Canada Pension Plan
Investment Assumptions

Presentation to the National Academy of Social Insurance Seminar: “What Stock Returns are Reasonable to Expect for Social Security Accounts or Investments Over the Long term?”

13 May 2005
Presentation

• Canadian Retirement System
• Replacement Rates
• 1998 CPP Amendments
• CPP Investment Assumptions
• Steady-State Funding
Canadian retirement system with mixed funding approaches is well recognized in the world for its capacity to adapt rapidly to changing conditions

- Full funding (RPP/RRSP)
- Partial funding (CPP/QPP)
- Pay-as-you-go funding (OAS/GIS)
CPP 1998 Amendments

• Principles to guide the federal-provincial decisions on the CPP:
  – The CPP must be affordable and sustainable for future generations. This requires fuller funding and a contribution rate no higher than the already legislated future rate.
  – CPP must be invested in the best interest of plan members, and maintain a proper balance between returns and investment risk.
CPP 1998 Amendments

• Increase the contribution rate by 65% over 6 years (1997-2003) and keep the same rate thereafter

• Moderate the future growth of benefits by 10% on a long-term basis (in 2050).

• Creation of the CPP Investment Board in order to diversify the CPP reserve fund and increase investment returns (www.cppib.ca)
Risk/Return of Asset Classes
CPP Diversified Investments

Assumed Mix for 2005-2020

- 65% Equities (Variable Income)
  - 25% Canadian Equity
  - 30% Foreign Equity
  - 10% Real Estate & Infrastructure
- 35% Fixed Income
  - 34.5% Bonds
  - 0.5% Cash

Assumed Mix for 2025+

- 55% Variable Income
  - 15% Canadian Equity
  - 30% Foreign Equity
  - 10% Real Estate & Infrastructure
- 45% Fixed Income
  - 44.5% Bonds
  - 0.5% Cash
Real Rate of Return

Federal Bond Yield Curve

-0.5% 0.0% 0.5% 1.0% 1.5% 2.0% 2.5% 3.0%
0 2 4 6 8 10 12 14 16 18 20
Years to Maturity

Real Rate of Return

-0.5% 0.0% 0.5% 1.0% 1.5% 2.0% 2.5% 3.0%
0 2 4 6 8 10 12 14 16 18 20
Years to Maturity

Ultimate Yield Curve - years 2015+
Initial Yield Curve - December 31, 2003
# Real Rate of Return: Bond Portfolio

<table>
<thead>
<tr>
<th>Spread Over Federal Bonds</th>
<th>Proportion in Bond Portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>-</td>
</tr>
<tr>
<td>Provincial</td>
<td>+40 bps</td>
</tr>
<tr>
<td>Corporate</td>
<td>+100 bps</td>
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- Ultimate real rate of return: 3.4%
Equity Risk Premium (ERP)

• ERP is the expected excess return on equity over a long-term fixed income investment, such as riskless Government of Canada bonds

• Recent articles have the expected ERP varying between –1% and 4.25%

• CPP Equity Risk Premium
  ▪ Return on long-term Gov’t Bonds = 2.85%
  ▪ Return on Equity = 4.8%
  ▪ ERP = 4.8% - 2.85% = 1.95%

• Equity Risk Premium over the last 50 years:
  ▪ Canada (S&P/TSX): 2.6%
  ▪ U.S. (S&P 500 in CDN$): 4.5%
## Real Rate of Return: Ultimate Assumptions

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Real Rate of Return</th>
<th>Asset Mix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canadian Equities</td>
<td>4.6%</td>
<td>15%</td>
</tr>
<tr>
<td>Foreign Equities</td>
<td>5.0%</td>
<td>30%</td>
</tr>
<tr>
<td>Real Estate &amp; Infrastructure</td>
<td>4.0%</td>
<td>10%</td>
</tr>
<tr>
<td>Marketable Bonds</td>
<td>3.4%</td>
<td>44.5%</td>
</tr>
<tr>
<td>Cash</td>
<td>1.5%</td>
<td>0.5%</td>
</tr>
<tr>
<td><strong>Real Rate of Return</strong></td>
<td><strong>4.1%</strong></td>
<td></td>
</tr>
</tbody>
</table>
Independent Peer Review Report

• Recommended Gross Rates of Return
  – Canadian Equity: 6.0%
  – Foreign Equity: 6.0%
  – Real Estate & Infrastructure: 5.0%
  – Bonds: 3.3%
  – Cash: 1.5%

• Results in a real rate of return of 4.6% (net of investment expenses)

• Equity risk premium = 3.3%
Expectations of the CPPIB

- CPPIB has diversified the CPP reserve fund
- The following is taken from the CPPIB 2004 Annual Report:

  “As a result of this diversification, the CPP Investment Board expects to earn a 4.5 per cent real rate of return (that is, above inflation) over the long term…”
In 2020, CPP/QPP assets are projected to be equal to 17% of the GDP.

CPP Steady-State Funding

Asset/Expenditure Ratio

9.9% Legislated contribution rate

9.8% Steady-state rate
• If the legislated contribution rate is higher than the steady-state rate, the funding status of the plan will increase over time.

• The higher this rate is set above the steady-state rate, the faster the plan will become more funded.

• SS rate under 21\textsuperscript{st} CPP Report at 31 Dec 2003: 9.8%  

• Current legislated rate from 2003: 9.9%
CPP Steady-State Funding

- If the steady-state rate is higher than the legislated contribution rate AND if finance ministers cannot reach agreement on solution, then:
  - Contribution rate increased by ½ of excess over three years, subject to maximum increase of 0.2% per year
  - Benefits frozen
  - At end of three years, next review performed to determine financial status of Plan.
Projecting Diversified Investments

- CPP Assets invested solely in long-term federal bonds will lead to a steady-state rate of 10.5%.
- Our expected investment policy of 65% variable income securities and 35% fixed income securities will lead to a steady-state rate of 9.8%.
- Two years of negative equity returns:
  - -10% (2005 & 2006) steady-state rate = 9.9%,
  - -10% (2017 & 2018) steady-state rate = 10.0%.
- Two years of positive equity returns:
  - +20% (2005 & 2006) steady-state rate = 9.7%,
  - +20% (2017 & 2018) steady-state rate = 9.6%.
Appendix: Real Rates of Return (1939-2003)

Steady-State between 10.3% and 9.3%

Stochastic Analysis
20-year periods

CPP 21 Projected Asset Mix

15%

26%

3.1%

4.1%

5.1%

59%
Appendix: Real Rates of Return (1939-2003)

Stochastic Analysis 3-year periods

CPP 21 Projected Asset Mix

34%

54%

12%

Steady-State between 10.3% and 9.3%