



Bureau du surintendant
des institutions financières
Bureau de l'actuaire en chef

Office of the Superintendent
of Financial Institutions
Office of the Chief Actuary



CPP Actuarial Adjustment Factors

Actuarial Study no.2

Annual Meeting of the Canadian Institute of Actuaries, Victoria

19 June 2003



Canadian
Institute of
Actuaries



Overview

- Purpose of the Study
- Methods
 - Individual Method
 - Collective Method
 - Steady-State Method
- International Comparison
- Actuarial Opinion



Purpose of the Study

- Re-examine the appropriateness of the legislated actuarial adjustment factor of 0.5% per month
- CPP legislation provides a role for the Chief Actuary in this respect
- Facilitate the understanding of the elements that influence the cost neutrality of actuarial adjustment factors

Methodology



- All results based on the 18th CPP Actuarial Report as at 31 December 2000
- Three Methods:
 - Individual
 - Collective
 - Steady-State Contribution Rate



Individual Method



- Only retirement benefits are considered in determining the actuarial adjustments
- Need to consider individual expectations in respect of:
 - Life expectancy
 - Real wage increases
 - Real rates of return



Individual Method

Individual always earned 100% of YMPE

| Age | Legislated Adjustments | Individual Aged 60 in 2004 | |
|-----|------------------------|----------------------------|--------|
| | | Male | Female |
| 60 | 0.70 | 0.696 | 0.727 |
| 61 | 0.76 | 0.746 | 0.774 |
| 62 | 0.82 | 0.801 | 0.824 |
| 63 | 0.88 | 0.861 | 0.878 |
| 64 | 0.94 | 0.927 | 0.937 |
| 65 | 1.00 | 1.000 | 1.000 |
| 66 | 1.06 | 1.080 | 1.069 |
| 67 | 1.12 | 1.170 | 1.144 |
| 68 | 1.18 | 1.271 | 1.228 |
| 69 | 1.24 | 1.386 | 1.321 |
| 70 | 1.30 | 1.516 | 1.425 |





Individual Method

- Results in different actuarial adjustments for males and females and for each individual.
- Example, at age 65 value of retirement benefits for females are about 15% higher than for males because they live longer.
- Results in female actuarial adjustments being higher than for males (before age 65).

Individual Method



Pros

- Relatively easy to understand
- Accounts only for retirement benefits
- Neutrality obtained on an individual basis

Cons

- Subjective and difficult to administer
- Inappropriate for CPP as it does not account for:
 - Loss of contributions
 - Loss of disability benefits
 - Plan's financing provisions

Collective Method



- This method considered more appropriate than the individual because it accounts for:
 - Loss of contributions to the Plan, and
 - Loss of disability benefits
- The actuarial adjustments are determined by comparing present values for a cohort of contributors (both sexes) as opposed to an individual.
- There are three components: The payment period of the pension, the contribution component and the disability component.

Collective Method

(Assumptions regarding loss of contributions)



Full loss: best-estimate

- CPP not key element in decision to retire
- Labour force participation rates same as CPP#18
- As such, Plan loses all contributions after benefit uptake

Partial loss: reasonable

- Consistent with trend toward reduced hours of work
- Requires subjective changes in participation rates to recapture lost contributions

No loss: unrealistic

- No contributions are lost after benefit uptake
- Requires projecting more workers than CPP#18
- Each lost contributor after benefit uptake is replaced by a younger one



Collective Method



Actuarial Adjustment Components (Cohort Age 60 in 2004)

Individual
Method

| Age | Payment Period of Pension | Contributions | Loss of Eligibility for Disability Pension | Total |
|-----|---------------------------------|---------------|---|-------|
| 60 | 0.693 | -0.047 | 0.009 | 0.655 |
| 61 | 0.741 | -0.036 | 0.006 | 0.711 |
| 62 | 0.794 | -0.025 | 0.003 | 0.772 |
| 63 | 0.854 | -0.016 | 0.001 | 0.840 |
| 64 | 0.922 | -0.007 | 0.000 | 0.916 |
| 65 | 1.000 | 0.000 | 0.000 | 1.000 |
| 66 | 1.083 | 0.004 | 0.000 | 1.088 |
| 67 | 1.175 | 0.007 | 0.000 | 1.182 |
| 68 | 1.277 | 0.009 | 0.000 | 1.287 |
| 69 | 1.395 | 0.011 | 0.000 | 1.406 |
| 70 | 1.525 | 0.012 | 0.000 | 1.537 |



Collective Method



Pros

- Recognizes CPP benefit provisions.
- Recognizes loss of contributions to the Plan.
- Defines cost neutrality by using present values for each year of birth cohort (collective vs individual).

Cons

- Ignores the financing provisions of the CPP.
- Adjustments may not be neutral from an individual perspective.

Steady-State Rate Method

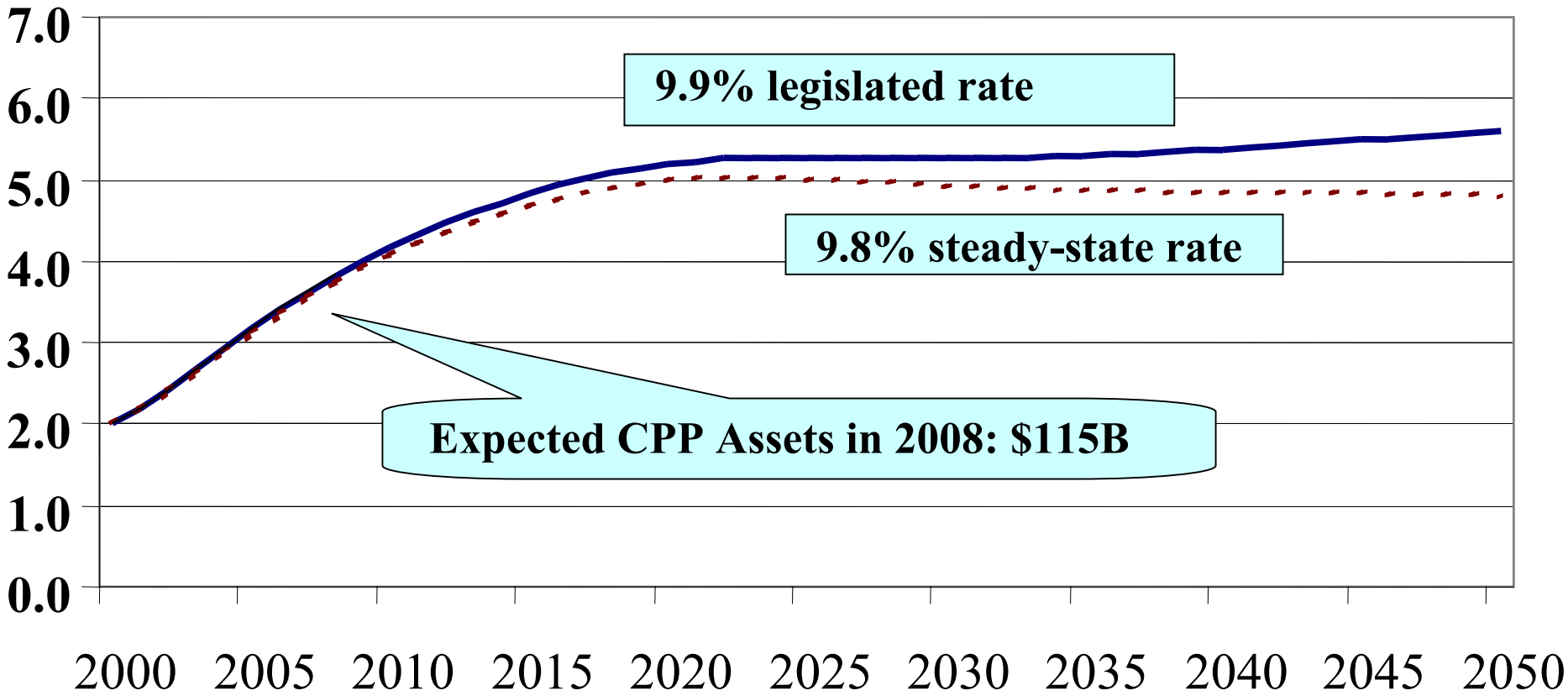


**Steady-state contribution rate is 9.8%,
0.1% lower than the legislated rate of 9.9%**

- Lowest rate that can be maintained over the foreseeable future and that will result in a Asset/expenditure ratio generally constant over a long period of time.
- The steady-state rate is the lowest rate that can be charged that is sufficient to sustain the plan without further increase. A funding level of 20%-25% is sufficient to meet that condition.



Evolution of Fund/Benefit ratio



Steady-State Rate Method



- Actuarial adjustments determined so that the steady-state contribution rate stays the same whether everyone **opts for benefit at age 65 or at any other age.**
- If everyone opts for benefit at age 65, 9.7% is the steady-state contribution rate (benchmark).



Steady-State Rate Method

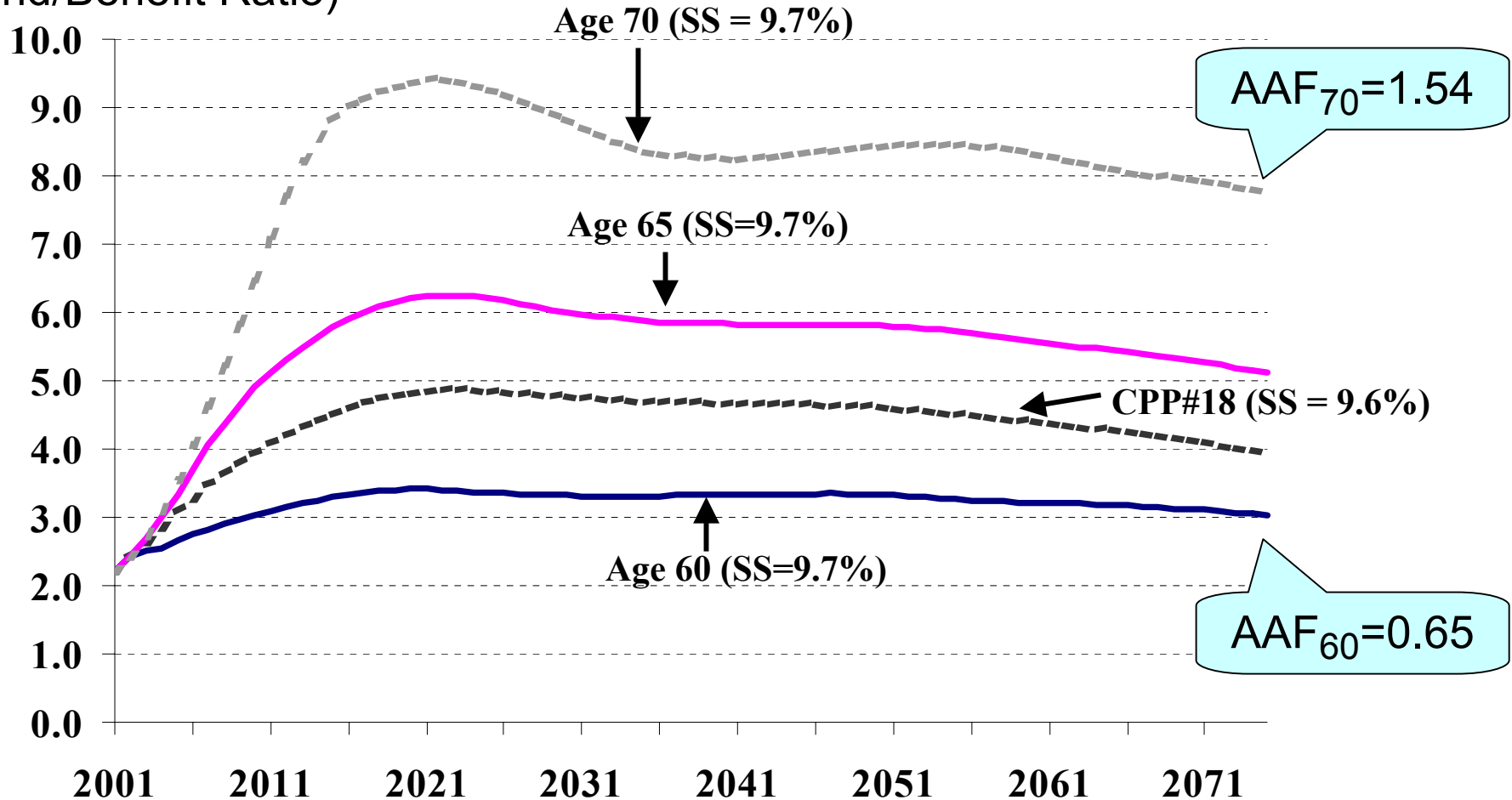


| Age | Legislated Adjustments | Actuarial Adjustments |
|--------------------------|------------------------|-----------------------|
| 60 | 0.70 | 0.649 |
| 61 | 0.76 | 0.708 |
| 62 | 0.82 | 0.772 |
| 63 | 0.88 | 0.839 |
| 64 | 0.94 | 0.914 |
| 65 | 1.00 | 1.000 |
| 66 | 1.06 | 1.081 |
| 67 | 1.12 | 1.176 |
| 68 | 1.18 | 1.283 |
| 69 | 1.24 | 1.403 |
| 70 | 1.30 | 1.540 |
| Steady-State Rate | 9.80% | 9.60% |

Steady-State Rate Method



(Fund/Benefit Ratio)



Steady-State Rate Method



Pros

- Simple to understand
- Recognizes all CPP provisions
- Adjustments neutral for Plan and Plan members on a collective basis

Cons

- Adjustments may not be neutral from an individual perspective

Sensitivity Analysis



| Age | Steady-State Method 18th CPP report (Study's Base Case with 1985 Economic Assumptions) | Law Factors | Steady-State Method 18 th CPP report (Study's Base Case) | Sensitivity Analysis* |
|-----|--|-------------|---|--------------------------|
| 60 | 0.72 | 0.70 | 0.65 | 0.62 |
| 61 | 0.76 | 0.76 | 0.71 | 0.68 |
| 62 | 0.81 | 0.82 | 0.77 | 0.75 |
| 63 | 0.87 | 0.88 | 0.84 | 0.82 |
| 64 | 0.93 | 0.94 | 0.91 | 0.90 |
| 65 | 1.00 | 1.00 | 1.00 | 1.00 |

*This test is a combination of low real-wage differential (0.6%) and high real rate of return in CPP assets (5.2%). This corresponds to the economic environment that prevailed over the last 15 years and is in line with the 18th report short-term outlook.



International Comparison



- Most countries use approximate adjustment factors that are different before and after the normal retirement age.
- Sweden has no adjustment factor but directly links amount of pension to life expectancy through annuity factor.
- Some countries reduce benefits based on the level of post-benefit uptake earnings.

Actuarial Opinion



- Cost neutrality could be restored without changing the current legislated actuarial adjustments through Plan provision changes.
- Examples could be:
 - Contributory period ending at age 65 for everyone, or
 - Requiring contributions from working beneficiaries, or
 - Adjust/Reduce temporarily benefits based on the level of post-benefit uptake earnings, as does the US Plan, or
 - Any other views ???

Actuarial Opinion



- The actuarial neutrality is used to mean Plan neutrality, which exists when the cost to the Plan is the same regardless of whether contributors take their benefit at age 65 as opposed to any other age from 60 to 70, inclusive.
- That is, the timing of any Plan member's benefit uptake is **neither advantageous nor disadvantageous to all Plan members taken as a group.**

Actuarial Opinion



- Benefit uptake prior to 65 is subsidized. Conversely, benefit uptake after 65 is penalized.
- Plan is financially sustainable even though the legislated actuarial adjustments are no longer neutral.
- A steady-state contribution rate of 9.7% is the benchmark scenario (each individual opts for their benefit at age 65).

Actuarial Opinion



- To better replicate exact factors, we recommend the use of uniform approximate factor for ages under 65 that would be different than for ages above 65.
- Adjustments should be reviewed periodically to reflect changes in demographic and economic conditions and/or changes in Plan provisions.

