



A comparative study of demographic and economic assumptions used for actuarial valuations of Social Security Schemes

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Thank you Mr. Chairman. Good morning ladies and gentlemen,

I feel privilege to speak before this honourable assembly.

Presentation Background (Slide 2) The results of this survey on demographic and economic assumptions was conducted by the Quebec Pension Board and first presented at the International Conference of Social Security Actuaries and Statisticians in Helsinki, Finland in May 2007.

Context of the study (Slide 3) Like most industrialized countries, Canada will experience an ageing of its population due to the drop in birth rates combined with increases in life expectancy. The assumptions used in the actuarial valuations of various national pension plans are based on information gathered from numerous sources. The information obtained with this study will be beneficial as it will allow us to compare our future projections with those made by other industrialized countries.

Participants (Slide 4) This slide lists the survey participants. I would like to thank them. Without their support, this study would not have been possible. I would also encourage any country in this room to participate in future surveys if similar information is available.

Outline (Slide 5) I will begin by discussing the demographic assumptions and projections for all of the countries included in the study. Next, I will compare the labour force participation among the countries, particularly for those aged 55 and over. Finally, I will discuss other economic variables, including inflation and the rate of increase in employment earnings.

Fertility (Slide 6) Three main variables determine changes in the population: the total fertility rate, net migration rate and life expectancy. Fertility contributes to the growth of a country's population. The number of births directly influences the number of new workers (and plan contributors) expected to join the labour force in approximately 20 years. The number of new contributors, and thus the level of fertility, is an important parameter to the funding of most social security schemes.



The countries with the lowest current fertility rates include Japan, Switzerland and Italy with rates in the range of 1.2 to 1.4 children per woman. A second group consisting of France, Finland, United Kingdom and Sweden anticipate fertility rates of approximately 1.8 children per woman in 2030. It is assumed that fertility rates in Canada will be between these two groups, with a rate of 1.6. The country with the highest assumed fertility rate is the United States with a rate of 2.0 children per woman.

In all of the countries studied, the projected total fertility rate is lower than the level required to renew the population; that is, 2.1 children per woman. In the absence of positive net migration, the population of several countries may decline over the next century.

Net migration (Slide 7) Positive net migration means an almost immediate increase of new workers. The effect that migration has on a plan's funding varies according to the level of migration and its distribution by age. Net migration expressed as a % of the population varies significantly among the surveyed countries. Currently, the rates range between 0.1% in France and 0.5% in Switzerland. Most countries anticipate small changes in net migration as a % of the population, except for Switzerland.

Canada anticipates net migration of 0.5% of its population in the next decade going up to 0.54% in 2020 and years thereafter. These projections are much higher than any of the other surveyed countries. Although the assumption for Quebec is higher than almost all other countries, it is still lower than Canada. The current net migration rate for Japan is similar to that of Finland; however a projection for future migration in Japan was not available. In most of the countries, the net migration is quite low and the projected levels of migration are not sufficient to offset the anticipated low fertility rates.

Male Life expectancy at 65 (Slide 8) Life expectancy at age 65 provides a good indication of the period during which pensions will be paid under a pension plan. In all countries studied, life expectancy is projected to increase rapidly. In 2000, male life expectancy varied between 15.5 years for Finland and 17.5 years for Japan. Most countries anticipate an improvement of between 3 to 4 years during the next thirty years. The exceptions are Japan with less than 2 years, although current life expectancy is relatively high compared to other countries and the United Kingdom with almost 5 years. Thus in 2030, male life expectancy is projected to be between 18 years for United States and 21 years for Switzerland.

Female Life expectancy at 65 (Slide 9) For women, life expectancy at age 65 varied between 19 years for United Kingdom and 22.4 years for Japan in 2000. There is a great deal of variation among the anticipated life expectancies in 2030. It can be divided into three groups: The United States with the lowest anticipated life expectancy at 20 years,

United Kingdom, Finland, Sweden and Canada in the range of 22 to 23 years and Switzerland, Japan, France and Italy with a life expectancy over 24 years. In most countries, the gap between men and women life expectancies reduces by approximately one year during the next thirty years, except for Japan where female life expectancy continues to grow at a higher rate than for males.

Population aged 65 and over (slide 10) The proportion of the population aged 65 and over is expected to increase in all countries, although at different rates. Japan should experience the greatest and most rapid population ageing. The proportion of its population aged 65 and above will increase from 20% to almost 30%. By 2030, at least 25% of the populations of Japan, Quebec, Finland and Italy will be age 65 and over.

The United States will also experience an increase in its population aged 65 and over, but the proportion will be lower than 20% by 2030. A higher fertility rate and higher net migration rate, combined with a lower life expectancy enables the United States to maintain, over the 30-year period, the smallest proportion of retirees.

Working –age population (slide 11) The size of the working-age population, those aged between 20 to 64, is a critical factor in a publicly-funded pension plan. Based on the results of the survey, the working-age population in Japan, Italy and Finland will decline significantly by 2030. On the other hand, United States, Canada, the United Kingdom and Sweden project continued growth among the working-age population.

Activity rates for men aged 55 to 59 (slide 12) Most industrialized countries have recently experienced a decline in labour force participation rates for males aged 55 to 64. Combined with increased longevity, this trend towards earlier retirement will have a significant impact on the funding of pension plans since the period over which pension benefits will be paid is increasing.

Due to the significant gap in labour force participation between males aged 55 to 59 and those 60 to 64, a separate analysis was done for each group. In most of the countries, it is projected that labour force participation rates for males aged 55 to 59 will remain stable or decline slightly between 2010 and 2030. The exception is Canada and Quebec where labour force participation rates are expected to increase over the same period. The highest labour force participation rate in 2005 was Japan at 94%, while the lowest rate, 70%, occurred in Finland and France.

Activity rates for men aged 60 to 64 (slide 13) In all countries surveyed, activity rates for men aged 60 to 64 decreased between 1980 and 1999. Since then, the opposite has been true and activity rates have increased except in Japan. It is projected that labour

force participation rates will remain relatively stable up to 2030. The exceptions are Japan, the United Kingdom and Canada where an increase is anticipated.

Activity rates for women aged 25 to 54 (*slide 14*) The age group 25 to 54 represents the largest number of workers and was therefore used to look at the participation of women in the labour market. Since the mid-1950s, the participation of women in the labour force has grown steadily and has contributed to the growth of the active population.

In 2005, female participation rates were highest in Sweden and Finland at about 85%. Canada, Switzerland and France followed at approximately 81%. The lowest female participation rates occurred in Japan and Italy at less than 70%. An increase of the participation rate for women is projected in all surveyed countries, except for Finland, where the activity rate is projected to level off around 85%.

Gap between men and women activity rates (*slide 15*) The gap in labour force participation between males and females is expected to narrow over the next 30 years in all of the countries surveyed except for Finland. In 2030, the lowest gap is anticipated to be approximately 5% in Finland and Quebec. In Japan, the gap between male and female activity rates exceeds 25% (except in 2030). One of the possible explanations for such a large gap is the Japanese culture, where males continue to have the role of sole provider of family income. In the United States, Canada and Europe, the man's previous role as sole provider has markedly declined.

Annual employment growth (*Slide 16*) Due to changes in the working-age population and participation rates in the labour force, employment over the next 30 years is expected to stagnate. Between 2006 and 2010, the average annual employment growth is projected to be strongest in the United States at 1.1%. The smallest projected growth is in Japan where employment will decrease on average 0.4% a year over the same period. After 2010, employment growth declines in all countries except for United and Canada.

Economic growth for most industrialized countries is expected to be driven more by labour productivity and less by employment in the future, which will have an impact on the real rate of increase in employment earnings. Due to slower growth of the active population, most countries expect the unemployment rate to decrease. In 2020, the projected unemployment rates of the surveyed countries are in the range of 4.5% for France to 6.5% for Canada.

Contributors (*Slide 17*) An ageing society will have a considerable impact on the number of contributors to the various pension plans. In the United States, Sweden and

Canada, the number of contributors is projected to grow over the next 30 years. In other countries, the growth will not be continuous over the entire period.

In Finland and Italy, the number of contributors will grow during the period 2005 to 2010, but then decline over the next 20 years. In the United Kingdom, France, Quebec and Switzerland, the effect of the retirement of the baby-boomers on the total number of contributors is expected to be felt later: growth will continue until 2020 and then decline thereafter. In Japan, the decline in number of contributors will be constant over the 30-year period.

Inflation rate (slide 18) Between 2000 and 2005, average inflation exceeded 2.5% only in the United States. Inflation seems to be under control mainly because, over last few years, most central banks have implemented a monetary policy based on a fixed inflation target. The target of the Bank of Canada is to keep inflation between 1% and 3%. The projected long-term inflation rates stabilize quickly over time, within a range of 1.0% for Japan and 2.8% for United States.

Real increase in employment earnings (slide 19) For the period 2000-2005, the average real rate of increase in employment earnings varies greatly among the surveyed countries: from -0.4% in Quebec to 2.6% in Finland. For the period 2006-2010, the average real rate of increase in earnings is expected to be between 0.2% in Italy and 2.1% in Sweden. Over the longer term, the rate varies between 1.0% for Switzerland and 2.1% for Sweden. With a decline of the long-term growth in employment, it can be assumed that growth of the real GDP will be mainly attributable to increased labour productivity, which will affect the real rate of increase in employment earnings.

Conclusion (slide 20) The population of all countries studied will age in the decades to come. By 2030, the active population will stagnate or slightly decline.

Most countries expect the participation rates of women to increase and, over the next few decades, the gap between males and females participation rates to further narrow. In most of the countries studied, the unemployment rate is expected to drop significantly and job growth is expected to be weak or negative.

Almost all of the actuaries consulted in the various social security agencies therefore expect a very different labour force from that recently observed. Economic growth in the coming decades should result primarily from work productivity, rather than employment growth, as was previously the case.