POPULATION AGING AND LIFE-COURSE FLEXIBILITY

BRIEFING NOTE

New *LifePaths* Projections of Hours of Work per Member of the Population

Highlights

- This note outlines developments in the projection of hours of work per member of the population (total hours of work in the economy divided by total population) using the *LifePaths* model.

- The most recent labour force and demographic data have been incorporated into the model and have changed the projections.

- Upper and lower band scenarios have been introduced to illustrate the potential future variation arising from normal business cycle variation.

- The potential impact of increased education levels on future labour productivity is illustrated in a new scenario.

This briefing note highlights updated *LifePaths*[1] projections that take into account recent labour market and demographic changes, which affect the projected peak and decline of hours of work per member of the population, in a context of population aging. It also highlights the introduction of a new way of illustrating the impact that increased education has on productivity and how this increased productivity could help offset the anticipated decline in hours of work per member of the population.

The concept of hours of work per member of the population, measured as the total number of hours of work produced in the economy divided by the total population, was introduced in the PRI's *Encouraging Choice in Work and Retirement.* It is a more reliable indicator of the impact of population aging on the amount of labour than the more commonly used dependency ratio (see Annex).

There have been new developments in the *LifePaths* projections:
- Updated labour force and demographic data have changed the projections.
- Upper and lower band scenarios account for business cycle variation.
- An added scenario shows the estimated impact of increased education levels on future labour productivity.
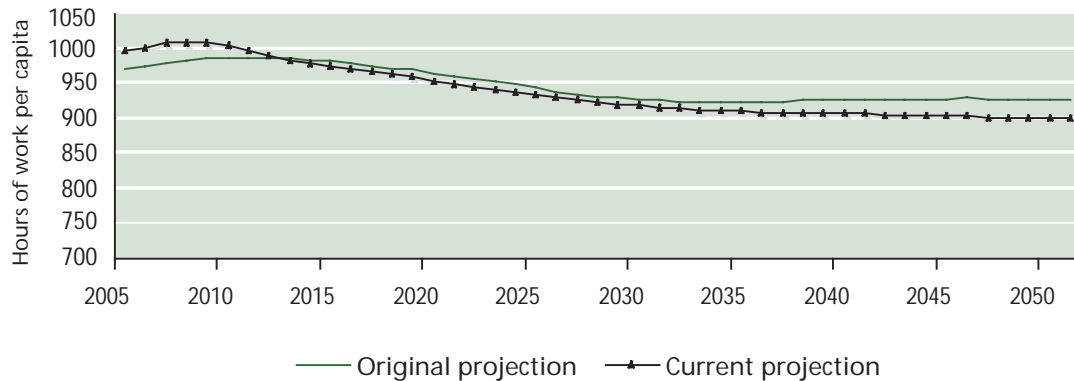
Changes in Hours of Work per Member of the Population

Updates to the *LifePaths* database have resulted in some changes in projecting hours of work per member of the population. The general trends remain the same as those portrayed in the original PRI report (*Encouraging Choice in Work and Retirement*). However, due to the greater than expected recent increases in both rates of labour market participation and hours worked, this revised projection (Figure 1) shows a higher peak in hours of work per member of the population in the near future. It also shows a larger decline in the future which results from higher estimates of future life expectancy than were previously projected (and hence a greater number of older people). As a result of both factors, we now project a 7% decline in hours of work per member of the population over the 2005 to 2025 period instead of the previous 3%, and a decline of 10% over the 2005 to 2051 period

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1 *LifePaths* is a microsimulation model developed by Statistics Canada in co-operation with the Government of Canada's Policy Research Initiative (PRI).

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instead of the previous 5%. (We should note that changes in projections are to be expected with *LifePaths,* as with any forecasting model; one of the strengths of the model is that it is continually being refined and updated with new data.)

FIGURE 1
Hours of Work per Member of the Population*
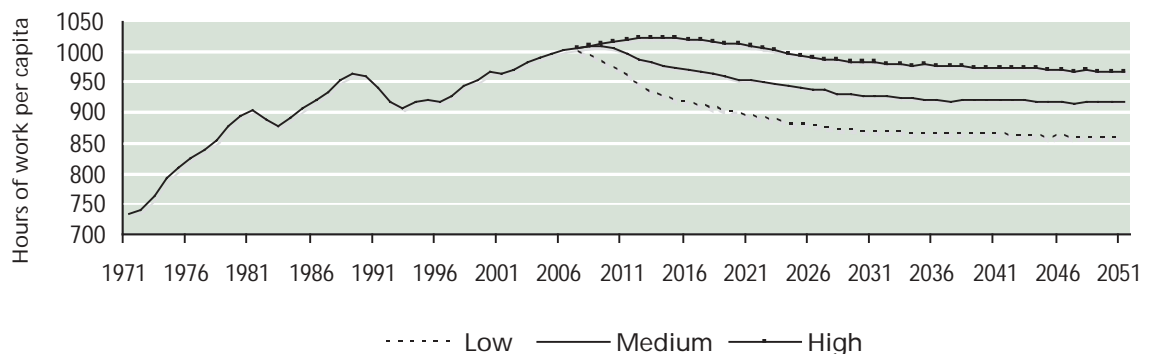### Original and Current Projections

Note: * Total hours worked in Canada, divided by total population per year.
Source: *LifePaths* Model, Statistics Canada.

Business Cycles

History has shown that business cycles cause the hours of work per member of the population to deviate from the long-run trend. (See for example the peaks and troughs in past years.) The likely future variance in hours of work per member of the population is now illustrated by projecting low and high economic scenarios in addition to the main projection (Figure 2). The high scenario represents the likely hours of work per member of the population in a peak or "boom" year, while the low shows the value in a trough or "bust" year. The medium scenario represents the main long-term *LifePaths* projection about which fluctuations would occur. So from a peak of approximately 1010 hours of work being performed annually for each member of the population in 2008, hours of work per member of the population in 2025 could range from 880 to 990 hours, depending on the state of the economy.

FIGURE 2
Projections of Hours of Work per Member of the Population*
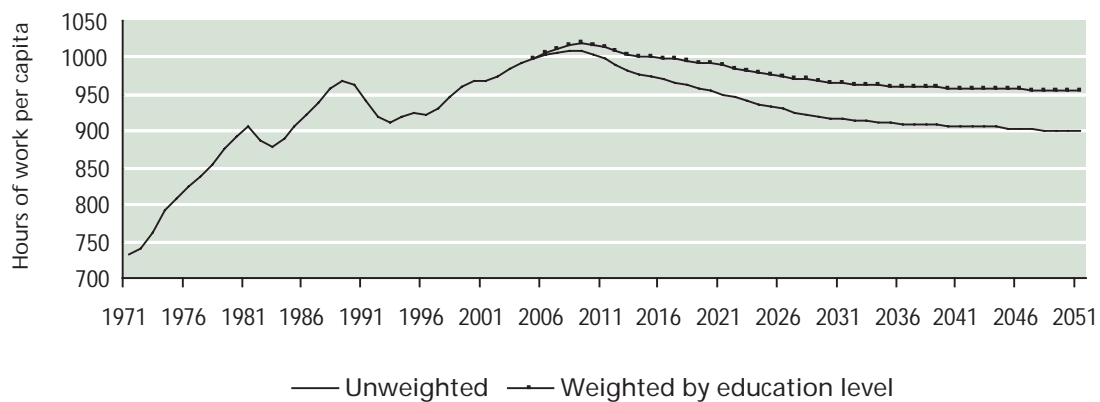### with Business Cycle Variation

Note: * Total hours worked in Canada, divided by total population per year.
Source: *LifePaths* Model, Statistics Canada.

Illustrating the Impact of Education on Productivity

The original projection of hours of work per member of the population did not include any measure of productivity. All hours of work were treated the same in the calculation regardless of the value of the labour. However, more educated individuals tend to be more productive, and *LifePaths* projections indicate that the labour force is expected to become more educated in the future if current educational attainment patterns continue. As a result, the value of one typical hour of work in the future is likely to be worth more than an hour worked today. The projection (Figure 3) illustrates this increased output by "weighting" hours according to the hourly wages of individual workers, which is related to their educational achievements. With this weighted calculation, the increased value of future labour in effect "replaces" a certain amount of the decrease in hours of work per member of the population, such that the model projects a decline in adjusted hours of work per member of the population of 2% from 2005-2025 and 4% from 2005-2051, significantly lower than the 7% and 10% estimates of the basic, non-weighted model. Note that this "productivity effect" derives only from increasing education levels and does not include productivity increases resulting from other factors.

FIGURE 3
Hours of Work per Member of the Population*
with Education-Induced Productivity Enhancements

Note: * Total hours worked in Canada, divided by total population per year.
Source: *LifePaths* Model, Statistics Canada.

Conclusions

This note updates the work on the impact of population aging on hours of work per member of the population originally developed for PRI's publication *Encouraging Choice in Work and Retirement.* Improvements to the *LifePaths* model have led to a greater projected impact of population aging with declines in hours of work per member of the population of 7% over the 2005 to 2025 period and 10% over the 2005 to 2051 period. High and low economic scenarios have been introduced to represent future business cycle variations. Finally, adding the effect of education-induced productivity enhancements, or more output generated for each hour worked, suggests a less severe impact of population aging with effective reductions in hours of work per member of the population of 2% from 2005 to 2025, and 4% from 2005 to 2051.

Annex: Comparing the Measurement of Hours of Work per Member of the Population to the Dependency Ratio

An important innovation in the measurement of the expected impact of population aging, developed by the PRI and Statistics Canada, is the hours of work per member of the population indicator (measured by total hours of work divided by total population) rather than the dependency ratio.

The dependency ratio, which refers to the ratio of the dependent population (aged under 15 or over 64) to the working age population (aged 15 to 64), has been the most commonly used aging measure, justified on the grounds that "dependants" use most government services and "working-age" individuals contribute most tax revenue. One major flaw in the dependency ratio is that many working-age individuals do not actively engage in the work force and the intensity of the contribution varies significantly within this group. The dependency ratio, for example, does not take into account the increased labour market participation of women, the delayed entry into full-time jobs of younger adults, or the recent increase in the labour market participation of older individuals.

The hours of work per member of the population measure corrects for these flaws and provides a better indication of the fiscal capacity to sustain public services. Figure 4 shows the historical changes in the hours of work per member of the population and the number of working age individuals per "dependant" (the support ratio, which is the inverse of the dependency ratio) and the future projections of the two measures. Each value has been indexed such that the level of each variable is one in 1971 (a value of 1.1 implies a level 10% higher than 1971). The dependency ratio, used alone, would have suggested greater increases in work over the historical period than actually took place, and greater declines in the future than what we anticipate using the newer measure.

FIGURE 4

Relationship Between Hours of Work per Member of the Population*
and Working Age Individuals (15-64) per Dependant

Note: * Total hours worked in Canada, divided by total population per year.
Source: *LifePaths* Model, Statistics Canada.