



Joint Colloquium of the IACA, PBSS and IAAHS Sections  
of the International Actuarial Association  
Westin Copley Place Hotel, Boston, U.S.A. – 4-7 May 2008

# Actuarial and Investment Management Issues for the CPP

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Office of the Superintendent of  
Financial Institutions Canada

Office of the Chief Actuary

Bureau du surintendant des  
institutions financières Canada

Bureau de l'actuaire en chef

Canada 

# Presentation Outline

- 1997 CPP Amendments
- 23<sup>rd</sup> CPP Actuarial Report
  - Setting the asset mix assumption
  - Volatility of results / sensitivity analysis
  - Evolution of liabilities
  - Actuarial balances
- CPP Peer Review Process

*Bridge over Mountain Creek, British Columbia, 1880*  
*Source : Library and Archives Canada*



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# Principles to Guide Federal-Provincial Decisions on the CPP

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- 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.
- Available on website at <http://www.cpp-rpc.ca/princips/principe.html>



# CPP Steady-State Funding

## Effect of the 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 ([www.cppib.ca](http://www.cppib.ca))



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# CPP Financing

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- *Steady-state funding*: replaces the original pay-as-you-go financing to build a reserve of assets equivalent over time to about five and a half years of benefit expenditures or about 25% of Plan liabilities.
- *Incremental full funding*: requires that changes to the CPP that increase benefits or add new benefits be fully funded (eg: increase in eligibility for disability benefits for long-term contributors).



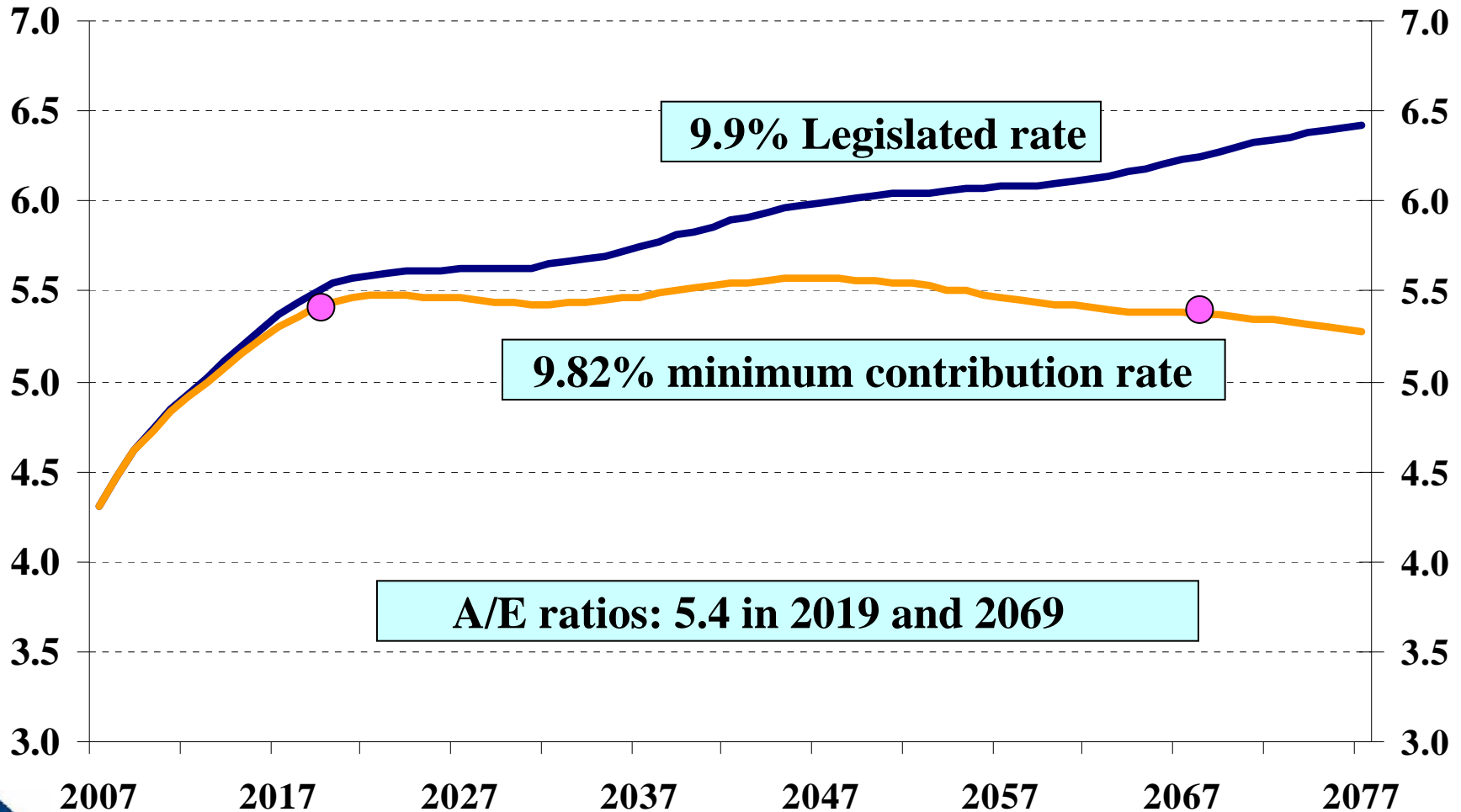
# CPP Financing

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- The current legislated contribution rate is 9.9%.
- The minimum contribution rate is 9.82%.
- If the legislated contribution rate is higher than the minimum contribution rate, the funding status of the plan will increase over time.
- The higher this rate is set above the minimum rate, the faster the plan will become more funded.



# Evolution of Asset/Expenditure Ratio



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# CPP Default Provisions

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- If the minimum contribution rate is higher than the legislated contribution rate AND if finance ministers cannot reach an agreement on a solution, then:
  - Contribution rate increased by  $\frac{1}{2}$  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.

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*Cisco, Colombie-Britannique, 1956*

© STM/CSN Collection © SI/STC

*Source : Canada Science and Technology Museum*



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# Setting the Asset Mix Assumption

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- CPPIB does not target specific asset allocations
  - risk allocated to investment strategies subject to risk limit
- CPPIB Reference Portfolio: relevant benchmark to compare performance of CPPIB (not a target)
- Must determine an appropriate asset mix over the 75-year projection period
  - Short-term mix similar to CPPIB Reference Portfolio
  - Long-term mix assumes a reduction of risk in the portfolio

# Ultimate Asset Mix Assumption

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- Investments in “riskier” assets, such as equities, are projected to decline over time
- As the ratio of active to retired members decreases, the asset mix of the portfolio must be adjusted to reflect a lower tolerance for risk
- Portfolio should be adjusted to minimize the CPP Fund’s potential for loss

# Evolution of CPP Asset Mix

	<b>Fixed Income</b>	<b>Equities</b>	<b>Inflation-Sensitive</b>
<b>2007</b>	28%	65%	7%
<b>2010</b>	30%	60%	10%
<b>2015</b>	30%	60%	10%
<b>2020</b>	35%	55%	10%
<b>2025</b>	40%	50%	10%

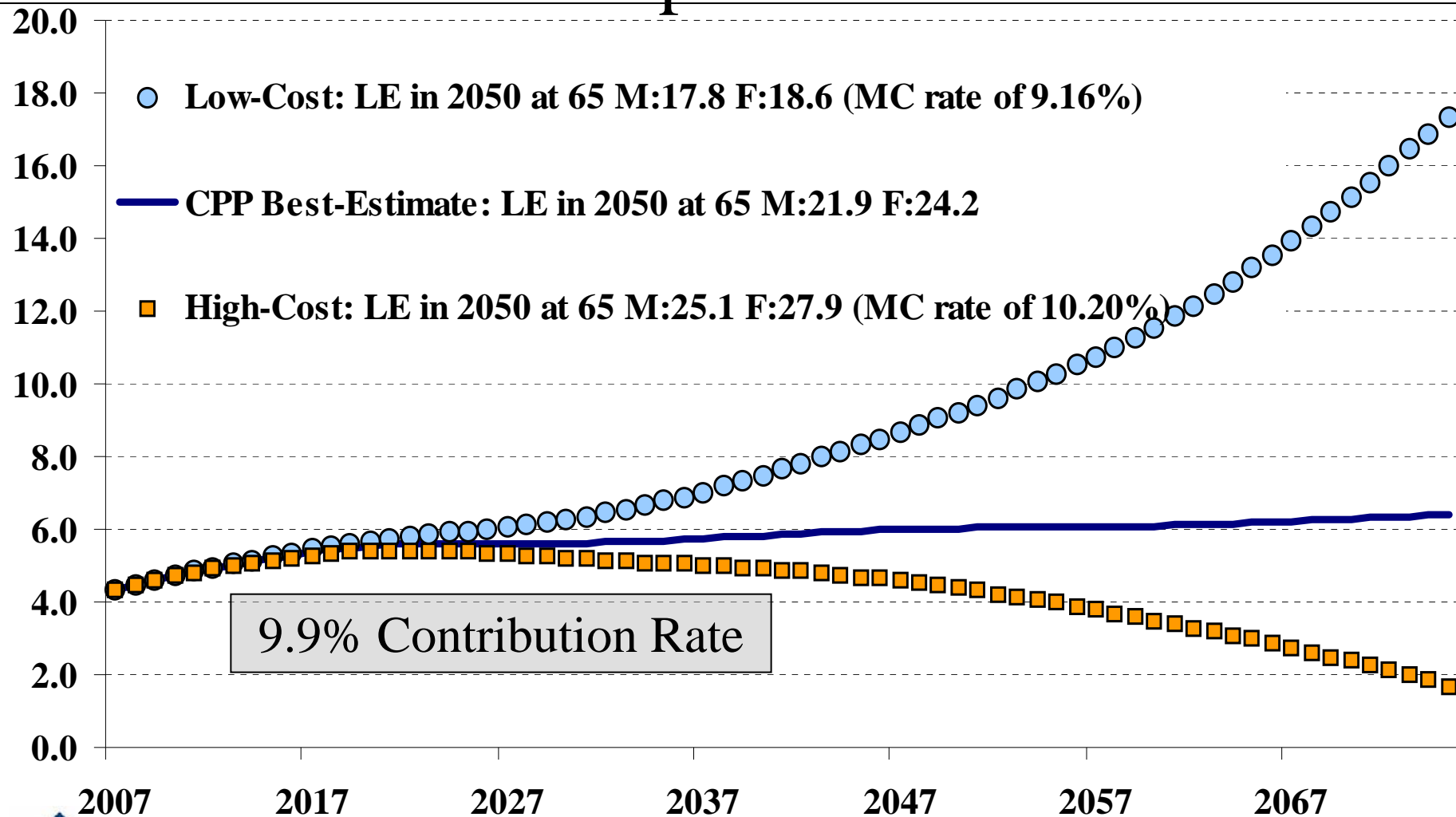
# Stochastic Modeling in CPP #23

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- Recommendation from CPP #21 review panel
- Incorporate stochastic modeling in determination of alternative assumptions for sensitivity analysis
  - Project probability distribution of potential outcomes
  - High cost and low cost assumptions
- Objective is to measure the impact of alternative assumptions on the financial status of the Plan

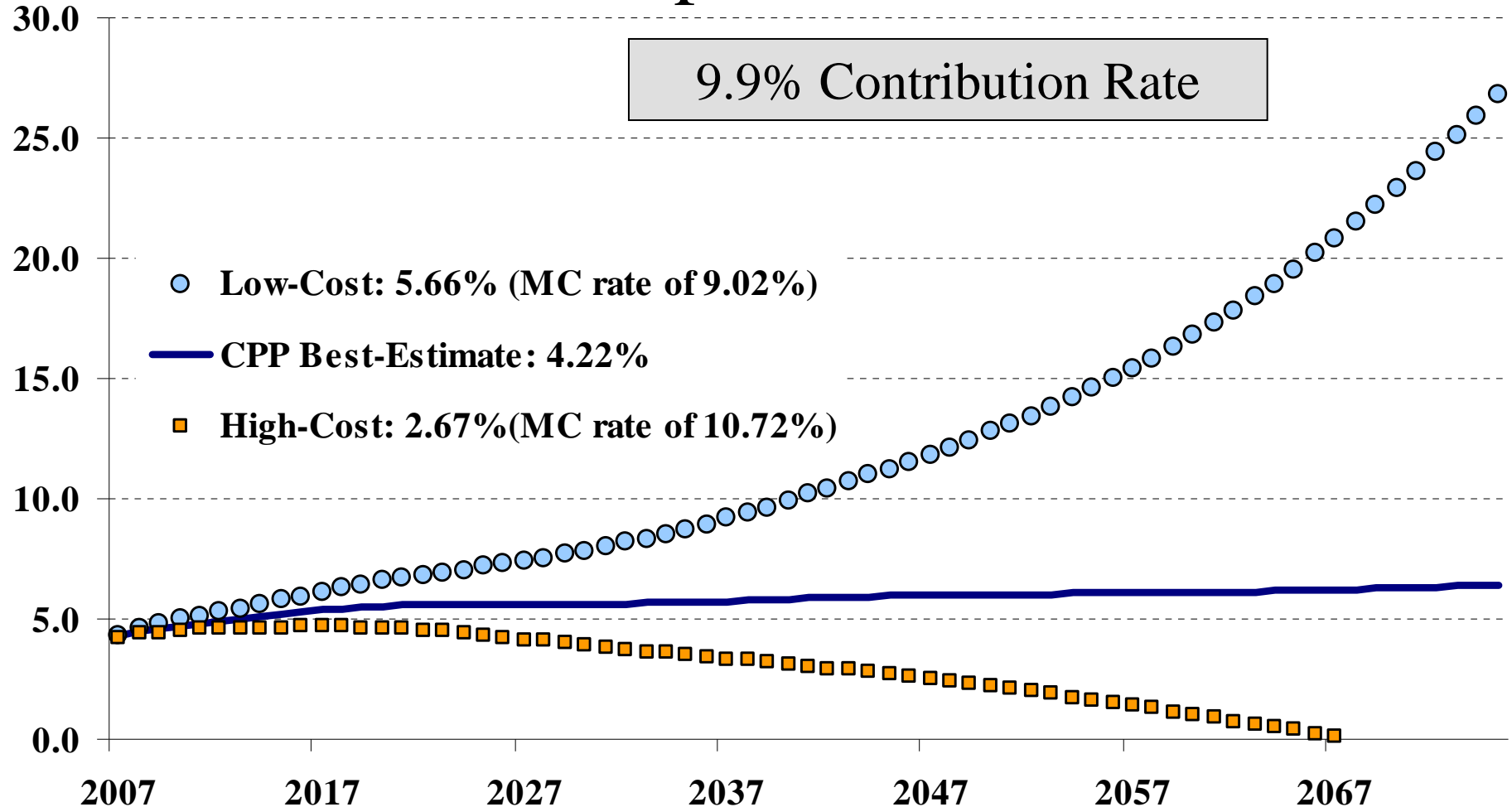
# Sensitivity Test – Life Expectancy

## Asset/Expenditure Ratio



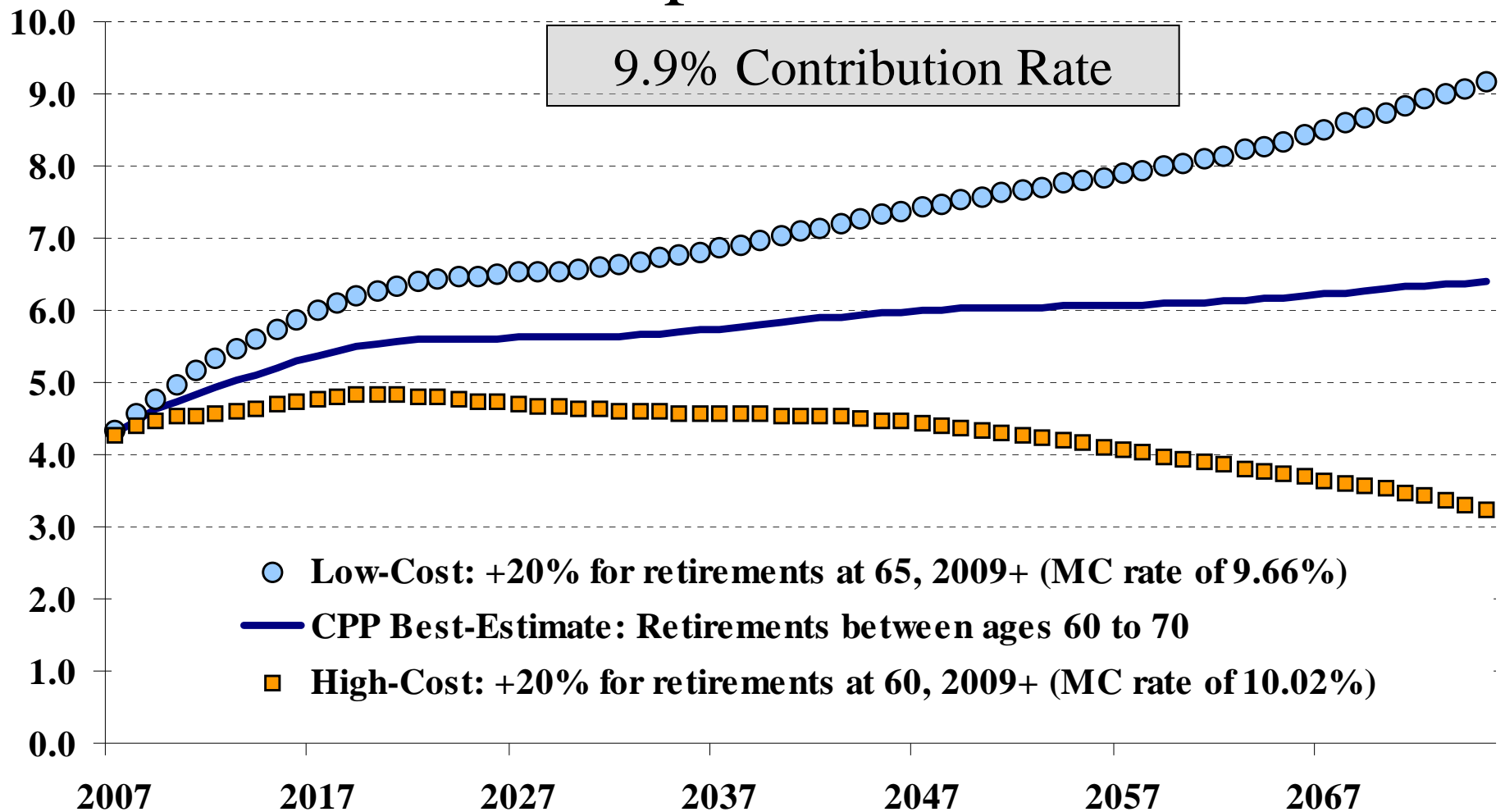
# Sensitivity Test – Real Rate of Return

## Asset/Expenditure Ratio



# Sensitivity Test – Retirement Rates

## Asset/Expenditure Ratio



# Balance Sheet Under Various Rates of Return

As at 31 December 2006

	<b>100% Risk-Free Bond Portfolio</b>	<b>Best-Estimate 55/45 Equity/Bond Portfolio</b>	<b>100% Equity Portfolio</b>
<b>Expected Real Return (%)</b>	2.8	4.2	4.9
<b>Assets (\$B)</b>	113.6	113.6	113.6
<b>Liability (\$B)</b>	919.8	733.5	675.9
<b>Unfunded Liability (\$B)</b>	806.2	619.9	562.3
<b>Funded Ratio (%)</b>	12.3	15.5	16.8
<b>Current Service Cost(%)</b>	8.6	5.9	5.0
<b>Minimum Contribution Rate (%)</b>	10.64	9.82	9.42



# Actuarial Balance

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- A positive actuarial balance indicates that estimated income (assets and contributions) is more than sufficient to meet estimated CPP expenditures for the period as a whole; negative actuarial balance indicates the opposite.
- Comparative measure with OASDI
- Expressed as a dollar value or percentage of contributory earnings



# Actuarial Balances Over Various Periods

		<b>Assets</b>	<b>Income</b>	<b>Expenditures</b>	<b>Actuarial Balance</b>
	<b>Period</b>	<b>(A)</b>	<b>(I)</b>	<b>(E)</b>	<b>(A)+(I)-(E)</b>
		<b>(\$B)</b>	<b>(\$B)</b>	<b>(\$B)</b>	<b>(\$B)</b>
<b>CPP:</b>	<b>2007-2031</b>	114	584	593	105
	<b>2007-2056</b>	114	917	960	70
	<b>2007-2081</b>	114	1,100	1,167	47*
<b>OASDI:</b>	<b>2007-2031</b>	2,048	15,354	16,727	675
	<b>2007-2056</b>	2,048	26,543	31,085	(2,494)
	<b>2007-2081</b>	2,048	34,113	41,237	(5,076)**

\* Equal to 0.42% of the present value of contributory earnings in the period

\*\* Equal to 1.95% of the present value of contributory earnings in the period



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*Canadian troops, Canal-du-Nord, 1918*  
*Source : Library and Archives Canada*



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# Strengthening the Accountability in 1997

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- Federal and provincial governments took meaningful steps to strengthen the transparency and accountability of actuarial reporting. They endorsed plans:
  - to review the CPP every three years, instead of every five years as before. Therefore, frequency of actuarial reporting was increased to once every three years with a further requirement to produce the report within one year of the valuation date;
  - to consult regularly with experts on assumptions to be used in actuarial reports;
  - to establish regular peer reviews of future actuarial reports on the CPP;
  - to supply actuarial information to Canadians in a timely manner.



# CPP has been peer reviewed four times since 1998

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- Role of the Auditor General and Selection Process
- Overseeing of the Peer Review by GAD
- Terms of Reference
  - Is the professional **experience** of the Chief Actuary and his staff adequate for carrying out the work required?
  - Does the work comply with professional **standards of practice** and statutory requirements?
  - Did the Chief Actuary have access to the **information** required?
  - Were the actuarial **methods and assumptions** used reasonable?
  - Does the actuarial report fairly **communicate** the results?

# Peer Review of CPP#23

- The independent Review Panel confirmed that:
  - the staff is competent and qualified to carry out the work required;
  - the work complies with all relevant professional standards of practice and statutory requirements;
  - the Chief Actuary had access to the data and he completed relevant tests on the data as might be expected;
  - actuarial methods and assumptions are reasonable;
  - assumptions are, in the aggregate, reasonable, but towards the high-cost side of the reasonable range;
  - the report fairly communicates the results;
- and made twelve recommendations on data, methodology, assumptions, communications of results and other actuarial issues.

*March 2008*



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*Thank you*

