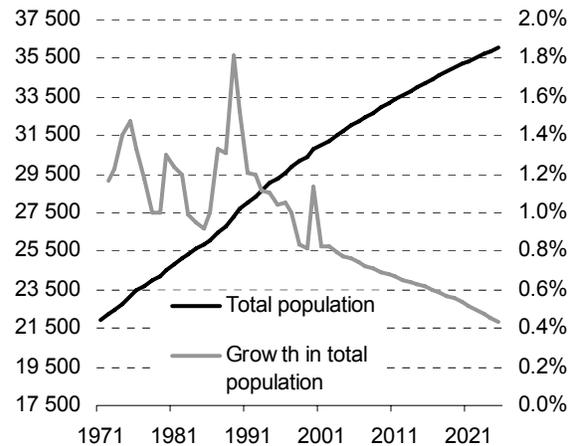
**Total population evolution in Québec**  
1971-2025  
(thousands and %)



Sources: Statistics Canada and Institut de la statistique du Québec (population projections are drawn from scenario A of the Institut de la statistique du Québec).

CHART 2

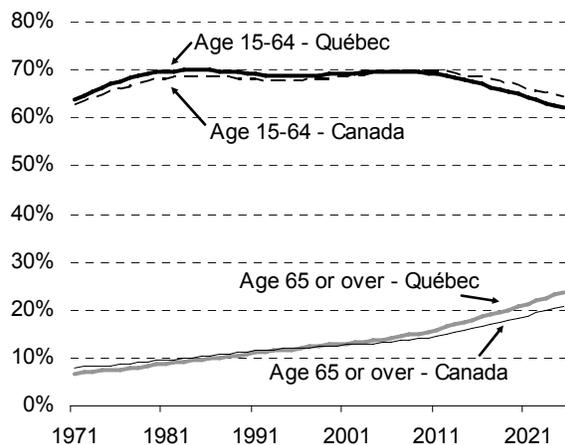
**Total population evolution in Canada**  
1971-2025  
(thousands and %)



Source: Statistics Canada (population projections are drawn from scenario 2).

CHART 3

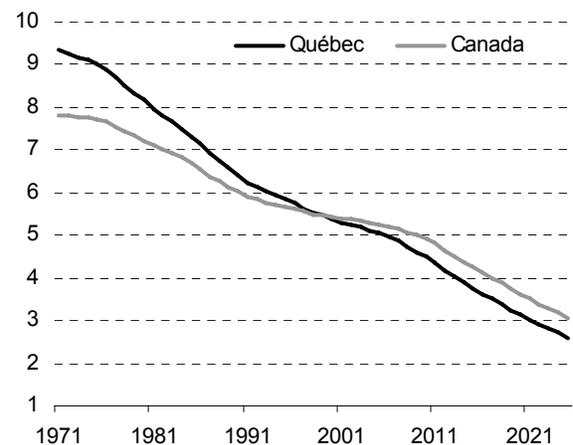
**Share of those age 65 or over and of those age 15-64 in the total population**  
1971-2025  
(percent)



Sources: Statistics Canada and Institut de la statistique du Québec.

CHART 4

**Number of people age 15-64 per person age 65 or over**  
1971-2025  
(ratio)

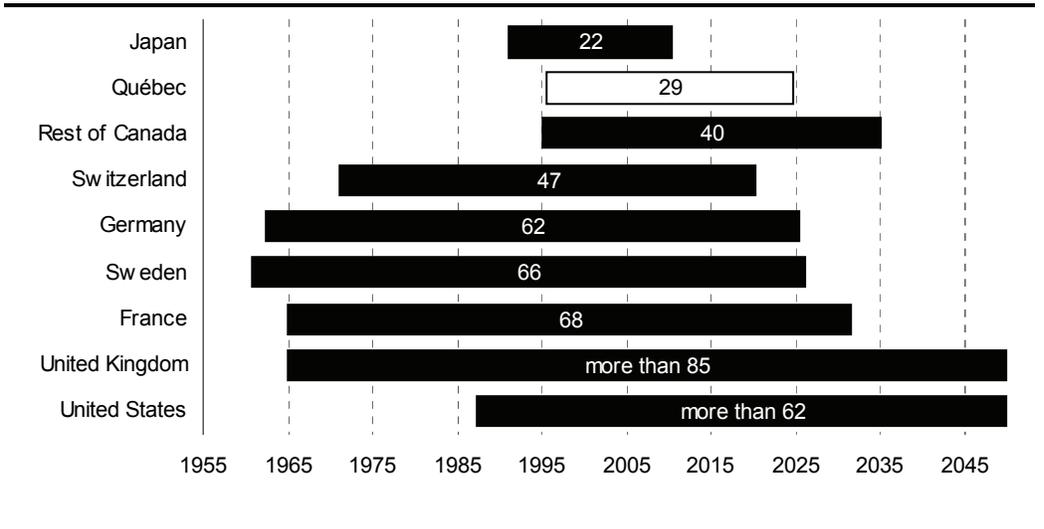


Sources: Statistics Canada and Institut de la statistique du Québec.

While all Canadian provinces are affected by population ageing, the phenomenon will be faster and more acute in Québec. The number of years required for the share of the population age 65 or over in the total population to rise from 12% to 24% will be 29 years in Québec (between 1996 and 2025), compared with 40 years for the rest of Canada (between 1995 and 2035).

CHART 5

**Number of years required for the share of the population age 65 or over to rise from 12% to 24%**



Sources: United Nations and Institut de la statistique du Québec.

The decrease in the pool of available workers could have significant economic and social implications. For instance, it could lead to labour shortages in certain economic sectors or regions and, consequently, to a decrease in the productive capacity of the economy. The result would be a drop in the growth rates of real GDP and per capita GDP, the latter generally being used as a measure of standard of living. In addition, the anticipated slowdown in economic growth, combined with the substantial increase in the number of retirees with respect to the number of people considered to be of working age, could generate significant pressure on public finances.<sup>4</sup>

For instance, the study *Impact des changements démographiques sur l'économie, le marché du travail et les finances publiques du Québec*, issued by the ministère des Finances du Québec in 2005, forecasts that, particularly because of the ageing of the population:

- average annual growth in real GDP will fall from 2.2% between 1981 and 2004 to 1.2% between 2020 and 2030;
- average annual growth in Québec's per capita real GDP will fall from 1.6% between 1981 and 2004 to 1.1% between 2020 and 2030;
- average annual growth in government revenues will decline from 3.3% between 2005 and 2009 to 3.1% between 2025 and 2029.

---

4 Ministère des Finances du Québec (2005); Guillemette (2003); Van Audenrode (2002).

## 1.2 Encouraging phased retirement to increase labour supply

One approach that is frequently considered to mitigate the negative effects of population ageing on economic growth is to keep persons close to the end of their career working. Since the share of older workers in the total population will rise significantly over the coming decades, a favourite option is to encourage them to remain on the labour market longer by increasing the average retirement age and raising their labour market participation rate.

Moving in this direction is especially desirable given that over the last 30 years the average retirement age and the labour market participation rates of people age 55 or over, particularly among men, have fallen substantially.

- In Québec, the labour market participation rate of men between age 55 and 59 fell significantly, from 83% to 67% between 1976 and 1996, while for men between age 60 and 64 it dropped from 66% to 37% over the same period. These rates stabilised as of 1996 and then rose slightly, between 1996 and 2003, to 73% and 47% respectively.
- The labour market participation rates of men in Canada have displayed a similar change over the same period. The participation rates of men between age 55 and 59 fell from 84% to 72% between 1976 and 1996, and then rebounded to 76% in 2003. For men between age 60 and 64, this rate fell from 67% to 44% between 1976 and 1996, and then rose to 53% in 2003.
- The reversal of the downward trend since 1996 could be attributable to some extent to factors such as improved health conditions and higher levels of schooling in older age groups. In addition, the significant drop in returns on financial markets in 2001 and 2002 may have forced many retirees to return to the labour market because of a decline in their retirement income. In spite of this recent improvement, the participation rates of men close to the end of their career remain well below previous peaks.

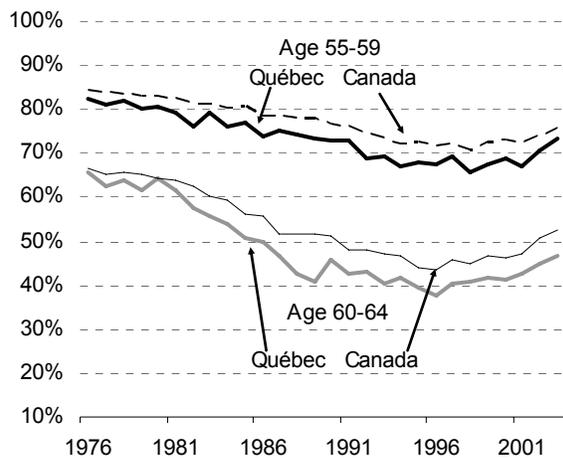
The change in labour market participation rates is different among women, mainly because of the arrival, in the older age cohorts, of women who participated in the labour market much more actively during their active life than those of earlier generations. Accordingly, participation rates for women have been rising since 1976.

- In Québec, the participation rate of women between age 55 and 59 rose from 29% to 52% between 1976 and 2003, while that of women between age 60 and 64 increased from 19% to 24% during the same period.
- The situation was similar in Canada between 1976 and 2003, with the participation rate for women between age 55 and 59 rising from 38% to 60%, while that of women between age 60 and 64 increasing from 25% to 32%.

However, the level of the participation rates among women close to the end of their career remains well below that of men in the same age cohorts.

CHART 6

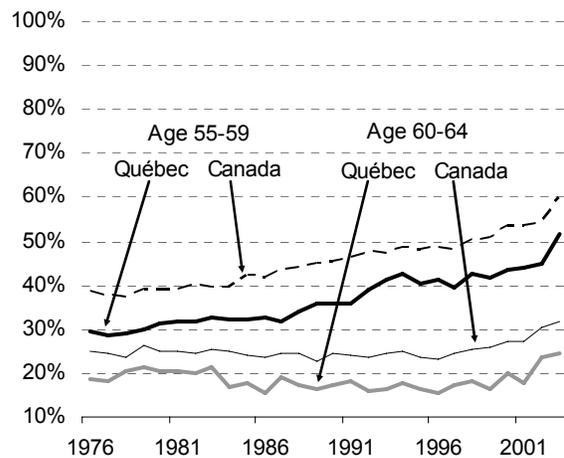
**Activity rates among men**  
1976-2003



Source: Statistics Canada.

CHART 7

**Activity rates among women**  
1976-2003



Source: Statistics Canada.

Along with the change in participation rates of workers close to the end of their career, the amount of time individuals spend on the labour market has decreased, while their life expectancy at age 65 has increased substantially over the last few decades, for both men and women.

- In Québec as in Canada, between 1970 and 2000, life expectancy at age 65 among men and women increased by three years, while the average retirement age of men decreased by five years in Québec and by three years in Canada during the same period.

CHART 8

**Average retirement age – Men<sup>1</sup>**

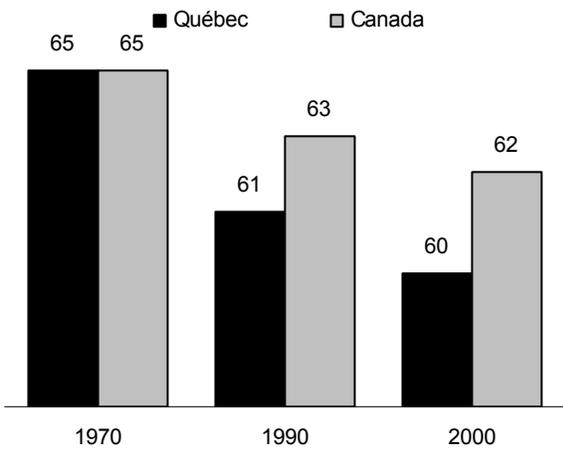
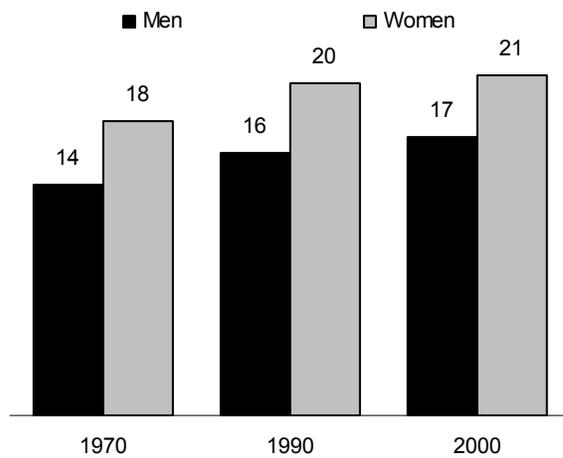


CHART 9

**Life expectancy at age 65 – Canada as a whole**



1 Information for women is not available for 1970. However, the values are the same as for men for 1990 and 2000. Sources: Statistics Canada and Régie des rentes du Québec.

Source: Statistics Canada.

This decrease in the working life span can be attributed in part to the increase in standard of living. It also stems from the implementation of many mechanisms facilitating access to early retirement in public and private pension plans both in Québec and in Canada. Many recent studies on the relationship between retirement systems and work incentive in OECD countries reach these conclusions.<sup>5</sup> In Québec and in Canada in particular, these include mechanisms that allow early withdrawal from the labour market at age 55, i.e. up to 10 years before normal retirement age, which is generally set at age 65, as well as mechanisms diminishing the actuarial reduction rates applicable to a retirement pension paid before normal retirement age.

In Québec, as in Canada, changes were made to the laws regulating pension plans and to the tax laws to facilitate early withdrawal from the labour market during the 1980s, a period of labour market stagnation and high unemployment. Such actions were justified at the time by the fact that, among other reasons, they aimed to encourage the entry of young workers into the labour market. However, as matters stand now, these measures could contribute to the anticipated labour shortage, particularly in economic sectors or in regions that will be most affected by population ageing.

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5 Among others, Gruber (1997); Gruber, Baker and Milligan (2001); Blöndal and Scarpetta (1997); Duval (2003); OECD (2005).

**Measures designed to encourage early retirement in private sector supplemental defined benefit pension plans in Québec**

**Early retirement eligibility age**

The *Supplemental Pension Plans Act* (SPPA) and the federal and Québec tax laws stipulate that a participant is entitled to take early retirement from age 55, i.e. 10 years or less from normal retirement age, generally set at age 65. At the federal level, these rules are set by the *Income Tax Regulations*. In Québec, the *Taxation Act* is fully harmonised with the federal rules in this regard.

**Payment of incidental benefits**

*Bridging benefit*

These laws stipulate that in addition to his normal pension, a participant who takes early retirement is entitled until age 65, if stipulated in his pension plan agreement, to a temporary bridging benefit from his plan, to bring his retirement income prior to age 65 to a level comparable with what he will receive at age 65, when public plan benefits normally begin. The maximum amount of the bridging benefit corresponds to the total of the benefits that may be paid by the public plans.

*Decrease in actuarial reduction rates*

The tax rules also allow the actuarial reduction rates normally applicable to a retirement pension paid prior to age 65 to be decreased by setting a minimum amount, less than what would ensure actuarial neutrality, generally as of five years or less from normal retirement age.

In the context of population ageing, economic studies on the effect of pension plans on work incentive, in particular those conducted by the OECD, argue that mechanisms allowing access to early retirement should be reviewed and that mechanisms such as phased retirement should be implemented to encourage retirement at an older age. Moreover, reforms designed to reduce the disincentive effects of pension systems on the labour supply and to encourage older workers to remain on the labour market as long as possible have already been implemented in some OECD member countries and are being considered in many others.<sup>6</sup>

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6 OECD (2000); Régie des rentes du Québec (2004).

In Québec, the Conseil consultatif sur le travail et la main-d'œuvre<sup>7</sup> (CCTM), consisting of representatives of employers and unions, has recommended that the government give preference to phased retirement to encourage workers eligible for retirement to continue working. Accordingly, in order to increase the labour supply of individuals close to the end of their career, one option consists of favouring the use of phased retirement in supplemental defined benefit pension plans (DBP).

The examination and review of the phased retirement provisions, specifically in the case of DBPs, are particularly relevant since the legislation currently applicable to this type of plan is especially unfavourable to a widespread use of phased retirement. It is in this context that this document analyses the effects on labour supply of the implementation of new provisions encouraging greater use of phased retirement in private sector DBPs.

In the current demographic context, a strategy to encourage workers close to the end of their career to continue working (full-time or part-time) would have a number of positive impacts:

- employers would benefit from skilled and experienced workers who, by remaining at work, would increase productivity and encourage the transfer of knowledge within the business;
- employees would have a new option offering more flexibility in transitioning from work to full retirement;
- these factors would have a positive effect on labour supply and would stimulate economic growth.

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7 The Conseil consultatif sur le travail et la main-d'œuvre (CCTM) was formed in 1968 when the *Act respecting the Conseil consultatif du travail et de la main-d'œuvre* was passed. The mission of the Conseil is to develop and maintain concerted action among employers and labour organizations and to guide and support government action regarding labour and manpower. By carrying out its mission, the CCTM contributes to the objective of promoting fair and balanced labour relations, favouring the adaptation and vitality of labour organizations and groups, and ensuring respect and protection of the individuals at work.



## 2. PHASED RETIREMENT

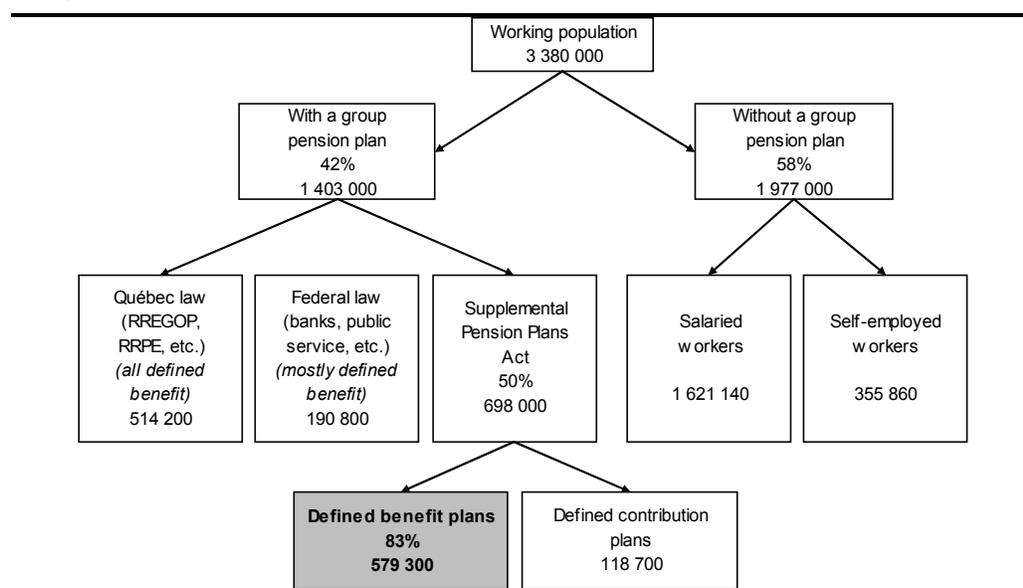
Although phased retirement is currently allowed, its implementation has not been very effective in encouraging workers to use it. A committee on phased retirement has been set up to examine the reasons why and propose solutions to make phased retirement more attractive. The examination focused on the conditions offered by private sector supplemental defined benefit pension plans.<sup>8</sup>

### 2.1 Supplemental defined benefit pension plans

In Québec, in 2003, 579 300 workers were covered by a private sector DBP, which is comparable to the number of workers covered by a pension plan of the Québec public sector and of the federal public sector in Québec. These workers represented the great majority of workers covered by a private sector supplemental pension plan, i.e. 83%. The other workers, i.e. 118 700, were covered by defined contribution plans.

CHART 10

**Pension plan<sup>1</sup> coverage in Québec**  
2003



1 Includes defined benefit and defined contribution pension plans. In all cases, workers can contribute to an individual or group RRSP.

Source: Régie des rentes du Québec.

8 For the remainder of the paper, unless otherwise specified, phased retirement will refer to the provisions offered under private sector supplemental defined benefit pension plans.

## 2.2 Issues with the current implementation of phased retirement

Phased retirement provisions, implemented in 1997, currently exist in pension plans. The *Supplemental Pension Plans Act* stipulates that, as of age 55, i.e. at 10 years or less from normal retirement age, a participant can reduce his work time and in return receive financial compensation from his pension plan, while continuing to contribute to it.

### Current phased retirement provisions stipulated in DBPs

Québec's *Supplemental Pension Plans Act* stipulates a series of provisions in the case where a DBP participant wishes to choose phased retirement.

- As of age 55, i.e. at 10 years or less from normal retirement age, which is generally set at age 65, a participant can reduce his work time following an agreement with his employer, while continuing to accumulate years of service under his plan, on the basis of his non-reduced salary.
- To offset the reduction in the participant's hours worked, a lump sum is paid to him once a year. Its value is equal to the lesser of 70% of the loss of income related to the decrease in hours worked and 40% of the maximum pensionable earnings on which he can contribute to the Québec Pension Plan (QPP).
- The compensation must be at zero cost to the pension plan, which implies that the value of the lump sums paid to the participant during the phased retirement period will reduce the value of his pension when he takes full retirement.

However, according to current legislative provisions, phased retirement is generally not an attractive option for DBP participants, since it suffers from the following disadvantages:

- The most significant disadvantage is the fact that the participant who chooses phased retirement waives the financial benefits granted for early retirement.<sup>9</sup> More specifically, a participant in phased retirement cannot receive incidental benefits, such as the bridging benefit and the decrease in actuarial reduction rates, since these are conditional on payment of a pension and not on payment of a lump sum.
- In addition, the financial compensation paid to a participant in phased retirement for the decrease in his hours worked consists of a lump sum paid once a year, and not a monthly retirement pension. The legislation prohibits the payment of a pension at the same time as the accumulation of service.
- Lastly, to prevent additional costs for the pension plan, the lump sum paid during the phased retirement period must be deducted from the amount of the final pension the participant receives when he begins full retirement.

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9 For the remainder of the paper, unless otherwise specified, the term “early retirement” will refer to the full retirement of a worker from the labour market prior to normal retirement age, i.e. age 65.

### **Current legislative constraints on the use of phased retirement in DBPs**

Pension plans in Québec that are certified for tax purposes are subject to Québec and federal tax laws as well as to specific legislation governing their operation.

#### **Payment of a retirement pension simultaneously with the accumulation of service is not allowed**

At the federal level, the *Income Tax Regulations* state explicitly that a participant in a DBP cannot accumulate additional years of service under his pension plan, in other words cannot continue to contribute to his plan to improve his final retirement pension, while at the same time receiving a retirement pension.

In this area, Québec's tax system is completely harmonised with the federal system. Similarly, at the provincial level, Québec's *Supplemental Pension Plans Act* forbids this practice by specifying that the retirement pension must be levelled over time, meaning that it must consist of equal periodic payments. This prevents a participant from continuing to contribute to his pension plan once payment of benefits begins.

In other words, it is not possible for a participant who receives a retirement pension to continue working on a reduced schedule while contributing to the retirement pension in order to increase the number of years of participation used in calculating the pension and thus to improve the final pension.

In 1997, to remedy these constraints, amendments were made to the SPPA to allow payment of a lump sum in the case of phased retirement, thus allowing a participant to continue to accumulate service.

#### **Payment of incidental benefits is not allowed in the case of phased retirement**

The tax laws allow the individual who chooses early retirement to receive incidental benefits, such as the bridging benefit and lower actuarial reduction rates applied to the retirement pension. These benefits increase the participant's retirement income. However, since these laws stipulate that such benefits are conditional on the payment of a retirement pension, they therefore cannot be paid to workers who choose phased retirement.

Because of the complexity of the current phased retirement provisions in DBPs and of the financial disadvantages phased retirement raises compared to early retirement, its use remains marginal. According to current provisions, an individual who chooses phased retirement must agree to a decrease in the present value of his pension plan compared to another participant who chooses early retirement at the same age. Such individual therefore loses the financial benefits he would have received had he chosen early retirement, which encourages him to withdraw earlier and completely from the labour market. The tax laws are thus rigid in the sense that they make no provision for an intermediate phase between the status of full-time employee and that of full-time retiree.

To illustrate this situation, table 2 shows the case of a representative worker and pension plan in Québec. At the end of his career, the worker earns a gross income of \$57 695. The table shows the discounted value of the net income he can expect to receive at age 60, depending on the various forms of retirement available to him<sup>10</sup>. It can be seen that the gross discounted value of his retirement benefits will be higher if he chooses early retirement at age 60 than if he continues to work part-time until age 63 (three days a week) in phased retirement, even if he continues to accumulate service under his pension plan.

- A worker who chooses early retirement at age 60 can receive, depending on his average life expectancy, a discounted gross income of \$375 066 from his private pension plan, while a worker who chooses phased retirement from age 60 to 63 would receive \$317 572.
- The loss of \$57 494 incurred by the worker who chooses phased retirement (i.e. \$317 572 less \$375 066), compared to a worker who opts for early retirement, is offset by the gross salary of \$99 041 he earns between age 60 and 63. However, taking into account income taxes and contributions paid and assuming he chooses to work part-time at 60% of his time for three years, his net gain will be only \$15 534,<sup>11</sup> which may not be sufficiently attractive.
- In other words, this worker will receive, after taxes and additional contributions payable and the loss of pension income, an additional net income of \$4.32 for every hour worked after the age of 60, whereas his gross hourly wage<sup>12</sup> will be \$28.85.

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10 The discounted value of net income depends, among other things, on the life expectancy of workers at the age when the calculation is carried out, and on the expected returns on investments.

11 I.e. his gross salary of \$99 041 less the loss of value of his pension plan of \$57 494, less income tax and additional contributions payable, which amount to \$26 013.

12 The gross hourly salary represents the amount actually paid to the participant by the employer for each hour worked. It is calculated by dividing the annual gross income at the end of the career of a representative participant, i.e. \$57 695, by the number of hours usually worked full-time during a year. The additional net hourly salary represents the supplementary net amount that a representative participant receives for each hour worked in phased retirement. It is calculated by dividing the difference between the discounted value of future net income in phased retirement and in early retirement, i.e. \$15 534, by the number of hours usually worked in phased retirement in a year, and this during three years. For the purposes of these calculations, we assume 2 000 hours of work per year for a full-time job and 1 200 hours per year in phased retirement.

There are a number of reasons for this situation:

- first, the worker who chooses phased retirement receives only part of his bridging benefit, namely the portion paid to him at age 63 and 64, which corresponds to a difference of \$21 928 compared to a worker who opts for early retirement and receives the bridging benefit for five years;
- second, he receives an annual lump sum payment rather than his retirement pension, which corresponds to a loss of \$35 566 (i.e. the loss of the retirement pension paid in the case of early retirement, \$81 229, offset in part by the lump sum of \$45 663);
- third, because of the additional employment income he earns, the worker who opts for phased retirement will have to pay additional contributions (employment insurance, Québec Pension Plan, private pension plan, etc.) and more income tax than a participant who is fully retired and does not work.

This example shows that, under the current system, the lump sum payment offered to a participant in phased retirement does not cover the loss of financial benefits granted for early retirement. Taking into account the salary earned by the participant, the additional taxes and contributions payable, and the loss of retirement income, when such participant chooses phased retirement and delays his full retirement by three years, his additional net hourly wage represents no more than 15% of his gross hourly salary. In this situation, only workers with a strong preference for work would opt for phased retirement.

TABLE 2

**Discounted value at age 60 of the future net income of a worker participating in a DBP for early retirement and phased retirement<sup>1</sup>**

|   | <b>Early retirement<br/>at age 60</b> | <b>Phased<br/>retirement from<br/>age 60 to 63<sup>2</sup></b> | <b>Difference</b> |
|---|---------------------------------------|--|-------------------|
| <b>Income</b>                                 |                                       |  |                   |
| Labour income                                 | 0                                     | 99 041   | 99 041            |
| <b>DBP retirement benefits</b>                |                                       |  |                   |
| Retirement pension                            | 337 699                               | 256 470  | - 81 229          |
| Bridging benefit                              | 37 367                                | 15 439   | - 21 928          |
| Lump sum payment                              | 0                                     | 45 663   | 45 663            |
| <b>Subtotal</b>                               | <b>375 066</b>                        | <b>317 572</b>   | <b>- 57 494</b>   |
| <b>Retirement benefits under public plans</b> |                                       |  |                   |
| Québec Pension Plan                           | 81 053                                | 81 053   | 0                 |
| Guaranteed Income Supplement                  | 0                                     | 0  | 0                 |
| Old Age Security Pension                      | 52 570                                | 52 570   | 0                 |
| <b>Subtotal</b>                               | <b>133 623</b>                        | <b>133 623</b>   | <b>0</b>          |
| <b>Income tax</b>                             | - 106 371                             | - 117 553  | - 11 182          |
| <b>Social contributions</b>                   | 0                                     | - 14 831   | - 14 831          |
| <b>TOTAL</b>                                  | <b>402 318</b>                        | <b>417 852</b>   | <b>15 534</b>     |

1 Produced using the profile of a representative participant in DBPs in Québec and the parameters of a representative DBP in Québec, as described in the section entitled "Statistical portrait of pension plans".

2 The participant works three days a week and receives a lump sum once a year. He is in phased retirement for three years, i.e. at age 60, 61 and 62.

Source: Ministère des Finances du Québec.

## 2.3 Creation of the Comité sur la retraite progressive

In 2002, the Conseil consultatif sur le travail et la main-d'œuvre proposed several amendments to the tax laws and to the laws governing pension plans in order to encourage phased retirement in private sector supplemental defined benefit plans. The members of the CCTM consider phased retirement as a way to avoid prematurely losing workers close to the end of their career, in the context of population ageing, and state that legislative amendments are absolutely necessary to make this retirement option more flexible and competitive compared to the many advantages of early retirement.

### **Recommendations of the CCTM concerning phased retirement in DBPs**

- Amend the federal and provincial tax laws to:
  - allow simultaneous accumulation of service and payment of a pension for phased retirement in DBPs;
  - allow payment of incidental benefits for phased retirement in DBPs;
  - extend the eligible period of reduced salary that can be credited to the pension plan.
- Amend the *Supplemental Pension Plans Act* to allow payment of a non-levelled pension in DBPs, depending on the needs of the retiree.

Subsequently, in 2004, as part of the Forum des générations,<sup>13</sup> the Québec government pledged to support the training and adaptation of workers to the future needs of the labour market by, among others, encouraging phased retirement. A committee consisting of representatives of a number of departments, employers and unions was mandated to propose solutions to the government in order to encourage phased retirement.<sup>14</sup> The committee was instructed to:

- identify the fiscal and other obstacles to phased retirement;
- study the conditions to satisfy so that phased retirement becomes a viable alternative to early retirement and a response to future labour needs;
- analyse the impact of various scenarios to ensure that those selected will encourage individuals to remain active on the labour market longer;
- identify favourable conditions for encouraging phased retirement on the basis of employer-employee agreements;
- present its recommendations to the government.

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13 The Forum des générations, organized by the Québec government, was held from October 12 to 14, 2004 for the purpose of debating the major challenges of demographic changes and the state of public finances. The Premier, the co-chairs of the regional forums, many members of the government and of the National Assembly, the chairs of the Conférences régionales des élus (CRÉ), as well as many leaders of national organizations were invited to participate in this forum.

14 The Comité sur la retraite progressive consists of representatives of the ministère de l'Emploi et de la Solidarité sociale, the ministère des Finances, the ministère du Travail, the Secrétariat du Conseil du trésor, the Régie des rentes du Québec and two members of the CCTM.



### **3. PROPOSALS TO ENCOURAGE PHASED RETIREMENT IN DEFINED BENEFIT PLANS OF THE PRIVATE SECTOR**

Work carried out by the Comité sur la retraite progressive has led to the elaboration of new phased retirement provisions that meet the objective of extending the active life of workers close to the end of their career. At the same time, these provisions make phased retirement more flexible and more attractive compared to early retirement.

This section describes these new phased retirement provisions as well as the methodology used to determine their impact on workers' decision to retire.

#### **3.1 New phased retirement provisions for increasing labour supply**

The committee's work showed that, for having a positive effect on labour supply, the phased retirement provisions must satisfy a number of safeguards. These safeguards are necessary to make phased retirement an attractive alternative to early retirement, while ensuring that it does not become more advantageous than full-time work. More specifically, the provisions identified by the Comité sur la retraite progressive should:

- allow payment of the retirement pension and a labour income at the same time as the accumulation of service under a pension plan;
- allow payment of incidental benefits in the case of phased retirement or full-time work.

To ensure that the phased retirement provisions are not more advantageous than full-time employment, which would result in a reduced labour supply:

- access to phased retirement would be allowed as of age 60 or 30 years of service. For example:
  - a worker aged 60 with less than 30 years of service would be eligible for the new phased retirement mechanisms,
  - a worker aged 55 with 30 years of service would also be eligible,
- the pension paid during phased retirement would be proportional to the reduction in work time;
- payment of incidental benefits would be permitted as of age 60 or 30 years of service to encourage late retirement.

Access to these new phased retirement mechanisms would not be a right for workers and must be covered by an agreement between them and their employer.

To illustrate the impact of these new provisions on the labour supply of individuals close to the end of their career, several phased retirement scenarios were formulated for representative individuals participating in a private sector supplemental defined benefit plan in Québec.

### **3.2 Methodology used to evaluate the worker's decision to retire**

The provisions stipulated by public and private pension plans have an influence on the labour supply of individuals. For example, these provisions could encourage individuals eligible for retirement to work part-time rather than full-time, or to take early retirement. These results stem from the fact that the retirement provisions directly affect the worker's expected income at retirement, as well as the relative value of his leisure with respect to consumption.

Before adding new provisions to pension plans, it is important to measure the work incentive effect they have on participants. For the purposes of this analysis, the impacts of the phased retirement scenarios on the labour supply of individuals close to the end of their career were estimated in three steps. These steps are described below.

## □ Step 1: statistical portrait of supplemental defined benefit plans

First, a statistical portrait of private sector supplemental defined benefit plans in Québec was drawn up to establish the characteristics of both the participants and the plans. This statistical analysis was carried out using a database taken from the administrative records of the Régie des rentes du Québec, presenting information on the retirement plans under its oversight.

The analysis was used to obtain the profile of a representative worker participating in a pension plan, on the basis of the following elements: his labour income during his career, at the end of his career and at retirement, his planned retirement age and the number of years of service accumulated in the pension plan. In addition, the characteristics of a representative DBP were also obtained, in particular information on contribution rates, retirement pension accumulation rates and on the amount of the bridging benefit.

## □ Step 2: calculation of a worker's future income

Next, because of its importance in the decision to retire, the impact of each phased retirement scenario on the expected income of a worker was measured. These future income flows were calculated using a simulation model of taxes and transfer programs in Québec. This model was adapted to calculate, at any given age, all the future income a worker can expect to receive from his employer and his retirement income under public and private plans.<sup>15</sup> The calculations were carried out on the basis of the characteristics of the representative worker and of the representative pension plan determined in the first step.

Using the future income flows, we calculate the net income replacement rate at retirement and the implicit tax on the continuation of work (ITCW) for each age at which the worker is eligible for retirement.

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<sup>15</sup> A more detailed description of the disposable income simulation model adapted to the calculation of retirement benefits is given in Appendix 2.

## THE NET INCOME REPLACEMENT RATES AT RETIREMENT AND THE IMPLICIT TAX ON CONTINUATION OF WORK (ITCW)

### Net income replacement rates at retirement

For each age, the replacement rates correspond to the ratio of the net income at retirement and the net working income.

### Implicit tax on continuation of work

The calculation of ITCWs is derived from a methodology used by the OECD<sup>16</sup> and consists in calculating, for a representative worker, the cost imposed on continuing full-time work. Accordingly, for each year when the worker considers the possibility of taking retirement (phased or early), i.e. from age 55 to 65, there is a specific ITCW associated with it. This measure is calculated using the net income, i.e. after taxes and transfers. The ITCW can be interpreted as a tax (ITCW > 0) or as a subsidy (ITCW < 0) applied to the continuation of work for an additional year.

For example, if the ITCW calculated for age 60 is 40%, that means that each dollar of net income earned by the worker during an additional year of work, i.e. from age 60 to 61, will contribute to reducing the discounted value of his net retirement income by \$0.40, in particular because the additional income of his pension will be less than the additional contributions he pays.

Moreover, the analysis of future income flows, net income replacement rates and the ITCWs associated with the phased retirement scenarios is not sufficient to determine the impact of the scenarios on a worker's labour supply, since the decision to retire also depends on the worker's preferences for leisure and consumption. For example, depending on his preferences, a worker could choose a situation that offers less retirement income (a lower net income replacement rate, providing him with a lower level of consumption), if that allows him to enjoy more leisure. The participant's preferences regarding leisure and consumption have accordingly been taken into account to measure the impact of the scenarios.

### □ Step 3: determine the impact on labour supply

Finally, to determine the impact of each phased retirement scenario on labour supply, the ITCWs and net income replacement rates calculated in step 2 were used in a welfare maximisation model, which takes into account the representative worker's leisure-consumption choices.<sup>17</sup> This model is used to determine how the choice between work and retirement would be affected on the basis of the worker's expected income and behaviour generally observed in relation to these choices.

16 Duval (2003).

17 A more detailed description of the welfare maximization model for a representative worker is given in Appendix 4.

### 3.3 Statistical portrait of pension plans

Using a sample consisting of 37 plans covering 133 194 active participants, drawn from the RRQ database, it was possible to collect information concerning the characteristics of workers and those of pension plans.<sup>18</sup> These profiles are depicted in the following tables.<sup>19</sup>

#### □ Main characteristics of the representative participant

The representative participant in a pension plan is 43 years old and on average has 13 years of active participation in his pension plan. Accordingly, at age 60, he will have accumulated 30 years of participation and will choose to take early retirement. Over his whole career, he will have earned an average annual income of \$51 081. His average income at the end of the career will be \$57 695.<sup>20</sup>

TABLE 3

#### Profile of the representative participant in a DBP in Québec

|                              | <b>Average</b> |
|------------------------------|----------------|
| Participant's average age    | 43.1           |
| Years of service at age 60   | 29.9           |
| Average income               |                |
| - Whole career               | \$51 081       |
| - End of career <sup>1</sup> | \$57 695       |
| Average age at retirement    | 59.6           |

1 Average income of participants age 50 or older.

Sources: Ministère des Finances du Québec and Régie des rentes du Québec.

18 The data are taken from actuarial analyses of private sector DBPs carried out between 2000 and 2003.

19 Appendix 1 provides more details concerning the statistical portrait of DBPs.

20 Average income over the whole career and average income at the end of the career are distinguished because the benefits from the DBP are calculated using the income of the five best years, which corresponds to the income at the end of the career of the representative participant. In addition, income over the entire career is used in the RRQ's benefits calculation.

## □ Main characteristics of the representative DBP

The examination of the sample shows that a pension plan usually stipulates that normal retirement age is 65, minimum early retirement age is 55 and that early retirement can be taken with lower rates of actuarial reduction at the age of 60. It also stipulates, for each year of participation, a pension accrual rate equivalent to 1.3% of the average salary of the participant's five best paid years, below maximum pensionable earnings (MPE), and 2.0% of average salary of the five best-paid years, above MPE.

TABLE 4

### Profile of the representative DBP in Québec

|   | <b>Parameters</b>           |
|---|-----------------------------|
| Normal retirement age                                     | Age 65                      |
| Minimum early retirement age                              | Age 55                      |
| Minimum early retirement age without actuarial reductions | Age 60                      |
| Contribution rate   |                             |
| Under MPE   | 4.5%                        |
| Over MPE  | 6.3%                        |
| Retirement benefits accrual rate                          |                             |
| Under MPE   | 1.3%                        |
| Over MPE  | 2.0%                        |
| Salary considered for the calculations                    | 5 best years                |
| Bridging benefit rate                                     | 0.7                         |
| Salary considered for the calculations                    | Up to MPE <sup>1</sup>      |
| Actuarial reduction rate                                  | 0.25% monthly before age 60 |

1 This is the typical formula used by many pension plans. The annual pension accrual rate of 1.3% under MPE reflects the fact that the Québec Pension Plan pension is equivalent to about 0.7% of salary for each year of service. Consequently, by using an annual pension accrual rate of 1.3% under MPE and 2.0% over MPE, the participant in a supplemental pension plan, after 35 years of service, ends up with a combined total pension (QPP and supplemental plan) equivalent to 70% of his salary.

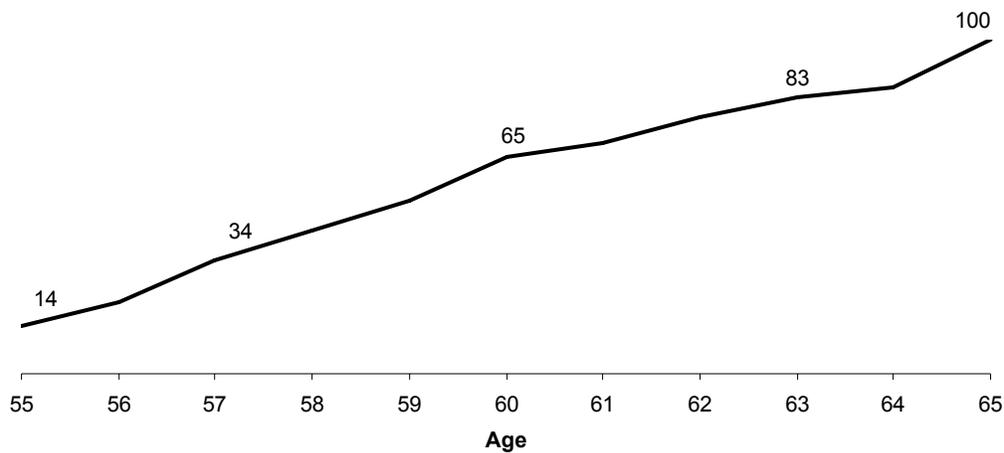
Sources: ministère des Finances du Québec and Régie des rentes du Québec.

## □ Age at the beginning of retirement

Average retirement rates, which represent for each age the proportion of participants who are retired, are essential for determining the impact of the scenarios on labour supply. The analysis of the pension plans showed that currently 14% of participants age 55 or less are fully retired. This proportion gradually rises to 65% at age 60, to 83% at age 63 and to 100% at age 65, the age at which all participants are fully retired.

CHART 11

### Average retirement rates<sup>1</sup> (For a cohort of 100 participants)



Note: Calculations based on the actuarial assumptions of supplemental defined benefit private sector pension plans.

1 Corresponds for each age to the proportion of the participants of a representative cohort who are fully retired.  
Sources: Ministère des Finances du Québec and Régie des rentes du Québec.

### **3.4 Impacts of the new phased retirement provisions on labour supply**

This section describes the impacts of three phased retirement scenarios on the labour supply of a representative participant in a private sector supplemental defined benefit plan in Québec. For each scenario, the net income of the participant in phased retirement for three years is compared to two other options available to him, namely:

- continuing to work full-time for a period of three years, and then taking full retirement;
- taking early retirement.

Before describing the phased retirement scenarios in greater detail, it is important to emphasise that access to this form of retirement would not be a right for workers and would have to be covered by an agreement between them and their employer. Accordingly, the impacts of the phased retirement scenarios on labour supply indicate, for each scenario under consideration, the degree to which workers will be encouraged to increase or decrease their labour supply compared to the actual situation, in which their plan offers practically no possibility of phased retirement. Employers could, according to their needs, allow or deny access to phased retirement in their pension plan. The impacts on labour supply, measured in this study, assume that employers allow phased retirement.

### 3.4.1 Description of the scenarios

The following table shows the main characteristics of the three phased retirement scenarios studied.

These scenarios stipulate that the worker enters phased retirement for a period of three years during which he works three days a week, which corresponds to a decrease of 40% of his work time. It is also stipulated that the participant claims his pension benefits from the Québec Pension Plan at the time he begins his retirement, whether early or phased, or at age 60 if he retires before that age.

TABLE 5

#### Summary of features of the phased retirement scenarios

| Characteristics   | Scenario 1   | Scenario 2   | Scenario 3   |
|---|--|--|--|
| Age of access to phased retirement  | Age 55, i.e. 10 years before normal retirement age       | Age 60 or 30 years of service <sup>1</sup>               | Age 60 or 30 years of service <sup>1</sup>               |
| Value of the pension and the bridging benefit paid under phased retirement          | Proportional to the decrease in work time (40% - 2 days) | Proportional to the decrease in work time (40% - 2 days) | Proportional to the decrease in work time (40% - 2 days) |
| Payment of the bridging benefit as of age 60 or 30 years of service                 | No   | No   | Yes  |
| Accumulation of service during phased retirement (on the basis of full-time salary) | Yes  | Yes  | Yes  |

1 In the case of a representative worker, the two criteria for access to phased retirement coincide since the worker will have accumulated 30 years of service at age 60.

Source: Ministère des Finances du Québec.

## **Phased retirement allowed at age 55**

**Scenario 1** stipulates the following provisions:

- The participant can have access to phased retirement as of age 55, on the basis of an agreement with his employer.
- During phased retirement, he receives a partial pension from his pension plan, proportional to the decrease in his work time, and he continues to accumulate service on the basis of his full-time salary. That implies that his retirement pension will be increased at the end of the phased retirement period, when he enters full retirement, to take into account the additional years of service he acquired.
- Since the participant receives a retirement pension from his plan, he enjoys the same benefits granted for early retirement, namely a bridging benefit proportional to the decrease in his work time and the decrease in actuarial reduction rates applicable to the retirement pension.

## **Phased retirement allowed as of age 60 or 30 years of service**

**Scenario 2** is defined by the following provisions:

- The participant can have access to phased retirement as of age 60 or 30 years of service, on the basis of an agreement with his employer.
- As in scenario 1, the participant:
  - receives a partial pension proportional to the decrease in his work time and continues to accumulate service on the basis of his full-time salary;
  - enjoys the benefits granted for early retirement, namely a partial bridging benefit and the decrease in actuarial reduction rates applicable to the retirement pension.

## □ **Phased retirement allowed as of age 60 or 30 years of service, with incidental benefits**

Finally, **scenario 3** stipulates the following provisions:

- As in scenario 2, it stipulates that the participant:
  - can have access to phased retirement as of age 60 or 30 years of service, on the basis of an agreement with his employer;
  - receives a partial pension proportional to the decrease in his work time and continues to accumulate service on the basis of his unreduced salary;
  - enjoys the benefits granted for early retirement, namely a bridging benefit and the decrease in actuarial reduction rates applicable to the retirement pension.
- However, unlike scenarios 1 and 2, the participant receives a full bridging benefit, rather than a partial benefit. In other words, what is particular about this scenario is that, as of age 60 or 30 years of service, the participant receives the full amount of the bridging benefit to which he is entitled (i.e. the amount to which he would be entitled for early retirement), whether he is phasing his retirement or working full-time.
  - The worker is assured of his full bridging benefit payment for a period of at least five years. For example, a representative worker who reaches 30 years of service at age 60 would be paid the full bridging benefit from age 60 to 65, whether he elects to work full-time or to phase his retirement.
  - For a worker who reaches 30 years of service before age 60, the full bridging benefit will be payable from then until age 65. For example, if a worker reaches 30 years of service at age 57, he will be paid the full bridging benefit for eight years, i.e. from age 57 to 65.

### 3.4.2 Scenario 1: phased retirement allowed at age 55

#### □ Summary

Even though in scenario 1 phased retirement is more attractive compared to the current situation, this scenario has a negative impact on the labour supply of participants age 55 to 65. On average, two participants out of ten would reduce their work time by one year.<sup>21</sup> This result is explained by the lack of safeguards structuring the phased retirement provisions, which implies that phased retirement would become an attractive alternative mostly compared to full-time work.

- The net discounted income the worker in phased retirement expects to receive approaches what he could receive if he worked full-time. That implies that the full-time worker who chooses phased retirement could maintain his standard of living while enjoying more leisure.
- In addition, given that access to phased retirement is allowed as of age 55, and that a representative worker has only 25 years of service at that age, a large proportion of still working full-time would be encouraged to work part-time before the average retirement age (60) via phased retirement.

#### □ Impact on the net income of participants

The following table presents the impact of scenario 1 on the net future income of a worker age 57 with 27 years of service whose annual remuneration is \$57 695.<sup>22</sup> The net income this worker can expect to receive if he chooses phased retirement can be compared with what he would receive if he opts for early retirement or chooses to continue working full-time for three years.

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21 In other words, the average impact on the labour supply of participants age 55 to 65 is -0.2 years.

22 Average salary at end of career of DBP participants.

— If the worker chose phased retirement at age 57, his annual net income would be \$30 462, compared to \$37 002 if he decided to work full-time and \$23 888 if he opted for early retirement. From a financial point of view, phased retirement lies between full-time work and early retirement ( $\$23\,888 < \$30\,462 < \$37\,002$ ).

TABLE 6

**Net income of a representative worker at age 57 according to scenario 1**  
(dollars)

|   | <b>Full-time work</b> | <b>Phased retirement – scenario 1</b><br>(3 days/week) |                                       | <b>Early retirement</b> |                                       |
|---|-----------------------|--|---------------------------------------|-------------------------|---------------------------------------|
|   | <b>Income</b>         | <b>Income</b>  | <b>Difference with full-time work</b> | <b>Income</b>           | <b>Difference with full-time work</b> |
| Labour income   | 57 695                | 34 617   | – 23 078                              | —                       | – 57 695                              |
| Retirement benefits under the private plan <sup>1</sup> | —                     | 11 714   | 11 714                                | 28 351                  | 28 351                                |
| Retirement benefits under public plans <sup>2</sup>     | —                     | —  | —                                     | —                       | —                                     |
| <b>Subtotal</b>   | <b>57 695</b>         | <b>46 331</b>  | <b>–11 364</b>                        | <b>28 351</b>           | <b>–29 344</b>                        |
| Taxes and contributions                                 | –20 693               | –15 869  | 4 824                                 | –4 463                  | 16 230                                |
| <b>NET INCOME AT AGE 60</b>                             | <b>37 002</b>         | <b>30 462</b>  | <b>– 6 540</b>                        | <b>23 888</b>           | <b>– 13 114</b>                       |

1 Benefits include the participant's retirement pension, the bridging benefit and lump sums.

2 Benefits include the retirement pension paid under the Québec Pension Plan and Old Age Security benefits.

Source: Ministère des Finances du Québec.

In terms of discounted net future income, phased retirement still lies between the two, but is much closer to full-time work than to early retirement ( $\$380\,249 < \$433\,304 < \$456\,556$ ). Paying a pension and allowing the accumulation of service enhances the attraction of phased retirement since the participant would obtain roughly \$53 000 less were he to opt for early retirement (\$380 249 compared with \$433 304), while he would receive only \$23 000 more if he chooses full-time work (\$456 556 compared with \$433 304).

- According to scenario 1, the worker would enjoy the benefit of an additional net income of \$14.74 for each hour worked during phased retirement from ages 57 to 60, i.e. roughly \$2 more per hour compared with full-time work and roughly \$3 more per hour compared with phased retirement based on current provisions.

TABLE 7

**Impact of scenario 1 on the net future income of a representative participant**

|   | Current system             |                                  |   | Scenario 1                                      |
|---|----------------------------|----------------------------------|---|---|
|   | Early retirement at age 57 | Full-time work from age 57 to 60 | Phased retirement from age 57 to 60 (3 days/wk) | Phased retirement from age 57 to 60 (3 days/wk) |
| <b>Present value of future net income at age 57 (dollars)</b>   |                            |                                  |   |   |
| - Labour income   | —                          | 165 501                          | 99 301  | 99 301  |
| - Retirement benefits under the private plan <sup>1</sup>   | 340 228                    | 326 676                          | 330 688   | 352 902   |
| - Retirement benefits under public plans <sup>2</sup>   | 109 175                    | 116 384                          | 115 429   | 115 429   |
| <b>Subtotal: Income</b>   | <b>449 403</b>             | <b>608 561</b>                   | <b>545 418</b>                                  | <b>567 632</b>                                  |
| Taxes and contributions   | -69 154                    | -152 005                         | -122 475  | -134 328  |
| <b>TOTAL</b>  | <b>380 249</b>             | <b>456 556</b>                   | <b>422 943</b>                                  | <b>433 304</b>                                  |
| Difference in income compared with early retirement (dollars)   | —                          | 76 307                           | 42 694  | 53 055  |
| Number of hours worked from age 57 to 60  | —                          | 6 000                            | 3 600   | 3 600   |
| <b>Additional net income for worker compared with early retirement, per hour worked<sup>3</sup> (dollars)</b> | <b>—</b>                   | <b>12.72</b>                     | <b>11.86</b>                                    | <b>14.74</b>                                    |

1 Benefits include the participant's retirement pension, the bridging benefit and lump sums.

2 Benefits include the retirement pension paid under the Québec Pension Plan and Old Age Security benefits.

3 Additional net income is calculated by dividing the difference in income compared with early retirement by the number of hours worked from age 60 to 63.

Source: Ministère des Finances du Québec.

As mentioned earlier, the impacts on the representative worker's net income are not sufficient on their own to determine the overall effect on labour supply because they do not reflect the value of leisure in the worker's choices.

- Given the heightened interest in phased retirement, the participant could choose this new option rather than full-time work if the remuneration he waives is offset by the leisure he could obtain in phased retirement.
- Similarly, an individual could choose phased retirement rather than early retirement if the gain, in terms of net income, is sufficient to offset the reduction in his leisure.
- The net impact on the overall labour supply therefore depends on the relative size of these two effects among workers.

### **□ Impact on the labour supply of participants**

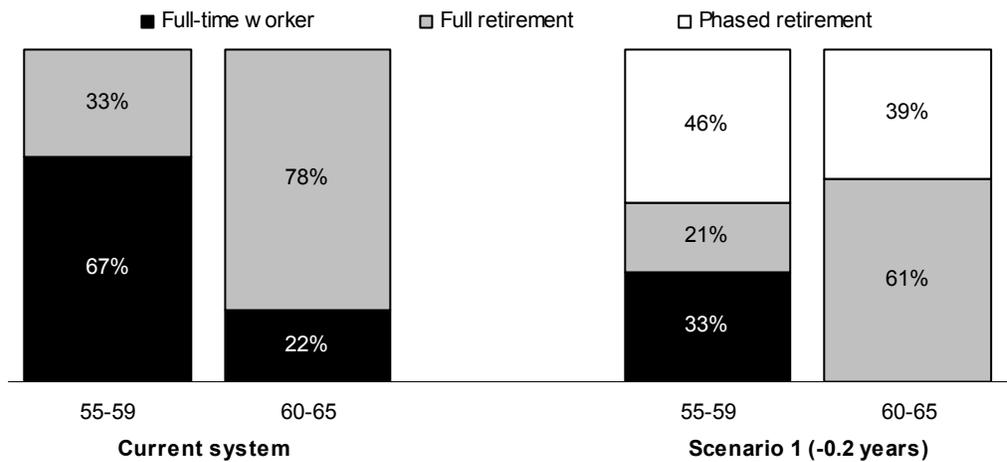
The results obtained using the welfare maximisation model indicate that scenario 1 would have a negative impact on the labour supply of participants age 55 to 65 and that, on average, two participants out of 10 would reduce their work time by one year. This result is mainly attributable to the fact that the new provisions encourage a large number of full-time workers to work part-time as of age 55, when they have, on average, only 25 years of service.

The proportion of full-time workers age 55 to 59 would drop from 67% to 33% while that of full-time workers age 60 to 65 would fall from 22% to 0%.

- The negative impact would be only partially offset by workers who, instead of taking full retirement, would decide to work part-time. The percentage of individuals age 55 to 59 who are fully retired would decline from 33% to 21% and that of those age 60 to 65 would fall from 78% to 61%.
- Overall, the net effect on labour supply would be negative because phased retirement would be allowed as of age 55, i.e. an age at which there is still a large proportion of full-time workers (e.g.: at age 55, 86% of workers are full-time).

CHART 12

**Impact of scenario 1 on the labour supply of participants age 55 to 65**



Source: Ministère des Finances du Québec.

### 3.4.3 Scenario 2: phased retirement allowed as of age 60 or 30 years of service

#### □ Summary

Scenario 2 has a positive impact on the labour supply of all participants age 55 to 65. On average, four participants out of 10 would increase their work time by one year.<sup>23</sup>

- Unlike scenario 1, access to phased retirement is allowed as of age 60 or 30 years of service, which limits the negative effects coming from the shift of full-time workers to this form of retirement before age 60.
- From age 60 to 65, many participants are already fully retired. Thus, there is a shift of participants in early retirement to phased retirement, which is greater than the shift of full-time workers to phased retirement.

#### □ Impact on the net income of participants

The following table shows the impact of scenario 2 on the net income of a worker at age 60 with 30 years of service. It enables us to compare the net income that this worker expects to receive if, between age 60 and 63, he is in phased retirement, versus what he would receive had he chosen early retirement at age 60 or opted to continue working full-time for three years.

- Had the worker chosen phased retirement at age 60, his annual net income would be \$35 239, compared to \$37 002 had he decided to work full-time and \$30 417 had he opted for early retirement. In terms of net annual income, phased retirement, as in scenario 1, lies between full-time work and early retirement ( $\$30\,417 < \$35\,239 < \$37\,002$ ).

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23 In other words, the average impact on the labour supply of participants age 55 to 65 is 0.4 years.

TABLE 8

**Net income of a representative worker at age 60 according to scenario 2**  
(dollars)

|   | Full-time work | Phased retirement according to scenario 2<br>(3 days/week) |               | Early retirement               |                |
|---|----------------|--|---------------|--------------------------------|----------------|
|   |                | Income   | Income        | Difference with full-time work | Income         |
| Labour income   | 57 695         | 34 617   | -23 078       | —                              | -57 695        |
| Retirement benefits under the private plan <sup>1</sup> | —              | 13 847   | 13 847        | 34 617                         | 34 617         |
| Retirement benefits under public plans <sup>2</sup>     | —              | 5 746  | 5 746         | 5 746                          | 5 746          |
| <b>Subtotal</b>   | <b>57 695</b>  | <b>54 210</b>  | <b>-3 485</b> | <b>40 363</b>                  | <b>-17 332</b> |
| Taxes and contributions                                 | -20 693        | -18 971  | 1 722         | -9 946                         | 10 747         |
| <b>NET INCOME AT AGE 60</b>                             | <b>37 002</b>  | <b>35 239</b>  | <b>-1 763</b> | <b>30 417</b>                  | <b>-6 585</b>  |

1 Benefits include the participant's retirement pension, the bridging benefit and lump sums.

2 Benefits include the retirement pension paid under the Québec Pension Plan and Old Age Security benefits.

Source: Ministère des Finances du Québec.

- In terms of discounted net income, phased retirement again lies between early retirement and full-time work ( $\$402\,318 < \$436\,701 < \$452\,737$ ). However, it is closer to full-time work than early retirement. Compared to phased retirement, the participant would receive roughly \$16 000 more working full-time ( $\$452\,737$  compared with  $\$436\,701$ ) and \$34 000 less in an early retirement situation ( $\$402\,318$  compared with  $\$436\,701$ ).
- According to this scenario, a worker in phased retirement would have an additional net income of \$9.55 for each hour worked after the age of 60, compared with \$4.32 under the current provisions.

TABLE 9

## Impact of scenario 2 on the future income of a representative participant

|   | Current system             |                                  |   | Scenario 2  |
|---|----------------------------|----------------------------------|---|---|
|   | Early retirement at age 60 | Full-time work from age 60 to 63 | Phased retirement from age 60 to 63 (3 days/week) | Phased retirement from age 60 to 63 (3 days/week) |
| <b>Present value of future net income at age 60 (dollars)</b>   |                            |                                  |   |   |
| - Labour income   | —                          | 165 069                          | 99 041  | 99 041  |
| - Retirement benefits under the private plan <sup>1</sup>   | 375 066                    | 313 899                          | 317 572   | 353 138   |
| - Retirement benefits under public plans <sup>2</sup>   | 133 623                    | 136 126                          | 133 623   | 133 623   |
| <b>Subtotal: Income</b>   | <b>508 689</b>             | <b>615 094</b>                   | <b>550 236</b>                                    | <b>585 802</b>                                    |
| Taxes and contributions   | -106 371                   | -162 357                         | -132 384  | -149 101  |
| <b>TOTAL</b>  | <b>402 318</b>             | <b>452 737</b>                   | <b>417 852</b>                                    | <b>436 701</b>                                    |
| <b>Difference in income compared with early retirement (dollars)</b>  | —                          | 50 419                           | 15 534  | 34 383  |
| Number of hours worked from age 60 to 63  | —                          | 6 000                            | 3 600   | 3 600   |
| <b>Additional net income for worker compared with early retirement, per hour worked<sup>3</sup> (dollars)</b> | —                          | <b>8.40</b>                      | <b>4.32</b>                                       | <b>9.55</b>                                       |

1 Benefits include the participant's retirement pension, the bridging benefit and lump sums.

2 Benefits include the retirement pension paid under the Québec Pension Plan and Old Age Security benefits.

3 Additional net income is calculated by dividing the difference in income compared with early retirement by the number of hours worked from age 60 to 63.

Source: Ministère des Finances du Québec.

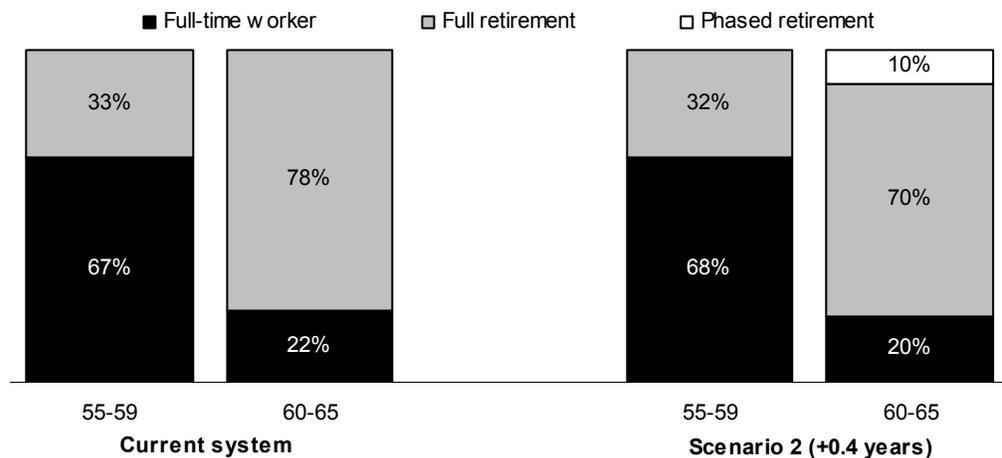
## □ Impact on the labour supply of participants

The results obtained using the welfare maximisation model show that scenario 2 would have a positive impact on the labour supply of participants age 55 to 65 and that, on average, four out of ten participants would increase their work time by one year. A number of factors contribute to this result.

- Phased retirement is not allowed prior to age 60 or 30 years of service. Accordingly, there are no full-time workers who choose phased retirement.<sup>24</sup> However, there is a slight increase in full-time workers because of the new options offered as of age 60.
- As of age 60, the positive impact is the result of the declining percentage of workers opting for early retirement. This proportion drops from 78% to 70% and is attributable to the fact that 10% of workers now choose phased retirement.
- While the proportion of full-time workers also declines from 22% to 20%, this decline is not enough to offset the positive impact of the decrease in early retirement.

CHART 13

### Impact of scenario 2 on the labour supply of participants age 55 to 65



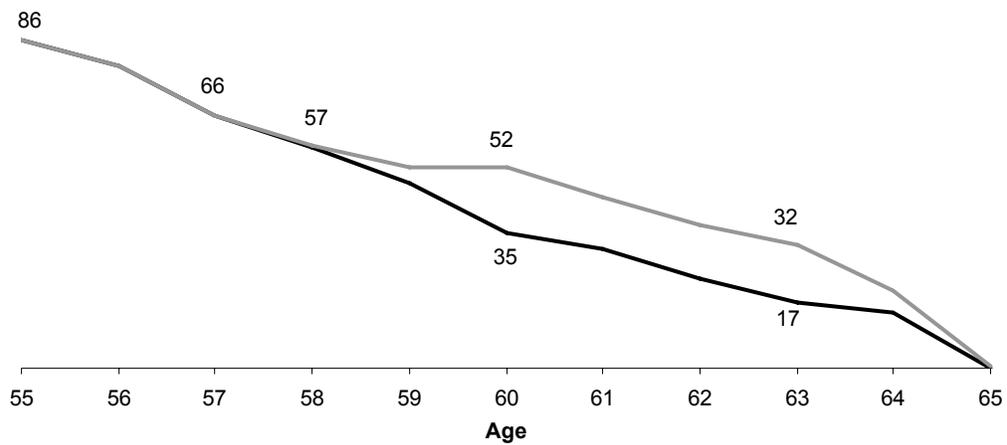
Source: Ministère des Finances du Québec.

24 It should be remembered that the impact on the labour supply is evaluated on the basis of the average characteristics of the workers participating in a DBP in Québec (i.e. the characteristics of the representative worker). This implies that certain workers represented by the sample data could reach 30 years of service before age 60.

Comparing the impact of scenarios 2 and 1, the importance of safeguards on the phased retirement provisions can be noted. In this case, to obtain a positive impact on labour supply, access should be limited to age 60 or 30 years of service.

CHART 14

**Impact of scenario 2 on the labour supply of persons age 55 to 65**  
(percentage of persons at work)



Source: Ministère des Finances.

### 3.4.4 Scenario 3: phased retirement allowed as of age 60 or 30 years of service, with incidental benefits

#### □ Summary

Scenario 3 has a positive impact on the labour supply of participants age 55 to 65. On average, seven participants out of 10 would increase their work time by one year.<sup>25</sup>

This difference from scenario 1 is once again attributable to the presence of safeguards on the phased retirement provisions, such as access as of age 60 or 30 years of service and the full payment of the bridging benefit to full-time workers. The positive effect is greater than in scenario 2.

More specifically:

- access to phased retirement as of age 60 or 30 years of service limits the negative impacts attributable to the shifting of a large number of full-time workers to phased retirement;
- from age 60 to 65, there is an appreciable shift of participants in early retirement to phased retirement;
- the impact is greater than in scenario 2, because in scenario 3 the full amount of the bridging benefit is paid to full-time workers as of age 60 or 30 years of service, which reduces, in relative terms, the financial benefits of early retirement. The result is that a larger number of persons continue working full-time after age 60.

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<sup>25</sup> In other words, the average impact on the labour supply of participants age 55 to 65 is 0.7 years.

## □ Impact on the net income of participants

The following table shows the impact of scenario 3 on the net future income of a representative worker at age 60 with 30 years of service. The net income this worker can receive if, from age 60 to 63, he is in a phased retirement situation can be compared with what he can receive if he chooses early retirement at age 60 or if he decides to continue working full-time for three years.

— In scenario 3, the net annual income of a worker age 60 who opts for phased retirement would be \$38 201, which is \$7 784 more than if he had chosen early retirement and \$3 764 less than if he had worked full-time.

TABLE 10

### Net income of a representative worker at age 60 according to scenario 3 (dollars)

|  | Full-time work<br>according to<br>scenario 3 | Phased retirement according<br>to scenario 3<br>(3 days/week) | Difference<br>with full-time<br>work |               |                |
|--|--|---|--------------------------------------|---------------|----------------|
|  | Income                                       | Income  | Income                               | Income        | Income         |
| Labour income  | 57 695                                       | 34 617  | -23 078                              | —             | -57 695        |
| Retirement benefits under the<br>private plan <sup>1</sup> | 8 379  | 18 874  | 10 495                               | 34 617        | 26 238         |
| Retirement benefits under public<br>plans <sup>2</sup>     | —  | 5 746   | 5 746                                | 5 746         | 5 746          |
| <b>Subtotal</b>  | <b>66 074</b>                                | <b>59 237</b>   | <b>-6 837</b>                        | <b>40 363</b> | <b>-25 711</b> |
| Taxes and contributions                                    | -24 109                                      | -21 036   | 3 073                                | -9 946        | 14 163         |
| <b>NET INCOME AT AGE 60</b>                                | <b>41 965</b>                                | <b>38 201</b>   | <b>-3 764</b>                        | <b>30 417</b> | <b>-11 548</b> |

1 Benefits include the participant's retirement pension, the bridging benefit and lump sums.

2 Benefits include the retirement pension paid under the Québec Pension Plan and Old Age Security benefits.

Source: Ministère des Finances du Québec.

- The discounted value of net future income is greater in scenario 3, both for phased retirement and for full-time work, compared with scenario 2. For a worker who opts for phased retirement, it is roughly \$8 400 more in scenario 3 (\$445 115 > \$436 701), while for full-time work, it is about \$14 000 more (\$466 803 > \$452 737).
- The additional net income of the worker in phased retirement would be \$11.89 for each hour worked after age 60, compared with \$4.32 for phased retirement under the current provisions.
- In addition, according to scenario 3, a full-time worker would be paid \$10.75 for each hour worked, compared with \$8.40 in the current situation. This result is due to the fact that the worker would receive the full amount of the bridging benefit even if he decided to continue working full-time or part-time.

TABLE 11

## Impact of scenario 3 on the future income of a representative participant

|   | Current system             |                                  |   | Scenario 3  |                                  |
|---|----------------------------|----------------------------------|---|---|----------------------------------|
|   | Early retirement at age 60 | Full-time work from age 60 to 63 | Phased retirement from age 60 to 63 (3 days/week) | Phased retirement from age 60 to 63 (3 days/week) | Full-time work from age 60 to 63 |
| <b>Present value of future net income at age 60 (dollars)</b>   |                            |                                  |   |   |                                  |
| - Labour income   | —                          | 165 069                          | 99 041  | 99 041  | 165 069                          |
| - Retirement benefits under the private plan <sup>1</sup>   | 375 066                    | 313 899                          | 317 572   | 367 384   | 337 643                          |
| - Retirement benefits under public plans <sup>2</sup>   | 133 623                    | 136 126                          | 133 623   | 133 623   | 136 126                          |
| <b>Subtotal: Income</b>   | <b>508 689</b>             | <b>615 094</b>                   | <b>550 236</b>                                    | <b>600 048</b>                                    | <b>638 838</b>                   |
| Taxes and contributions   | -106 371                   | -162 357                         | -132 384  | -154 933  | -172 035                         |
| <b>TOTAL</b>  | <b>402 318</b>             | <b>452 737</b>                   | <b>417 852</b>                                    | <b>445 115</b>                                    | <b>466 803</b>                   |
| <b>Difference in income compared with early retirement (dollars)</b>  | —                          | <b>50 419</b>                    | <b>15 534</b>                                     | <b>42 797</b>                                     | <b>64 485</b>                    |
| Number of hours worked from age 60 to 63  | —                          | 6 000                            | 3 600   | 3 600   | 6 000                            |
| <b>Additional net income for worker compared with early retirement, per hour worked<sup>3</sup> (dollars)</b> | —                          | <b>8.40</b>                      | <b>4.32</b>                                       | <b>11.89</b>                                      | <b>10.75</b>                     |

1 Benefits include the participant's retirement pension, the bridging benefit and lump sums.

2 Benefits include the retirement pension paid under the Québec Pension Plan and Old Age Security benefits.

3 Additional net income is calculated by dividing the difference in income compared with early retirement by the number of hours worked from age 60 to 63.

Source: Ministère des Finances du Québec.

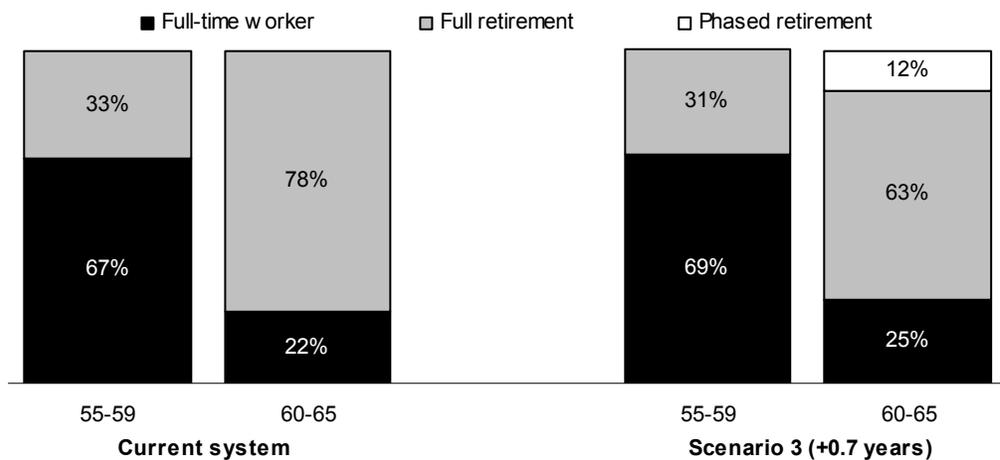
## □ Impact on the labour supply of participants

The results obtained using the welfare maximisation model show that scenario 3 would have a positive impact on the labour supply of participants age 55 to 65 and that, on average, seven out of ten participants would increase their work time by one year.

- Phased retirement is not allowed prior to age 60 or 30 years of service. Accordingly, there are no full-time workers who choose phased retirement.<sup>26</sup> However, there is a small increase in the percentage of full-time workers (from 67% to 69%) because these workers can now take advantage of the full amount of the bridging benefit as of age 60 or 30 years of service.
- As of age 60, the positive impact results from the decline in the number of workers choosing early retirement. The proportion of such workers falls from 78% to 63%. Phased retirement is thus chosen by 12% of workers age 60 or over.
- The proportion of full-time workers also increases from 22% to 25%. This increase is due, in particular because scenario 3 is more generous regarding full-time work.

CHART 15

### Impact of scenario 3 on the labour supply of participants age 55 to 65



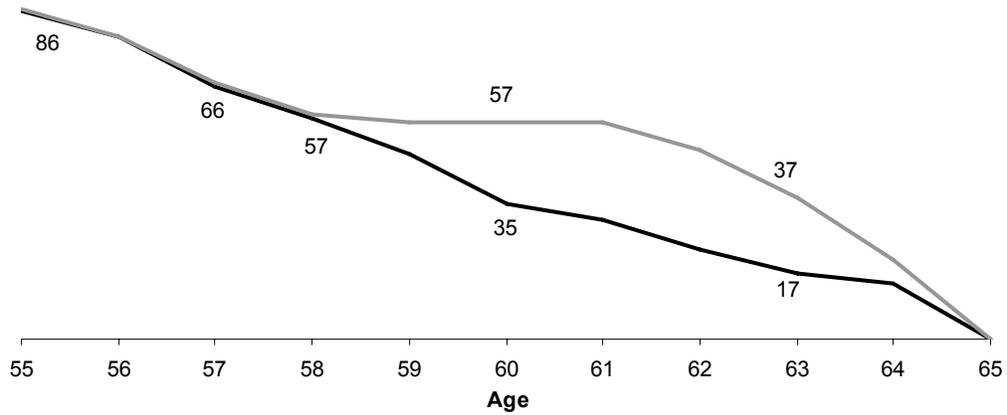
Source: Ministère des Finances du Québec.

26 See note 24.

CHART 16

**Impact of scenario 3 on the labour supply of persons age 55 to 65**  
(percentage of persons at work)

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Source : Ministère des Finances du Québec.

### 3.4.5 Summary of the impacts of phased retirement scenarios

The following table gives an outlook of the impacts of the phased retirement scenarios on the discounted value of net income, the net hourly earnings and the labour supply of workers age 55 to 65.

TABLE 12

#### Summary of the impacts of the three phased retirement scenarios

|   | Current system           |                               |                            | Phased retirement scenarios     |   |  |
|---|--------------------------|-------------------------------|----------------------------|---------------------------------|---|--|
|   | Full-time work to age 63 | Phased retirement (3 days/wk) | Early retirement at age 60 | Scenario 1<br>Allowed at age 55 | Scenario 2<br>Allowed as of age 60 or 30 years of service | Scenario 3<br>Allowed as of age 60 or 30 years of service with incidental benefits |
| <b>Discounted value of net future income for a worker age 60 (dollars)</b>                                    | 452 737                  | 417 852                       | 402 318                    | 436 701                         | 436 701   | 445 115  |
| <b>Additional net income<sup>1</sup> for worker compared with early retirement, per hour worked (dollars)</b> | 8.40                     | 4.32                          | —                          | 9.55                            | 9.55  | 11.89  |
| - Difference in discounted value of net future earnings   | 50 419                   | 15 534                        | —                          | 34 383                          | 34 383  | 42 797   |
| - Number of hours worked as of age 60   | 6 000                    | 3 600                         | —                          | 3 600                           | 3 600   | 3 600  |
| <b>Change in the labour supply of participants age 55 to 65</b>   | —                        | —                             | —                          | -0.2 years                      | +0.4 years  | +0.7 years   |

1 Additional net income at age 60 from work compared with that from early retirement represents the ratio between the difference in the discounted value of net future earnings and the number of hours worked as of age 60.

Source: Ministère des Finances du Québec.

## 4. LEGISLATIVE AMENDMENTS NEEDED TO IMPLEMENT NEW PHASED RETIREMENT PROVISIONS

For phased retirement to become a more attractive option in defined benefit pension plans, amendments must be made to the federal tax laws<sup>27</sup> and to Québec's *Supplemental Pension Plans Act*. These changes are needed to remove the constraints that currently prevent greater use of phased retirement. The amendments to the legislation should allow payment of a retirement pension at the same time as accumulation of service, and payment of incidental benefits as part of deferred retirement.

However, to ensure that phased retirement encourage workers close to the end of their career to extend their active life, the amendments under consideration must include the following safeguards:

- access to phased retirement can be allowed as of age 60 or 30 years of service;
- the pension paid during phased retirement must be proportional to the reduction in work time;
- payment of incidental benefits to full-time and part-time workers can be permitted as of age 60 or 30 years of service, in order to encourage late retirement.

If the new legislation satisfies these safeguards, it could, for instance, allow implementation of phased retirement provisions similar to those stipulated in scenarios 2 and 3, according to the needs of employers. Phased retirement would become more flexible and more attractive compared to early retirement for participants close to the end of their career. It would encourage later retirement, as shown by the analysis of impacts on the labour supply of participants.

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27 Note that, with respect to pension plan registration rules, Québec's tax legislation refers to federal tax legislation, therefore, Québec's legislation would not have to be amended.

More specifically, the legislative changes should first enable the payment of a pension at the same time as the accumulation of service under the pension plan.

- Currently, an individual who opts for phased retirement receives a smaller retirement pension once he retires fully. The reduction in pension is equal to the value of the amounts paid by the DBP during phased retirement and is tied to the payment of a lump sum rather than a retirement pension, as explained in the section on issues with the current implementation of phased retirement.
- By allowing both the payment of a retirement pension and the accumulation of service during the period of phased retirement, this constraint, which currently is the main obstacle to the use of phased retirement in DBPs, would be eliminated.
- To remove this constraint, an amendment to paragraph 8503(3)b) of the federal ITR is needed.
- At the provincial level, the SPPA requires that the retirement pension payable by a plan be uniform, except for adjustments to reflect the bridging benefit and inflation. In order to become possible to pay a retirement pension at the same time as the accumulation of service in DBPs, an amendment to section 59 of the SPPA would be needed. This section currently requires that life benefits be paid in equal periodic payments, which prevents a revaluation of the final retirement pension reflecting the additional years of service accumulated during the period of phased retirement.

The changes to the legislation must also allow payment of incidental benefits as part of deferred retirement.

- Currently, an individual who opts for full-time work or phased retirement in DBPs after age 60, loses the value of incidental benefits relating to early retirement. Tax rules have not been formulated to allow payment of incidental benefits in the case of later retirement, whether full or phased. Rather, these rules favour early and full withdrawal from the labour market.
- To remove this constraint, it is recommended that the payment of incidental benefits be dissociated from the pension payment. Amendments are needed to subparagraph 8503(2)(b)(i) of the ITR.

**Summary of legislative amendments needed to enable new phased retirement measures in DBPs**

**Amendments needed to the *Income Tax Regulations* at the federal level**

Subparagraph 8503(2)(b)(i):      Dissociate the payment of incidental benefits from the pension payment.

Paragraph 8503(3)(b):            Allow simultaneous accumulation of service and payment of a retirement pension.

**Allow simultaneous accumulation of service and payment of a retirement pension.**

Section 58:                          Review the definition of bridging benefit.

Section 59:                          Allow payment of a non-levelled pension to reflect accumulation of service during phased retirement.

Section 69.1:                        Allow payment of incidental benefits (bridging benefit) in the case of accumulation of service during phased retirement.



## 5. CONCLUSION

The analysis of private sector supplemental defined benefit pension plans in Québec indicates that, in order to encourage phased retirement and make it more competitive compared to early retirement, several amendments to the federal law and to the *Supplemental Pension Plans Act* are needed. These amendments should make it possible to simultaneously receive payment of a retirement pension and accumulate service under the plan, and allow payment of incidental benefits in case where retirement is deferred.

However, these amendments alone are not sufficient for the new phased retirement provisions to encourage workers to remain at work longer. Certain safeguards are needed to control access to phased retirement in order to make it an attractive alternative to early retirement and encourage retirement at a later age while, at the same time, prevent it from becoming more attractive than full-time work. In short, the tax laws and the laws governing pension plans should allow:

- payment of the retirement pension and a labour income at the same time as accumulation of service under a pension plan;
- payment of incidental benefits in the case of phased retirement or full-time work.

To ensure that the new terms and conditions of phased retirement are not more advantageous than full-time employment, which would result in a reduced labour supply, the laws should also provide that:

- access to phased retirement be allowed as of age 60 or 30 years of service.  
For example:
  - a worker aged 60 with less than 30 years of service would be eligible for the new phased retirement mechanisms,
  - a worker aged 55 with 30 years of service would also be eligible,
- the pension paid during phased retirement be proportional to the reduction in work time;
- payment of incidental benefits be permitted as of age 60 or 30 years of service to encourage late retirement.

Access to these new terms and conditions of phased retirement would not be a right for workers and must be covered by an agreement between them and their employer.

This analysis shows that the new phased retirement provisions, applied within a framework that ensures that its use extends the active life of workers, is a strategy with many positive impacts. The new provisions will help increase labour supply while keeping experienced and qualified workers employed and facilitate the transfer of knowledge in businesses. In the context of ageing of the population, employers, employees and society will all benefit.

In order to implement the new provisions promoting phased retirement, in November 2006, the Québec government passed a recommendation designed in particular to authorize the ministère des Finances du Québec, jointly with the ministère de l'Emploi et de la Solidarité sociale and the Régie des rentes du Québec, to continue talks with the federal government in this regard.

## GLOSSARY

### ❑ Pension plan

Pension plans include all pension plans certified for tax purposes and that must comply with a framework law or are established under a specific law. This includes pension plans subject to the *Supplemental Pension Plans Act*, those that come under federal jurisdiction (chartered banks, communications and transportation sectors and federal public service) as well as the plans of the Québec public administration, the health and education sectors, such as the pension plans of the government and public bodies (RREGOP) and the pension plan for executive personnel (RRPE). Retirement savings vehicles, such as group registered retirement savings plans (RRSP), are excluded from this definition since they only have to comply with a federal law, namely the Income Tax Act.

### ❑ Supplemental pension plan (SPP)

These are plans subject to the *Supplemental Pension Plans Act*. They represent a subset of pension plans and are called supplemental because they are in addition to the public pension plans, such as the Québec Pension Plan, the Old Age Security Pension and the Guaranteed Income Supplement. They are covered by the proposals to encourage phased retirement put forward by the Comité sur la retraite progressive. Plans governed by a federal framework law, public administration plans and plans of the health and education sectors are not SPPs under the *Supplemental Pension Plans Act*.

### ❑ Defined benefit pension plans

This is a type of pension plan under which an employer and, if stipulated by the plan, his employees, undertake to make sufficient contributions to cover a given level of benefits at retirement. In such plans, the participant's retirement pension is calculated according to a formula that takes into account the worker's years of participation in the plan (number of years of service) and the benefit accumulation rate (for example, the retirement pension could correspond to 2% of the average salary of the worker's five best-paid years for each year of participation in the plan).

### **❑ Defined contribution pension plan**

This type of pension plan stipulates a defined level of contributions for the employer and, if stipulated by the plan, his employees. For example, the worker could pay 4% of his salary each year into his accumulation account under the plan and his employer would contribute by the same amount. In these plans, the retirement income depends on the funds accumulated by the participant at the time of his retirement.

### **❑ Québec Pension Plan (QPP)**

The Québec Pension Plan is a contributory and compulsory social insurance plan based on remuneration. It is an integral part of public pension plans and protects the contributor and his family against loss of income attributable to retirement, disability and death. There are three types of benefits under the Québec Pension Plan, namely disability benefits, the retirement pension and survivor benefits (death benefits, surviving spouse's pension, and orphan's pension). Apart from a few exceptions, any person living in Québec, over age 18 and receiving a salary, must contribute to the Québec Pension Plan. An employer and his employees each contribute half the contributions (in 2005, each contributes 4.95% of the worker's salary, for a total of 9.9%, up to the maximum pensionable earnings). A self-employed worker must pay the full-required contribution (9.9%).

### **❑ Maximum pensionable earnings (MPE)**

This is the maximum salary on which workers in Québec contribute to the Québec Pension Plan for a given year. It is set at \$41 100 in 2005.

### **❑ Old Age Security pension (OASP)**

The Old Age Security pension is a monthly benefit paid on demand to most Canadians age 65 or over who satisfy residency requirements. It is part of the public pension plans. The occupational antecedents of the application are not a factor in determining eligibility and it is not necessary to be retired. The Old Age Security pension is subject to federal and provincial income tax. High-income recipients also repay all or part of their benefits through the tax system.

## ❑ **Guaranteed Income Supplement (GIS)**

The Guaranteed Income Supplement is a monthly benefit paid to Canadian residents who receive a full or partial Old Age Security pension and have low or no income. The GIS is part of public pension plans and can begin to be paid during the same month as the Old Age Security pension. The amount of the monthly payments, determined for the year, can increase or decrease depending on changes in the recipient's annual income. Unlike the Old Age Security pension, the Guaranteed Income Supplement is not taxable. The GIS is not paid after a period of six months spent outside Canada, regardless of the total duration of the person's residence in Canada.

## ❑ **Normal retirement age**

Normal retirement age is generally set in public and private pension plans at age 65. At that age, the participant can demand to receive his QPP benefits without actuarial reduction, his Old Age Security pension and his Guaranteed Income Supplement benefits. However, some supplemental pension plans may stipulate a normal retirement age less than 65.

## ❑ **Early retirement**

Early retirement allows the worker to leave work completely and begin to receive pension benefits before the normal retirement age stipulated by his plan. A pension plan can be neutral in relation to early retirement or include incentives for its use. For instance, for a defined benefit pension plan to be neutral, when the retirement pension is paid as of age 60 rather than age 65, its amount should be adjusted downward (actuarial reduction rate) to allow for the fact that the pensioner will receive his pension over a longer period than normally stipulated by his plan. However, plans can provide incentives to take early retirement that consist in eliminating or diminishing the actuarial reduction rate in the case of early retirement. They can also stipulate payment of a temporary additional pension, also called bridging benefit, until age 65. The temporary pension, in the case of early retirement, is considered an incidental benefit in the pension plan since it is in addition to the basic pension.

### **❑ Bridging benefit**

A bridging benefit is an additional temporary pension that a pension plan can offer to its participants when they choose early retirement. The bridging benefit is paid by the plan, in addition to the basic pension, to make retirement income prior to age 65 comparable with what the participant will receive after age 65, which includes retirement benefits from the QPP, the OASP and the GIS. The maximum amount payable as a bridging benefit corresponds to the total of the benefits that may be paid by the public plans.

### **❑ Phased retirement**

Phased retirement allows the worker to gradually withdraw from the labour market by working part-time for a certain period, as opposed to immediate and full withdrawal. A pension plan can stipulate provisions allowing phased retirement that often incorporate an organisation of work component (such as work time reduction programs) and a financial component (such as the integration of work and retirement income). For an employee to be able to opt for phased retirement, he and his employer must first have come to an agreement to that effect.

## APPENDIX 1 — STATISTICAL PORTRAIT OF SUPPLEMENTAL DEFINED BENEFIT PENSION PLANS IN QUÉBEC

The following tables show the results of the statistical analysis of supplemental defined benefit pension plans in Québec. The statistical analysis of DBPs was carried out on a sample consisting of 133 194 participants in 37 DBPs, taken from the administrative database of the Régie de rentes du Québec concerning all DBPs under its oversight. The sample is divided by plan size and economic sector.

TABLE 13

### Profile of the representative participant in a DBP in Québec

|                              | Representativeness of the average |                              |  |
|------------------------------|-----------------------------------|------------------------------|--|
|                              | Average                           | Confidence interval<br>(95%) | Coefficient of<br>variation <sup>1</sup> |
| Years of service at age 60   | 29.9                              | [29.2 ; 30.6]                | 7.3                                      |
| Average income               |                                   |                              |  |
| – Whole career               | \$51 081                          | [\$46 997; \$55 166]         | 24.8                                     |
| – End of career <sup>2</sup> | \$57 695                          | [\$53 251; \$62 137]         | 22.6                                     |
| Average retirement age       | 59.6                              | [58.9 ; 60.2]                | 3.1                                      |

1 The coefficient of variation (CV) represents the degree of dispersion of the variable compared to the average. Generally speaking, a CV below 20 indicates that the average is representative.

2 Average income of participants age 50 or over.

Sources: Ministère des Finances du Québec and Régie des rentes du Québec.

TABLE 14

### Average retirement age in DBPs by economic sector

| Economic sector | Years       |
|-----------------|-------------|
| Commercial      | 61.6        |
| Financial       | 59.0        |
| Manufacturing   | 59.9        |
| Municipal       | 57.6        |
| Services        | 61.9        |
| <b>Average</b>  | <b>59.6</b> |

Note: Calculations based on the actuarial assumptions of the pension plans; no data available for the primary sector.

Sources: Ministère des Finances du Québec and Régie des rentes du Québec.

TABLE 15

**Average number of years of service in DBPs by economic sector**

| <b>Economic sector</b> | <b>Average age</b> | <b>Average participation in the plan</b> | <b>Years of service at age 60</b> |
|------------------------|--------------------|--|-----------------------------------|
| Commercial             | 44.4               | 14.7                                     | 30.4                              |
| Financial              | 41.7               | 12.5                                     | 30.8                              |
| Manufacturing          | 42.2               | 11.6                                     | 29.5                              |
| Municipal              | 40.7               | 12.7                                     | 32.0                              |
| Primary                | 47.0               | 16.4                                     | 29.4                              |
| Services               | 46.1               | 12.9                                     | 26.8                              |
| <b>Average</b>         | <b>43.1</b>        | <b>13.0</b>                              | <b>29.9</b>                       |

Source: Ministère des Finances du Québec and Régie des rentes du Québec.

TABLE 16

**Average income in DBPs by economic sector**

| <b>Economic sector</b> | <b>Average labour income</b> |                                  |
|------------------------|------------------------------|----------------------------------|
|                        | <b>All participants</b>      | <b>End of career<sup>1</sup></b> |
| Commercial             | \$58 075                     | \$59 270                         |
| Financial              | \$38 967                     | \$45 722                         |
| Manufacturing          | \$60 856                     | \$69 803                         |
| Municipal              | \$45 629                     | \$48 255                         |
| Primary                | \$68 778                     | \$74 593                         |
| Services               | \$52 219                     | \$63 662                         |
| <b>Average</b>         | <b>\$51 081</b>              | <b>\$57 695</b>                  |

1 Average income of participants age 50 or older.

Sources: Ministère des Finances du Québec and Régie des rentes du Québec.

TABLE 17

**Average rates of retirement by economic sector**

(Cohort of 100 retirees)

| Economic sector | Number of participants | Age       |           |           |           |            |
|-----------------|------------------------|-----------|-----------|-----------|-----------|------------|
|                 |                        | 55        | 57        | 60        | 63        | 65         |
| Commercial      | 32 339                 | 10        | 34        | 76        | 90        | 100        |
| Financial       | 37 267                 | 23        | 45        | 68        | 82        | 100        |
| Manufacturing   | 26 880                 | 2         | 28        | 66        | 82        | 100        |
| Municipal       | 14 613                 | 45        | 52        | 82        | 84        | 100        |
| Services        | 21 060                 | 1         | 13        | 29        | 74        | 100        |
| <b>Average</b>  |                        | <b>14</b> | <b>34</b> | <b>65</b> | <b>83</b> | <b>100</b> |

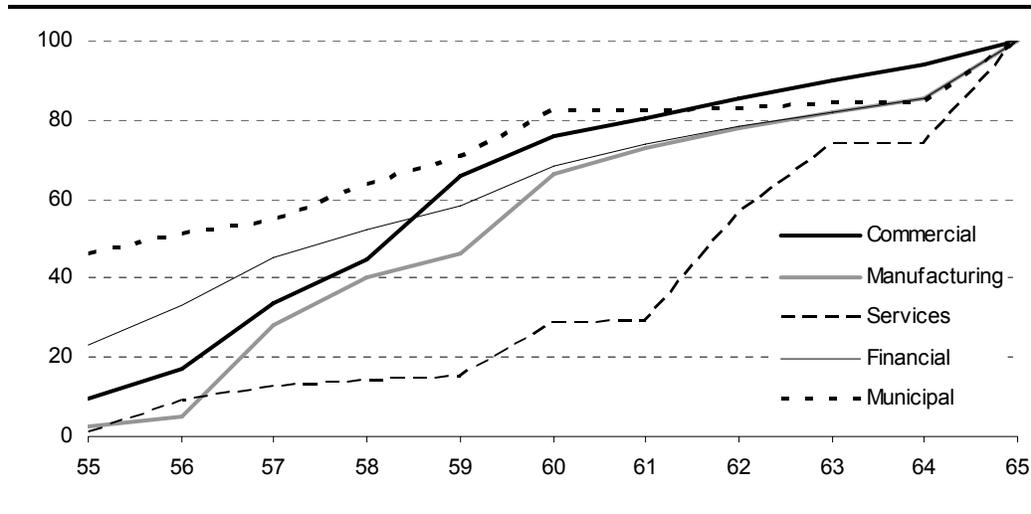
Note: Calculations based on the actuarial assumptions of the pension plans; no data available for the primary sector.

Sources: Ministère des Finances du Québec and Régie des rentes du Québec.

CHART 17

**Average rates of retirement by economic sector**

(Cohort of 100 retirees)



Note: Calculations based on the actuarial assumptions of the pension plans; no data available for the primary sector.

Sources: Ministère des Finances du Québec and Régie des rentes du Québec.



## APPENDIX 2 — NET INCOME SIMULATION MODEL ADAPTED TO THE CALCULATION OF RETIREMENT BENEFITS

Present and future income flows of a representative worker and DBP are calculated using a simulation model of compulsory deductions and transfers to individuals.

This model, which is among the tools used by the ministère des Finances du Québec to study the impact of tax policies, calculates personal income taxes (provincial and federal), compulsory social contributions, Québec government and federal government benefits, and the resulting net income, using a typical worker approach.<sup>28</sup> Net income (disposable income) represents gross income plus transfers less compulsory deductions.

To study the impact of the retirement scenarios on the net income of participants, the calculation of retirement pensions according to the characteristics of a DBP was incorporated.

For a given retirement scenario, the following two indicators were calculated: the net income replacement rates for a representative worker age 55 or over and their discounted value at retirement age. The net income replacement rate represents the rate of replacement of the salary lost by the increase in all other incomes, after compulsory deductions and transfers. The present value is calculated using the survival probabilities of men derived from the UP-94 mortality table, assuming a discount rate of 4%. It is assumed that inflation is zero and that the parameters of the tax system and of transfers are constant.

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28 The following components are calculated: at the federal level, the Old Age Security pension (OASP), the Guaranteed Income Supplement (GIS), the GST credit, personal income tax and employment insurance contribution; for Québec, personal income tax, the sales tax credit (QST), the shelter allowance, the property tax refund, the QPP contribution and retirement pension and the contribution to the Health Services Fund.

Accordingly, the discounted value of the replacement rates at age  $x$  is calculated using the following formula:

$$VATR_x = \sum_{n=0}^{120-x} \frac{TR_{x+n}}{(1+i)^n} {}_n p_x$$

where:  $VATR_x$  represents the discounted value of the net income replacement rates at age  $x$ ;

$TR_x$  represents the net income replacement rate at age  $x$ ;

$i$  represents the discount rate;

${}_n p_x$  represents the probability that a person of age  $x$  lives to age  $x+n$ .

All these calculations are repeated by varying the retirement age from age 55 to 65. The present values of the net income replacement rates for each retirement age enable us to calculate the implicit tax on continuation of work (ITCW) associated with the pension plan. The ITCWs are calculated using the following formula:

$$TIPT = - \left( \frac{VATR_{t+1}}{1+i} - VATR_t - Cotisations_t \right)$$

where:  $VATR_{t+1}$  represents the present value of the net income replacement rate at retirement age  $t+1$ ;

$VATR_t$  represents the present value of the net income replacement rate at retirement age  $t$ .

The variables  $i$  and  $Cotisations_t$  correspond respectively to the discount rate ( $i = 4\%$ ) and to the rate of contribution to the pension plans assuming full-time work at time  $t$ . This approach is based on a methodology used by the OECD (see Duval, 2003).

It is also assumed that the salary of an additional year of work has the same value as the loss of a year of leisure. For this reason, the salary earned during the additional year of work is not considered in the calculation.

Interpretation of the ITCW is relatively simple. If, for an additional year of work, the increase in the present value of the retirement pension is greater than the contributions payable and the loss of a year of pension, it is assumed that the pension plan encourages the worker to remain at work. If, on the other hand, an additional year of work causes more loss than benefit on the retirement pension, the worker is then encouraged to retire.

## APPENDIX 3 — IMPLICIT TAX ON CONTINUATION OF WORK (ITCW) AND NET INCOME AT VARIOUS AGES

This appendix describes the impact of the various phased retirement scenarios on the net income and the ITCW imposed by the representative DBP at various retirement ages.

### □ Scenario 1

Note that the net income of a worker in scenario 1 is always higher than that of the individual in early retirement. Accordingly, some individuals could choose phased retirement rather than early retirement, which translates into a positive impact on labour supply.

Recall that scenario 1 can also be an alternative to full-time work as of age 55 because some workers are ready to forego part of their income to obtain more leisure and the ITCW imposed by pension plans is positive. This implies that the worker is encouraged to work part-time, because the pension plans impose a tax on the continuation of full-time work. Moreover, the ITCW increases substantially at age 57. As of age 57, the representative DBP imposes a higher tax on continuation of work, rising from 19% to 39% between age 56 and 57 and to over 45% thereafter. Accordingly, as of age 57, a full-time worker has a very strong incentive to work part-time, which would reduce his total labour supply.

TABLE 18

#### Net income of a worker and ITCW by age, in scenario 1

| Age | Current system |                 | Phased retirement scenarios<br>(3 days/week) |          |
|-----|----------------|-----------------|--|----------|
|     | Full-time work | Full retirement | Scenario 1                                   | ITCW (%) |
| 55  | 37 002         | 21 375          | 29 287                                       | 25.0     |
| 56  | 37 002         | 22 685          | 29 751                                       | 19.0     |
| 57  | 37 002         | 23 888          | 30 462                                       | 38.6     |
| 60  | 37 002         | 30 417          | 35 239                                       | 48.7     |
| 63  | 37 002         | 33 518          | 37 092                                       | 48.0     |
| 65  | 39 711         | 33 570          | 38 957                                       | 46.2     |

Source: Ministère des Finances du Québec.

## □ Scenario 2

In this scenario, as of age 63, the net income of a worker who decides to choose phased retirement is comparable to that of a worker who chooses full-time work. As the following table shows, as of age 63, the net income of a worker in phased retirement is \$37 092, compared to \$37 002 for full-time work. Accordingly, before age 63, full-time work is more profitable than part-time work, while after age 63 the two options are comparable in terms of net income. However, the ITCW imposed on the continuation of full-time work reaches a peak at age 60, i.e. 48.7%. Pension plans accordingly encourage the worker to choose phased retirement as of age 60, because they impose a tax on the continuation of full-time work.

Compared to early retirement, scenario 2 is relatively advantageous because the difference in net income between the two alternatives is roughly \$5 000 at age 60 when the worker reaches 30 years of service. Thus, this phased retirement scenario encourages individuals who would have opted for early retirement to remain at work part-time, which has a positive impact on labour supply. We are thus in a situation in which phased retirement is still more advantageous than early retirement, but less advantageous than full-time work before age 63, and equivalent to full-time work after that age.

TABLE 19

### Net income of a representative worker by age in scenario 2

| Age | Current system |                 | Phased retirement scenarios<br>(3 days/week) |          |
|-----|----------------|-----------------|--|----------|
|     | Full-time work | Full retirement | Scenario 2                                   | ITCW (%) |
| 55  | 37 002         | 21 375          | n/a  | n/a      |
| 56  | 37 002         | 22 685          | n/a  | n/a      |
| 57  | 37 002         | 23 889          | n/a  | n/a      |
| 60  | 37 002         | 30 417          | 35 239                                       | 48.7     |
| 63  | 37 002         | 33 518          | 37 092                                       | 48.0     |
| 65  | 39 711         | 33 570          | 38 957                                       | 46.2     |

Source: Ministère des Finances du Québec.

## □ Scenario 3

Compared with scenario 2, scenario 3 results in a higher net income at age 60. This is attributable to the fact that this scenario stipulates payment of the full amount of the bridging benefit as of age 60 or 30 years of service, whether the worker is in phased retirement or working full-time, which is not stipulated in scenario 2. The net income of a worker in phased retirement at age 60 in scenario 3 is therefore greater by about \$3 000 compared with the same net income in scenario 2.

TABLE 20

### Net income of a worker by age in scenario 3

| Age | Current system |                 | Phased retirement scenarios<br>(3 days/week) |          |
|-----|----------------|-----------------|--|----------|
|     | Full-time work | Full retirement | Scenario 3                                   | ITCW (%) |
| 55  | 37 002         | 21 375          | n/a  | n/a      |
| 56  | 37 002         | 22 685          | n/a  | n/a      |
| 57  | 37 002         | 23 889          | n/a  | n/a      |
| 60  | 37 002         | 30 417          | 38 201                                       | 33.9     |
| 63  | 37 002         | 33 518          | 40 239                                       | 41.8     |
| 65  | 39 711         | 33 570          | 38 957                                       | 46.2     |

Source: Ministère des Finances du Québec.



## APPENDIX 4 — LABOUR SUPPLY MODEL BASED ON THE MAXIMISATION OF WORKERS' WELFARE

To determine the effect on labour supply, a partial equilibrium welfare maximisation model was used. This model can determine the labour supply of a representative worker at each year when retirement is possible, i.e. from age 55 to 65. It is thus possible to determine the labour supply of a representative worker over a period of 10 years as of age 55, in the current situation or following the implementation of the new provisions.

The problem of welfare maximisation of the representative worker therefore consists in maximising the discounted sum of his utilities between age 55 and 65:

$$\text{MAX: } W = \sum_{\text{age}=55}^{65} \frac{U_{\text{age}}}{(1+r)^{\text{age}-55}} \quad (1)$$

Where  $U$  = worker's utility;

$r$  = discount rate

The model assumes *a priori* that at each period, households maximise a constant elasticity of substitution (consumption/leisure) utility function defined as follows:

$$U_{\text{age}} = (\alpha_{\text{age}} (C_{\text{age}} - C_{\text{min}_{\text{age}}})^{-\rho} + (1 - \alpha_{\text{age}}) (L_{\text{age}} - L_{\text{min}_{\text{age}}})^{-\rho})^{\frac{-1}{\rho}} \quad (2)$$

where  $L$  is leisure;

$L_{\text{min}}$  is the minimum leisure;

$C$  is consumption in goods and services;

$C_{\text{min}}$  is the minimum consumption;

$\alpha$  is the distributive share of income;

$\rho = \frac{1}{\sigma} - 1$ , where  $\sigma$  is the elasticity of substitution.

The budgetary constraint at time  $t$  is mainly a function of expected salary and retirement pension:

$$C_{age} = nb_{age}^{TP} w_{age} h^{TP} (1 - tm_{age}) + nb_{age}^{RP} w_{age} h^{RP} (1 - tm_{age}) + nb_{age}^{RC} rente_{age} \quad (3)$$

where:  $w$  is the salary rate;

$tm$  is the implicit tax on continuation of work (ITCW);

$rente$  is the expected retirement pension by age;

$h^{TP}$  is the average number of hours of work for a full-time worker;

$h^{RP}$  is the average number of hours of work for a worker in phased retirement;

$nb^{TP}$  is the proportion of workers who work full-time;

$nb^{RP}$  is the proportion of workers in phased retirement;

$nb^{RC}$  is the proportion of workers in full retirement.

The demand for leisure, for a given period, is equal to the maximum number of hours that a person can offer, from which his labour supply is subtracted.

$$L_{age} = maxh - nb_{age}^{TP} h^{TP} - nb_{age}^{RP} h^{RP} \quad (4)$$

where  $maxh$  is the maximum number of hours available, i.e. 24 hours per day.

Starting from first order conditions, we can determine demand functions for leisure and consumption of goods and services at each period. The basic scenario and the preferences of individuals are calibrated on the data deriving from the portrait of DBPs in Québec. In addition, the model incorporates the implicit tax on the continuation of work generated by pension plans in addition to the income replacement rates, which are used to calculate the expected retirement pension. By varying these parameters, it is therefore possible to estimate changes in labour supply.

### **The net impact on labour supply of a change to a pension plan results from a substitution effect and an income effect**

To analyse the choices of individuals regarding labour supply, a welfare maximisation model was used, in which a worker derives satisfaction from the consumption of leisure as well as from the consumption of other goods and services. Using a standard utility function, the individual's preferences among all possible combinations of these two categories of goods can be represented, as well as his propensity to substitute the consumption of other goods and services for leisure.

The model assumes that among all possible combinations of leisure and consumption of goods and services that he can obtain with his budget, an individual chooses the one that maximises his welfare. This is called the optimal combination. The individual's budgetary constraint depends on the prices of the two desired goods. The price of consumption refers to an index of prices of goods and services on the market and the price of leisure is measured by the salary the worker foregoes when he devotes more time to leisure. For instance, if the worker decides to reduce his work days by one day, he is said to place a value at least as great as this additional day of leisure as on the consumption of goods and services that this day's salary would have procured for him.

The optimal leisure/consumption combination of an individual changes when the conditions he faces are changed. For instance, suppose that the individual's salary is reduced. The net impact of this reduction in the relative price of leisure on labour supply can be broken down into two effects, namely the substitution effect and the income effect. The difference between these two effects can be understood intuitively, without an overly technical explanation.

First of all, the worker is encouraged to substitute leisure for work because it is now less expensive to forego work. The reduction in salary is said to induce a substitution effect that tends to reduce labour supply. However, a reduction in salary means that for a given number of hours of work, the worker's total income, and consequently his consumption of goods and services, declines. To offset the decline in standard of living resulting from the reduction in salary, the worker will tend to increase his labour supply. The reduction in salary is then said to produce a revenue effect that tends to increase labour supply. The net effect of a reduction in salary on labour supply therefore depends on the relative size of these two effects.

The labour supply model used here thus captures the two effects of a change made to the pension plan on labour supply. The substitution effect results mainly from changes to the plan's ITCW, since a change to the ITCW implies a change in the relative price of leisure. The income effect stems mainly from changes to the replacement rate, since a change in the replacement rate affects the capacity to maintain the standard of living at retirement.

For example, if a change to the pension plan raises the ITCW at age 55, the worker will tend to substitute leisure for work since his salary is lower and the time he devotes to leisure becomes less expensive. Accordingly, he has a greater incentive to retire. However, if his income replacement rate is very low at age 55, the worker will tend to work more to maintain his level of utility. By creating an interaction between the substitution effect and the income effect, the model is able to determine the net impact on labour supply of a change to the pension plan.



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