Canada Pension Plan: Fertility Projections

Panel 1: A Primer on Fertility Rates

SOA Annual Meeting 2005
Fertility Symposium

14 November 2005
Presentation

- Canada Pension Plan – key assumptions
- Total and cohort fertility rates
- Comparison of G8 countries
- Size and aging of Canadian population
- Sensitivity tests – aging and financial impacts
Canada Pension Plan - Key Assumptions

- Fertility rates
- Mortality rates
- Net migration rate
- CPP disability rates
- Retirement rates
- Unemployment rate
- LF participation rates
- Real-wage differential
- CPI increases
- Real rate of investment return
Total and Cohort Fertility Rates (*)

Total fertility rate

Cohort fertility rate

TFR 1952-1976: 3.1
TFR 1977-2001: 1.6

Latest complete cohort 2001, born 1952-1956: 1.9

Ultimate C/TFR: 1.6 in 2016+

TFR: ~1.5 2002-2009

Projected


(*) The cohort fertility rate is for a 29 year old female in a given year.
Cohort Fertility Rates

Mean age at motherhood would continue to increase:

<table>
<thead>
<tr>
<th>Year</th>
<th>1975</th>
<th>2001</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26.2 yrs</td>
<td>28.5 yrs</td>
<td>29.4 yrs</td>
</tr>
</tbody>
</table>

Women aged 15-29
Children per woman

Birth years

- 1943-47
  - Women aged 15-29: 1.8
  - Women aged 30-49: 0.4
  - Total: 2.2

- 1963-67
  - Women aged 15-29: 1.1
  - Women aged 30-49: 0.6
  - Total: 1.7

- 1983-87
  - Women aged 15-29: 0.7
  - Women aged 30-49: 0.9
  - Total: 1.6

Mean age at motherhood:

- 1975: 26.2 years
- 2001: 28.5 years
- 2016: 29.4 years

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## Comparison Between the G8 Countries

<table>
<thead>
<tr>
<th>Year</th>
<th>Canada(*)</th>
<th>France</th>
<th>Germany</th>
<th>Italy</th>
<th>Japan</th>
<th>Russia</th>
<th>UK</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005-2010</td>
<td>1.52</td>
<td>1.85</td>
<td>1.34</td>
<td>1.38</td>
<td>1.37</td>
<td>1.40</td>
<td>1.66</td>
<td>2.04</td>
</tr>
<tr>
<td>2010-2015</td>
<td>1.56</td>
<td>1.85</td>
<td>1.41</td>
<td>1.41</td>
<td>1.44</td>
<td>1.44</td>
<td>1.70</td>
<td>1.98</td>
</tr>
<tr>
<td>2015-2020</td>
<td>1.60</td>
<td>1.85</td>
<td>1.48</td>
<td>1.45</td>
<td>1.51</td>
<td>1.51</td>
<td>1.77</td>
<td>1.91</td>
</tr>
<tr>
<td>2020-2025</td>
<td>1.60</td>
<td>1.85</td>
<td>1.55</td>
<td>1.52</td>
<td>1.58</td>
<td>1.58</td>
<td>1.83</td>
<td>1.86</td>
</tr>
</tbody>
</table>

(*) Projections for Canada are based on the 21st CPP Report. Projections for the other G8 countries are based on United Nations population projections, 2004 revision.
Life Expectancies at Birth
(with improvements after each year shown)

Life Exp, years

F-M Gap, years

1905 1925 1945 1965 2003 2025 2075

Males Females F-M Gap

5.0 7.1 7.8 7.7 8.2 8.6 8.7

54.4 63.7 70.7 73.0 82.6 87.4 89.7

50 60 70 80 90 100

F-M Gap, years

0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0

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Evolution of Migration as % of Population

- **Projected net migration**
  - Ultimate: 0.54% in 2020+

Population Projections – Size & Aging

• The Canadian population is aging.
• Mean age in 2003: 37.6 years
  2030: 43.1 years
• Population will continue to age from low fertility, increasing life expectancies, and aging of baby boomers.
• Net migrants relatively younger than population → will impede aging of population.
• Population will continue to increase, but at declining rate due to projected low fertility.
• Total dependency ratio (< 20 & 65+) / (20-64) will increase from 61/100 in 2003 → 78/100 in 2030.
Components of Population Growth (thousands)

Births and Migration

Births

Deaths

Natural growth < 0 from 2030+
Age Structure of Canada

1975

Males

Females

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Age Structure of Canada

1975, 2003

Males

Females

1975

2003

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Age Structure of Canada

1975, 2003, 2075

Males

Females

65+

25%

8%

13%

2003

2075

1975
Sensitivity Tests

• OBJECTIVE: Measure the effect of alternative assumptions on financial results of the CPP.
• Most sensitivity tests performed one assumption at a time, holding rest at their best-estimate levels.
• 2 tests performed per assumption → wide range of potential experience.
• “Low-cost” scenario ⇒ decrease in contribution rate.
• “High-cost” scenario ⇒ increase in contribution rate.
• Changes in fertility rate have small short-term impact on financial position, but long-term impact can be significant.
# Sensitivity Tests - Fertility

<table>
<thead>
<tr>
<th>Assumption</th>
<th>2001</th>
<th>2016+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low fertility</td>
<td>1.51</td>
<td>1.30</td>
</tr>
<tr>
<td>Best-Estimate</td>
<td>1.51</td>
<td>1.60</td>
</tr>
<tr>
<td>High fertility</td>
<td></td>
<td>1.90</td>
</tr>
</tbody>
</table>
Age Structure Under Varying Fertility Assumptions

2030

Males

Females

low fertility

best-estimate

high fertility
Age Structure Under Varying Fertility Assumptions 2075

Males

Females

25%

30%

22%

low fertility

best-estimate

high fertility

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Sensitivity Test – Fertility
CPP Asset/Expenditure Ratio

9.9% Ultimate Contribution Rate

Low cost: 1.9
(Steady-State rate 9.5%)

Best-Estimate: 1.6
(Steady-State rate 9.8%)

High cost: 1.3
(Steady-State rate 10.1%)
Sensitivity Test – Employment
CPP Asset/Expenditure Ratio

9.9% Ultimate Contribution Rate

Low cost: LF participation rate in 2030 at 81% (Steady-State rate 9.3%)

Best-Estimate: LF participation rate in 2030 at 73%

High cost: LF participation rate in 2030 at 71% (Steady-State rate 10.0%)
Sensitivity Test – Real Rate of Return
CPP Asset/Expenditure Ratio

9.9% Ultimate Contribution Rate

Low cost: 5.1%
(Steady-State rate 9.3%)

Best-Estimate: 4.1%

High cost: 3.1%
(Steady-State rate 10.3%)
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Thank you.

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