



Office of the Superintendent of  
Financial Institutions Canada

Bureau du surintendant des  
institutions financières Canada

Office of the Chief Actuary

Bureau de l'actuaire en chef

# *Setting Assumptions for Funding Actuarial Valuations*

*Presentation to the BC Public Sector Pension Conference  
by Jean-Claude Ménard, Chief Actuary*



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# *Office of the Chief Actuary*

- Mandate: conduct statutory actuarial valuations on the
  - Canada Pension Plan (CPP) – **19M members**
  - Old Age Security Program (OAS) - **5M beneficiaries**
  - Federal public sector pension and insurance plans (Canadian Forces, Royal Canadian Mounted Police, Public Service, Members of Parliament, Federally Appointed Judges) – **0.8M members**
  - Canada Student Loans Program – **0.5M loans**
  - Employment Insurance Program – **17M workers**
- OCA also prepares additional actuarial reports whenever Bill of material changes to CPP is introduced before Parliament or amendments are made to the OAS Program and public sector pension plans.



# *Office of the Chief Actuary (cont'd)*

- Chief Actuary and the actuarial staff of the OCA are members of the Canadian Institute of Actuaries (CIA), and subject to CIA Standards of Practice and Rules of Professional Conduct
- External and internal quality control tools:
  - External peer reviews of CPP actuarial reports (made public)
  - Audit by the Office of Auditor General
  - Internal OSFI audit
  - Internal peer reviews of valuation work.
- The latest external CPP peer review panel confirmed that
  - the work performed by the OCA meets all professional standards of practice and statutory requirements
  - the assumptions, both individually and in the aggregate, are within a reasonable range, and are in accordance with the Canadian Institute of Actuaries' standards.

**The 25th CPP Actuarial Report as at 31 December 2009 confirmed that the CPP is financially sustainable over the long term**



# *Funding valuation of the DB plan sets future contributions requirements*

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- Funding valuation deals with the ongoing cost of the plan
  - It provides a basis for determination of future employee and employer contributions
- It is based on long-term demographic and economic assumptions that are likely to reflect future cash flows of the plan
- Canadian Institute of Actuaries standards require an actuary
  - To assume that the plan continues indefinitely
  - To choose assumptions representing best judgement of actuary as to the future events. Depending on the plan's funding policy assumptions may include provisions for adverse deviations
- Predictable pattern of contributions is important for plan's sponsor
  - It helps to avoid intergenerational transfers between different cohorts of stakeholders.



# *Main Valuation Assumptions*

## Economic Assumptions

- Inflation rate: **OCA ultimate assumption 2.3%**
- Real wage increases: **OCA ultimate assumption 1.3%**
- Real rate of return: **OCA ultimate assumption 4.0% (4.1%)**

## Demographic and Other Assumptions

- Mortality rates and life expectancies
- Fertility rate
- Migration rate
- Promotional and seniority salary increases
- Rates of retirement
- Rates of termination / Rates of disability

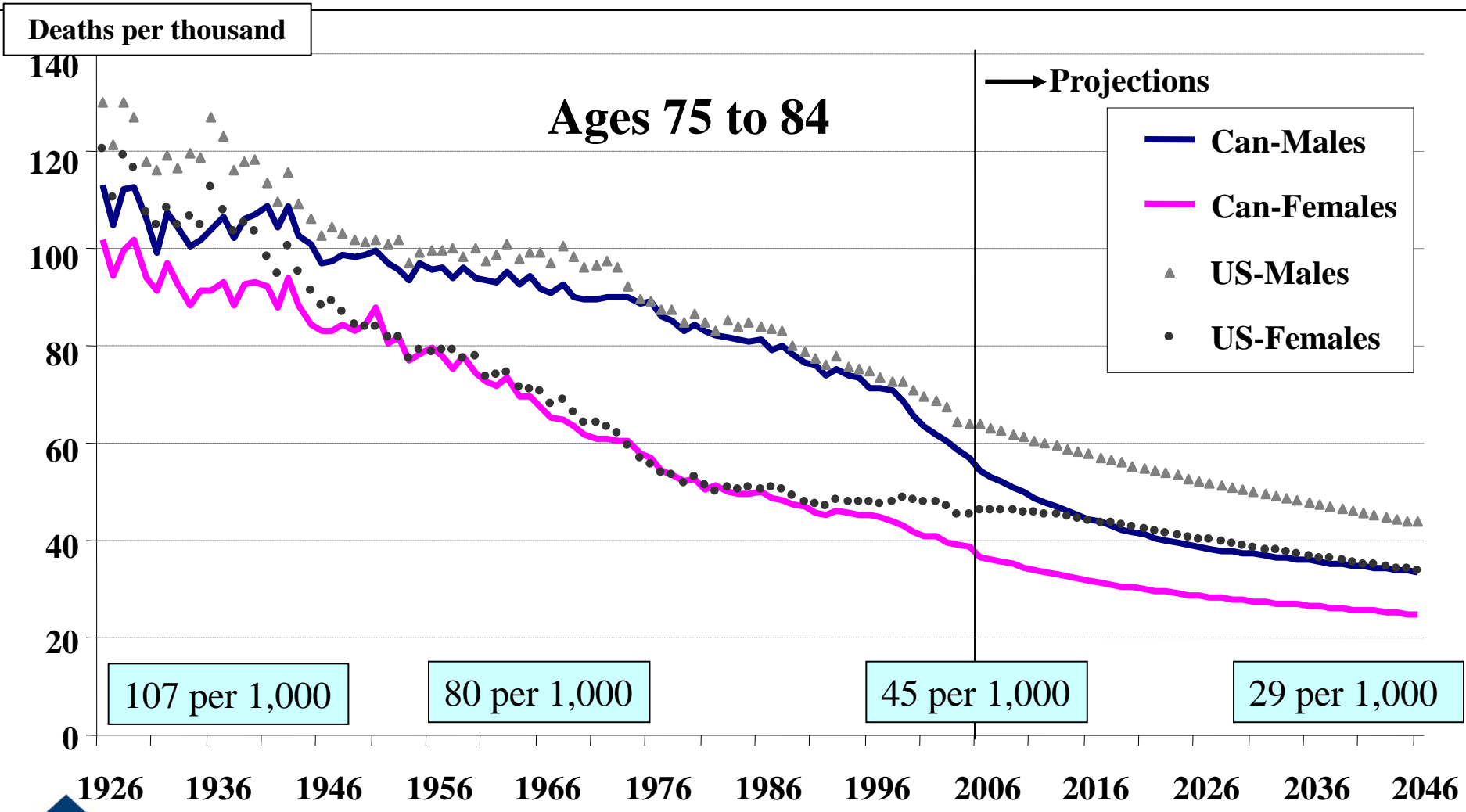


# *Contribution to increase in life expectancy at birth has gradually shifted to people over age 65*

Change attributable to (in years)	Males				Females			
	1925- 1965	1965- 1985	1985- 2005	2005- 2025	1925- 1965	1965- 1985	1985- 2005	2005- 2025
Infant mortality (<1)	5.8	1.2	0.2	0.1	4.6	1.0	0.2	0.1
Child mortality (1-14)	2.5	0.3	0.2	0.1	2.5	0.3	0.1	0.0
Young adult mortality (15-44)	2.1	0.6	0.6	0.5	3.9	0.4	0.2	0.2
Older adult mortality (45-64)	0.1	1.3	1.5	0.9	1.9	0.8	0.7	0.5
<b>Elderly mortality (65+)</b>	<b>0.3</b>	<b>1.0</b>	<b><u>2.6</u></b>	<b>2.6</b>	<b>2.2</b>	<b><u>2.3</u></b>	<b>1.7</b>	<b>1.7</b>
Estimated Multivariate Effect	-0.1	-0.1	-0.2	-0.2	-0.4	-0.2	-0.1	-0.1
Total Change in Life Expectancy	10.7	4.3	4.8	4.0	14.7	4.6	2.8	2.5



# *Elderly mortality rates have decreased over the last 80 years, more so over the last 40 years*



Source : Office of the Chief Actuary, 25th CPP Actuarial Report and 2009 OASDI Trustees Report



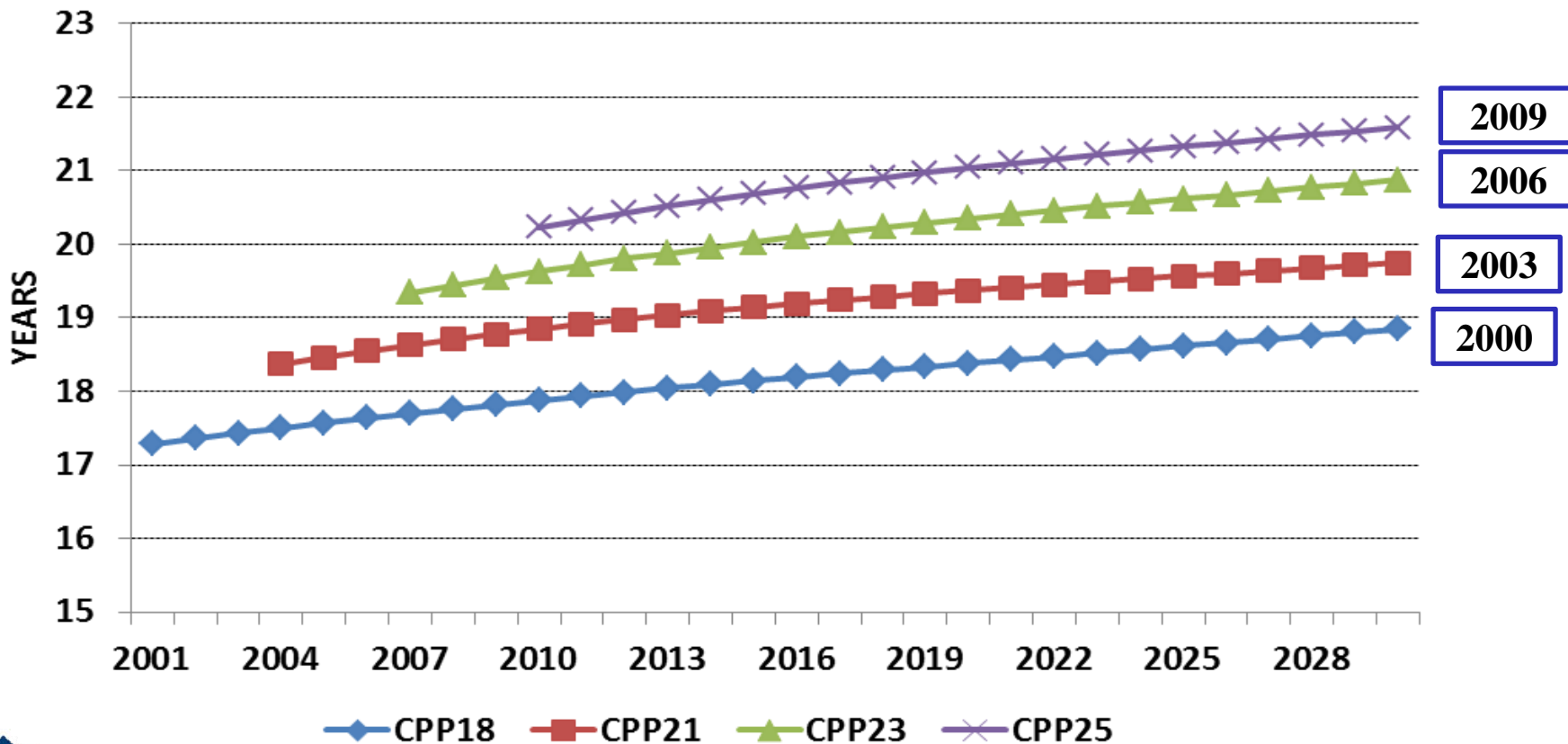
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# *The OCA continuously strengthens mortality improvement rates assumption*

**Life Expectancy of Canadian Male at age 65  
(with future mortality improvements)**





# *Setting Real Rate of Return assumption is one of the biggest challenge in the current environment*

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Real rate of return assumption is derived using building block approach:

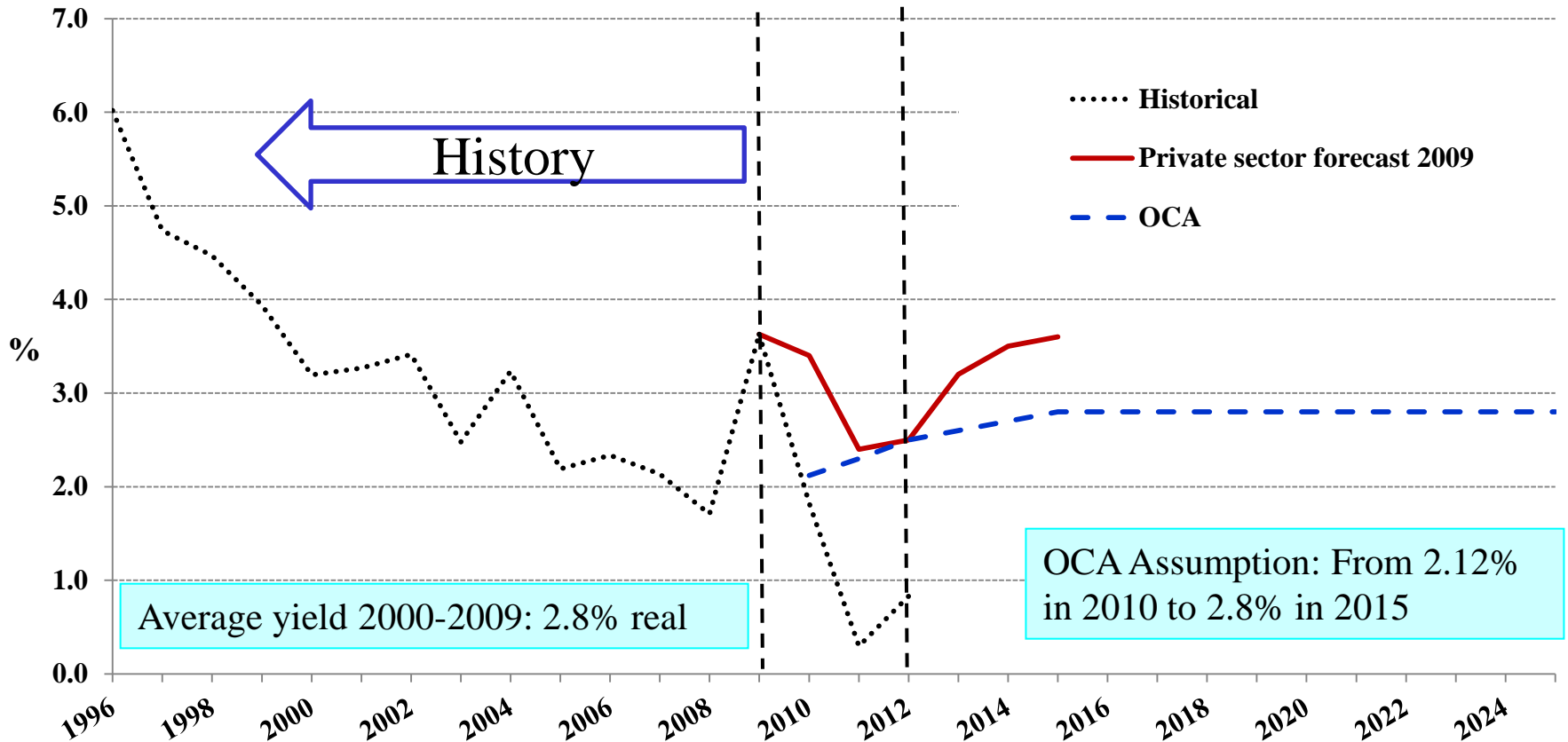
- Government of Canada long-term bonds
- Equity risk premium (additional return over bonds)
- Real rate of return by asset class
- Asset mix
- No provision for adverse deviation



# Government of Canada long-term marketable bonds

## What did we know at the end of 2009?

### Real Yield on the Canada Long-Term Bonds (maturity 10 + years)



1996 to 2012: Government of Canada Marketable Bonds, Average Yield: Over 10 Years (VI22487)

Forecasts for the Govt. Canada LT bonds with duration over 10 years are obtained by adjusting projections for 10-years Govt. Canada LT bonds by 0.4% for December 2009 average private sector forecasts published at : <http://www.fin.gc.ca/pub/psf-ppsp/index-eng.asp>



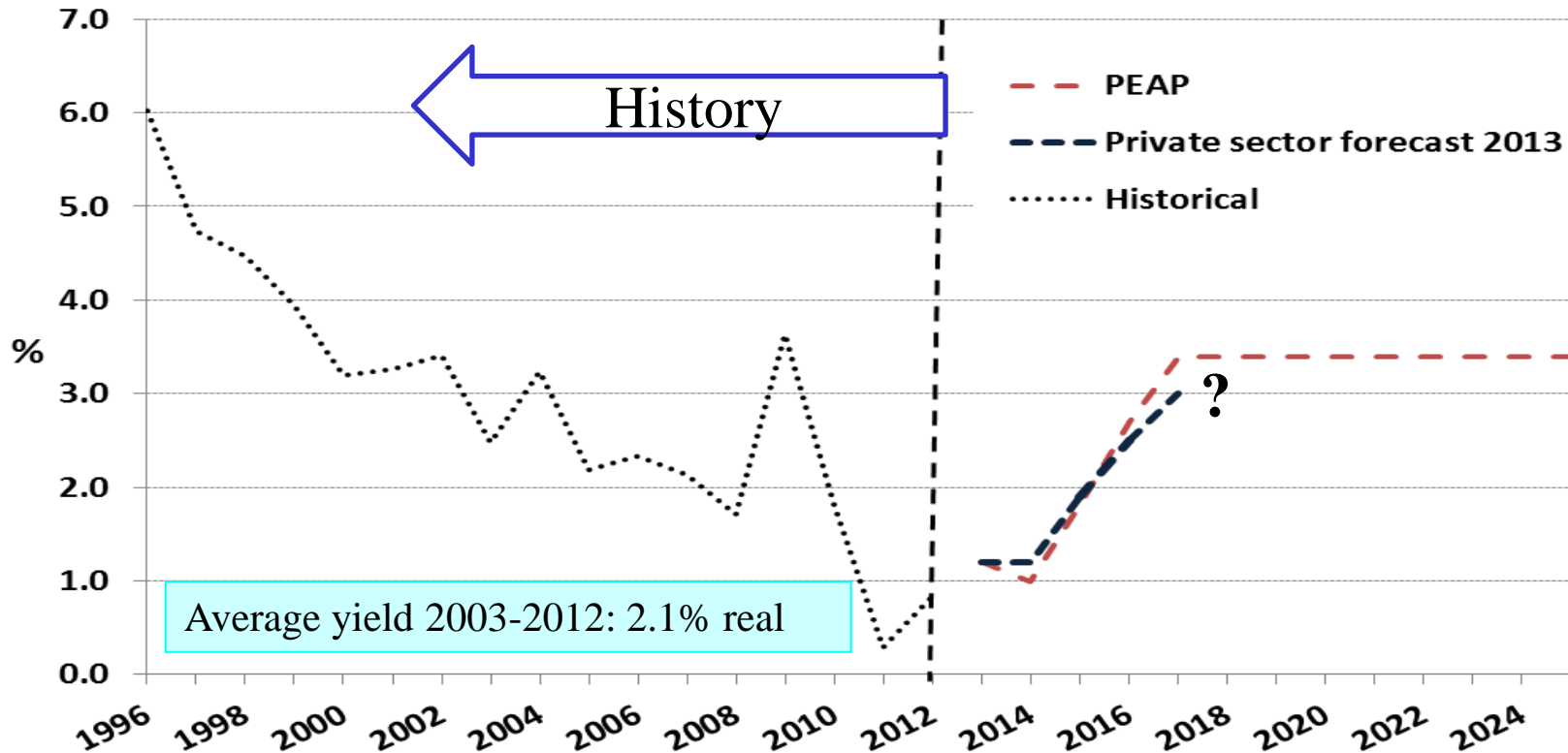
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# Government of Canada long-term marketable bonds yields were at all time low in 2011

## Real Yield on the Canada Long-Term Bonds (maturity 10 + years)



Average yield 2003-2012: 2.1% real

1996 to 2012: Government of Canada Marketable Bonds, Average Yield: Over 10 Years (VI22487), 2013+ : Projections

Forecasts for the Govt. Canada LT bonds with duration over 10 years are obtained by adjusting projections for 10-years Govt. Canada LT bonds : by 0.3% for PEAP, and by 0.4% for average private sector forecasts presented in Federal Budget 2013.

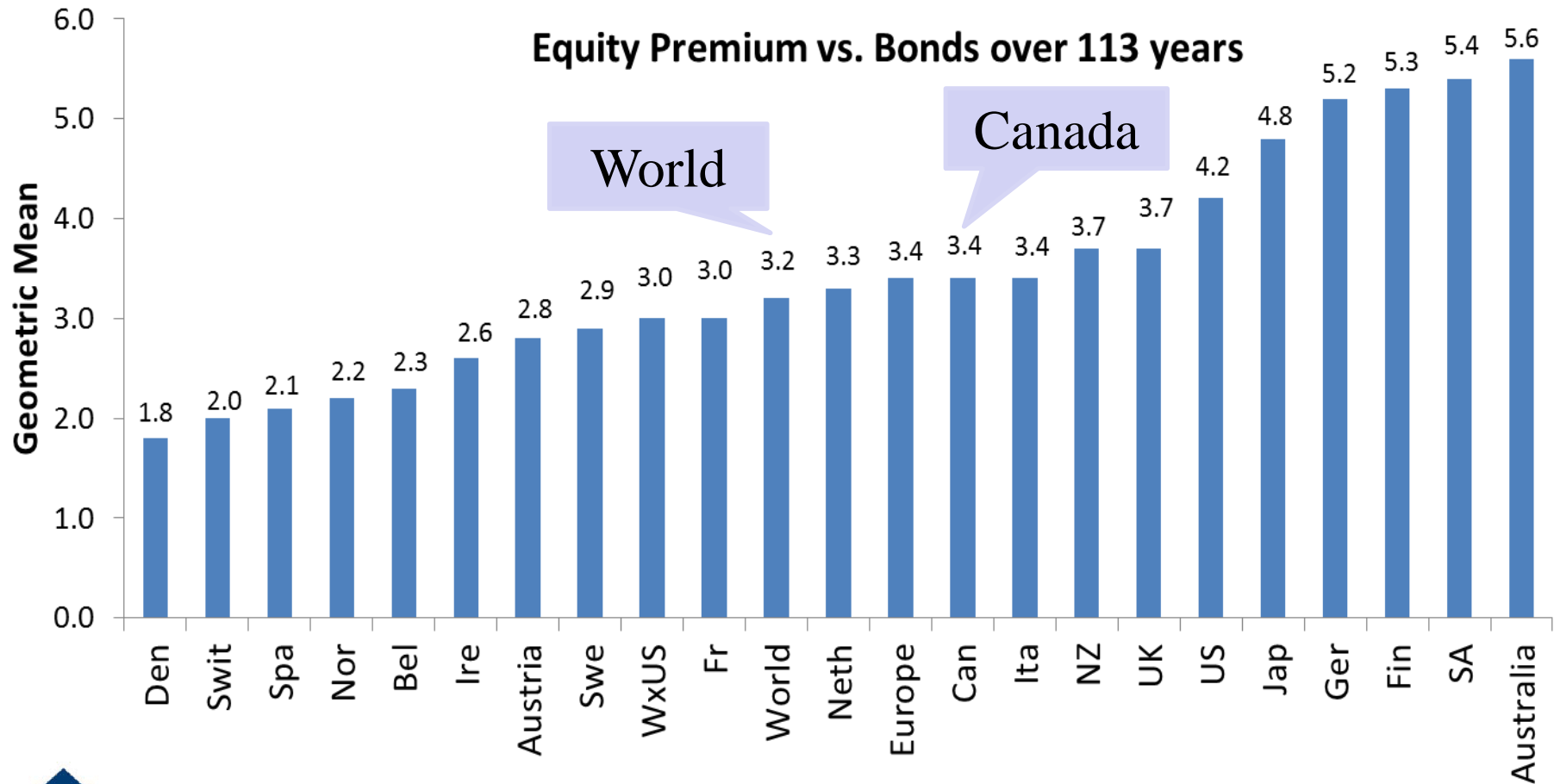


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# *The future ERP is expected to be lower than in the past (3.4% for Canada)*



# *Real rate of return assumed by the OCA is in line with assumptions of peers*

## **Ultimate asset mix and real rate of return assumptions**

	<b>Equities</b>	<b>Fixed Income</b>	<b>Alternative investments/RE&amp;I</b>	<b>Real rate of return</b>
<b>CPP</b>	42%	40%	18%	<b>4.00%</b>
<b>QPP</b>	57%	30%	13%	<b>4.50%</b>
<b>PSSA</b>	54%	18%	28%	<b>4.10%</b>
<b>RREGOP</b>	51%	35%	14%	<b>4.50%</b>
<b>ON PSPP</b>	47%	40%	13%	<b>3.85%</b>
<b>OTPP</b>	44%	18%	38%	<b>2.85%</b>
<b>OMERS</b>	39%	33%	28%	<b>4.25%</b>
<b>HOOPP</b>	34%	55%	11%	<b>4.05%</b>
<b>AB PSPP</b>	57%	28%	15%	<b>4.00%</b>
<b>BC PSPP</b>	52%	29%	19%	<b>3.50%</b>

*Due to current low interest rates environment, the OCA assumes real rate of return of 3.6% for the next few years.*



# *Conclusion*

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- Assumptions used by the OCA in statutory actuarial reports reflect our best-estimates of short- and long-term economic and demographic trends
- There is an uncertainty inherent to the financing of pension plans. In our opinion it should not be replaced by a certainty that interest rates will remain at their current low point over the long term.
- Retirement is expensive and could become even more expensive in the future with improved longevity and uncertain future global economic growth.





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# *Setting Assumptions for Funding Actuarial Valuations*

## *Thank you*



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